
Actors and Institutions in Water Management Policy:

A case study of the Everglades' Restudy process,

1992-2000

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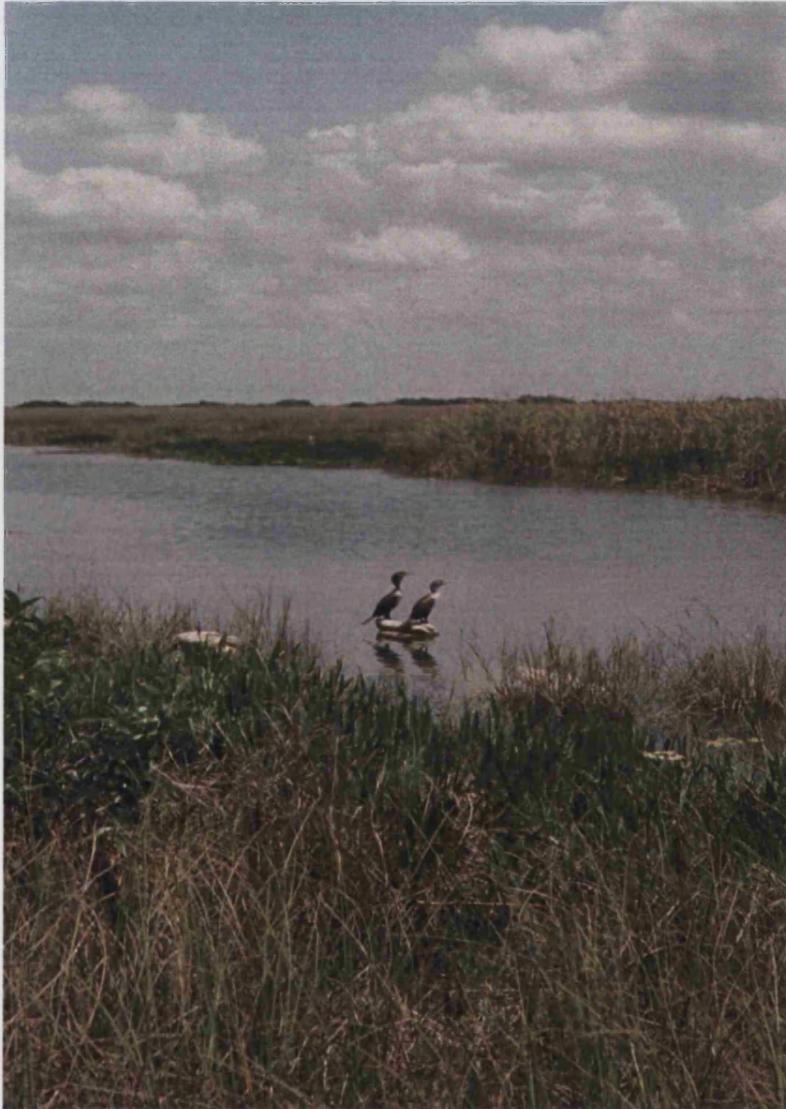
Abstract

The Central and Southern Florida Comprehensive Review Study (Restudy, 1992 – 2000) is recognized for its innovative approach to water management planning. The Restudy is a policy development process for the greater Everglades ecosystem that integrates natural sciences, simulation models, and an unusually broad-based commitment to stakeholder engagement. It led to authorization of the Comprehensive Everglades Restoration Plan (CERP) through the federal Water Resources Development Act of 2000, despite significant conflict between different stakeholder groups. The thesis deploys a grounded theoretical approach to analyze a range of empirical data. These data include transcripts of semi-structured interviews with 77 actors representing a spectrum of stakeholder interests that includes scientists, federal and state level public servants, environmentalists, farmers, Native Americans and local citizens. Interviews were conceptualized through participant observation at various public meetings over the period 1999-2001, and further supported through extensive archival research. The nature and quality of communications between actors, the building of new institutions, and the mobilization of different forms of scientific knowledge throughout the process are identified as critical factors in achieving an agreed outcome. The analysis highlights the profound importance of a small number of actors who had the capability and credibility to move between different policy arenas in brokering the process. The agency of these actors created a number of new institutional structures that enabled stakeholders to achieve a negotiated outcome that fell within the range socio-political acceptability. The CERP met the requirements of nature while accommodating anticipated growth in demand for water supply and flood control with the expansion of the South Florida population. The thesis contributes to a growing literature on questions of environmental governance for sustainability. It offers conclusions that may be relevant in many different geographical contexts where there is currently conflict about how to achieve more equitable allocation of water.

Note on Presentation

This thesis investigates a case study in a US context, featuring analysis of semi-structured interviews with Americans and the review of archival documentation written in American English. Additionally, the thesis highlights the importance of socio-cultural context. Accordingly, to better reflect the particular US context and to maintain the authenticity of the interviews and archival sources this thesis is written in American English. Quotations that draw from literature appearing in UK published materials retain the UK English spelling.

**For Martin –
My perfect partner on the amazing journey of life**



Two cormorants, Everglades National Park.
(Photograph by author).

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Attachments

- Attachment 1: SFWMD Facility and Infrastructure Location Index Map
Attachment 2: Animation of Hydrological Simulation Model

Acronyms and Abbreviations

ADT	Alternative Design Team
AET	Alternative Evaluation Team
ANT	Actor Network Theory
ASRs	Aquifer Storage and Recovery wells
C&SF Project	Central and South Florida Project for Flood Control and Other Purposes
CERP	Comprehensive Everglades Restoration Plan
CEMs	Conceptual Ecological Models
<i>Conceptual Plan</i>	<i>Conceptual Plan for the Restudy</i>
COE/Corps	United States Army Corps of Engineers
CPR	Common Property Resource
CROGEE	Committee on the Restoration of the Greater Everglades Ecosystem
DEP	Florida Department of Environmental Protection
DERM	Miami Dade County Department of Environmental Resources Management
DOI	Department of Interior
EAA	Everglades Agricultural Area
EAC	Environmental Advisory Committee
EFA	Everglades Forever Act
EM	Ecological Modernization
ENP	Everglades National Park
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EvCo	Everglades Coalition

<i>Federal Objectives</i>	<i>Federal Objectives for South Florida Restoration</i>
<i>Final Feasibility Report</i>	<i>Central and Southern Florida Project Comprehensive Review Final Integrated Feasibility Report and Programmatic Environmental Impact Statement</i>
FIU	Florida International University
FOE	Friends of the Everglades
FWCA	Fish and Wildlife Coordination Act
<i>FWCA</i>	<i>Fish and Wildlife Coordination Act Reports</i>
FWS	Fish and Wildlife Service
GCE	Governor's Commission for the Everglades
GCSSF/Commission	Governor's Commission for a Sustainable South Florida
IALE	International Association of Landscape Ecologists
<i>Initial Draft Plan</i>	<i>Central and Southern Florida Project Comprehensive Review Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement</i>
<i>Initial Report</i>	<i>Governor's Commission for a Sustainable South Florida Initial Report</i>
<i>Interim Report</i>	<i>Governor's Commission for a Sustainable South Florida – An Interim Report of the C&SF Project Restudy</i>
<i>LEC-94</i>	<i>Draft Lower East Coast Regional Water Supply Plan Preliminary Options Descriptions</i>
<i>LEC-97</i>	<i>Draft Lower East Coast Regional Water Supply Plan</i>
LULAC	League of United Latin American Citizens
Mod Waters	Modified Water Deliveries
MT	Modeling Team
NAS	National Audubon Society
NEPA	National Environmental Protection Act
NMS	Florida Keys National Marine Sanctuary
NOAA	National Oceanographic Atmospheric Association
NPCA	National Parks Conservation Association
NPS	National Park Service
NSM	Natural System Model
OPEs	Other Project Elements
PMs	Performance Measures
Q/Q/T/D	Quantity/Quality/Timing and Distribution
RECOVER	Restoration, Coordination and Verification Team
REM	Rational Ecological Modernization
Restudy	Central and Southern Florida Project Comprehensive Review Study
SAC	Sanctuary Advisory Council
SCT	Science Coordination Team
SERC	Southeast Environmental Research Center
SFWMD/District	South Florida Water Management District
SSG	Science Sub-Group
STAs	Storm Water Treatment Areas
UNESCO	United Nations Educational, Scientific and Cultural Organization
USGS	United States Geological Survey
WCA	Water Conservation Area
WMM/Model	South Florida Water Management Model
WRDA	Water Resources Development Act
WWF	World Wildlife Fund

Chapter 1: Introduction to the Everglades' Restudy Process and US Water Management

*"The Everglades is a test.
If we pass, we may get to keep the planet."
-Joe Podgor, Friends of the Everglades*

Introduction

Concern about the equitable management of water resources is increasingly ubiquitous. Numerous recent books consider how water resource management issues manifest and are addressed in watersheds around the world (De Villers, 2000; Postel, 1997; Rothfeder, 2001; Shiva, 2002; Simon, 1998; Ward, 2002). While often linked together, water management issues can be broadly categorized as either quantity or quality concerns. This thesis focuses on quantity concerns, specifically investigating *how* to develop a water management policy that equitably allocates water to competing users within a watershed. The greater Everglades ecosystem in Florida, US, is the case study featured in this thesis. The Florida Everglades is a nationally and internationally significant and threatened wetlands landscape. Portions of the greater ecosystem constitute three US National Parks as well as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage site and Ramsar Convention Wetland of International Importance.

An understanding of the value of wetlands in general provides a framework for appreciating the Everglades' significance. Worldwide, wetlands constitute approximately only 6.4% of land area but are essential ecosystems for humanity and nature (Mitsch and Gosselink, 1993:4). Wetlands provide freshwater supply and flood protection to humans, as well as offering habitat for wildlife with a biodiversity of species second only to rainforests. Throughout the world wetlands are threatened by economic development and its by-products, such as pollution. Approximately 56% of total wetlands are found within tropical or sub-tropical regions (Mitsch and Gosselink, 1993:5). The majority of these are located within developing nations that face numerous socio-economic challenges such as political instability and poverty that compel utilization of natural resources for profit. This is coupled with the reality of

limited financial resources for conservation or restoration. The Everglades are globally significant because they are sub-tropical wetlands located within a prosperous, politically stable developed nation. They are located not only within a single nation, but also within an additional political sub-unit, the State of Florida. US Secretary of the Interior Bruce Babbitt identified the Everglades as the “singular, most important, ultimate test of whether we are going to have the capability to do ecosystem restoration” (Cushman, 1994:18). Babbitt and others appropriately identified the Everglades as a test case because if overcoming the challenges of integrating the environment’s need for water into allocation policy proves not possible in the Everglades, then integrated management of threatened wetlands in other parts of the world will also be questioned.

Investigation of the process through which Everglades’ water management policy was developed provides valuable insights on policy-making strategies that integrate allocation of water for environmental and human needs. First, this chapter presents an overview of some challenges of water resource management. The second section discusses the Everglades’ ecosystem and why it offers a compelling case study meriting investigation. Finally, the chapter concludes by outlining the material contained in this thesis.

1.1 Water Resources Management Challenges

The field of water resource management encounters a number of challenges: scale, uncertainty, conflicting interests, policy context, and the role of different types of knowledge, particularly science. This section reviews these challenges and situates water resources management in its broader context of issues entailing environmental governance for sustainability. *Governance* a term deployed to express the broadening of decision-making from the sole remit of government to decision-making processes inclusive of involvement by conflicting interests and different types of knowledge. As Stoker explains, “Governance is ultimately concerned with creating the conditions for ordered rule and collective action. The outputs of governance are not therefore different from those of government. It is rather a matter of difference in processes” (1998:17). The concept of *sustainability* expresses the objective of integrating environmental needs with human socio-economic needs. So, within the issue of water management, governance for sustainability entails development of policy that

equitably allocates water to competing users to meet environmental as well as societal needs.

One of the inherent challenges of water resources management is how to determine what the actual needs are for the environment (Council of Environmental Quality, 1988; Syme, et al., 1999). Sciences such as hydrology and ecology are used to determine parameters for what constitutes an equitable allocation of water for environmental needs. However, a characteristic of water in a natural ecosystem is its variable distribution over time and space where the primary source of water is rainfall (Postel, 1988). As a result of natural variation, questions are raised about how to approach equitable allocation. Should allocation occur on annual, monthly, or daily intervals to reflect varied rainfall? How should excessive rain events or extended drought periods be addressed? There are two types of uncertainty endemic to water management issues: 1) how data that determines the environment's need is collected, and 2) how much water will be available in a specific location at a future time.

Determining equitable allocation of water for human needs also entails uncertainty. One uncertainty about the future human needs for water is accurately predicting population growth rate. An additional uncertainty is whether water use will remain the same or whether other factors such as conservation measures will alter per capita usage (Wolff and Gleick, 2002). For other human needs, like agriculture or industry, regional socio-economic trends are also a source of uncertainty. Will these activities and their demand for water increase or decline over time? Another challenge is that as a result of different human uses for water, the public interest for water allocation is not a monolithic position. Instead, the public interest is composed of a plurality of different, often competing, interests (Ostrom, 1990; Rydin, 2003). The philosophy of governance seeks to incorporate these competing interests in decision-making processes, which presents the difficulty of integrating their input complementary to the policy context of existing government legislation (Berkhout, et al., 2003; Kooiman, 1993; Kooiman and Van Vliet, 1993; Rhodes, 1996; Rosenau, 1997; Thesys, 2002; Vogler and Jordan, 2003). The underlying challenge of governance is *how* to integrate these competing interests effectively into a policy-making process. This, coupled with the challenge of integrating environmental needs, is a primary area of investigation in this thesis.

One strategy for governance is the collaborative management of resources (Conley and Moote, 2003). A collaborative water management approach gathers multiple interests through participatory processes to make collective decisions about

the equitable allocation of water resources. How such collaborative water management occurs in practice is a key question investigated throughout this thesis. Collaborative water management further highlights the challenge of selecting the appropriate spatial scale to undertake decision-making. Scale is important as it reflects not only the extent of interests that need to be included, but also the extent of science required. For issues of water management, the watershed is the preferred spatial scale (McGinnis, et al., 1999; Michaels, 2001; Omernik and Bailey, 1997; Salvesen, 1995a). For example, a hydrological simulation model of a watershed includes the geographic extent of water movement. The input to the model is rainfall as opposed to the need to include the additional uncertainty of flows into the study area from upstream portions of the watershed outside of the study area (Fennema, et al., 1994; Obua, 1996; Sorensen, et al., 1999; Yan, et al., 1999).

Approaching management at the watershed scale is further complicated if the watershed crosses political boundaries. The trans-boundary geography of watersheds occurs on multiple spatial scales such as the Mississippi River crossing multiple state boundaries or, even more complex, trans-national watersheds such as the Nile River, Jordan River, or Tigris and Euphrates watershed. The potential for explosive conflict is clear. For example, Boutros Boutros-Ghali, Egypt's Minister of State for Foreign Affairs stated in 1989 to the US Congress: "The national security of Egypt is in the hands of eight other African countries in the Nile basin" (as quoted in Postel, 1997:73). Recent writings on water management issues highlight examples from across the globe of managing water resources at a watershed scale (Chenoweth, et al., 2002; Corral-Verdugo, et al., 2002; Fall, et al., 2003; Walmsley, 2002). The complexity of trans-national or trans-regional watersheds often means that existing institutions lack the authority to reach legitimate or tenable governance decisions for water. While communication amongst government agencies is necessary, water management debates highlight the benefit of including collaborative strategies such as representational deliberation (Byron and Curtis, 2002; Rhoads, et al., 1999). Within a US context, recent findings have accentuated the merits of approaching water management from a watershed scale (Habron, 2003; Lant, et al., 2001; Serveiss, 2002) and particular advocacy is focused on fostering greater levels of collaboration for more effective watershed based planning strategy (McGinnis, et al., 1999; Michaels, 2001). Greater collaboration offers an approach that theoretically can improve governance of water resources at the watershed scale. Clear challenges exist in the governance of water resources and empirical work is merited that further investigates

how to transfer the theory of collaboration into an effective policy-making process that provides for equitable allocation of water to competing users. Specifically, this thesis seeks to understand *how* a policy-making *process* unfolds through exploration of the Everglades' case study. Following this overview of challenges to the effective governance of water resources, the next section describes the Everglades and the specific set of issues surrounding its water management.

1.2 The Everglades

The Everglades has transformed from a nearly untouched ecosystem to one of the brink of destruction within 125 years. This section summarizes the early history of water management in the Everglades. It discusses how the evolution of water management philosophies and government legislation reflected changing social values and political priorities in the US. Finally, this section presents the initial attempts at localized restoration in portions of the watershed that established the framework from which the Restudy process emerged.

1.2.1 Morphology of the Everglades

The greater Everglades ecosystem includes approximately 18,000 square miles (47,000 square kilometers) stretching from Orlando to Florida Bay and consists of a hydrologically linked mosaic of sawgrass, ridges and sloughs, wet prairies, marl prairies, mangrove swamps, rivers, lakes, uplands, coastal areas and estuaries (Plates 1.1 – 1.8). The pre-drainage landscape (Map 1.1) covered approximately 8.9 million acres and had three essential characteristics: large spatial scale; habitat heterogeneity; and a hydrological pattern of dynamic storage and sheet-flow (McCally, 1999; Ogden and Davis, 1994). Map 1.2 depicts the landscape types of the pre-drainage ecosystem south of Lake Okeechobee. Since 1881, the natural system has been dramatically altered into a landscape divided by canals and levees, greatly diminishing pre-drainage characteristics. Map 1.3 shows the current managed system with canals, water management structures, and major roads. A variety of political jurisdictions fall within the traditional extent of the ecosystem boundary including federal, state, tribal and private land ownership. The South Florida Water Management District (SFWMD) includes 16 counties of local level government (Map 1.4).

Plate 1.1: Sawgrass Landscape¹



Plate 1.2: Ridge and Slough Landscape



¹ Plates 1.1-1.8 are photographs by author.

Plate 1.3: Tree Island Amid Sawgrass



Plate 1.4: Marl Prairie During Dry Season



Plate 1.5: Anhinga on Anhinga Trail, Everglades National Park



Note the slough in foreground, sawgrass and then tree island in the background.

Plate 1.6: Pines and Palms in Upland Portion of Everglades National Park



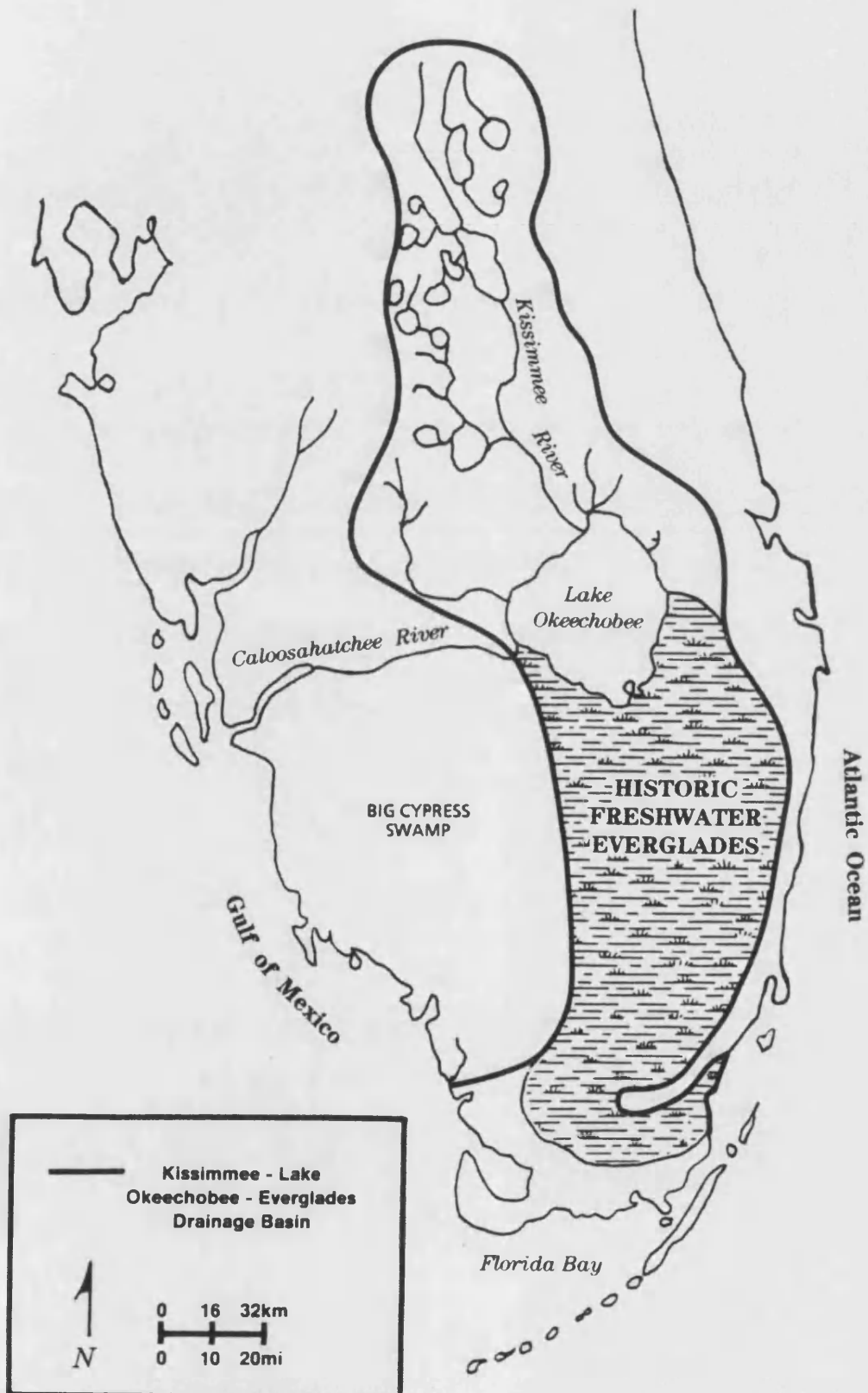
Plate 1.7: Wet Prairie



Plate 1.8: Deep Water Slough at Edge of Mangroves

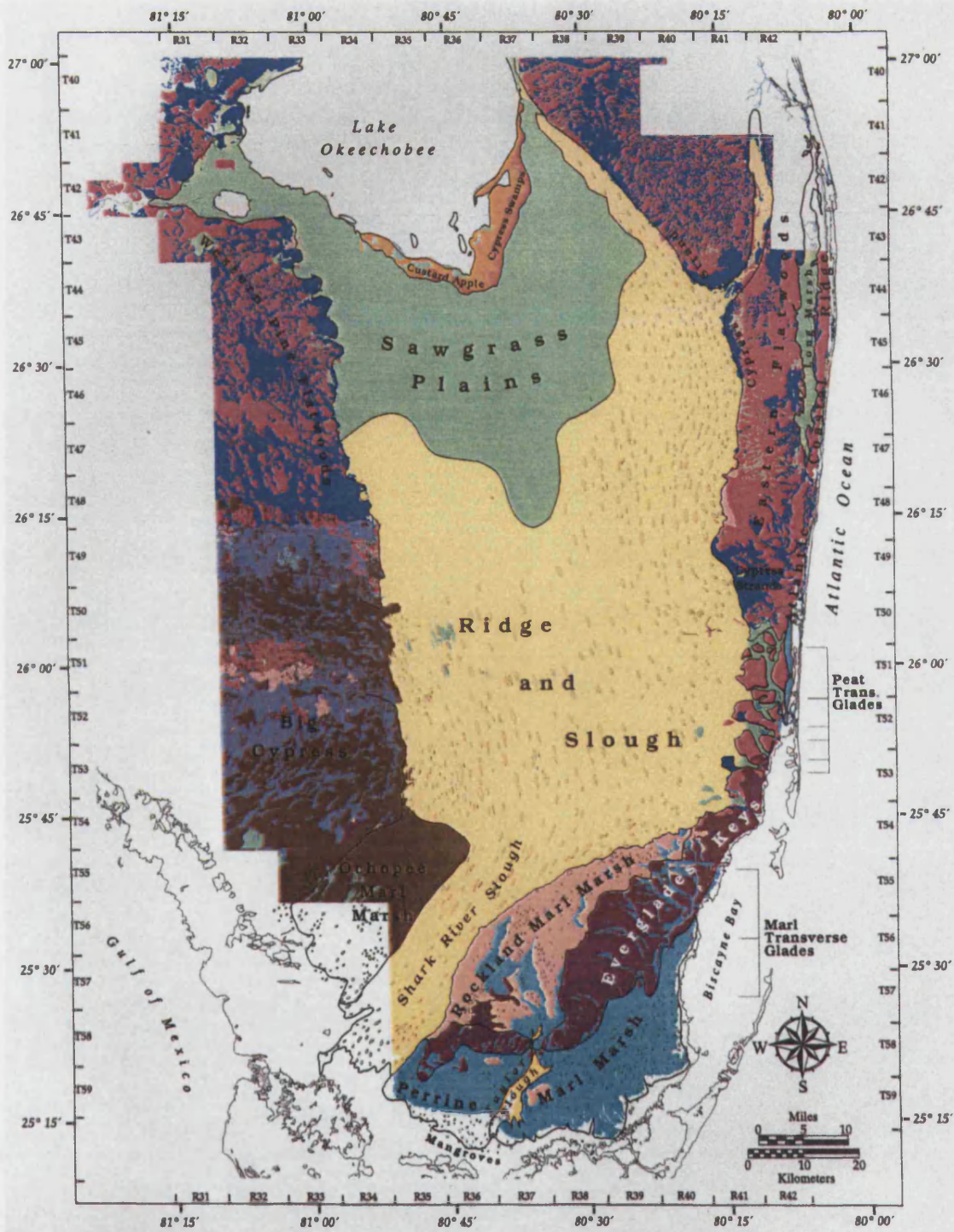


Map 1.1: Extent of Pre-drainage Ecosystem²



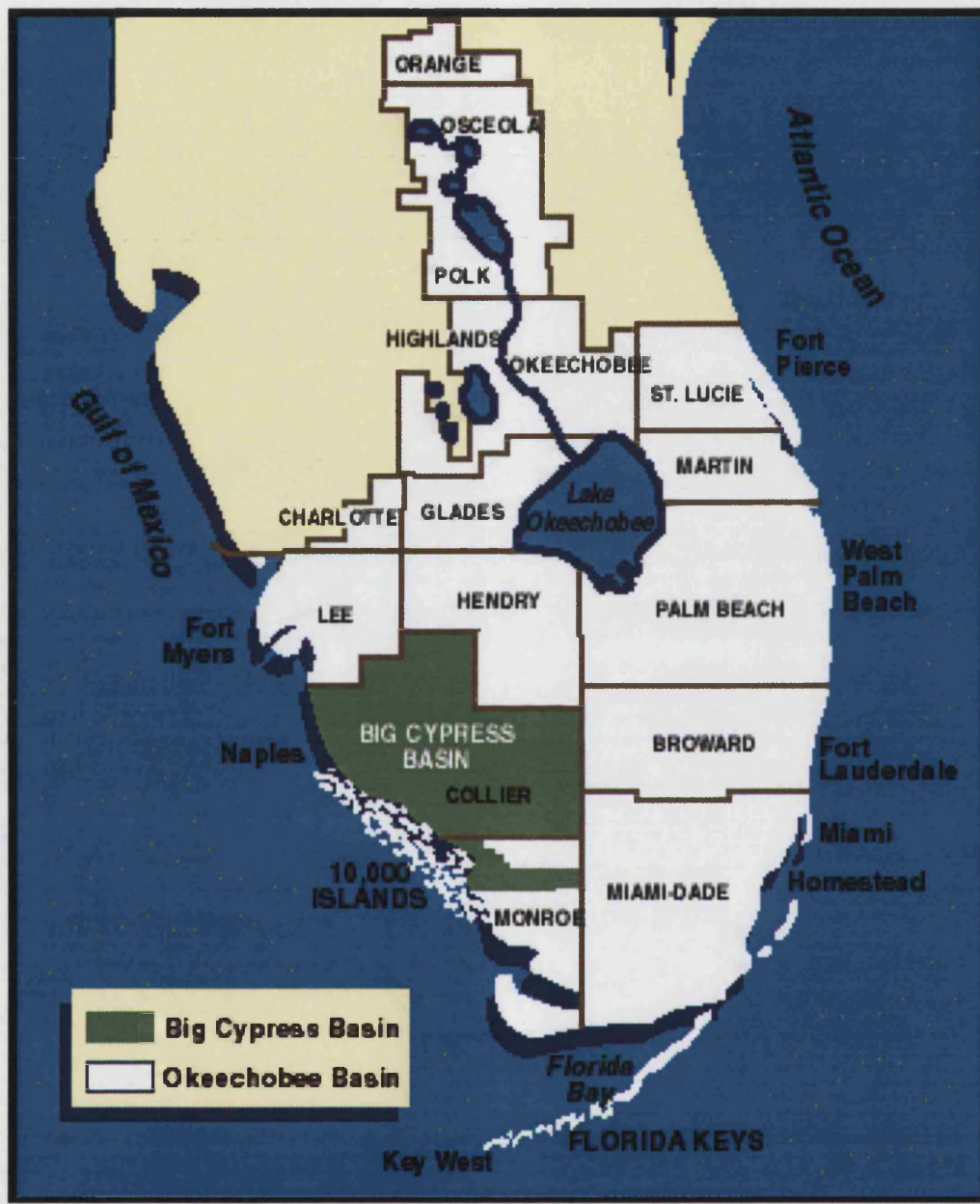
² From Light and Dinneen (1994:52).

Map 1.2: Pre-drainage Landscape Types³



³ Provided by McVoy, interviewee.

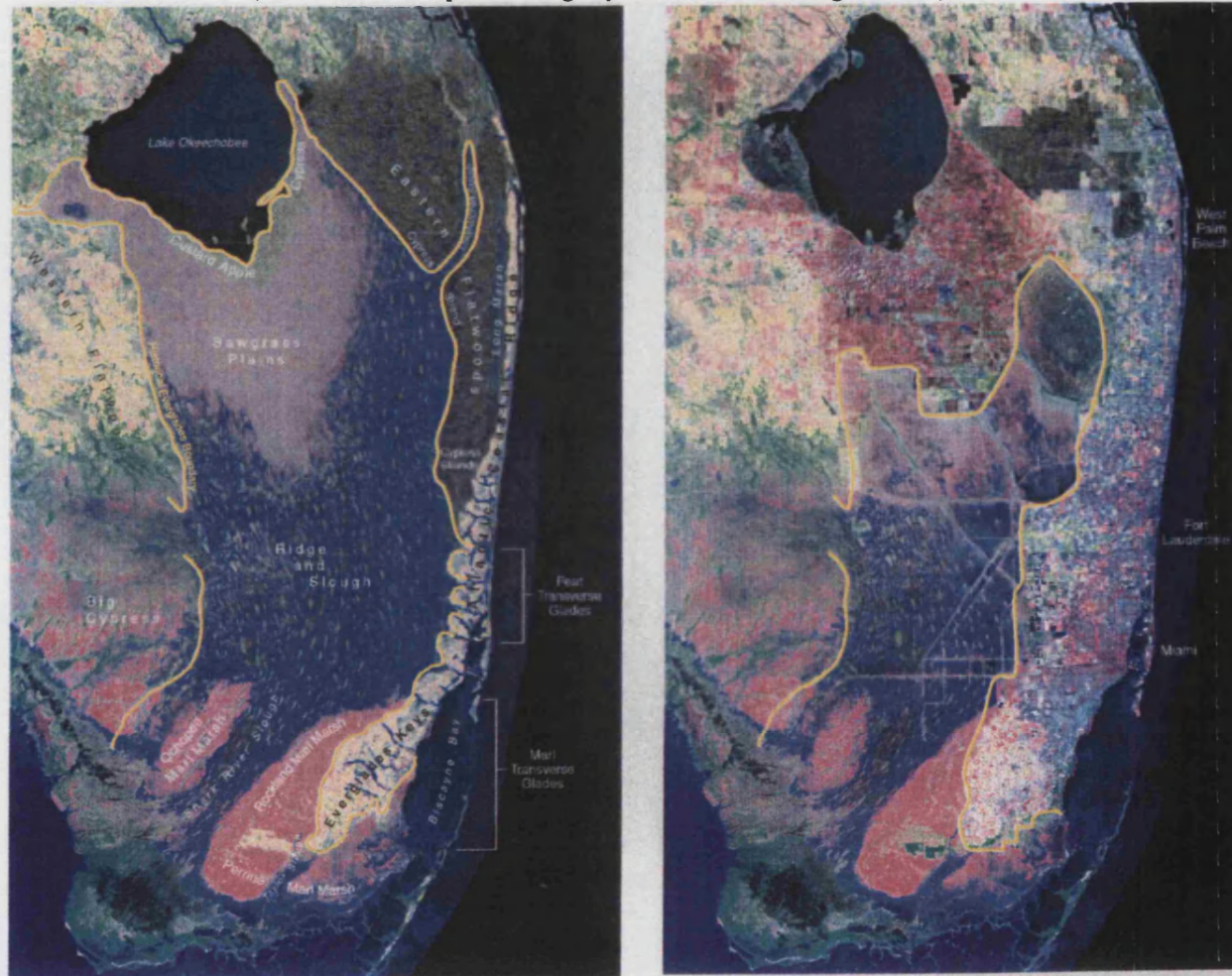
Map 1.4: 16 Local Counties within the SFWMD⁵



As depicted by Plate 1.9, anthropomorphic change to the ecosystem through water management structures has affected the functional feature of dynamic storage and sheet flow south of Lake Okeechobee. Habitat heterogeneity and spatial extent are greatly diminished and today only approximately 50% of the original natural system remains.

⁵ Available: http://www.sfwmd.gov/histo/3_counties.html [March 16, 2004].

Plate 1.9: Reconstructed and Actual Satellite Image of the Everglades⁶
(left: estimate of pre-drainage system circa 1850; right: 1994)



⁶ Provided by Obeysekera, interviewee.

1.2.2 Hydrological Management Reflects Social Values

This sub-section summarizes the early history of water management in the Everglades. Changing approaches to hydrological management can be directly linked to progressive transformation of social values towards water resources and wetlands landscapes. The history of hydrological management in South Florida clearly demonstrates how social values have changed over time. This sub-section considers how evolution of water management philosophies and government legislation reflected changing social values and political priorities in the US. The sub-section begins by discussing the concept of 'Manifest Destiny' with the expressed objective of draining wetlands for agriculture. Discussed next are the earliest attempts to approach conservation measures and flood control. Finally, the shift in social values and related legislation to protect wetlands and water resources is discussed.

Hydrology and 'Manifest Destiny'

"From 1620 to the middle of the nineteenth century, the dominant and virtually unchallenged discourse that guided Americans' relationship with the natural environment was the discourse of Manifest Destiny" (Brulle, 2000:115). Manifest Destiny is a philosophy of economic progress based on harvesting abundant natural resources and settling open spaces that implicitly meant concern for future availability or quality of natural resources did not even merit contemplation (Gedicks, 1993; Marcus, 1992). When considered, natural resources were understood as God-granted gifts to promote human settlement across the North American continent. Natural resources could be freely used for human benefit without concern for shortages or the interrelationship to other resources or users. Hence, Manifest Destiny "provides both an economic and moral rationale for exploiting the natural environment" (Norton, 1991:76-77). For example, O'Sullivan stated: "Our manifest destiny is to overspread the continent allotted by Providence for the free development of our yearly multiplying millions" (1845, as quoted in Brulle, 2000:115).

Hence, when Florida became a State in 1845 the Everglades were seen as a worthless swamp, an obstacle to conquer. Progress meant pursuing the objective of converting wetlands to productive agriculture. For example, the first federal evaluation of Florida by T. Buckingham Smith in 1848 reported:

"The Ever Glades are now suitable only for the haunt of noxious vermin, or the resort of pestilent reptiles. The statesman whose exertions shall cause the millions of acres they contain, now worse

than worthless, to teem with products of agricultural industry...will merit a high place in public favor, not only with his own generation, but with posterity. He will have created a state!" (as appearing in Snyder and Davidson, 1994:87)

Florida's statehood occurred contemporaneously with passage of the Swamplands Act of 1850, which authorized the transfer of twenty million acres to state ownership with Florida agreeing to reclaim land for settlement and agriculture (Light and Dineen, 1994). The objective of reclamation, establishing human control over natural hydrology, was undertaken without consideration for ecological ramifications. Florida is not unique in this regard; large-scale drainage of wetlands occurred across the Midwest as a dominant settlement practice of westward migration (Prince, 1997).

Vileisis describes wetlands as a "landscape on the periphery" (1997:2) that has long been misunderstood. She connected social understandings of wetlands to their consequent treatment stating that the "most revealing theme is how Americans have long regarded wetlands as private property just like all other land. Without a clear hydrologic and ecologic understanding of these lands, early settlers saw no reason to treat them differently" (1997:5). While different estimates exist for pre-settlement wetland area (Cowardin, et al., 1979; Dahl, 1990; Shaw and Fredine, 1956), approximately 53% of wetlands in the United States were lost from 1780s -1980s (Dahl, 1990; Mitsch and Gosselink, 1993). From 1880s – 1980s Florida experienced a 46% decrease in wetland area (Mitsch and Gosselink, 1993). Hence, drainage of the Everglades was concurrent with US values and water management policies.

Reflective of the collective will of the American people to fulfill the philosophy of Manifest Destiny, by the end of the 19th century initial attempts were made to drain the Everglades for conversion to agriculture. From 1881 – 1893, developer Hamilton Disston made the first attempt at drainage in the Kissimmee River and Lake Okeechobee area. Drainage was more difficult than anticipated and an organized effort by the State of Florida was not undertaken until 1905 under the leadership of Governor Napoleon Bonaparte Broward. Broward established the Everglades Drainage District in 1907, and by 1917 the four primary arteries totaling 236 miles of canals were in place: West Palm Beach, Hillsboro, North New River and Miami. By 1931 there were an additional 202 miles of canals. The Mississippi River and Tributaries Act of 1928 charged the federal government with responsibility of flood control and resulted in the first *federal* involvement to develop flood protection along Lake Okeechobee by the Army Corps of Engineers (COE). During the Great Depression and World War II drainage works stopped and the Everglades Drainage

District declared bankruptcy (Light and Dineen, 1994). To fulfill the objectives of Manifest Destiny, Everglades' drainage moved from an individual initiative to a state objective to finally become a federal responsibility. Federal involvement allowed subsequent stages of drainage to be more extensive, organized and effective.

Comprehensive Drainage in Tandem with Conservation

Severe hurricanes in 1947 and 1948 prompted demand for the COE to develop a regional water management plan. In 1948 Congress authorized the Central & Southern Florida Project for Flood Control and Other Purposes (C&SF Project). The primary objective shifted from drainage to the provision of flood control. Flood control was achieved using channel improvements, levees, pumps and water storage areas. The modified focus provided the nomenclature for the newly formed Central & Southern Florida Flood Control District, which was the local sponsor responsible for operations of the C&SF Project, designed and implemented by the COE. The authority responsible for water management in South Florida changed names reflective of a shift in the prioritization of the challenges presented by wetlands to societal development. Called the "Drainage District" pre-1948, the name identified the primary societal management concern at the time for the Everglades. Post-1948 the title of the water management agency was changed to the "Flood Control District". Interestingly, this name was again derived from what was seen as the largest water management challenge and continued to reflect society's failure to recognize the Everglades' benefits to either humans or nature.

The first recognition of the Everglades as a valuable ecosystem was not as a source of freshwater or natural flood protection, but rather as an important habitat for an array of wading birds. In a parallel process entirely disconnected from the water management objectives of large-scale drainage and flood control, Everglades National Park (ENP) was established in 1947, following Congressional authorization in 1934. Unlike earlier National Parks whose existence was a result of their outstanding scenery, ENP was championed as worthy of National Park designation because it was habitat for an exceptional array of wildlife. As President Harry Truman stated at ENP's dedication, the Everglades "shall protect hundreds of all kinds of wildlife which might otherwise soon be extinct" (Vileisis, 1997:191). The dichotomy of separate policies of conservation and comprehensive drainage within the same region – abundantly apparent to us today – was not understood in the 1940s.

The hydrological connectivity of the system as well as the link between hydrology (water quantity, timing and distribution) and ecology (wildlife and its

habitat) were not realized.

Not only did public works agencies fail to understand the hydrology of the area for their drainage and flood-control purposes, but park planners also misunderstood the Everglade's need for a natural, sheet-like water supply. Moreover, no government agencies recognized the consequences of their own projects on other agencies' projects. The result of these divergent policies would be decades of conflict and wetland degradation (Vileisis, 1997:192-193).

Hence, Vileisis highlighted two critical problems with early water management projects:

- 1) conflicting management policies of governance for the same ecosystem; and,
- 2) lack of communication amongst agencies during individual project implementation.

Overcoming these two critical shortcomings became fundamental objectives of the Restudy process. While logical today, these two objectives were counter-intuitive to the established institutional structures of government agencies in 1948.

The complete disconnect between water management and ENP protection is apparent by considering effects of the C&SF Project implementation. Refer to Attachment 1 for location of water management structures discussed below. In the first stage of the C&SF Project (1952-1954) the COE constructed perimeter levees between the Everglades and the higher eastern coastal ridge. The resulting of lower water levels allowed for settlement with enhanced flood protection, but reduced water flows to ENP. From 1954-1959 the Everglades Agricultural Area (EAA) received improved flood protection and water supply from levees, pumps and the creation of Water Conservation Areas (WCA) 1 and 2. From 1960-1963 the system was further compartmentalized into WCA-2A, 2B, 3A and 3B as a result of levees and greater human controls of water distribution through pumping. For the first time water flows into ENP were directly controlled as a result of a levee (L-29) along the north side of the Tamiami Trail that transected the Everglades, and four pump stations (S-12A, 12B, 12C, 12D). L-29 and S-12 structures changed water movement into ENP from sheet-flow to a system dependent on human control.

The first multi-purpose authorization was the ENP-South Dade Conveyance System (1968). It was intended to improve water flows to ENP and meet the development needs of water supply for the growing urban area and flood protection for farmers. As a result controversial modifications were made to the C-111 basin through changes to levees and installation of pumps. L-67C and the L-67 Extension canals were designed to convey water from WCA-3 to ENP. Attempts to further

remedy the restricted water flow into the Park were addressed in 1970 when Congress established minimum flow volume into the Park with varying monthly discharges. By 1973 the C&SF Project was complete, though additional system modifications were made for water supply objectives through 1979 (Light and Dineen, 1994). Flood control took clear precedence over conservation as a result of lack of understanding of the connectivity of an ecosystem where the very essence is water.

Legislation and Events of the US Environmental Movement

As the C&SF Project neared completion social values in the US evolved to incorporate concern for the natural environment. Rachel Carson's Silent Spring (1962) presented scientific evidence to a popular audience of societal ability to wreak havoc on nature through improper management and catalyzed the movement of placing higher value on protection of the natural environment, including water resources. Ultimately, in response to scientific evidence and public interest during the late 1960s and early 1970s, key environmental protection legislation was instituted at a federal level. Resultant policy was reflective of changing societal values. However, from a practical perspective, the process of federal environmental protection policy was separate but parallel to the implementation of existing projects. Hence, the 1948 C&SF Project authorization, with minor modifications, continued to govern its implementation in the 1960s.

To understand specific events in the Everglades it is crucial first to explore the creation of federal environmental protection legislation. In the late 1960s and early 1970s a number of core laws were established that provided protection to the environment and are applicable to water management in wetlands. These laws include the National Environmental Protection Act (NEPA) (1969), the Clean Water Act (1972), and the Endangered Species Act (ESA) (1973). NEPA is the foundation of environmental protection in the United States. While previously the COE evaluations only considered the economic feasibility of a project, NEPA expanded feasibility to include environmental concerns and public interest review (Vileisis, 1997). Interestingly, the COE policy of incorporating environmental and social values into evaluations began *prior* to NEPA as a result of pressure from the public and the Fish and Wildlife Service (FWS) (Studt and Sokolove, 1996). Therefore, NEPA formalized the COE's informal policy of considering potential adverse effects such as habitat destruction and pollution. This demonstrates how modifications to environmental policies reflect changes in societal values.

In 1972, the Federal Water Pollution Act, commonly known as the Clean

Water Act, expanded the COE jurisdiction to wetlands. The Clean Water Act did not definitively identify the extent of the US waters and initially the Corps and Environmental Protection Agency (EPA) applied a narrow interpretation that only included the traditional realm of navigable waters. The definition broadened as a result of a successful lawsuit by the National Resources Defense Council in 1975 to include “all freshwater wetlands adjacent or connected to other waters protected” (Studt and Sokolove, 1996:38). This definition was further broadened in 1977 to include wetlands not connected to other waters. The goal of the Clean Water Act was to restore and maintain the chemical and physical integrity of US waters. Crucially for wetlands, Section 404(a) requires a permit from the COE before dredged material can be discharged into wetlands.⁷ To evaluate permit applications the COE relies on both public interest review and EPA guidelines under Section 404(b)(1) of the Clean Water Act. The 404(b)(1) guidelines state that “no discharge or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic system”.

The 1993 passage of the Excavation Rule expanded the concept of discharge and closed legal loopholes that had continued to allow destruction of wetlands. Prior to the Excavation Rule ditches or large holes that drained the wetlands could be dug as long as none of the removed material was re-deposited in the wetland. Additionally, the Excavation Rule takes into account actions not only in wetlands, but also around wetlands so that indirect destruction is considered. Hence, the Excavation Rule broadens the COE Section 404 permitting process evaluations to consider the environmental impacts of all activities in or around wetlands to determine if wetlands are damaged or destroyed. During this time a number of federal acts expanded involvement of wetland policy management to other federal agencies. For example, the Fish and Wildlife Coordination Act (FWCA) was originally enacted in 1934 and strengthened by amendments in 1946, 1958, 1978 and 1995 (Studt and Sokolove, 1996). FWCA applies to congressionally authorized and federally permitted water development projects, such as Section 404 permits, and required the Corps to consult with the Fish and Wildlife Service (FWS) to avoid habitat loss. Also passed in 1972, the Coastal Zone Management Act provides financial incentives to states for coastal management that includes protection of coastal wetlands. The 1973 ESA includes the creation of habitat conservation plans to create solutions that balance development

⁷ However, not all wetland impacts require a Section 404 permit. Section 404(e) authorizes the Corps to issue general permits for activities in wetlands that are similar and will only cause minimal adverse effect to the environment (Studt and Sokolove, 1996).

with maintaining integrity of endangered species' habitat.

In 1977 President Carter issued the Executive Order on Wetlands (EO 11990), which Vileisis called "a milestone in conservation and the highest administrative action ever taken to protect wetlands" (1997:252). It required federal agencies to consider the protection of wetlands: "Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities" (EO 11990). EO 11990 was noteworthy because it provided agencies with a unified statement on wetlands, whereas previously agencies had conflicting mandates. For example, the COE, Soil Conservation Service and the Bureau of Land Reclamation had a policy of drainage while the FWS and Department of Interior (DOI) had a policy of wetland protection (Kusler and Brooks, 1987). The Food Security Act of 1985, amended in 1990, was commonly known as the "Swampbuster Act" because it removed incentives for the conversion of wetlands to farmland. The Food Security Act drew the United States Department of Agriculture into the wetland policy arena as farmers who violated the "Swampbuster Act" could lose substantial Department of Agriculture subsidies until converted wetlands were restored (Vileisis, 1997).

Despite EO 11990, different agencies administering policies that directly and indirectly affected US wetlands followed separate management models. Hence, individual wetlands often suffered from management conflicts. To resolve discrepancies in management procedures in 1989 the COE, EPA, FWS and Soil Conservation Service jointly issued the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands." This manual came under great criticism by public interests because it expanded the COE jurisdiction. In response, in 1991 the White House proposed revisions of the joint manual that would have reduced the scope of the COE's original jurisdiction; these suggestions also were highly criticized. In 1992 the COE was legally prevented from doing wetland identifications and management with the 1989 manual and as a result the COE uses the 1987 manual (Vileisis, 1997). The critical point that this demonstrates is even the question of identification of wetlands – the necessary precursor to protection – has been long been a point of debate.

In 1987 a National Wetlands Policy Forum investigated wetland management in the US and provided the recommendation "to achieve no overall net loss of the nation's remaining wetlands base and to create and restore wetlands." President

George Bush embraced this recommendation and made the objective of “no net loss of wetlands” a unified federal agency goal and raised awareness of wetlands to the public. The word “net” was key to implementation of wetland management policy because if wetland loss was unavoidable then mitigation procedures were followed. Mitigation was controlled by the November 15, 1989 EPA and Corps Memorandum of Agreement. The mitigation Memorandum of Agreement took effect on February 7, 1990 and formalized the sequencing requirement of first: no loss to a wetland habitat. Secondly, on-site mitigation selected over off-site mitigation. Finally, in-kind mitigation preferred over out-of-kind mitigation (Studt and Sokolove, 1996). While wetlands have undergone a significant transformation in status through environmental protection laws, Mitsch and Gosselink emphasized: “There is no specific national wetland law...[and they] have been managed under regulations related to both land use and water quality” (1993:565). As a result, there is no single agency responsible for wetlands management and wetlands cannot be clearly managed as either aquatic or terrestrial ecosystems. Therefore, from a policy context wetlands present distinct management challenges that necessitate inter-agency coordination and collaboration amongst scientists from a range of specialties.

The creation of new government laws and policies for protecting water resources reflected a progressive change in society’s values of wetlands. As scientific knowledge about the direct and indirect benefits of wetlands increased, there was slowly greater recognition by the wider public of wetlands as a valuable landscape. Wetland benefits include: better quality and quantity of the water supply, flood protection, erosion reduction, groundwater aquifer recharge, prevention of salt-water intrusion, nutrient processing, pollutant retention, plant life providing oxygen to the atmosphere, wildlife habitat, fishing, and recreation. Placing a “value” on a wetland is problematic because benefits imply anthropocentric terms. A body of literature exists where economists have sought to quantify the value of nature in monetary terms (Costanza, et al., 1997; Costanza, et al., 1998).

It is not within the scope of this thesis to assign or evaluate economic values for the Everglades. Instead, the concept of “value” is considered in socio-political terms such as the priorities, concerns and expectations of different stakeholder groups.⁸ The greater Everglades ecosystem provides numerous benefits to South Florida including: water supply for a population of 6 million people and extensive

⁸ For example, while the National Audubon Society and Sierra Club have a similar objective of restoring the Everglades, they have different modus operandi on how to attain that objective based on their underlying values and beliefs.

agriculture, flood protection, water storage, groundwater aquifer recharge, prevention of salt-water intrusion, pollutant retention, nutrient processing, freshwater supply to estuaries, fishing, wildlife habitat⁹, the cultural home of two Native American Tribes and recreation. While the Everglades are perceived as spatially distant from water users the reality is that the quality and quantity of water for human use in South Florida is directly related to the quantity and quality of the water in the Everglades. Without the Everglades to provide groundwater seepage the aquifer would be contaminated by saltwater intrusion and South Florida would effectively be a desert.

1.3 Everglades Offers Compelling Case Study

The preceding overview provides an understanding of the societal context and legislative framework from which the Restudy process emerged. Federal legislation of the Water Resources Development Act (WRDA) 1992 introduced the idea of restoring the greater Everglades' watershed. WRDA 1992 instructed the COE and the local sponsor, the South Florida Water Management District (SFWMD), to determine if a restoration plan was necessary and feasible. WRDA 1996 authorized development of a comprehensive plan to restore the South Florida ecosystem as the primary objective, while also continuing to meet the objectives of water supply and flood control in the C&SF Project. The process of revising the C&SF Project to be inclusive of ecosystem restoration as well as human needs was known as the Central and Southern Florida Project Comprehensive Review Study (Restudy). WRDA 1996 stipulated a July 1, 1999 submission deadline to Congress. Once the Restudy was submitted to Congress the result was known as the Comprehensive Everglades Restoration Plan (CERP), which was authorized by WRDA 2000. This thesis critically analyzes the Restudy process (1992 – 2000). The Restudy process had the multi-purpose planning objectives of Everglades' restoration and meeting the anticipated increase in the human needs of water supply and flood protection for a growing population living in the greater Everglades watershed.

The scope of the thesis from WRDA 1992 through WRDA 2000 established a temporal framework delineated by key federal legislation. The thesis investigates *how* a policy-making *process* occurred. This thesis considers the roles of both institutions and actors in the creation of the multi-purpose water management plan. Applying a

⁹ Including 16 endangered species.

temporal framework whereby WRDA 2000 was the terminus of the water management policy-making process allowed the process to be considered a “success” because CERP was authorized in WRDA 2000. Hence, the Restudy process is identified as “successful” measured by achieving the legislative transition from plan creation to implementation. An investigation of the actual process of policy creation within the framework of the authorizing legislation has the objective of identifying key factors to success as well as distinct challenges to collaborative water management. The Restudy offers a case study to investigate a process of collaborative water management for governance of water resources. Identifying key factors to its success may offer lessons that can be applied to other multi-purpose water management plans. In addition, an understanding of the process that led to the passage of WRDA 2000 and the way that challenging conflicts were managed to create CERP may be beneficial towards resolving future conflict during the implementation of CERP.

The Restudy process offers a compelling case study for various reasons. Firstly, the greater Everglades ecosystem is relevant on a range of spatial scales. At the local and regional scale the ecosystem’s fresh water faces demands from a range of users: a growing population, agriculture and the environment. The South Florida watershed highlights intense conflict between human and environmental needs for limited water resources. Secondly, the Restudy is an example of an environmental governance process that relies on science and an unusually strong commitment to meaningful involvement of competing stakeholder groups. The regional events in the greater Everglades watershed are relevant to debates about sustainability and equitable allocation of water resources in a US national context. Additionally, the presence of nationally and internationally protected lands as part of the watershed coupled with one of the fastest growing US regional population increases the stakes of the water management debate and focuses national and international attention on the Everglades watershed. Finally, this thesis’s empirical research occurred ongoing with the Restudy process, which offered reflective insights from stakeholders contemporary with the process.

1.4 Thesis Structure

This chapter has presented challenges to water management and reasons why

the Everglades offer an interesting case study to investigate questions of governance for sustainability. The societal value of wetlands in the US has experienced a substantial shift in recent history. This chapter has framed the socio-political context from which the Restudy process emerged by considering the movement away from the philosophy of Manifest Destiny towards a society where wetlands are increasingly valued both for societal welfare and wildlife habitat. This thesis is interested in evaluating how a policy-making process for a multi-purpose water management plan unfolds in a highly conflicted watershed with many competing stakeholder groups. At its core, the investigation of the Restudy process in this thesis is concerned with collaborative management as a strategy of governance for sustainable and equitable water management.

Chapter 2 embeds the Everglades case study in the literature of environmental governance. Firstly, the chapter defines environmental governance and discusses the different discourses that together constitute the governance literature – particularly focusing on sustainable development and environmental justice. Giddens’ structuration theory (1984) is presented as a conceptual approach towards understanding the relationships between actors’ agency and institutions in governance. Bryson and Crosby offer a practical approach of a “shared-power world” (1992, 1993) where both the formal and informal communications (Healey, 1997) in different social settings shape the unfolding of a decision-making process. Rather than a monolithic position, public interest in a shared-power world consists of many competing interests. Collaborative management, which features decision-making through participatory forums, is explored as a strategy for sustainable and equitable environmental governance. Collaborative management recognizes the power dependence of actors and institutions mobilized through a “governance perspective” (Stoker, 1998). The chapter considers if participatory forums lead to shared understandings that result in enlightened solutions for public welfare, or rather if interests engage in such forums as a strategic compromise to maximize individual benefit. Two features of collaborative management include: 1) the importance of communication; and, 2) the integration of scientific evidence to both identify problems and determine potential solution sets. Application of collaborative management as a strategy for environmental governance is considered within the specific US socio-cultural context.

Chapter 3 discusses the methodological design deployed to investigate questions exploring the use of collaborative management as a strategy for

environmental governance in the Florida Everglades. The chapter discusses methodological approaches to evaluation of policy processes and considers the challenges of investigating an ongoing process and the specific case study of the Restudy. The chapter argues for approaching questions of CPR at the appropriate spatial scale, which in the case of Everglades' water management is the watershed scale. The thesis's central purpose of exploring how governance of a policy-making process unfolds requires a qualitative research design that investigates the roles of both actors and institutions. The chapter explains the triangulated approach of archival investigations, participant observation and semi-structured interviews. The chapter describes stakeholder selection methodology developed to identify stakeholder groups and the "follow-the-actor" methodology deployed to identify interviewees. Finally, the chapter discusses the use of Atlas.ti to analyze the data using a grounded theory approach.

Chapter 4 is the first of three empirical chapters and focuses on presenting and evaluating the events of the unfolding of the Restudy process (1992-2000). Analysis seeks to evaluate how governance of the Restudy process mobilized science and competing stakeholder groups to produce a scientifically robust plan within the range of socio-political acceptability determined by representatives from key interests. The chapter traces the transformations of institutions and actors, specifically focusing on the creation and evolution of organizations through the building of new institutions. Discussion explores the necessity of the different organizations to the governance of the process and also follows the growing acceptance of key ideas that emerged from the earliest stages of the Restudy. Through integration of data from interviewees the role of informal communications is considered, as well as the formal communications appearing in archival analysis of extensive documentation. Overall, this chapter seeks to tell the story of how collaborative management as a strategy for governance occurred throughout the Restudy process.

Chapter 5 builds from Chapter 4's investigation of the role of institutions in the development of key organizations in the Restudy process to a focus on the role of actors' agency. Firstly, actors are classified as "insiders" and "outsiders", based on their membership in organizations. Following classification, actors' membership in organizations is traced through the different stages of the Restudy process, following the evolution of organizations presented in Chapter 4. The networks of actors are explored by considering the non-prompted mention by interviewees of other individuals. Then the chapter turns to a consideration of four case studies to illustrate

the differential experiences of insiders and outsiders during the Restudy process. Finally, Chapter 5 explores the effectiveness and fairness of the Restudy process from the perspective of different actors. This chapter highlights the importance of both formal and informal communications in the governance of the Restudy.

Chapter 6 investigates the role of powerful scientific knowledges in the Restudy process, exploring questions about what and who determines the roles and “soundness” of science. The chapter begins by identifying the scientific inputs, processes, outputs and outcomes. The core of this chapter then seeks to evaluate the roles played by different types of science and scientists within the Restudy process. Quantitative and social sciences together shape the Restudy process, its output and future implementation. Sections of Chapter 6 discuss the roles of hydrology, ecology, hydrological simulation models and adaptive management. The rationale for excluding water quality as a primary focus is considered as is the role of flow in the ecosystem. The chapter draws on issues of power and uncertainty and considers if science was the main driver of the Restudy process or if other factors expedited the authorization of CERP in WRDA 2000.

Chapter 7 concludes the thesis by discussing the key findings and original contributions to knowledge of this thesis. The chapter begins by moving away from the specific themes featured in Chapters 4 (institutions), Chapter 5 (actors’ agency), and Chapter 6 (role of science) to consider the relevance of the wider US socio-political context in which the Restudy process unfolded. From this wider context, the chapter discusses the key findings to the research questions about the roles of institutions, actors and different types of knowledge. The implications of key findings are explored from their theoretical, methodological and practical policy contributions. Finally, the thesis concludes by considering to what extent collaborative management offers a strategy for genuine consensus-building or is rather pragmatic, negotiated compromise.

Chapter 2: Theory and Practical Approach to Environmental Governance for Collaborative Water Management

“It is vital, when encountering a serious problem, not merely to try to solve the problem in itself but to confront and transform the processes that gave rise to the problem in the first place.”

-David Harvey, 1973 (as quoted in Harvey, 1999:184).

Introduction

The focus of this chapter is to discuss environmental governance. While Chapter 1 frames this thesis in the US national policy context, Chapter 2 positions the thesis within the academic literature. At its core, this thesis is a case study that investigates environmental governance in issues of water management. Chapter 2 embeds the case study in the literature of environmental governance. Firstly, the chapter defines environmental governance and discusses different discourses of governance. Secondly, the chapter considers the dynamics of actors and institutions in a practical approach to governance. Finally, the chapter discusses collaborative management of water resources.

2.1 Understanding Governance

Governance is an “organizing framework” that represents “a paradigm shift” in understanding policy creation and implementation (Judge, et al., 1995:3). Thesys provides a cohesive definition of governance as:

The sum of the many ways interacting individuals and institutions, public and private, manage their common affairs; a continuing process through which conflicting or diverse interests may be accommodated and a co-operative action may be taken: it includes formal and informal arrangements that people and institutions either have agreed to or perceive, to be in their interests (Thesys, 2002:6).¹⁰

¹⁰ Definition originally put forward by Commission on Global Governance in Our Global Neighborhood (1995). This definition was later adopted by Bail (1996) on behalf of the EEC.

Hence, governance has the foundational components of including actors and institutions that extend beyond the traditional confines of government and interact to determine management of common affairs. The dynamics of relationships between actors and institutions provides a grounding focus for investigation of governance. Also featuring prominently in governance are debates about the roles of two key themes – communication and science – woven throughout this chapter and thesis. The applicability of this definition to multiple spatial scales demonstrates environmental governance as a theory with relevant linkages at global, national, regional and local scales.

To express the breadth of principles that governance incorporates Stoker offers the phrase “governance perspective” (1998:19). Rhodes presents four features pertinent to understanding a governance perspective’s purview:

- 1) Interdependence between organizations: governance is broader than government, covering non-state actors with shifting boundaries between public, private and voluntary sectors in a series of networks;
- 2) Continuing interactions between and within these networks, caused by the need to exchange resources and negotiate shared purposes;
- 3) Game-like interactions, rooted in familiarity, trust and shared commitments to legitimacy;
- 4) Significant autonomy from the state, which seeks to steer the networks to achieve its policy goals, but cannot fully control them (1996:660).

Hence, formal government institutions experience “tension between the wish for authoritative action and dependence on the compliance and action of others” (Stoker, 1998:22).

Stoker’s work emphasizes some challenges raised by governance. He offers five propositions on governance and then presents critical issues to the governance perspective as a result of the dissociation of the complex reality of decision-making and the exercise of normative framing. Stoker’s five propositions on governance are:

- 1) Governance refers to a set of institutions and actors that are drawn from but also beyond government.
- 2) Governance identifies the blurring of boundaries and responsibilities for tackling social and economic issues.
- 3) Governance identifies the power dependence involved in the relationships between institutions involved in collective action.
- 4) Governance is about autonomous self-governing networks of actors.

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- 5) Governance recognizes the capacity to get things done which does not rest on the power of government to command or use its authority. It sees government as able to use new tools and techniques to steer and guide (1998:18).

While these propositions frame a positive norm for decision-making, they also illuminate ambiguity of responsibilities, which can result in lack of accountability. Stoker concludes that a governance perspective, with greater rights for individuals, also requires acceptance of heightened social responsibility.

Perhaps most interesting about Stoker's analysis are implications of power dependence. Institutions and actors committed to collective action of a governance perspective are reliant on the actions of other institutions and actors. As Kooiman describes, "These interactions are based on the recognition of interdependencies. No single actor, public or private, has all knowledge and information required to solve complex, dynamic and diversified problems...or sufficient potential to dominate unilaterally in a particular governing model" (1993:4). To achieve collective action goals requires exchange of resources, such as knowledge, personnel and funding and is also highly dependent on the social context and rules of negotiation. Hence, institutions and actors are both central building blocks of a governance perspective.

Governance acknowledges that conceiving of public interest as a single, monolithic concern is a fallacy in the context of modern society. Rather, "public interest" is understood to be composed of a plurality of stakeholders with different types of knowledge and values. Central to understanding governance is the recognition that "boundaries between and within public and private sectors have become blurred. The essence of governance is its focus on governing mechanisms which do not rest on recourse to the authority and sanctions of government" (Stoker, 1998:17). Hence, governance moves conceptualization of the sphere of decision-making away from the remit of strictly formal governmental structures¹¹ towards recognition of the need to better include the plurality of experiences and knowledges that constitute affected public interests to foster more deliberative debate on social policy.¹²

Key differences in processes are governance's commitment to collective action with greater levels of *inclusion* of stakeholder groups for *deliberation* of a given societal question (Bloomfield, et al., 2001). As a concept, governance recognizes that society is complex, pluralistic and socially unequal, and respects different types of knowledge and

¹¹ Formal government's promotion of governance is called "meta-governance", which is concerned with how political authorities are engaged with guiding "the self-organisation of governance systems through rules, organizational knowledge, institutional tactics and other political strategies" (Jessop, 1997:575).

¹² See Vogler and Jordan (2003) for further discussion on the shift from government to governance of environmental issues.

experience. Through mobilization of difference, a governance perspective seeks to find a common ground by promoting communication amongst the plurality of interests that constitute the “public.” Governance approaches policy decision-making and community action by incorporating contributions from public, private and other sectional interests as appropriate to the issue. Inclusion of the pluralism of society is attempted by broadening the range of rules and resources used in decision-making with the objective of finding mechanisms to negotiate amongst conflicting interests to yield an agreed solution.

Integration of the environmental as part of governance is a particularly prominent and important strand. In the past, issues of environment were seen as separate from the social and economic; in modern society governance integrates these spheres to reflect their inter-connectivity. More specifically, environmental governance extends beyond the formal governmental structures towards recognition of linkages between the economic, social and environmental on multiple levels, both formally and informally (Healey, 1997) in debates about environmental policy. A key principle of environmental governance reflects the idea that environmental “problems” are socially constructed. As Brulle explains: “Environmental problems are fundamentally based on how human society is organized” (2000:5).

Underlying environmental governance is the idea that analysis of environmental problems must be based on understanding the social processes and the socio-cultural context in which these problems originate (Stern, et al., 1992). Hence, geography matters because problems are a product of a given societal context’s institutions and actors and the distinct physical geography that accordingly varies from place to place. “Environmental problems by definition are found at the intersection of ecosystem and human social systems” (Dryzek, 1997:8) and as a result are highly complex. Governance seeks to integrate socio-cultural and biophysical processes; Urban notes that as a discipline, geography “has the potential to fill this niche” (2002:204). Reflective of a governance perspective, now “Any contemporary discussion of science, technology, governance and the processes of modernization must take account of the ways in which conceptions of the environment are shaping them” (Berkhout, et al., 2003:1).

2.1.1 Strands of Governance as Different Discourses

Governance can be understood as a new cultural discourse for addressing environmental decision-making. Discourse has been defined as “sets of linguistic practices and rhetorical strategies embedded in a network of social relations” (Litfin, 1994:3). This thesis reflects a broader conception than linguistic analysis and

understands the term discourse as a “shared way of apprehending the world” (Dryzek, 1997:8). Hence, discourse is the nomenclature used to express the ordering of shared knowledge and understandings of “story-lines” (Hajer, 1995) or “coherent worldviews” (Habermas, 1984) held by an “epistemic community” (Haas, 1992). “Environmental discourse is time- and space- specific and is governed by a specific modeling of nature” (Hajer, 1995:17). A discourse perspective for different environmental issues occurs at varied spatial scales (Dryzek, 1997). For example, on a global scale Litfin (1994) and Hajer (1995) consider discourse in climate change negotiations and within a US national context Dixon and Hapke (2003) investigate the role of discourse in agricultural policy.

Governance represents a discursive shift in understanding environmental decision-making. It reflects that “Environmental problems are not problems of our surroundings, but – in their origins and through their consequences – are thoroughly social problems, problems of people, their history, their living conditions, their relation to the world and reality, their social, cultural and political situation” (Beck, 1992b:81). Linkage of environmental problems to social fabric means “their resolution requires social change” (Brulle, 2000:75). Understanding environmental governance as a discourse considers dynamics of knowledge, power and contextual factors where environmental issues “may be viewed primarily as informational phenomena or as struggles among contested knowledge forms” (Litfin, 1994:13). Hence, power is embedded in different strands of social understandings that compete to define policy. As Litfin explains, it is critical to recognize: “Discourses do not solve environmental problems – they merely offer alternative interpretive lenses through which problems can be viewed, lenses that lend themselves to certain policy solutions” (1994:194). Nevertheless, establishment of widely accepted discourse is an achievement resulting from human communication that constructs social reality through coordination of institutions and individual actors (Brinton, 1985). Environmental governance in fact is an overarching discourse with many facets and the following sub-sections discuss some dominant discourses.

Industrialism vs. Survivalism

Since the Industrial Revolution the discourse that has predominated in society is industrialism. Dryzek (1997) argues that social theories of capitalism, socialism and communism all have, as their basis, industrialism and the discourse is inherent in dominant social institutions. As a discourse, industrialism focuses on economic growth. Human population growth facilitates the presence of workers and problem-solvers to use technology and energy resources to convert the raw matter of natural resources into

goods with increased value. Prices in markets reflect scarcity and value so these economic forces, as well as technological and human innovation, will prevent the depletion of natural resources. The discourse of industrialism is so dominant that “for a long time [there was] no need even to articulate the basic tenets of this Promethean discourse; they were just taken for granted” (Dryzek, 1997:53).

In response to concerns about human activity stressing ecological limits of the earth, during the 1960s and 1970s the counter-discourse of survivalism gained purchase. Also commonly known as the “limits” discourse, survivalism gained prominence with the publication of Hardin’s “The Tragedy of the Commons” (1968). In addition to Hardin’s metaphor of the communal grazing pasture of a medieval village, this discourse draws on the imagery of “spaceship earth” with exponential human growth as a malignant cancer that will ultimately cause the collapse of the earth’s life-supporting ecosystems (Dryzek, 1997). 1972 heralded the first global conference with an environmentally focused agenda. The conference resulted in the creation of United Nations Environmental Program and in the same year the Club of Rome released The Limits to Growth (Meadows, et al., 1972). At the time Limits was considered revolutionary because it hypothesized that reliance on technology alone for the future of the earth was neither a prudent nor adequate strategy. Limits highlighted linkages between population, industrialization, food availability, resource depletion and pollution. It postulated that the limits to growth would be reached within a century, with disastrous results to social, environmental and economic systems. The report noted that movement away from the projected dismal destiny was possible through alteration of population growth trends and efforts to establish stable economic and environmental conditions by seeking not only technical solutions, but also more joined-up management of social, environmental and economic systems (Meadows, et al., 1972).

Like the “Club of Rome”, survivalism is an elitist discourse because its solutions seek to impose hierarchical controls on human activity, such as reproduction (Dryzek, 1997). Industrialism, at least within a capitalist context, is also to an extent an elitist discourse as it sees beneficent elites as controlling the opportunities for modest economic advancement of an ever-growing population available to commit to perpetuating economic growth. In the discourse of industrialism, each human is a rational agent working to improve his/her individual economic position. Survivalism questions this core tenet of industrialism and advocates inclusion of the social and environmental into the equation for choice of rational action. Survivalism’s premise is that without a socio-cultural change common property resources will be depleted. However, the survivalist

solution is very top-down, autocratic and pessimistic; it denies the ability of the individual to move beyond an economically myopic rational agent and treats the human masses “as problems to be controlled” (Dryzek, 1997:51).

Nevertheless, this initial counter-discourse to industrialism has a lasting legacy in the environmental movement today. Some principles of survivalism, such as growth management, remain central to shaping the policy position of a number of environmental groups, such as Sierra Club.¹³ However, Dryzek stresses that the discourse of survivalism should not be equated with more radical green groups (1997:155-194). Dryzek calls survivalism the governance discourse that calls on elites to “think globally, act globally” (1997:41) and identifies survivalism’s biggest challenge as transferring its message that is highly pertinent to elites acting in a coordinated manner at a global scale towards greater relevance at different spatial scales.

Interestingly, both survivalism and industrialism’s response to its arguments are framed through the use of scientific technical models that possess uncertainty. Hence, the debate between survivalism and industrialism serves to highlight a key question underlying environmental governance: how to proceed in the light of scientific uncertainty? “One way to resolve this issue might be to compare the answers to two questions. First, if we believe [industrialists] and they are wrong, what are the consequences? Second, if we believe the survivalists and they are wrong, what are the consequences?” (Dryzek, 1997:60). The following sub-section considers the discourse of Risk Society (Beck, 1992), which presents an argument for employing a precautionary approach in the face of uncertainty.

Risk Society and the Precautionary Principle

Governance can occur in contexts that address a range of issues, but a distinguishing feature of environmental governance is the inclusion, and often domination, of the role of scientific information in decision-making. Environmental governance features both scientific uncertainty and large risks associated with inaction. Hence, policy decisions often have to be made on incomplete knowledge with the potential for cataclysmic negative repercussions that extend beyond the spatial area influenced by the decision-makers. As a result, Beck identifies modern society as a Risk Society (1995; 1992a; 1992b; 1996).

A Risk Society has an omni-present concern with “the management of dangers that are the inherent by-product of industrial society” (Hajer, 1995:36). A clear example

¹³ See <http://www.sierraclub.org> [October 24, 2003].

is the nuclear industry. Beyond proliferation of weapons is the apparently more benign nuclear power industry. As Chernobyl (1985) and Three Mile Island (1978) evidenced, science developed with the underlying goal to benefit modern society presents inherent risks. The nuclear fallout from Chernobyl's accident did not respect political borders. Within the twenty-first century, the porosity of traditional government borders as a feature of Risk Society has manifested in other examples, such as non-state sponsored terrorism. Climate change is much discussed in the literature to illuminate the policy-making implications of a Risk Society (for example, see Bulkeley, 2001; Hajer, 1995; Lee, 1995; Litfin, 1994). Like the nuclear industry, climate change illustrates that the problems created by science can often only be measured by science. "Dependence upon science to make tangible otherwise invisible environmental risks is characteristic of...modern Risk Society" (Demeritt, 2001:309).

Bulkeley (2001) discusses the applicability of Risk Society analysis to Australia's governance of climate change. Australian concerns about climate change conform to the principle that modern environmental risks are inescapable because they:

- 1) arise as unintended consequences of modernity;
- 2) are distanced over space and time; and,
- 3) require technical means to quantify.

The precautionary principle has been advocated as a sound policy approach to address socially constructed environmental issues that are surrounded by uncertainty and offer the potential for distributing disaster irrespective of socio-economic status or geography. The precautionary principle instructs that it is prudent to err on the side of caution in the face of scientific uncertainty. Notably, the movement towards the precautionary principle is a: "'bias shift'...away from a conventional problem-solving mode, wherein doing nothing would be favored on burden-of-proof grounds, toward a risk-averting mode, wherein prudent contingency measures would be undertaken to avoid risks we would rather not face" (Ruggie, 1986:231). The precautionary principle proved to be particularly resonant in the development of multi-national agreements on measures to prevent ozone destruction (Litfin, 1994).

Risk Society does not just occur in the context of multi-national policy. In the UK, BSE was a socially constructed¹⁴ crisis cited as an example of Risk Society and the need for the precautionary principle in the face of scientific uncertainty (Hinchliffe, 2001). O'Riordan's work provides guidelines for employing a precautionary approach to policy:

¹⁴ Resulted from a socially accepted practice of feeding meat to natural omnivores.

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- 1) Where unambiguous scientific proof of cause and effect is not available, it is necessary to act with a duty of care.
 - 2) Where the benefits of early action are judged to be greater than the likely costs of delay, it is appropriate to take the lead and to inform society why such action is being taken.
 - 3) Where there is the possibility of irreversible damage to natural life support functions, precautionary action should be taken irrespective of the foregone benefits.
 - 4) Always listen for calls for a change of course, incorporate representatives of such calls into deliberative forums, and maintain transparency throughout.
 - 5) Never shy away from publicity and never try to suppress information, however unpalatable. In the age of the internet, someone is bound to find out if information is being distorted or hidden.
 - 6) Where there is public unease, act decisively to respond to that unease by introducing extensive discussions and deliberative techniques (ESRC and GEC, 1999:17).

Hence, O’Riordan’s description of the precautionary principle highlights the features of using the best available knowledge to make reasoned decisions through mechanisms that allow for flexibility, transparency, and communication with the public, ideally in forums that promote interactive participation and deliberation. Events like Chernobyl and BSE and issues like climate change highlight the underlying message of the precautionary principle: “We may need to act in the near term to avoid letting today’s “risk” become tomorrow’s crisis” (Brodeur, 1986:86). Beck’s underlying commentary of modern society’s identity as a Risk Society is relevant background context to two dominant discursive strands of environmental governance: sustainable development and environmental justice.

Sustainable Development

A well-subscribed discourse of environmental governance is sustainability, commonly identified as sustainable development. In academic literature sustainable development is distinguished as a *strategy* for environmental sustainability, rather than having synonymous meaning. As Dobson says, sustainable development is “a *conception* of sustainability in that it contains views on what is to be sustained, on why, [and] on what the object(s) of concern are”(1998:60). While the distinction is notable, in recognition of sustainable development’s role as the predominant discourse of sustainability this section focuses discussion on sustainable development. Our Common

Future (WCED, 1987), commonly known as the Brundtland Report,¹⁵ is recognized as presenting the most widely acknowledged definition¹⁶ of sustainable development: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987:43).

Many diverse interests have mobilized around the discourse of sustainable development. Its recognition and widespread purchase are partly reflective of sustainable development’s malleability to meet the varied needs of a plurality of interests. Compared to the more oppositional survivalist discourse, as a strand of environmental governance sustainable development can be more easily meshed with existing industrialist institutions. As its nomenclature indicates, sustainable development recognizes the need to perpetuate economic development and seeks to integrate environmental concerns into existing institutional structures. “The main challenge is to figure out how economic systems might be made sustainable” (Dryzek, 1997:30). Nevertheless, sustainable development is packaged as a “win-win” discourse for addressing environmental issues and continued economic development. “The concept of sustainable development should be credited with providing the story-line around which different key economic and environmental interests could converge” (Hajer and Fischer, 1999:3). However, linked to the success of sustainable development’s popular recognition is a failure to establish clear parameters of its shared meaning. The array of interests that related to sustainable development have transformed it into an amorphous term with such a gamut of interpretations that in some instances the concept becomes a meaningless platitude that enables perpetuation of the status quo.

The discourse of sustainable development has been described as “very functional concept for setting out a common way of talking about environmental issues. Yet its conceptual basis has been weak from the outset” (Hajer and Fischer, 1999:3). Torgerson calls sustainable development “an incrementalist strategy that involves deliberate accommodation with established institutions orientated to the promotion of industrialism” (1995:15). The origins of sustainable development are linked to a conception of sustainability “predicated on the belief that individuals and institutions can be persuaded to accept responsibility for the production of environmental problems and change their everyday practices to alleviate future impacts” (Burgess, et al., 1998:1446). However, this conception has proved elusive through the multitude of meanings ascribed

¹⁵The report’s common nomenclature is in honor of the Commission's chairperson, Norway's Prime Minister Gro Harlem Brundtland.

¹⁶The concept of sustainable development has become a term with a range of definitions, with permutations reflective of the understanding of different stakeholder groups.

to the discourse and instead offers a “have it all” position on environmental protection and continued economic growth. Too often acceptance of responsibility is largely ignored and existing institutional practices are wrapped in new terminology and then perpetuated. Brulle criticizes sustainable development as having “the same appeal that conservation had to corporate and government communities” (2000:158). In a US context the discourse of conservation served as a pacifying, partial strategy that enabled continuing development in the early twentieth century. Ultimately, as Hajer and Fischer comment, “it is clear that sustainable development has not produced the sort of institutional restructuring that appear to be necessary” (1999:3).

Despite justified criticism, sustainable development is an important discursive strand of environmental governance. A fundamental contribution of sustainable development is that it brings issues of the environment into mainstream policy-making. The discourse, despite its ambiguity, has cemented the basic principle of environmental governance: that economic, social and environmental spheres should be re-conceptualized as inextricably linked. Returning to the Brundtland Commission, it asserted that a critical and often overlooked contribution to environmental governance was promotion, through practice, of more participatory forms of decision-making.¹⁷ Our Common Future resulted from the Commission’s empirical application of deliberative and inclusive practices to obtain a detailed unanimous vision statement from a diverse committee of stakeholders about the shared future of the planet. For example, chairperson Brundtland states:

Due to the scope of our work, and the need to have a wide perspective, I was very much aware of the need to put together a highly qualified and influential political and scientific team, to constitute a truly independent Commission. This was an essential part of a successful process. Together, we should span the globe, and pull together to formulate an interdisciplinary, integrated approach to global concerns and our common future (xii).

Furthermore, Brundtland highlighted the relevance of the processes used by the World Commission on Environment and Development to future processes of environmental governance stating, “We hope to share with others our learning process...It is something that many others will have to experience if global sustainable development is to be achieved”(xiii). Hence, the Brundtland Report was a foundational work on environmental governance not only through principles promoted, but also in approaches practiced.

¹⁷ Albeit inclusive of global elites rather than wider “public”.

The Brundtland Report's call for action was responded to through the organization of the June 1992 UN Conference on Environment and Development in Rio de Janeiro, Brazil. Commonly known as the "Earth Summit," Rio occurred 20 years after the UN's first conference on "human environment."¹⁸ Rio's conference title reflects the theoretical progression from the anthropocentric title of "human environment" towards recognition of linkages between "environment and development". A central issue that manifested at Rio was the existence of the North-South divide of "haves" and "have-nots". The "haves" from developed countries had used environmental resources without restriction to reach a high level of economic development. The "have-nots" were developing countries that lacked established technological infrastructures and were more reliant on raw materials for economic trade. The Earth Summit rejected the idea advocated by developed countries that all nations should be charged with responsibility for equal action to protect the global environment as such a stance was considered inequitable to developing countries. Instead the Earth Summit sought to promote the idea that the perspectives of developed nations and developing nations needed to be integrated into governance of the global commons for a more "sustainable" future for all. The policy results of the Earth Summit were a statement of principles, the Rio Declaration, and Local Agenda 21, which identified the need to address these global issues at a local scale and promoted specific strategies for the attainment of sustainable development. Hence, the discourse of sustainable development tied local action to global environment and coined the phrase: "think globally, act locally."

A decade later Earth Summit 2002 was held in Johannesburg, South Africa. Sometimes identified as "Rio + 10", Johannesburg was seen as an opportunity to assess progress of objectives identified at Rio and discuss strategies for the globe to move towards improved environmental governance. Earth Summit 2002 turned to the World Humanity Action Trust's definition of governance as "the framework of social and economic systems and legal and political structures through which humanity manages itself"(2000).¹⁹ Johannesburg reinforced the linkage between governance and sustainable development by noting the necessity of formal and informal structures working together towards the goal of sustainability. Existence of multiple understandings of sustainable development is often seen as detrimental to attainment of a common purpose. However, recall that a necessary component of environmental

¹⁸ In Stockholm, Sweden.

¹⁹ Available: <http://www.earthsummit2002.org/es/issues/Governance/governance.htm> [April 22, 2003].

governance is the coming together of a plurality of voices to build relational networks and shared understandings for collective action. In an optimistic interpretation, multiple definitions of sustainable development may be viewed as a first step towards building these relational networks.

Nevertheless, social theorists lament that the “critical messages contained in much of environmental discourse before Brundtland and Rio are lost. Missing is the critique of industrial progress, in particular questions about the viability of endless material growth and consumption” (Hajer and Fischer, 1999:3). Issues of responsibility and social change, as advocated by Burgess, et al. (1998) are obscured. Hence, what theorists identify is ultimately the loss of meaningful cultural critique of modern society as the source of environmental issues (Hajer and Fischer, 1999; Hajer, 1995).

The discourse of sustainable development illustrates the complexity of environmental governance. Brulle bemoans the lack of a singular universally accepted discourse with a clear meaning (2000). However, a singular discourse would inevitably not meet the needs of the multiple, competing stakeholder groups that through collective action together form the public interest. The need for a range of discourses that compete to define the policy direction of environmental governance is in fact an underlying principle of a governance perspective. Although sustainability cannot offer a monolithic discourse, the diversity of meanings ascribed to sustainable development has been conceptualized as ranging from “strong” to “weak” sustainability (O’Riordan, 2001). The relationship between interpretation of sustainability and different levels of environmental governance appears in Table 2.1. Hence, the discourse of sustainable development highlights the principle that environmental governance draws together previously disparate realms and is not a singular concept but rather has a range of interpretations.

Environmental Justice

Like sustainable development, the discursive strand of environmental justice is socially constructed. As Harvey argues, “discourses do not exist in isolation from beliefs, social relations, institutional structures, material practices, or power relations” (1999:159). While sustainable development had a wider buy-in from European and developing nations, it had less resonance in a US cultural context. In contrast, the discourse of environmental justice directly emerged from US socio-political culture.

Table 2.1: Environmental Governance and Level of Sustainability

<i>Label</i>	Cornucopian	Accomodation	Communalist	Deep Ecologist
<i>Approach to Resources</i>	Exploitative	Conservationist	Preservationist	Extreme Preservationist
<i>Type of Economy</i>	Anti-green: unfettered markets	Green: markets guided by market instruments	Deep green: markets regulated by macro-standards	Very deep green: markets heavily regulated to reduce 'resource take'
<i>Management Strategy</i>	Maximize GNP: human and environmental resources infinite and substitutable	Modified economic growth: preservation of 'critical' resources	Zero economic growth	Smaller national economy: localized production (bio-regionalism)
<i>Ethical Position</i>	Instrumental (man over nature)	Inter- and intra-generational equity	Extension of moral considerability to non-humans	Ethical equality (man in nature)
<i>Sustainability level</i>	Very weak	Weak	Strong	Very strong

Adapted from Svedin, et al. (2001:57).

Often called the “grassroots” environmental movement the concept of environmental justice is tied to bottom-up social justice movement²⁰ and history of political action at a local level. The foundation of environmental justice can be traced back to the US Civil Rights Movement, led by Martin Luther King Junior. He preached and led the practice of peaceful resistance at a grass-roots level to protest social injustice of segregation in the United States. The principles of the movement expanded to include social justice for all people, regardless of race, ethnicity or religion. The environmental justice movement emerged as a powerful strand of social justice that linked together the socio-economic with the environmental (Harvey, 1996).

Like sustainable development, the discourse of environmental justice demanded governance that incorporated the environment with the social and economic aspects of modern society. Towers (2000) explained the discourse of environmental justice as coordinated grassroots in practice. “The grassroots environmental movement is better named the environmental justice movement. Transcending the grassroots, environmental justice applies to the scale of humanity in its appeals for both distributive and procedural justice” (Towers, 2000:23). Distributive justice entails debate about the equitable allocation of resources. Although equitable allocation is frequently associated with questions of equitable distribution of environmental “bads” such as locating land-fills or nuclear power plants, the remit of distributive justice also includes equitable allocation of environmental “goods”, like clean water or green spaces (Dobson, 1998). Procedural justice addresses how decisions are made and includes the demand for public participation in environmental decisions at a local and regional level (Lake, 1996). Procedural justice means that environmental governance should have “transformative potential by broadening the range of respected knowledges in the public realm and by allowing those with limited voice to exert greater influence on decisionmaking outcomes” (Bloomfield, et al., 2001:502). Hence, while sustainable development was based on the concept of inter-generational equity, the discourse of environmental justice focused on intra-generational equity.

The research history of environmental justice began with Freeman’s ground-breaking work that linked exposure to environmental risks with socio-economic status (1972). Some research seeks to tie inequity of exposure specifically to race (Bryant and Mohai, 1992; Bullard, 1983, 1990, 1993, 1994; Pulido, 2000). However, Bowen's (2002) review of environmental justice empirical studies questions the scientific basis

²⁰ For detail of the theoretical emergence of social justice see Harvey (1972, 1973). Smith (2000) offers an overview of the applicability of the theory of social justice to modern society.

for attribution to this singular category. Research has more effectively linked inequity to economic status than race (Pollack and Vittas, 1995; Tomboulion, et al., 1995). Rather than environmental justice being seen as restricted to a question of racial bias,²¹ the literature points to the concept of environmental justice encompassing multiple facets of a community including socio-economic status and race.

One of the first examples of environmental justice in practice occurred in the 1970s with the widely publicized environmental disaster of Love Canal. Local residents formed a grassroots organization, Citizens Clearinghouse for Hazardous Waste (CCHW), advocating clean-up of toxic effluent in their working-class community. After the resolution of Love Canal, other grassroots organizations requested advice on successful environmental justice strategies and CCHW provided information to communities on how to organize to effectively address environmental issues of other localities (CCHW, 1993). Hence, environmental justice manifests at a local scale but forms social networks to other localities engaged in similar debates. Schlosberg highlighted the example of CCHW to express the linkages of grassroots as the basis for the networks that constitute the wider movement of environmental justice (1999). A core process of environmental justice is communication, both within localities and networking strategies amongst communities (Towers, 2000). Communication is a social process that involves information exchange of the sharing of meanings and calls up behavioral responses. Communication is a foundational social process of environmental governance; it is through communication that the range of cultural values and types of knowledge that constitute a social network for a shared concern are expressed and debated towards attainment of a negotiated solution.

Like sustainable development, environmental justice recognizes the relevance of social network linkages across different spatial scales. To express the importance of networks in environmental justice Schlosberg cites Brecher and Costello's (1994) metaphor of Lilliputians capturing Gulliver with many individual threads as demonstration of the power in "a variety of local actions, woven together, [which] creates a network strong enough to tackle problems larger than those which any locality might be able to deal with on its own" (Schlosberg, 1999:138). While a single strand is grassroots, the collectivity of grassroots actions yields the environmental justice movement. The term "grassroots" as "an essentially democratic, locally based group" (Gould, et al., 1996:3) is further illuminated in

²¹ A sub-strand of environmental justice termed "environmental racism" has emerged in the context of African-American communities (Bullard, 1990, 1993, 1994) and Native American tribal nations (Churchill, 1997; Ishiyama, 2003; Laduke, 1999; Laduke and Churchill, 1992).

Brulle's comparison of the management of different environmental groups as either "grassroots or Astroturf" (2000:90). Unlike grassroots organizations, Astroturf environmental groups are nationally mobilized, most often with top-down management and focus on broader scale issues instead of local concerns. This comparison points to what distinguishes the discourse of environmental justice: the retention of a local-based problem focus and the transferability of principles rather than specific issues to different locations.

2.1.2 Geography of Discursive Strands

Discourses offer varied ways of ordering reality with different types of knowledge, values, interpretations and meanings. Reflective of different socio-political and cultural contexts as well as varied physical environments, it is not unexpected that discursive strands have varied purchase geographically. As evidenced by the federal government policy that removed the US as a signatory of the Kyoto Protocol, as a nation the US appears reticent to embrace the discourse of sustainability. In contrast, environmental justice resonates within the US context. Why is there a difference in the integration of these two strands of governance as part of US society?

One explanation is that the environmental justice movement developed within the context of US society and resounds through the common identification of a clean environment as a "human right". Presented in the context of promoting reasonable human needs as inalienable human rights for localities, environmental justice can be seen as an extension of the principles contained in the Bill of Rights of the US Constitution. Culturally, in the US infringement of individual rights is a worthwhile cause for individual action. As negative effects to the right for a clean environment affect other individuals in the same community, environmental justice reaffirms a local approach. Hence, there is a direct, localized benefit to those who buy-in to the environmental justice movement. In contrast, sustainability has much more indirect benefits to buy-in; sacrifices today may be beneficial to someone across the globe or living in future generations. In contrast, outside of the US the strand of sustainability has a longer tradition than environmental justice.²²

Consideration of the geography of different discursive strands highlights the multi-faceted quality of environmental governance. Grounded in the principle of

²² For an overview of how the changing relationship between environment and society is both spatial and temporal in a UK context see Macnaghten and Urry (1998).

collective action, environmental governance benefits from different discursive strands. In fact, Rosenau (1992) sees the simultaneous movement of decision-making authority downwards to localities and upwards to supra-national organizations as an attribute of modernity. Adger (2000) highlights the need to recognize the existence of increasingly global linkages as well as considering problems at local scale. Ultimately, the strength of environmental governance is drawing these two strands meaningfully together into a robust framework. Sustainability advocates balancing the needs of today with future needs. In contrast, environmental justice advocates more inclusive and communicative strategies for making decisions yielding just outcomes. As a framework for governance, these strands together highlight the importance of appropriate goals, procedures and outcomes that recognize the linkage of the economic, social and environmental. Stirling (2003) highlights the challenges presented by pluralism in managing relational links among different interests in a community for a shared issue. These relational linkages occur in specific locales, but also have linkages across spaces (local, regional, national and international) manifesting as different social networks and experiences and resulting in varied relational and socio-cultural understandings of shared issues. So, while identification of universal structures for ideal environmental governance is not tenable due to the range of local variations, *principles* of sound environmental governance are clear: unification of social, economic and environment; inclusion of multiple stakeholder perspectives; and procedural and distributive justice.

Ecological Modernization

Principles from the two dominant discursive strands of sustainable development and environmental justice yield different approaches to environmental policy in specific geographies. One such approach from the strand of sustainability developed within a European context is ecological modernization (EM). Summarized as the “ecologization of the economy” (Mol and Spaargaren, 1993b:437), EM is a theory of environmental governance advocating integration of environmental issues into existing market structures towards sustainability. EM is heavily linked to the discourse of sustainability, specifically in the socio-political context of the developed world (Mol and Sonnenfeld, 2000; Mol, 2000; Murphy, 2000; Murphy and Gouldson, 2000), and virtually ignores environmental justice.²³ Dryzek sees EM as a specific

²³In the literature EM is often presented as an oppositional theory to Beck's “Risk Society” (1992b). While EM is criticized as a conservative theory that reinforces status-quo of economic dominance in decision-making, Risk Society is seen as a radical societal critique. Blowers summarizes the contrast by

sub-strand of the discourse of sustainable development stating that EM focuses “on exactly what needs to be done with the capitalist political economy, especially within the confines of the developed nation state” (1997:143). EM is conceptually a very top-down approach, highlighting interaction between national governments and business towards evolution of a more complementary relationship of environmental conservation with economic development through industrialization (Harvey, 1999).

EM emerged in the 1980s from studies of Germany and the Netherlands (Huber, 1985, 1982; Jänicke, 1985; Mol, 1994, 1992). Early work emphasized technological innovation as a way to overcome environmental degradation caused by industrialization. For example, EM theorizes that pollution caused by the technologies of industrialization could be overcome to benefit the environment through further technological innovation while also offering additional economic benefit. From the original specificity of the western European context, subsequent research has attempted to transfer the principles of EM to other geographies, mainly within the developed world.

Hajer undertakes a comparative study of the UK to the established EM context of the Netherlands (1995). Mol and Spaargen (1993a) consider the relevance of EM in a US context. Pervasively, EM research pertains at the scale of national governance. Recently, researchers have attempted to widen EM's relevance to the sub-national scale, such as Gibbs' (2000) investigations of regional development agencies in England. The appropriateness of EM in a US context remains a question that merits further empirical investigation. Interestingly, geography has been identified as a reason for questionable applicability of EM in a US context. Unlike the top-down concept of EM from the national policy scale within the confines of western European countries, the larger spatial area of the US fosters engagement of environmental governance at the scale of the more localized concerns of the bottom-up environmental justice movement (Mol and Sonnenfeld, 2000).

Another question about the applicability of EM is the premise that the *existing* institutions at a national government level can effectively incorporate the environmental strand of issues and develop innovative solutions to environmental policy concerns. As noted by Hajer, EM is “the discourse that recognizes the structural character of the environmental problematique but none the less assumes that existing political, economic, and social institutions can internalize the care for the

highlighting their different conceptualization of science: “Unlike ecological modernisation where science and technology are seen as the solution to the problem, in the risk society analysis scientific expertise is portrayed as exercising control over technologies that cannot ultimately be controlled” (1997:856).

environment”(1995:25). Hajer views this as problematic since he sees environmental problems and their solutions as invariably socially constructed. Hence, to Hajer the assumption that existing institutions can accommodate the environmental realm removes one of the potential reflexive solutions to approaching environmental issues. To address this shortcoming of EM theory Hajer proposes the theory of Rational Ecological Modernization (REM) (1995).

REM expands from the theory of EM by focusing on processes of institutional transformation through discourse coalitions (Hajer, 1995). Hajer's integration of policy discourses should be recognized as a theoretically divergent strand from Mol's presentation of EM as a theory of “unplanned social change” (Murphy, 2000:2), whereby EM is a natural stage in progression of industrialization. Christoff (1996) effectively summarizes these two approaches to EM as “weak” and “strong” respectively. Weak EM focuses on technological solutions to environmental issues and relegates policy-making to the elitist realm of policy, science and business experts. Strong EM (e.g. REM) advocates broader changes to institutions and seeks to include more open decision-making processes through discursive strategies. Both theorizations have at their core the idea that economic development and environmental protection are not necessarily in opposition and can be reconciled to mutual benefit. Hence, the divergence is in *how* the linkage promoted by EM should be approached in policy development. REM presents an approach more likely to be accepted in a US context by advocating greater inclusion of pluralistic views rather than entrusting resolution singularly to national government.

REM acknowledges that policy will be the product “of the interaction that takes place in practices that often lie beyond the traditional political realm” (Hajer, 1995:15). Hajer turns to Giddens' (1984) social theory for understanding institutional transformation of policy discourse as occurring in constraining and enabling institutions inhabited by actors with agency. Hajer says that research should focus on how agency and institutions' “interaction transforms the rules of domination” (1995:48). REM is an institutional approach that focuses on the recursive transformations of existing institutions through discourse as well as the creation and evolution of new institutions to integrate issues of environment and economy. However, as approaches to sustainable development REM, and indeed EM, are widely critiqued as failing to present a sufficient discursive shift from existing modern society. Their approach to “sustainable development is a perspective that offers these economic and social institutions a new lease on life...[where] sustainable

development is framed in terms not so much of fundamental social change as of adjustment to basic institutional practices” (Hajer and Fischer, 1999:4).

Environmental Governance in a US Context

Hence, the dominant approaches to sustainable development appear relatively inapplicable to the specificity of US political and geographical contexts. REM is a movement in the right direction with advocacy of inclusion beyond government, yet still tied to a European context that features a greater consensus tradition towards finding a “win-win” solution as opposed to the more adversarial “win-lose” of a US context. The “win-lose” positioning reflects strong reliance on courts and litigation for conflict resolution in the US (Dryzek, 1997). Webler and Renn illustrate the differences between the European and US context through analysis of the role of labor unions (1995). European labor unions are willing to play a moderating role in labor-management conflict in exchange for shared power. In contrast, in the US unions’ serve as advocates to protect workers’ rights and promote higher wages and improved working conditions through negotiation, protest and litigation. In the US, “It is the litigative avenues that have provided interest groups with their most formidable means to shape policy” (Webler and Renn, 1995:20). In a European context “groups unhappy with resulting policies cannot file lawsuits challenging them, as they can in the U.S.” (Hadden, 1995:241). European environmental governance processes are “based more on consensus, reflect more deference to technical experts in relevant fields, provide less opportunity for intervention by the courts, and are in general less adversarial than those in the US” (Fiorino, 1995:235; see also Jasanoff, 1987, 1986; Vogel, 1986).

The omni-present threat of litigation is powerful even when not actually used. What negotiated results are achieved in a US context are often a result of the real potential for litigation, and the desire to avoid this conflict-resolution forum that yields clear winners and losers, and does not seek livable compromises. “The courts are often unable to resolve differences in values nor sort through conflicting scientific evidence” (Baughman, 1995:253) so an environmental governance approach relevant to a US context is merited. In fact, past reliance on the protracted and expensive route of adversarial litigation to include different viewpoints in decision-making provides an underlying incentive to find a new way forward. Environmental governance offers the opportunity for the opening of decision-making to greater levels of participation by pluralistic interests with a movement away from “win-lose” towards negotiated agreements. Rational choice theory applies to organizations and different interest

groups in bargaining (Friedman, 1962), and to avoid a complete loss in litigation, organized interests in the US context are increasingly willing to undertake conflict resolution through less formal channels than courts. Recognition of local variability is important in crafting sound approaches to governance. This socio-cultural dimension of policy is needed “to further the appreciation of the *particularity* of the way societies relate to the natural environment, to explore the different ways in which the social order is implicated in environmental politics” and policy (Hajer and Fischer, 1999:6). To be meaningful and to appropriately reflect the specific US context, a different socio-cultural discourse and theoretical approach to environmental governance is required that better integrates environmental justice and sustainable development.

2.2 Practical Approach to Governance

This section moves from framing the concept of governance in academic literature towards building a practical understanding of environmental governance relevant to a US context. As noted above, governance “refers to the emergence of new styles of governing in which the boundaries between the public and private sector, national and international, have become blurred” (Svedin, et al., 2001:43). Hence, the concept of governance is linked to policy-making where decisions are made across a range of administrative levels (Rosenau, 1997). What does this mean in practice at different spatial scales? Much research has been done on governance at an international scale where the stakeholders are different nations (for example, Litfin, 1994; O’Riordan, 2001; Rolen, et al., 1997). In the same way that Nye (1990:20) summarizes Rosenau’s observations about postindustrial world politics as “diffusion of power” from state actors to non-state actors, the concept transfers to different spatial scales to promote the exploration of the diffusion of power from government to non-governmental actors in environmental governance at intra-national, regional or local scales. Diffusion of power coincides with a shift away from traditional notions of “hard” power to “softer” forms of “co-optive” power (Litfin, 1994:195). A turn to governance is needed as “neither the state nor the market is uniformly successful in enabling individuals to sustain long-term, productive use of natural resource systems” (Ostrom, 1990:1). Firstly, this section identifies two different types of natural resources – public good and common property – and discusses specific challenges of managing common property resources. Secondly,

this section considers the roles of institutions and actors in the theory and practice of environmental governance. Understanding the inter-relationship between actors and institutions presents a conceptual framework from which emerges a practical approach to understanding environmental governance.

2.2.1 Water: Common Property Resource

Weale's (1992) research on the politics of air pollution discusses how some environmental governance issues can yield a "public good" result.²⁴ As defined in economists' terms, public good means individual use leads to no subtraction in value from others' consumption. Hence, if a given stakeholder group achieves improvement in air quality for the benefit of their individual interest that improvement is collectively shared by all interests. Unlike air pollution, water management planning with the objective of equitable allocation of limited water for consumptive uses has different interests competing for the same water. Where the "public" is in fact a plurality of competing interests, environmental governance is not strictly for the public good because allocation to one interest means that same water is no longer available to another interest.²⁵ In a policy-making process water is rather a "common property resource" (CPR) with the objective of equitable allocation for consumption by different users. CPRs are "resources for which exclusion is difficult and joint use involves subtractability" (Berkes, et al., 1989:91; as quoted in Young, 2001:285).²⁶

Ostrom's Governing the Commons (1990) analyzes the challenges associated with managing CPRs. To understand CPRs she stresses the differentiation and dependence of the "resource system" and the flow of "resource units" produced by the system. "The distinction between the resource as a *stock* and the harvest of use units as a *flow* is especially useful in connection with *renewable* resources, where it is possible to define a replenishment rate" (Ostrom, 1990:30). Water is a renewable, yet limited CPR. When the withdrawal of flow units exceeds the rate of replenishment of the resource system, a renewable resource is diminished over time. Ostrom calls withdrawal of resource units from a resource system "appropriation" and those that withdraw the units "appropriators". In this thesis, the term appropriator is equivalent

²⁴ Other research on governance of public good resources includes work on climate change, such as by Benedick (1990), Litfin (1994) and Demeritt (2001).

²⁵ Water quality is however an issue of public good. In some instances water can be re-used by multiple users for non-consumptive uses (e.g minimal stream-flow at an upstream location where the same water remains available for later consumptive use downstream). However, consumptive water allocation is generally not compatible with undertaking collective action for "public good".

²⁶ See also McCay and Acheson (1987) and Ostrom (1990).

to a set of actors that forms a stakeholder group representing a specific interest that is part of the pluralistic public interest. In CPR appropriation, “the resource units are not jointly used, but the resource system is subject to joint use” by multiple stakeholder groups either simultaneously or sequentially (Ostrom, 1990:31). Hence, sustainable management of CPR is directly tied to collective action of the multiple stakeholder groups that are appropriating from a given resource.

Analysis of rational agents’ behavior in the context of collective action is known as *public choice theory*, a corollary to rational choice theory (Weale, 1992:42). Public choice theory seeks to understand the motivations of actors’ from stakeholder groups to participate and also evaluates processes of collective action and the results. The main rationale for collective action is that: “When appropriators act independently in relationship to a CPR generating scarce resource units, the total net benefits they obtain will usually be less than could have been achieved if they had coordinated their strategies in some way” (Ostrom, 1990:38). In fact, actors’ selfish behavior can be strategic as it offers the potential for greatest individual benefit provided other appropriators do not deploy the same strategy. Such “opportunistic behavior” (Stoker, 1998:23) increases complexity and uncertainty of outcomes. The rationale for communicative action is that through sectional interests actors’ agreement to a management strategy no one user receives disproportionate benefit or detriment compared to other users (Habermas, 1984). Susskind and Cruikshank (1987) stress that no stakeholder would choose to participate in collective action process if they could individually obtain their needs outside of negotiation. “To justify participating in a negotiated agreement, stakeholders must conclude that alternatives would likely produce less satisfactory results” (Baughman, 1995:257).

The standard academic analogies are behavior in Hardin’s commons or the prisoner’s dilemma²⁷. However, Ostrom stresses that these analogies are inadequate since it is not uncommon for actors to alter their behavior throughout a policy process. Ostrom notes: “that individuals utilize contingent strategies in many complex and uncertain field settings is an important foundation for later analysis” (Ostrom, 1991:36-37). One such strategy is “tit-for-tat in a two-person game in which an individual adopts a cooperative action in the first round and then mimics the action of the opponent in future rounds” (Axelrod 1981:1984). However, in practice issues of environmental governance are far more complex. Therefore, it is necessary to approach public choice theory from a broader conception of rational action (Ostrom,

²⁷ See Ostrom (1990) and Hardin (1968) for further details about these well-known scenarios.

1990). Popper (1967) stresses the need for the theoretical analysis of decision-making situations in which individuals are placed because such “situational variables are most likely to affect individual choices of strategies and how those situational variables occur” (Ostrom, 1990:38). Hence, the foundational challenge of CPR decision-making is “how to change the situation from one in which appropriators act independently to one in which they adopt coordinated strategies to obtain higher joint benefits or reduce their joint harm” (Ostrom, 1990:39).

Therein lies a fundamental challenge of governing CPR because “organizing appropriators for collective action regarding a CPR is usually an uncertain and complex undertaking” (Ostrom, 1990:33). Governing CPRs entails two key uncertainties:

- Strategic behavior of competing stakeholder groups
- Understanding of the CPR function and renewal rate

Hence, both social behavior and physical sciences’ limits of understanding complex ecosystems are sources of uncertainty in the governance of CPRs. “Uncertainty reduction is costly and never fully accomplished. The uncertainty stemming from strategic behavior by the appropriators remains even after one acquires considerable knowledge about the resource system itself” (Ostrom, 1990:34). Hence, the governance of a CPR must occur with incomplete knowledge and recognition of uncertainty. “Given these levels of uncertainty about the basic structure of the problems appropriators face, the only reasonable assumption to make about the discovery and calculation processes employed is that appropriators engage in a considerable amount of trial-and-error learning.” (Ostrom, 1990:34).

To explore the governance of CPRs in light of these uncertainties Ostrom analyzes CPR case studies in water management, fisheries and forestry from varied geographies. She uses the following qualities to delineate performance between “robust, fragile, and failed institutions”:

- Clear boundaries and membership
- Congruent rules
- Collective-choice arenas
- Monitoring
- Graduated sanctions
- Conflict-resolution mechanisms
- Recognized rights to organize
- Nested units

Through her analysis of CPRs in different parts of the world, Ostrom (1990) demonstrates that the success or failure to achieve sustainable appropriation of resource units from a CPR is linked to very local geographies. For example, Ostrom contrasts nearby fishing areas to demonstrate how subtle variations differentiate between sustainable and failed CPR management. Alanya Turkey's fishery agreement amongst local fishermen is a successful "example of the many institutional arrangements that have been devised, modified, monitored, and sustained by the users of renewable CPRs to constrain individual behavior that would, if unconstrained, reduce joint returns to the community of users" (Ostrom, 1990:20). In contrast, two other nearby Turkish fishing grounds have failed as CPRs partly because they are more accessible by outsiders.

Like Ostrom, Young's (2001) review of CPR literature highlights that contextual factors of a given location, such as existing institutions and communal use arrangements amongst actors, contribute either to successful management or degradation of the resource (see also Blaikie and Brookfield, 1987; Grima and Berkes, 1989). The case study of groundwater development in the US southern plains illustrates how regional management institutions and the expansion of capitalist production systems have mediated degradation of CPRs (Emel and Roberts, 1995; Roberts and Emel, 1992). Research in other locations also highlights the beneficial role of community-based institutions in promoting local stewardship of CPRs in coastal areas of Japan (Ruddle, 1989), the Caribbean (Millar, 1989), and Shetland Islands (Millar, 1996). Local institutional arrangements to manage CPRs in West African rural communities are far more resilient and flexible than often assumed (Freudenberger, et al., 1997). For example, in Nigerian wetlands flexible access rights to fisheries can help to offset the livelihood risk in a CPR where the relative abundance of resources is subject to extreme spatial and temporal variation (Thomas, 1996).

Giordano (2003) focuses on the role of scale in managing CPRs. He theorizes that CPR issues and potential solutions for a given resource depend on the socio-political scale at which it is addressed. This idea is not new. In the mid-1800s John Wesley Powell advocated establishment of the political units to govern the American west by watersheds as he anticipated that water would be the limiting resource (Reiser, 1986). Teclaff (1996) highlights application of Powell's ideas in the design of Tennessee Valley Authority with a management area that approximately coincided with the Tennessee River basin. Dales (1968) compares socio-cultural practices of settlement in Canada and the US and relates them to different water management policies. Canadians tend to live along lakes or rivers that flow into lakes. In contrast, Americans tend to live on rivers

that flow into the ocean. He points out that while in the US pollution generally goes downstream, the Canadians “pollute themselves”. The different policy approaches to water management reflect variation in the geography of the CPRs’ watersheds. Giordano (2003) distinguishes these as “fugitive” (US) and “open-access” (Canada) resources.

Hence, successful determination of an appropriate scale for approaching environmental governance varies depending on the resource. Interestingly, the demarcation of an environmental governance boundary (socio-political system) is most effective when it reflects the spatial extent of the physical resource. Global water management issues occur at, and are best addressed at, watershed scales. Water quantity concerns exist for water resources because of:

- 1) continued population growth;
- 2) increased per capita usage; and,
- 3) unequal distribution of available water.

The variation of these allocation pressures across space means that quantity concerns also vary by watershed. Hence, the watershed becomes the logical spatial unit for addressing governance of water management.

CPR problems concern 1) allocating fixed quantity of resource units to competing stakeholder groups; and 2) how to maintain the resource system over time. “Both types of problems are involved in every CPR to a greater or lesser extent, and thus the solutions to one problem must be congruent with solutions to the other” (Ostrom, 1990:47). Hence, development of a CPR policy focuses on competing stakeholder groups negotiating an acceptable distribution of the resource units and the responsibility for maintaining the CPR. A common assumption is that “all resource users are motivated by a selfish interest for short-term gain and are thus unable and/or unwilling to act collectively to ensure the long-term productivity of the resource” (McCay and Acheson, 1987:7). However, various examples show that stakeholder groups can act collectively to manage a CPR (Feeny, et al., 1990; Hames, 1991; Netting, 1976; Ostrom, 1990; Young, 2001). Collective action by competing stakeholder groups relies on:

- 1) addressing the CPR at the appropriate spatial scale;
- 2) inclusion of all competing appropriators in the debate; and
- 3) existence of suitable institutions in which accepted solutions can be negotiated.

Hence, both actors and institutions feature as fundamental components in determining the governance of a CPR. The following sections focus discussion on the role of actors and institutions in water management.

2.2.2 Actors in Governance of CPR

Typically, an individual or small group of actors represents a given stakeholder group in a policy-making process that debates management of a CPR. This section focuses on the various roles of different sets of actors in decision-making for allocation of a CPR. Qualities of the actors engaged in the process are highly relevant in how a given governance process unfolds. It is critical to recognize that categorization of actors for a given policy-making process is socially constructed. “The definition of the relevant public, [and] the construction of expertise...are not constants but depend upon the system of institutions and ideas, as well as individual motivations and social structures within which policy strategies are debated and chosen” (Weale, 1992:10). In governance to determine water allocation three broad categories of actors exist:

- **Common good actors**– stakeholders with expertise in procedural policy or science whom promote pursuit of overall good
- **Sectional interests** – enter process as advocate of a single stakeholder group perspective and negotiate, seeking minimally to defend and ideally to enhance a specific position
- **Wider public** – average citizens largely not engaged with process

Of the above categories, the most active in a policy-making process are common good and sectional interests actors. The wider public is largely not engaged with the process. “Certainly one of the standard arguments against including the public at large in public policy decisions is that they are not competent to do so” (Crosby, 1995:169). Research has shown that the public can meaningfully engage in policy debates through organized participatory forums (Burgess, et al., 1998; Harrison and Burgess, 1994; Harrison, et al., 1998; Harrison, et al., 1996). However, practical application problems remain, including: how to appropriately select individuals from the public for participation who are representative of the overall range of public interests; how to meaningfully integrate such participatory forums into a decision-making process; and, how to find members of the wider public willing to contribute their time (Fischer, 2000).

Interestingly, although the wider public itself has minimal power as an actor, the perception of *representing* the wider public interest can imbue both common good and sectional interests actors with powerful agency in the policy-making process. Both actor categories attempt to enhance their power by claiming to speak for either

the wider public interest or substantial segments of public interest, based on the idea that “people and organizations are always delegating power, whether implicitly or explicitly, to interest groups” (Hadden, 1995:243). Jasanoff stresses that legitimate representation in policy processes does occur:

The lay public’s interests can be served in many instances through good-faith efforts to consult a broad cross-section of the expert community, so that agency conclusions are not tainted by marginal science or extremist politics. For instance, participation by scientists from federal agencies and research institutions may effectively substitute for direct involvement of citizens (1990:248).

The approach this thesis deploys to attain representation of the breadth of public interest is through inclusion of actors from the range of competing stakeholder groups as well as common good actors. The following discussion focuses on the differences in motivations, objectives and roles between common good and sectional interests actors in a decision-making process.

In a US context, common good actors participate to build policy that balances the competing demands of sectional interests into a solution that is both fair and avoids litigation in courts. Common good actors typically possess either policy-making or scientific expertise and these two types of expertise are then called upon to work together. “In many respects, policymakers and technical experts inhabit different worlds and speak different languages. Yet they interact with one another in complex networks of power, with the authority of each group being highly circumscribed by the authority of the other” (Litfin, 1994:8). The need to integrate both policy and technical expert common good actors also presents communicative challenges, “leading to the possibility of mutual misunderstanding and mistrust” (Litfin, 1994:31). For example, scientific experts accept the need to make decisions with scientific uncertainty and operate over longer time scales, but may fail to understand the complexities of politics. Policymakers may be knowledgeable about policy negotiations and existing legislation, but may fail to apply critical scientific findings appropriately to policy decisions or be uncomfortable with uncertainty and generally operate on shorter decision-making time scales (Litfin, 1994).

Hence, common good actors whom can effectively communicate with both policymakers and scientific experts are highly valuable in a policy process. “The most valued expert is one who not only transcends disciplinary boundaries and synthesizes knowledge from several fields but also understands the limits of regulatory science and the policy issues” (Jasanoff, 1990:243). Litfin (1994) calls

these individuals “knowledge-brokers” as their powerful agency is tied to their ability to interpret and communicate different types of knowledge. Called “super-agents” in this thesis, such knowledge-brokers are important in governance of CPR as “data does not stand on its own; it must be interpreted” (Litfin, 1994:33). Super-agents are “powerful political actors simply by virtue of their authority as interpreters of reality. Their power had little to do with control or domination but was instead a function of the perceived legitimacy of their knowledge” (Litfin, 1994:78).

While common good actors will possess some bias based on their past experiences, they strive to execute the policy-making process for the sake of advancing an equitable and tenable water management policy. Being concerned with the overall societal benefit, they use their agency to advance forums for fruitful interaction amongst sectional interests. In contrast, sectional interests actors participate to defend, and ideally advance, their specific stakeholder group’s interest. “They are driven by the self-interest of their members rather than the wider concern with the public interest or more particularly those excluded from the network” (Stoker, 1998:24). Incentives of sectional interests actors to engage in collective action are:

- 1) to avoid exclusion of their interest from the policy-making process;
- 2) to ensure that their interest does not receive any less than competing stakeholder groups; and,
- 3) to attempt to maximize their benefit through involvement in decision-making.

Haas (1990) calls groupings of sectional interests “epistemic communities,” which are “knowledge-oriented groups whose cultural standards and social arrangements revolve around a primary commitment to epistemic criteria in knowledge production and application” (Litfin, 1994:45). Success of sectional interests actors to achieve their preferred policies depends on the ability “to mobilize resources on behalf of shared normative beliefs” (Litfin, 1994:49). Hence, the success of a given sectional interest actor is directly connected to their ability to enroll other sectional interests actors into an effective coalition. Such groupings of actors with shared meanings have been called “actor networks” (Davies, 2002; Latour, 1999) or “actor strategies” (Few, 2002; Long and van der Ploeg, 1994), which are defined as the way social groups use their available power resources, or their knowledge and capability, to resolve their particular problem” (Brown and Rosendo, 2000:212). In fact, Rosenau summarizes the ethos of governance as the creation of “new networks and strategies based on approaches that use networks rather than hierarchical

arrangements” (1997:51).

Hence, sectional interests actors seek to advance their position in participatory public forums through the formation of networks and coalitions. A hypothesis for why competing stakeholder groups agree to participate in collective action forums is that to advance or defend a given position, sectional interests actors “will learn that to persuade they have to advance arguments that go beyond their private interests...towards search for the public interest” (Prior, et al., 1995:80; see also Smith and Beazley, 2000). Therefore, a primary motivation for sectional interests to participate in a time-consuming governance process is not to build coalitions for the sake of being committed to the public interest. Rather, sectional interests agree to participate in collective active forums for pragmatic self-preservation of their individual interests. “The fluidity of governance offers opportunities and threats to various social groups, depending on their access to resources and support, and on their collective capacity to identify and accommodate change” (O’Riordan, 2001:22).

CPR governance processes benefit from the participation of both common good and sectional interests. Both categories fulfill a specific and necessary role in a policy-making process. The results of a collective action forum are the product of necessary compromise by all *participating* interests and then positioned as a legitimate representation of *public* interest. However, recognize that rather than representing the wider public, collective action results in amalgamation of specific stakeholder groups’ individual interests that have been patched together through collaboration for pragmatic reasons rather than beneficent public interest motivations. If a given stakeholder group could fully attain their individual objective without having to compromise with the other powerful stakeholder groups as rational sectional interests actors they would avoid collective action forums. In a complex governance process no single interest is able to delineate the policy result without interacting with others: “Engaging in networks and partnerships can be costly to undertake and also costly if ignored” (Lowndes, et al., 1997:340).

Hence, participation in forums of governance by sectional interests is highly pragmatic: the motivation for the sectional interests to participate is to defend or enhance their individual position. In a complex governance process this goal cannot be attained unless stakeholder groups agree to work with other sectional interests. Therefore, the collaborative product from an organizational forum for sectional interests actors should more accurately be understood as delineating the *range of socio-political acceptability*, rather than as public interest. Range of socio-political

acceptability is a concept to express the boundaries within which a policy must fall in order to be accepted by powerful stakeholder groups amongst the plurality of public interests. The central definitional differentiation between *public interest* and *range of socio-political acceptability* is that the latter consists of the plurality of interests that possess the resources to impede the policy-making process or policy implementation. A collective action position entails both shared adversity and benefit as sectional interests actors seek to maximize their individual benefit while ensuring that other interests do not get more than their fair share.

Common good actors benefit from the existence of a forum that attains a collective action position inclusive of the sectional interests that could otherwise individually undermine the policy-making process. Without forums of sectional interests actors, common good actors lack a tool for policy creation informed by knowledge of the range of socio-political acceptability. Common good actors are able to mobilize the policy-making process to reflect the collective demands of stakeholder groups. For example, Stephenson and Pops (1989) note that universal acceptance of an intermediary “may help to encourage improved communication between disputants as well as broaden the spectrum of bargaining outcomes which each party is willing to consider seriously” (Baughman, 1995:256-7).

Individual identity of actors in both categories is important for legitimacy and accountability. As Smith and Beazley explain, core to a governance process is: “the *representativeness of partners* affording *accountability to stakeholders* providing the basis for a *pluralistic and participatory partnership structure*” (2000:865, original emphasis). Selection of individual actors to represent sectional interests in organizational forums with the purpose of collective action is crucial for the ability of the organization to meaningfully contribute to the policy-making process. Effective common good actors need to have the knowledge, resources and skills to possess powerful agency in a governance process. These qualities of common good actors are important so that they can amalgamate and transform different types of knowledge for enhanced communication to move the governance process forward. One quality of common good actors is their ability to inhabit and communicate in organizations with varied institutions. In a water management policy-making process, both familiarity with science and policy is a clear asset. The above discussion of actors has led into the institutions that actors inhabit. The following section considers how actors’ agency is shaped through the institutions of different types of social settings to attain an agreed outcome in a governance process.

2.2.3 Institutions in Governance of CPR

Institutions are “identifiable practices consisting of recognised roles linked by clusters of rules or conventions governing relations among the occupants of these roles” (Young, 1989:5). Ostrom defines institutions as: “the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions” (original source Ostrom, 1986; appearing in Ostrom, 1990:51). More simply, institutions are the rules and resources of governance (Giddens, 1984). In the literature, the term “structure” is sometimes used interchangeably with institution to signify rules and resources. In this thesis the terms structure, institution or institutional structure are all defined as rules and resources. Organizations should be distinguished from institutions. Organizations are “material entities possessing physical locations (or seats), offices, personnel, equipment, and budgets” (Young, 1989:32). Hence, organizations are a specific combination of institutions and actors, often with a stated purpose and purview of concern. Examples of organizational purposes include forums for discussion of science, policy, economics and public involvement (Weale, 1992).

Often described as constraining, it is critical to recognize that institutions are both *constraining and enabling* in shaping how actors may exert their agency and in how governance processes may unfold. As Stoker explains: “Governance means living with uncertainty and designing our institutions in a way that recognizes both the potential and the limitations of human knowledge and understanding” (1998:26). For example, Ostrom’s work has the foundational purpose of studying “how individuals supply their own institutions, how they commit themselves to conform to their own rules, and how they monitor each other’s conformance to these rules” (1990:55). Institutional analysis traditionally fixates on institutions as the basic determining factor in shaping a governance policy. Weale describes the rationale for an institutional approach: “public policies need to be understood in the light of the specific configuration of institutions and organisations that exist...some configurations will create the conditions within which certain public policies may be pursued, whereas other configurations will prevent certain strategies of policy” (1992:52). However, as discussed above in the previous section, actors’ agency, particularly that of super-agents, also features prominently in governance. “Discourse

is shaped by the institutional context in which it occurs,” (Weale, 1992:219) and actors’ agency can also transform institutions (Giddens, 1984, 1989, 1987). As a result, when analyzing a governance process “the issue of ‘agency’ needs to be connected to these institutional and contextual dimensions” (Macnaghten and Urry, 1998:102). Relegating the importance of actors’ agency removes a critical facet from the rubric of understanding governance. Hence, this thesis undertakes an institutional analysis with a commitment to understanding actors’ agency. One social theory that provides a conceptual framework for this approach is Giddens’ structuration theory.

2.2.4 Why Giddens is Good for Understanding Governance

Structuration theory offers a set of elegantly simple yet profound concepts for understanding dynamics of social interactions. The components of structuration theory are 1) actors, with agency; and 2) institutions. Giddens defines agency not as *intention* of an action, but rather actors’ *possession* of the capability to produce an effect in social relations. As a result, by definition all actors possess some degree of agency, and “agency implies power” (Giddens, 1984:9). Institutions are “rules and resources, or sets of transformation relations, organized as properties of social systems” (Giddens, 1984:25), where social systems are the reproduced relations amongst actors. Structuration theory understands modernity as consisting of the inextricable interactions of actors and institutions. The crux of structuration theory is that, through agency, actors and the institutions they inhabit have a recursive relationship that is continuously evolving. As Giddens writes, “the rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system reproduction (the duality of structure)” (1984:19). Macnaghten and Urry summarize structuration theory noting that Giddens “argues that in modernity reflexivity consists of social practices being constantly examined and reformed in the light of incoming information received about those very practices, thus altering their constitution” (1998:26).

A longstanding debate in academic literature is over the relative importance of institutions and agency in social systems (Held and Thompson, 1989). Structuration theory denies primacy to either actors or institutions and rather highlights how actors and institutions are continually evolving responsive of their reflexive interaction. Hence, structuration theory allows the exploration of governance to move beyond the debate of which component has primacy to investigation of *how* processes of governance unfold across space and time. Structuration theory does not make normative assumptions, but rather promotes the flexible investigation of how actors and structures are inter-

connected. In fact, one of the most interesting facets of a governance process is contemplating the ways in which actors and institutions are intertwined.

Reflective of the recursive relationship of institutions and agency, organizations can emerge, evolve and dissolve responsive to changing purview of concern. Any given organization will have specific institutions to facilitate its purpose. As part of a governance process, a given organization will likely be linked in a network of other organizations. An organization is an identifying phrase for delineating distinct spaces within overall governance institutions inhabited by actors. Hence, organizations can be understood as specific sub-groupings within the wider network of institutional structures (both formal and informal) that constitute an environmental governance process. "Actors and institutions gain a capacity to act by blending their resources, skills and purposes into a long-term coalition" (Stoker, 1998:23). At a global scale such coalitions have been called "regimes" (Litfin, 1994; Mayer, et al., 1995). An alternative terminology is *universe*. In this thesis, the term universe classifies groupings of organizations into categories based on different primary thematic functions with a common discursive strand in a policy-making process. This thesis will group organizations as belonging to the categories of science, local involvement or policy universes towards analyzing the Restudy policy-making process. How actors within these different discursive universes mobilize resources and function will offer insight into the multiple facets of a policy-making process.

Building from earlier discussions about the appropriate scale to address governance of different CPR, principles of recursive actor-institution interactions are applicable on multiple scales. Giddens has been criticized for his lack of empirical examples to illustrate structuration theory (see for example, Gregson, 1989; Thrift, 1983). In fact, Giddens advocates structuration theory to be used in empirical investigations selectively, "more as a sensitizing device than as providing detailed guidelines for research procedure" (Giddens, 1989:294). Structuration theory accounts for the recursive linkages across multiple levels of social systems; a methodology that simultaneously encompasses all of the facets of structuration theory's remit would simply be impractical. Rather, structuration theory should be seen as a conceptual tool to analyze specific points of interest in social systems.

Conceptually, structuration theory is a shift in understanding of modernity, moving away from "the standard schism between subject and object (decision-maker and decision situation) toward a recognition that subjects are at least partially constituted by the discursive practices and contexts in which they are embedded"

(Shapiro, et al., 1988:398). Hence, reflexive transformations of institutions and agency offer a grounding concept for understanding modernity. In the context of this thesis, structuration theory provides a framework for recognizing that actors in CPR issues *can* alter the situation, an ability that is often overlooked.

As long as analysts presume that individuals cannot change such situations themselves, they do not ask what internal or external variables can enhance or impede the efforts of communities of individuals to deal creatively and constructively with perverse problems such as the tragedy of the commons (Ostrom, 1990:21).

Conceptualization of agency and institutions as linked through the dynamic of reflexive transformations opens the possibility for new solutions to environmental governance issues.

The most effective solutions will promote greater ownership and buy-in from the range of stakeholders. “Inviting the public to be part of the decision making process from the start improves the likelihood that the resulting decision will be considered appropriate” (Webler and Renn, 1995:28). Unlike EM, structuration theory also recognizes that existing institutions may be inadequate to solve new problems that transcend traditional government boundaries. A potential recursive transformation is the creation of new institutions, or organizations that draw on new institutions, as well as the evolution of existing institutions through actors’ agency. Hajer and Fischer note that “differences in cultural frames of reference now lead to new sorts of conflict in environmental politics” (1999:7). Such conflicts also require new problem-solving strategies. Structuration theory offers a cohesive, logical and insightful conceptual framework to contribute towards improved understandings of the dynamics of how processes of governance unfold. The following section explores a practical approach to applying the concept of structuration theory to environmental governance.

2.2.5 A Practical Approach to Environmental Governance

As theorized by Giddens, the dynamics of governance in practice consist of the recursive interactions of actors’ agency and institutions. This section focuses on a practical approach for considering the types of institutional social settings actors may inhabit in a governance process and then considers how categories of actors’ agency manifests in these settings. This section will draw particularly on the insightful work of Bryson and Crosby (1989, 1992, 1993; Healey, 1997), which presents policy-making processes as occurring in three social settings: forums, arenas and courts.

The delineation of forums, arenas and courts is based on the premise of governance occurring in a “shared-power, no-one-in-charge, interdependent world” in which both problems and tenable solutions transcend organizational and structural boundaries (Bryson and Crosby, 1993:175). As depicted in Figure 2.1, forums, arenas and courts are defined by the different policy-making activities that occur in these social settings:

- **Forums** are the setting of *communications*.
- **Arenas** are the setting of *policy decision-making*.
- **Courts** are the setting of *adjudication and conflict management*.

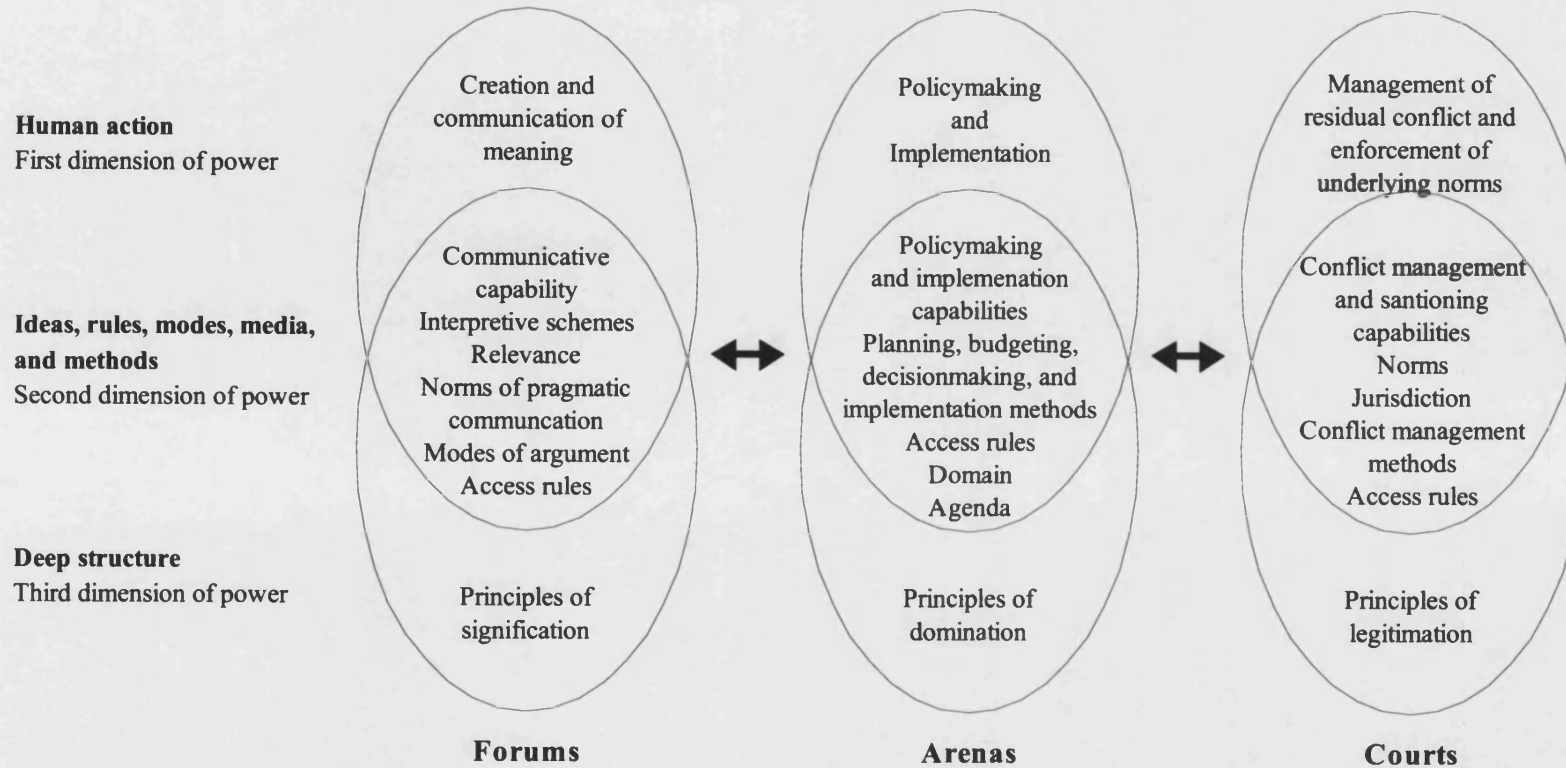
The activities of communications, policy decision-making and conflict management, respectively within forums, arenas and courts, are shaped by three dimensions of power:

- First dimension is *human action*
- Second dimension is *ideas, rules, modes, media and methods*
- Third dimension is *deep social structure*

The first dimension of power is reflective of the plurality of observable behavior in human action. Hence, the first dimension considers these highly evident foundations of power such as social status, knowledge, and financial leverage. The second dimension of power “is exercised more subtly, through manipulation of what comes up for decision and action” (1993:177). Ability to (mis-)direct the agenda of a governance process by producing a focus on some issues while excluding others is the underlying principle of the second dimension of power, which manifests through use of ideas, rules, modes, media and methods. The third dimension of power is even more subtle as it is the power to shape felt needs, grounded in social, political and economic structures that provide the foundation of rules, resources, and transformational elements of human relations. Hence, it is the third dimension of power that provides “basis for potential set of issues, conflicts, policy preferences, and decisions...that public actors *might* address” (1993:17).

A shared-power world recognizes that communications within forums, arenas and courts can range from formal to informal. As a way to present different degrees of formality of activities, Healey (1997) offers the terminology of hard and soft infrastructures. Hard infrastructures are the rules and resources of policy systems while soft infrastructures are the practices and strategies of particular social networks.

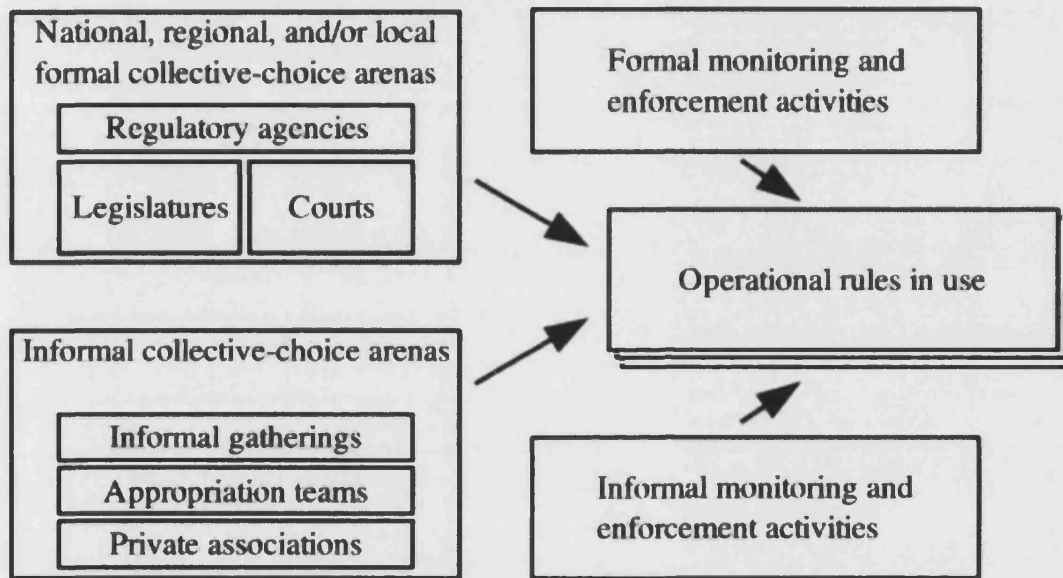
Figure 2.1: A Practical Approach for Understanding Environmental Governance



(Bryson and Crosby, 1993: 180)

Hard infrastructure recognizes the formal structures while soft infrastructure highlights more informal dynamics of social norms and relationships as together combining to yield governance. Healey stresses the need for both hard and soft infrastructures noting, “there is much evidence that relying on the soft infrastructure of individual instances of framing processes is not enough” (1997:285). Depicted in Figure 2.2, Ostrom also endorses understanding of formal and informal “collective-choice arenas” (1990:52) as yielding the operation rules in use for governing CPRs.

Figure 2.2: Formulation of Operational Rules



Adapted from Ostrom (1990:53).

These operational rules “may or may not closely resemble the formal laws that are expressed in legislation, administrative regulations, and court decisions” (Ostrom, 1990:51). As an example of how both formal and informal communications in different social settings interplay in governance Ostrom provides the example of passing legislation in the Congressional arena:

It is relatively easy for a group of individuals to introduce new organic legislation authorizing a new type of special district, but state legislators will rarely support such proposed legislation when there is substantial opposition to it in the state. But when individuals in one area have discussed such proposals with others who are likely to be affected, organic laws frequently are passed with close to unanimous support (1990:139).

Through this explanation Ostrom shows that formal policy-making in arenas is reflective of and dependent on coordinated actions of informal communications.

The heart of Bryson and Crosby's thesis is that actors²⁸ have the greatest ability to influence a governance process through the second dimension of power. Through the second dimension issues that public actors *might* address "influence the transformation of that potential set into the *actual* issues, conflicts, policy preferences, and decisions addressed in the first dimension, and those items that remain in the second dimension as potential issues, covert conflicts, grievances and nondecisions" (1993:178; Bryson and Crosby 1989). As Bachrach and Baratz explain, "To the extent that a person or group – consciously or unconsciously – reinforces barriers to the public airing of policy conflicts, that person has power" (1962:949; appearing in Bryson and Crosby 1993:177).

From an analytical perspective, a shared-power world approach offers a way to consider the complexity and multiple levels of "layered structures" (Bryson and Crosby, 1993:178) at which the social dynamics of Giddens' structuration theory unfolds in practice. Reference to Bryson and Crosby's framework appears in subsequent empirical chapters of the thesis to analyze the actions of actors in specific institutional settings of the Restudy. Integration of identified categories of actors into the shared-power world framework reinforces delineation of distinctive roles for common good and sectional interests actors. The shared-power world framework is particularly helpful towards understanding the subtle use of the second dimension of power by common good actors to direct the unfolding of the Restudy process.

Reflective of their ability to move across different social settings, inhabit multiple organizations of the governance process, and engage in formal and informal communications, common good actors, particularly super-agents, have powerful agency in the second dimension.

Public policy...in part, has to do with what is feasible within a given situation, but this a meaningless notion until we realise that what is feasible is itself something that must be interpreted and decided by political agents, and innovative political agents can redefine the limits of the possible (Weale, 1992:213).

Hence, as presented in structuration theory, key actors possess the ability to recursively transform a policy-making process. However, it is crucial to recognize that in a complex governance process even the most powerful of actors has constraints. "Governing from the governance perspective is always an interactive process because no single actor, public or private, has the knowledge and resource

²⁸ Bryson and Crosby use the term "planners", which corresponds to the category of "common good" actors used in this thesis.

capacity to tackle problems unilaterally” (Kooiman, 1993:22). Smith and Beazley reinforce the need for forums to build partnerships amongst “sectional interests” when stating, “building the capacity to govern will of necessity include a range of interests and actors” (2000:856).

Rather than presenting an impediment to the goals of common good actors, partnerships amongst sectional interests, used effectively, can enhance the agency of common good actors. The conundrum of power dynamics in a governance process is summarized by a core paradox of political power: “In order to gain political power, political power must be relinquished” (Svedin, et al., 2001:52). Bryson and Crosby stress that common good actors can “usually gain leverage through their ability to design and use forums in which no one group can dominate” (1993:191). By empowering sectional interests in such forums, “possibilities are thereby enhanced for the emergence of a collective interest or vision that transcends narrow partisan interests. Once this collective vision emerges it can have a profound impact on subsequent decisionmaking in arenas, or on conflict management in courts” (Bryson and Crosby, 1993:191).

Powerful common good actors are not only able to leverage the mobilization of sectional interests actors, but also actually shape the range of socio-political acceptability by wielding power in the second dimension to determine organizational rules and resources, such as types of knowledge, accessible to a given forum. As Weale insightfully states: “Environmental policy is as often about deciding the nature of a problem as deciding between competing interests involved in a problem. The process by which this common understanding is constructed involves both the shaping and determination of policy preferences, as well as their expression” (1992:216). This is true at the scale of a specific policy as well as in broader delineation of the shared meaning of a discourse. For example, Hajer and Fischer attribute the emergence of sustainable development as a dominant discourse to the ability of actors to mold the concept to existing institutions. “Key actors...have basically framed the issues, determined the language in which the environmental debate is conducted, and pre-defined the direction in which solutions are to be sought” (1999:3). Use of a shared-power world approach allows investigation of the relationship of agency and institutions to understand governance as a network of multiple, layered interactions in different social settings.

In light of the power of super-agents in a shared-power world, how does this approach to understanding governance address Munton’s (2003) question of how to

conceptually and practically integrate representative democratic forms of governance with the deliberative participation of public interests? An aspect of a shared-power world is that existing organizations may need to be modified to better incorporate the representational views of the plurality of stakeholders on the pertinent spatial scale for planning. Recursive modification of institutions can include creation of new institutions, promoting evolution towards mechanisms to integrate pluralist perspectives into existing democratic institutions. Hence, effective environmental governance calls for a hybrid of the traditional forms of governance, to transform existing institutions towards increased opportunities for public participation. In a shared-power world improved effectiveness may be achieved by integrating competing stakeholder groups into the decision-making process through empowering collective action forums.

The approach of a shared-power world is applicable to improved understanding and management of highly debated CPRs, such as water. If a negotiated outcome cannot be agreed, then lack of agreement becomes problematic for all stakeholders resulting in diminished availability of water and uncertainty in future access. The resolution of highly contested water allocation in trans-national, intra-national and smaller scale watersheds is undeniably difficult and will require tailored solutions according to distinctive socio-cultural and physical aspects of particular regions. The principles to apply in crafting solutions, however, remain the same. Resolution requires moving beyond the formal confines of existing government institutions towards use of more flexible and responsive social settings of governance that recognize a shared-power world. Principles of governance in a shared-power world include increased collaboration and communication amongst conflicting stakeholder groups and appropriate integration of different types of knowledge, including science. The following section focuses on strategies of *how* to approach collaborative water management.

2.3 Collaborative Water Management

This thesis is interested in exploring the question of how governance unfolds in the case study of developing Everglades' water management policy. This section specifically explores how to integrate principles of governance into an approach for collaborative water management. First, the section defines and discusses

collaborative management and presents some theories of collaboration. Next, the section considers examples of practical approaches to collaborative water management, specifically in a US context. Highly technical scientific knowledge as well as increased capability for information communication are principles that compel a movement to governance (Renn, et al., 1995).

2.3.1 Defining Collaborative Management

Collaborative management has been defined as “multi-party natural resource management projects, programs, or decision-making processes using a participatory approach” (Conley and Moote, 2003:372). Collaborative management can be deployed for a host of CPR including forests, fisheries, and water allocation. Collaborative management for “area-wide planning” (Salvesen and Porter, 1995) or “special-area planning” (Finder, 1995; Marsh and Lallas, 1995) considers an issue on an appropriate spatial scale, determined by the biophysical boundaries of the ecosystem function. As previously discussed, the appropriate area-wide boundary for water management issues is the watershed. Area-wide collaborative management differs from traditional regional planning “in its focus on conflicts between development and protection of natural resources in a specific geographic area, such as a watershed, estuary, or endangered species habitat” (Salvesen and Porter, 1995:3). Such area-wide management often includes multiple political jurisdictions and is collaborative because “participants seek to reconcile [conflicting] interests in an integrated, efficient, and equitable manner not possible through traditional means, on the basis of common interests” (Marsh and Lallas, 1995:27). Empirical research has identified a shift to collaboration as linked to increased collective action (Blowers, 2000, 1997; Healey, 1998, 1997; Poncelet, 2001).

In the context of collaborative management the range of science included for water management extends beyond the limits of a singular discipline, such as hydrology or ecology. In this thesis the term “ecosystem restoration science” is used to express the amalgamation of different scientific knowledges, including social science, relevant to collaborative water management. This analysis of collaborative water management in the Everglades’ Restudy is a case study that offers comparison for future collaborative management initiatives in a US context. Kusel and Adler advocate study of collaborative efforts that are identified “a priori as ‘successes’ in an attempt to understand the factors that make the case a success, so that it can be replicated” (2001:379).

The term “success” is applied in this thesis to signify that competing interests achieved a socio-politically acceptable water management policy through the Restudy process. Hence, success means reaching a process outcome through collaboration, rather than the technical content of the output (Schuett, et al., 2001). Research has stressed the importance of not idealizing collaborative management (Conley and Moote, 2003; Smith and Beazley, 2000). For example, regarding the case studies Ostrom analyzed she notes:

I do not know if these appropriators reached optimal solutions to their problems. I strongly doubt it. They solved their problems the way that most individuals solve difficult and complex problems: as well as they were able, given the problems involved, the information they had, the tools they had to work with, the cost of various known options, and the resources at hand (1990:56).

Collaborative management in practice includes the potential that the collective action result of negotiated compromise may not yield optimal solutions, but rather offers workable and accepted solutions to resolve complex problems. Litfin uses the term “political dynamics of compromise and concession” to describe collaborative consensus building in practice (1994:113). This thesis uses the phrase “range of socio-political acceptability” to identify the social parameters within which a successful solution must fall to be accepted by the range of competing stakeholder groups. A successful collaborative management process is evidenced through the creation of partnerships to find solutions that fall within the range of socio-political acceptability.

Stoker describes governance “as an interactive process [that] involves various forms of partnership” (1998:22). Such partnerships are ephemeral; actors may agree to certain parameters but generally competing interests are going to want the right to step out of the consensus forum. Collective action partnerships focus on “building [the] capacity to govern which will of necessity include a range of interests and actors” (Smith and Beazley, 2000:856). Hence, the first step in collaborative management is recognition of the identity of different stakeholder group interests, followed by the process of bringing these competing interests together into a collective action forum to contribute to policy-making. The resulting “common statements” (Eijndhoven and Est, 2003:228) from competing stakeholder groups offers common good actors the range of socio-political acceptability within which solutions must fall to be socially accepted. Therefore, collective action forums offer the incentive of greater decision-making power to individual sectional interests

through collective positioning. As explained by Rosenau:

Given a world where governance is increasingly operative without government, where lines of authority are increasingly more informal than formal, where legitimacy is increasingly marked by ambiguity, citizens are increasingly capable of holding their own by knowing what, where and how to engage in collective action (1992:291).

Collaborative management recognizes the need to find effective strategies to promote diverse and conflicting interests to participate in collective action.

In a US context, as previously discussed, the strong potential for litigation in courts where clear winners and losers are identified offers an incentive for finding collaborative strategies. Strategies must be equitable and legitimate because, if any given interest is dissatisfied and has adequate economic and temporal resources legal action is an underlying threat. Litigation is expensive, time-consuming and erodes goodwill amongst competing interests that may be forced to work together for implementation of the policy. A large incentive to engage in collaborative collective action is to avoid the black and white decisions resulting from the social setting of courts, which delineates interests as either winner or loser. Sectional interests can better attempt to advance and defend their interest in collective action settings, as such communicative forums operate in shades of gray that can more likely yield livable compromises amongst competing sectional interests. Ultimately, collaborative management emphasizes that “our policy-making models must be reoriented around more sophisticated socio-cultural assumptions that recognize the great variety of experiences involved in an effort to find different ways to achieve the same goals” (Hajer and Fischer, 1999:20).

2.3.2 Healey’s Collaborative Planning

A widely discussed theoretical understanding of collaborative management is collaborative planning (Healey, 1997). Healey’s work emerges from a land use and local environmental planning perspective and draws on Habermas’ theory of communicative action (1984) and Giddens’ structuration theory (1984). Through collaborative planning Healey asserts the relevance of space and place, in short that “geography matters”, in the realm of community affairs (1998:3). Collaborative planning advocates a communicative, relation-building approach towards resolution of resource allocation and collective affairs of a given community. Habermas’ theory of communicative action is based on the ideal speech situation and defines society as one where social institutions “come under conditions of rationally motivated mutual

understanding, that is, of consensus formation that rests in the end on the authority of the better argument” (Brulle, 2000:29). However, Habermas recognizes that this theoretical model in practice is unable to encompass the dynamics of social interactions of agency and institutions stating, “no complex society could ever correspond to the model of purely communicative social relations” (Habermas, 1996:326). Nevertheless, the theory of communicative action offers a valuable normative contribution that highlights the importance of communication to collaborative management.

It is worth mention that some theorists are critical of a communicative action focus arguing that, being based on human speech-acts, non-humans are de-facto excluded (Eckersley, 1999). Eckersley criticizes the lack of an “authentic” human representative that can appropriately speak for nature because humanity “can only speak about the nature that we humans have constituted” (1999:40). In practice, nature itself does not have a say in society’s environmental governance policies, which are ultimately assembled by humans who *attempt* to consider the needs of nature. Policies are the product of a socially constructed agreement that governs collaborative management, seeking to balance the needs of humans and environment (Torgerson, 1999). Ultimately, the ability for society to address environmental issues is tied to the success of the pluralistic interests agreeing to come together and communicate because, “healing the rift between human beings and the natural world...is not a matter of joining what was once put asunder, but of getting the relations between human beings right first” (Dobson, 1998:198).

Healey’s communicative planning approach sees all forms of knowledge as socially constructed, but does not privilege certain types of knowledge, such as science. A communicative planning approach sees public policies as a way to be accountable to all stakeholders of a given community affair. Hence, policy-making processes with mechanisms for inclusion of different types of knowledge that promote communication amongst stakeholder groups will yield a consensus solution. Planning is reflexive of the social context in which it is embedded and further has the ability to transform the social context through planning practices (Healey, 1997).

Healey’s communicative planning approach is rather idealistic in two respects. The first is the attempt to equalize the importance of the contribution of all types of knowledge. Denial of primacy among types of knowledge, namely science and technology, obscures real issues of power that manifest and must be grappled with in processes of environmental governance. Failure to address the topic of differential

power of varied knowledges is a frequent criticism of communicative planning (Flyvbjerg, 1998; Rydin, 2003; Tewdwr-Jones and Allmendinger, 1998). The second ideal is Healey's assertion that through communication competing interests *will* move away from competitive bargaining to consensus building. Such positivist positioning of communicative action "downplay[s] the pervasive element of struggle in discursive practice" (Litfin, 1990:20). Rather, as discussed above, communicative action yielding consensus is a normative theory often punctured by the reality of practical limitations.

"Those that thought that once a shared understanding was established, ameliorative environmental action would only grow and spread are now proven clearly wrong" (Hajer and Fischer, 1999:99; see also Yearley, 1996).

Communicative action has been critiqued as being "as an ideal toward which both science and politics can strive, but it does not shed much light on actual processes" (Litfin, 1990:20). Even Healey conceded that governance ultimately should be:

judged by the qualities of *process*, whether they build up relations between stakeholders...and whether the relations enable trust and understanding to flow among the stakeholders and to generate sufficient support for policies and strategies to enable these to be relevant to...the cultural values of those involved, and have the capacity to endure over time" (1997:71, original emphasis).

In subsequent chapters, this thesis debates the extent to which processes of environmental governance yield consensus agreements amongst highly conflicted stakeholders or if willingness to communicate and the resultant solutions are rather pragmatic, negotiated compromise.

2.3.3. Other Approaches to Collaborative Management

This thesis takes a less prescriptive approach to collaborative management than Healey's collaborative planning. Rather than seeking to test normative characteristics, the thesis explores the complex unfolding of a policy-making process through principles of collaborative management. Principles for investigation include collective action, communication processes and consideration of the roles of different types of knowledge, particularly science. The inquiry of these principles is conceptually framed by Giddens' structuration theory and understood as occurring within a shared-power world composed of the recursive transformations of agency and institutions. Collaborative management of CPR issues should avoid the error of simplifying collective action, either excessively pessimistically or optimistically, and

should turn to a more general set of presumptions:

- Actors face varied provision problems depending on the institutions.
- Actors must navigate organizations in the different social settings of forums, arenas and courts (Ostrom, 1990:46).

Such an approach to collaborative management recognizes that “there is no one ‘right’ way to model collective action: different models imply different assumptions about the situation and lead to substantively different conclusions” (Oliver, 1980:359).

A number of terms circulate in the literature to describe activities of collaborative management of CPR resources. In a specific US context, collaborative management is often called special-area management planning (Camacho, 1996; Finder, 1995; Marsh and Lallas, 1995). More broadly, collaborative activities are called regulatory negotiation (Fiorino, 1995; Shonfield, 1965), partnerships (Davies, 2002; Gibbs, et al., 2001; Lowndes, et al., 1997; Merchant, 1999; Poncelet, 2001; Smith and Beazley, 2000), consensus groups (Innes and Booher, 1999), coalition-building (McCann, 2001), or community-based management (Becker, 2001; Chenoweth, et al., 2002; Kusel and Adler, 2001; McGinnis, et al., 1999; Rhoads, et al., 1999). While specificity varies, each of these terms refers to multi-party resource management decision-making processes that seek to negotiate development and resource protection through participatory approaches (Conley and Moote, 2003). As an “idealized narrative” collaborative management “is hailed as a way to reduce conflict among stakeholders; build social capital; allow environmental, social and economic issues to be addressed in tandem; and produce better decisions” (Conley and Moote, 2003:372). As discussed above, the success of a given collaborative management process often varies from this normative ideal. Nevertheless, certain features are identifiable that enhance the likelihood of collaborative management success. Features include: organizations with reflexive institutions; engagement of actors that represent conflicting stakeholder groups; and transparency and accountability of decision-making. To demonstrate the relevance and also inter-connectivity, these features are highlighted from Ostrom’s analysis of southern California’s governance of groundwater allocation (1990:103-142).

Reflexive Institutions

Reflexive institutions, also known as “self-governing institutions” (Ostrom, 1990), allow flexibility through monitoring of both ecosystem function and organizational governance. In collaborative water management, flexibility is required to address different sources of uncertainty, including endemic issues such as erratic

rainfall, as well as incorporating new scientific findings, such as ecological responses to water management policies (Davis and Ogden, 1994b). Similarly, flexibility is required within the socio-cultural aspect of decision-making to include newly identified stakeholder groups and find solutions within collective action forums. Such flexibility allows the gradual evolution of organizational institutions, where rules are “devised and modified over time according to a set of collective-choice and constitutional-choice rules” (Ostrom, 1990:89). Evolution occurs as conceptually framed by structuration theory with recursive transformations between actors’ agency and institutions (Giddens, 1984) where actors exhibit the most influence in the second dimension of a shared-power world (Bryson and Crosby, 1993).

A potential reflexive transformation is the creation of new organizations as appropriate forums to address a water issue collaboratively. For example, Ostrom’s analysis of California’s groundwater allocation by basin highlighted the need for new organizations to formulate institutions that were perceived to be equitable in order to establish the organizations’ legitimacy to devise solutions accepted by stakeholders. Ostrom calls this “mutual prescription” (1990:113) to describe a participatory forum of competing stakeholders reaching a negotiated settlement where each agreed to governance of groundwater with the allocation rule of sharing proportionate withdrawal reductions. “By negotiating their own agreement, the parties had ended the pumping race faster and at a lower cost than they could have through a court proceeding. They had also gained firm and marketable rights to defined shares of the safe yield of the basin” (Ostrom, 1990:114).

Representation

In the California groundwater allocation example, a crucial feature in the building of new institutions was inclusion of all the appropriators from a given basin. “Although each pumper might be tempted from time to time to withdraw more water than legally allowed, each pumper wants total withdrawals from the basin constrained so that access to the storage and flow values of the resource will be continued over the long run.” (Ostrom, 1990:126). Including all the appropriators for a basin created buy-in to the process and prevented a single interest from over-pumping the system. Interestingly, when scientific evidence determined that two water basins believed to be separate actually had hydrological connectivity, new institutions were created to include all appropriators in a single governing organization.

Transparency and Accountability

Openness of the decision-making process and accountability of those affected by the ultimate policy decision are features of successful collaborative management. Again, drawing from the example of California groundwater allocation, Ostrom emphasized the importance of the accountability of appropriators and the transparency of stakeholder action through monitoring. Water use was monitored by neutral “watermasters” who released annual extraction data by stakeholder group. “Given the accuracy of the information and its ease of access, each pumper knows what everyone else is doing, and each knows that his or her own groundwater extractions will be known by all others” (Ostrom, 1990:125). The neutrality and veracity of watermasters, common good actors in this scenario, were important as they served as the information brokers that guaranteed transparency of data and accountability of stakeholders.

Other Examples of Collaborative Water Management

Restructuring of California’s groundwater allocation in part occurred in recognition that if a tenable governance solution was not agreed and implemented that ultimately the aquifers would be depleted. Litfin comments that governance for crisis response is a common impetus, but presents a new problematique:

By challenging old institutions, and hence old patterns of thinking, crises clear a space for the consideration of new ideas on how to explain and solve problems...The importance of crises for catalyzing environmental regime formation bodes poorly for problems that develop more gradually, such as loss of biodiversity, tropical deforestation, and global climate change, even if the resulting damage may be huge and irreversible (1994:185).

Hence, a more proactive form of collaborative management for issues such as ecosystem restoration is needed where it does not require crisis to prompt action.

Some examples of long-standing institutions for water management exist. Spanish *huertas* are collective action organizations that allocate limited water to local communities in semi-arid southern Spain. Ostrom notes that these foundational institutions have existed for hundreds of years, but continue to gradually evolve in response to the actors engaged in collaborative management. For example, different watersheds in the same region have adopted different institutions guiding daily management, but are grounded in the same principles of self-governance (1990:69-82). Similarly, *zanjeras* in the Philippines are self-governing institutions for collaborative water management including both maintenance of irrigation systems and

equitable distribution of water. “The most striking similarity between the *huerta* and *zanjera* systems is in the central role given to small-scale communities of irrigators who determine their own rule, choose their own officials, guard their own systems, and maintain their own canals” (Ostrom, 1990:82). The underlying questions addressed by the Spaniards centuries ago when they developed *huertas* are the same encountered by water users in determining water management policy today:

- What is the amount of the resource available for use?
- How should the water be equitably allocated to competing users?

Shiva (2002), Postel (1997), De Villers (2000), Simon (1998), Rothfeder (2001), and Reiser (1986) each present book length discussions of case studies regarding how these questions are being addressed successfully, and unsuccessfully, today in watersheds across the globe.

Collaborative water management offers a strategy that increases the likelihood of developing a successful policy resolution to water management conflict (McGinnis, et al., 1999; Michaels, 2001; Stein, 1999). Increasingly, research stresses the importance of incorporating local stakeholder group perspectives in policy-making processes through collaborative management. Notably, in the US inclusion of stakeholder groups for collaborative management has occurred in watersheds both east and west of the Mississippi, respectively within the “right to use” and “prior appropriation” approaches to water allocation. Examples include the Hudson River Valley (Connelly, et al., 2002), Chesapeake Bay (Horton, 2003; Meyers, et al., 1995), Great Lakes (Beierle and Konisky, 2001), Oregon (McCreary and Adams, 1995; Rickenbach and Reed, 2002), California (Salvesen, 1995b) and Alaska (Salvesen, 1995a). Other research stresses the benefits of collaboration for improved integration of scientific findings in policy decision-making (Wolosoff and Endreny, 2002). One particular approach is through the presentation of scientific findings to policy-makers through the visual tool of simulation modeling technology (Jones and DeVreede, 2000; Sklar and Browder, 1998).

The understanding of collaborative water management in this thesis includes bringing together stakeholder group interests into forums of communication for collective action. Normatively, negotiated solutions that fall within the range of socio-political acceptability can be achieved. Different types of knowledge have a role in the communications and some, such as science, have a particularly powerful role. To better understand collaborative water management empirical investigations are merited that consider:

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- 1) communication processes, and
 - 2) roles and power of types of knowledge.

The following sections discuss communication processes and present literature about the roles of science in environmental governance.

2.3.4 Communication Processes in Governance

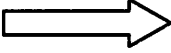
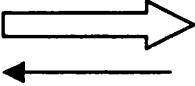
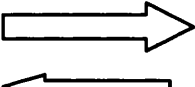
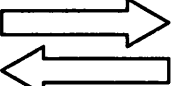
Actors exert their agency in collaborative management by engaging in different types of communication processes. Communication processes are different mechanisms of information transfer within, among and beyond universes of a given governance process. The different *types* of communication processes are determined by variation in the combinations of the following characteristics:

- level of interaction
- directionality
- degree of formality
- participants
- methods

Directionality describes the extent of information transfer and can be either uni-directional or multi-directional. Uni-directional is the most basic information transfer, such as a command or distribution of written documentation. By definition, a uni-directional linkage has a minimal *level of interaction*. Multi-directional information transfer consists of information *exchange* and has a range of levels of interaction amongst actors. *Methods* are the means by which information is transferred between actors and can have different *degrees of formality*, dependent on the social settings, as discussed above, in which the communications take place. Different methods of information transfer include speeches, written documentation, meetings, conversations, workshops and focus groups. *Participants* include actors, stakeholder groups, organizations and the wider public. Prevalent combinations of these characteristics can be grouped into four broad types of communication processes: dissemination, consultation, participation and empowerment. Table 2.2 presents characteristics of the four types of communication processes.

At the most basic level is dissemination of information, with minimal interaction. As parity of information exchange increases, communication types become more interactive. Empowerment is the most interactive and complex type of communication process where “stakeholders are afforded the opportunity to become

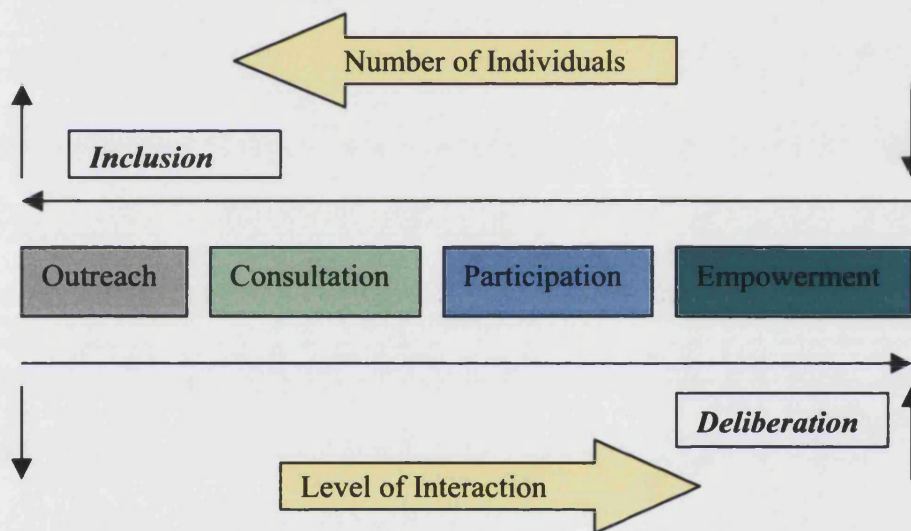
Table 2.2: Identification of Types of Communication Processes

Types of Processes	Level of Interaction	Directionality	Degree	Participants	Mechanisms
Dissemination	Minimal	Uni-directional 	Formal	Key actors Groups Institutions	·Presentation ·Speech ·Written documentation ·Media reports ·Public outreach
Consultation	Low	Multi-directional with greatly disproportionate information transfer 	Formal or Informal	Key actors Groups Institutions Public	·Interviews ·Q&A Sessions ·Written documentation with anticipated feedback ·Some open meetings, depending on structure
Participation	Medium	Multi-directional with disproportionate information transfer 	Formal or Informal	Key actors Groups Institutions Public	·Open meetings, depending on structure ·Closed meetings, depending on structure ·Some face-to-face or remote conversations among key actors
Empowerment	High	Multi-directional with parity of information exchange 	Formal or Informal	Key actors Groups Institutions	·Open meetings, depending on structure ·Closed meetings, depending on structure ·Some key actor face-to-face or remote conversations

decision-makers rather than simply decision-informers” (Baughman, 1995:260).

Would it be possible for communication in environmental governance to consist solely of empowerment? Governance consisting only of empowerment has practical limitations. For example, time-consuming in-depth deliberation by definition includes fewer numbers of people than consultation or participation and a process can be seen as exclusionary if it lacks dissemination of information to the wider public. As depicted in Figure 2.3, different communication processes reflect variable amounts of inclusion and deliberation.

Figure 2.3: Inclusion and Deliberation



Most public involvement strategies are either going to be more effective at inclusion or at deliberation and rarely attain a balance of these opposing forces (Bloomfield, et al., 2001). To overcome these limitations in practice, decision-making processes may most effectively attain a manageable balance by incorporating a range public of outreach and involvement strategies (Bryson and Crosby, 1993; O’Riordan, et al., 1988). Effective collaborative management includes multiple types of communication processes. “No single technique for citizen participation can meet all the different needs of citizens in a complex policymaking environment” (Hadden, 1995:250).

In fact, different types have a functional linkage as communication processes with greater levels of interaction are built from dissemination. Information dissemination is a “type of public good in the management of CPR” (Ostrom, 1990:138). However, for actors from competing stakeholder groups to meaningfully

influence the policy process they must climb the ladder of participation (Arnstein, 1969) to more interactive forms of communication processes. In the US, institutionalization of public consultation strategies originally occurred to provide public scrutiny towards protecting individuals from infringements of government (Daneke, et al., 1983). Public consultation was in effect by the early 1930s for agricultural policy and by the late 1930s in water management with consultation regarding creation and management of the Tennessee Valley Authority (Daneke, et al., 1983).

The 1950s-1960s saw a change in federal objectives for public consultation. Instead of promoting participation simply for reasons of protection of individual interests, some in the federal government suggested that participation was *essential* to good governance” (Webler and Renn, 1995:19, original emphasis). Today federal agencies are required to include consultation in regulatory decision-making (DeSario and Langton, 1987). The National Environmental Protection Act (NEPA) (1969) formally institutionalized public consultation for environmental policy. In addition, both the Federal Advisory Committee Act (1972b) and Freedom of Information Act (1966) opened information to public review, asserting “in effect, that no component of regulatory decisionmaking was too arcane or technical to be entirely isolated from public review and criticism” (Jasanoff, 1990:45-6). While beneficial that consultation requirement was formalized to prevent egregious environmental destruction, the formality also results in public consultation consisting of a post-facto review rather than more dynamic involvement in tandem with a policy-making process.

Participation is the term that expresses the inclusion of more informal public involvement contemporary with policy development. Participation seeks to draw together the diversity of interests in communicative forums to discuss policy issues. By definition, for governance to be collaborative management it must minimally include a participatory process. Use of more interactive communication processes in environmental governance “reflects a trend toward resolving disputes through consultation, mediation, and negotiation rather than litigation or other forms of institutional confrontation” (Bingham, 1986; Fiorino, 1995:225). Participation enhances the acceptability of decisions by the public: “legitimacy of U.S. public policy...rests in large measure on people’s belief that all diverse interests were properly represented” (Hadden, 1995:251). However, quality and effectiveness of participatory processes is often questioned. Brulle stresses, “public participation is a necessary, but not sufficient action to reconstruct an ecologically sustainable social

order” (2000:61). “In many areas of social policy, participation remains a buzzword that is rarely fully employed” (Pain and Francis, 2003:48). Webler and Renn identify four specific problems with participation in modern society:

- 1) Citizens feel cheated if they are asked to participate only to find out that the decision has already been made.
- 2) Environmental managers are often uninformed about the citizens’ concerns and neglect the experiences and preferences of the publics when setting policy or making decisions.
- 3) Most people have limited trust in public institutions and limited confidence in the decision making process.
- 4) The rationale that managers use for making trade-offs between different cost and benefit dimensions is rarely compelling for citizens. This has led to accusations by citizens that environmental decision making is technocratic, while experts lament about public “irrationality” (1995:26-7).

A way of overcoming these limitations is to include forums that empower some individual actors who represent the range of competing stakeholder group interests towards increased ownership of the process and buy-in to negotiated solutions.

The institutions of empowerment forums are crucial to establishing fairness and competency of the policy-making process (Renn, et al., 1995). “A fair process allows affected parties to assert and protect their individual interests and to shape the development of the collective will. Competence refers to the capacity of a process to provide procedural tools for making the best possible decision” (Fiorino, 1995:230). Like deliberation and inclusion fairness and competency can be positioned as oppositional forces in practice. Greater fairness of representation means making the empowerment forum more inclusive. However, a highly inclusive forum is likely less competent in making effective decisions. Rather, what is needed is a balance between inclusion and deliberation to ensure fairness and competency. An approach to resolve this conundrum of empowerment is to include actors that represent key stakeholder group interests in the deliberative forum. “Although this [inclusion of representative actors] raises questions about the overall fairness of the process, it does contribute to its competence” (Fiorino, 1995:232).

Such empowerment forums in collaborative management processes will often be led by a neutral common good actor to mediate negotiations amongst competing interests (Pruitt and Kressel, 1985). “Mediation involves intervention of an acceptable, impartial, and neutral third party who has no authoritative decision-

making power to assist contending parties in voluntarily reaching their own mutually acceptable settlement” (Baughman, 1995:254; Stephenson and Pops, 1989). The common good actor’s strength lies in the empowerment of others to settle their own differences through finding a tenable solution within the range of social acceptability.

By bringing together competing stakeholder groups such empowerment forums have the basic function of enhancing communications between interests. For example, discussing a common institutionalization of an empowerment forum in the US, the citizen advisory committee, Lynn and Kartez highlight its benefits as:

- informing public agencies about broad community attitudes;
- educating citizens about proposed institutional actions;
- increasing ultimate acceptance of those decisions (1995:89)

Through the foundation of communication in empowerment processes competing interests are exposed to the different understandings of a CPR management issue, which provides a basis for finding a shared solution. Empowerment forums illustrate the necessity of both institutions and actors’ agency in effective collaborative management of CPRs.

As discussed above, communication processes in a US context have the underlying threat of litigation if more collaborative forms of issue resolution fail. Collaborative management in the US has been criticized as “pluralistic politics at its worst – a case of administrative agencies handing over governmental authority to representatives of private groups who make policy in their own interests” (Fiorino, 1995:233; also see Funk, 1987). However, if these interests were not included litigation is an omni-present threat in the US (Hadden, 1995; Renn, et al., 1995). Hence, a primary issue with collaborative management in the US is whether the actors involved are legitimate representatives of a community (Lynn and Kartez, 1995). Collaborative management processes seek to prevent litigation by including the range of conflicting stakeholder groups in participatory or empowering forums. Reflective of these cultural institutions, one of the first barriers to power in a collaborative management process is inclusion in the more deliberative and selective stakeholder forums. In a US context the actors selected for participation are linked to stakeholder groups that have the resources to mobilize in the formal social setting of courts: “Although participation is theoretically open to all interested and affected parties, in practice it has been limited to representatives of organized interests” (Fiorino, 1995:231). Those interests with access have greater opportunities for influence.

Nevertheless, amongst those stakeholder groups with representation in

participatory forums of collaborative management, differential levels of power exist in terms of the ability of competing interests to mobilize resources within institutional rules to influence the outcome.

The threat of withdrawing from the discussions, thereby potentially dooming the negotiations, provides a constant source of influence. Despite this, the inequities in resources, time, and influence that the parties bring to the negotiating table have direct consequences for the ability of the participants...to convince or win over the others to their preferred solution (Fiorino, 1995:232).

As a result of the inclusion in such forums, Fiorino (1995) argues that collaborative management both levels and reinforces inequities. For example, a leveling feature is a governing rule that require consensus amongst participants, which “puts all the participants on the same footing when they make arguments, influence debates, and block or promote agreement” (Fiorino, 1995:231). A source of inequity is the ability for different interests to make substantial voluntary time commitments.

Another notable source of inequity is the level of technical knowledge possessed by different actors as communication of different types of knowledge occurs in governance processes. Rydin (2003) identifies the realm of environmental governance as incorporating different types of rationalities, or knowledges: scientific, economic, and communicative. As detailed in Table 2.3, these different knowledges are used as strategies in governance. Scientists, with their ability to understand technical knowledge, are positioned to most effectively mobilize the resource of scientific knowledge. As Litfin explains:

The power of scientists to interpret reality has itself become a productive source of political power, regardless of how knowledge gets translated into technology. Scientists’ power derives from their socially accepted competence as interpreters of reality. Yet they are not simply powerful agents wielding an arsenal of knowledge; rather, discourse itself is a source of power, facilitating the production of identities and interests (1994:29).

Hence, in a highly scientific debate lack of technical knowledge reduces the ability of an actor to meaningfully contribute to communications. “The most consequential – and exclusionary – of all possible boundaries is that between “science” and other systems of cognitive authority...people who are not scientists are *de facto* barred from having any say about its substance; correspondingly, to label something “not science” is to denude it of cognitive authority” (Jasanoff, 1990:14, original emphasis). This positioning of science is problematic for collaborative management because, as Brulle explains, “If scientific language is taken to be the lingua franca of ecological issues,

then those citizens who do not have credentials in the appropriate sciences are not legitimate participants in the dialogue. Without the power to speak the specialized discourse of science, they are without a voice in this public debate” (2000:273). Not only does science determine solutions, but also science delineates and frames the problem, and “whoever defines the problem can often determine the solution that is chosen” (Hadden, 1995:242). Hence, for multiple reasons the roles of science and technical information is a central issue of collaborative management.

Table 2.3: Comparing Three Rationalities

	Scientific Rationality	Economic Rationality	Communicative Rationality
View of environment	<i>Physical reality</i> Object of scientific inquiry	<i>Resource</i> Object of consumption for economic processes	<i>Socially constructed</i> Interface of the physical and social
Nature of environmental problems	Arise from lack of understanding and knowledge lead to poor management	Arise from difficulty of incorporating unpriced or common property resources in market economies	Arise from inadequate stakeholder involvement and rejection of lay knowledge
Preferred environmental solutions	Knowledge-led, based on sound science	Introducing market-based tools of private property rights and quasi-market pricing	Consensus building through collaboration amongst conflicting stakeholders

Adapted from Rydin (2003:111).

2.3.5 Role of Sciences in Collaborative Management

Science and technology are powerful resources for actors to shape the problem definition – both through questions asked and those left un-asked – as well as potential solution sets in collaborative management. Traditional decision-making strategies for environmental policy have been heavily based in quantitative science. However, questions asked of science in a policy context cannot be answered singularly by science because of the social, political and environmental aspects (Hunt and Shackley, 1999; Rushefsky, 1986; Salter, 1988; Weinberg, 1970). Such “trans-scientific” (Litfin, 1994:30) policy questions require inclusion of socio-political evaluation of quantitative science data. In the context of collaborative water management, an additional complexity is the integration of different types of quantitative science – hydrology and ecology. In this thesis the amalgamation of hydrology, ecology and social sciences in collaborative water management is called *ecosystem restoration science*. A further complication about the use of science in

water management policy is how to address endemic uncertainty. In collaborative management uncertainty can both “confound efforts to assign probabilities to alternative ends and means...[and] even hinder agreement on what the proper means and ends should be” (Litfin, 1994:180). Demeritt stresses that rather than objective truth, “scientific knowledge should be presented more conditionally as the best that we can do for the moment” (2001:329).

“Although pleas for maintaining a strict separation between science and politics continue to run like a leitmotif through the policy literature, the artificiality of this position can no longer be doubted” (Jasanoff, 1990:230). Research increasingly stresses the need to recognize science as socially constructed (Castree and Braun, 1998; Collins and Pinch, 1993; Demeritt, 2001, 1998; Dixon and Hapke, 2003; Golinski, 1998; Harrison and Burgess, 1994; Hess, 1997; Jasanoff, 1987; Schneider, 2001). Although science and politics are generally conceived as separate spheres, they mutually influence how the other unfolds. Science shapes the political arguments presented by stakeholders and politics shapes formulation of future research questions and funding allocation. Demeritt contends: “this pattern of reciprocal influence belies the categorical distinction so often made between science, based purely on objective fact, and politics, which involves value-laden decision making that is separable from and downstream of science.” (2001:308). Attempts to express social construction of science have included excising the term “truth” and instead identifying science as “accepted vs. rejected knowledge” (Shapin and Schaffer, 1985:13-14). Nevertheless, quantitative science should not be seen as entirely relativist. Rather, the power of science is linked both to its perception of objectivity, and its ability to be socially constructed. As Litfin explains, “While science is an inescapably social process involving persuasion and power relations, it also can tell us something about how the natural world works” (1994:26). What is of interest in investigating how collaborative management unfolds is why some types of science are afforded primacy in policy-making processes. Exploration of what information is socially accepted and what is rejected amongst the range of “objective” data helps illuminate how specific types of knowledge are both socially constructed and linked to power. “If scientific knowledge is inherently a discursive product of power relations, even before it is brought into the policy realm, then science in policy making is all the more embedded in power relations” (Litfin, 1994:24).

In practice, science has two faces in policy-making. First is confidence in science’s ability to solve society’s problems and the opposite side is recognition of

scientific reason's failure to solve some complex problems (Caldwell, 1985). Such Janus positioning of science points to greater nuance in the complex reality of policy-making. "Rather than the science itself...interpretation of the science" drives policy decisions (Litfin, 1994:104). The key questions of interest then are how is knowledge socially constructed, by whom, and why. Actors engaged in policy-making interpret science: "Facts deemed relevant are always chosen selectively, depending on the interests of the communicator and audience" (Litfin, 1994:4). Common good actors with scientific expertise have particular ability to leverage the powerful resource of science by framing the interpretation of knowledge. Often, such technically informed common good actors act "as intermediaries between the original researchers, or the producers of knowledge, and policymakers who consume that knowledge but lack the time and training necessary to absorb the original research" (Litfin, 1994:4). In a shared-power world where the greatest ability to influence a decision-making process is in the second dimension of power the ability of such technically skilled common good actors is further leveraged in shaping the process and solution sets. "The ability to interpret reality allows experts to wield real power." (Litfin, 1994:31).

Ostrom (1990) stresses the need to recognize the role of different access to technical information in decision-making. Even where information is easily obtained, the technical complexity of the information might make it practicably inaccessible to non-scientific actors. Despite this inequity in the ability to mobilize the resource of technical information, scientific knowledge as an institution is "a source of social legitimacy" (Ziman, 1984:2). For example, Litfin describes how actors with both scientific and political rationales for a given policy position most frequently would emphasize scientific reasons because science "is seen as more legitimate" (1994:103).²⁹ Within the discourse of environmental justice, "use of scientific experts [is seen] as part of a system of oppression and domination. Without access to experts of their own, some local community activists see scientific discussions as a means of keeping their viewpoints and concerns from being addressed by government officials" (Brulle, 2000:208). However, if environmental justice groups have access to experts they also try to leverage scientific knowledge to prove their position. Jasanoff notes Rushefsky's (1986) observation that "competing interest groups use both knowledge and gaps in knowledge for instrumental purposes [as] scientific uncertainty is a resource that can be mobilized by regulators and other actors in their efforts to

²⁹ In contrast, in research in rural Pakistan local users cite socio-political explanations rather than scientific rationales for the different levels of access to water resources (Mustafa, 2002).

influence policy” (1990:6).

US culture oscillates between “deference and skepticism toward experts” (Jasanoff, 1990:9):

Many Americans are persuaded that even the most technical policy decisions require a judicious mixture of scientific and nonscientific judgment, and there is a concomitant fear of letting experts usurp that part of decisionmaking which should be truly political. Yet an alternative view – that components of decisionmaking requiring specialized knowledge should be depoliticized and left to experts – continues to reassert itself in American politics (Jasanoff, 1990:9).

From either position it is undeniable that science is a powerful resource shaping processes and outcomes of environmental decisions. The foundational concern is science applied to policy without consideration for the socio-political. As Habermas summarizes, the fear is that “scientization of politics reduces the process of democratic decision-making to a regulated acclamation procedure for elites alternately appointed to exercise power” (1970:68). Decisions made through singular reliance on scientific judgment encounter two primary criticisms:

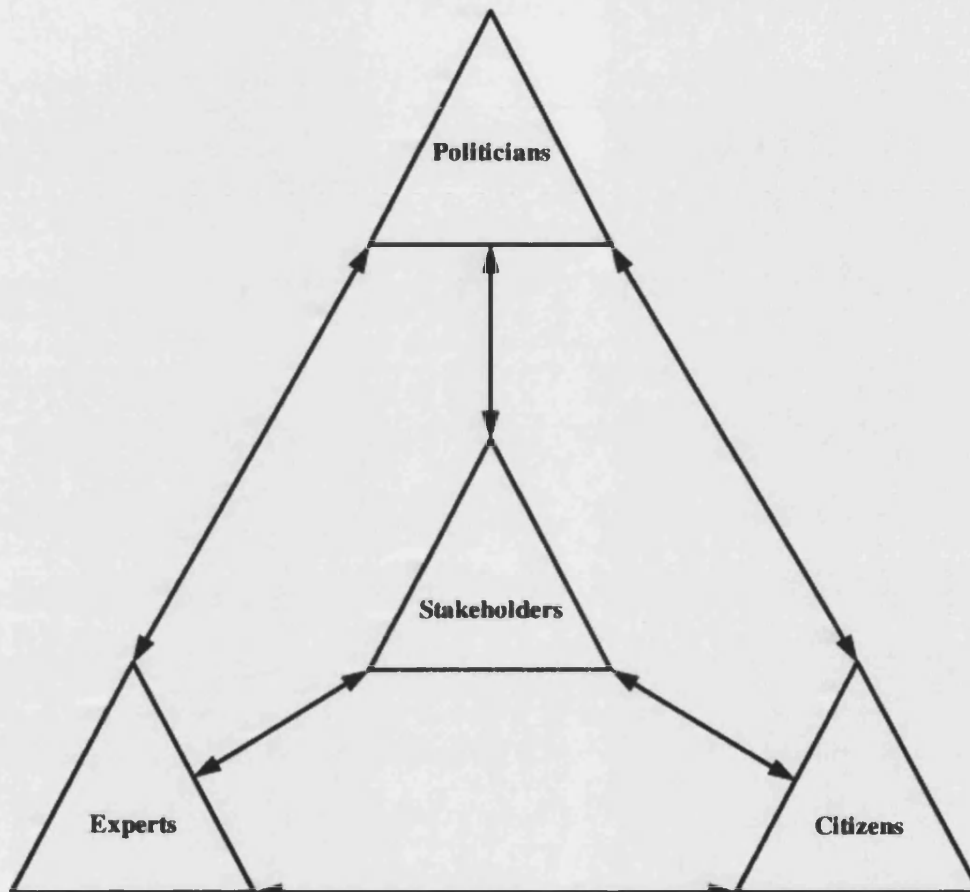
First, because they de-emphasize the consideration of affected interests in favor of “objective” analyses, they suffer from a lack of popular acceptance. Second, because they rely almost exclusively on systematic observations and general theories, they slight the local and anecdotal knowledge of the people most familiar with the problem and risk producing outcomes that are incompetent, irrelevant, or simply unworkable” (Renn, et al., 1995:1).

Further, within the US, the wider public shares a conviction that decisions cannot be wholly legitimate if they can only be understood by the initiated (Jasanoff, 1990).

To overcome these limitations collaborative management as a strategy for governance encourages participatory debates about science to extend to non-technical actors. The objectives of “demystifying scientific knowledge and demonstrating the social relations its construction involves does not necessarily imply disbelief in either that knowledge or the phenomena it represents” (Demeritt, 2001:210). Rather, in a shared-power world the realm of decision-making is no longer only left to scientists, but transcends traditional social boundaries and becomes the concern of politicians, stakeholder groups and the wider public. As depicted in Figure 2.4, creation of socio-politically acceptable and scientifically sound policy requires communications amongst different types of actors. Such “social embedding” (Schneider, 2001:339) of science and technology belies the social construction of problem identification and framing of solutions. Water management policy development extends beyond

quantitative science and, by necessity, incorporates the social dynamics of a shared-power world.

Figure 2.4: Partnerships in Collaborative Management



Adapted from Bellucci, et al. (2003:44).

As Joss and Berlucci note, “The relationship between science, technology and society has undoubtedly become one of the most salient and challenging issues in contemporary politics” (2003:3). Jasanoff (1990) provides the examples of regulatory practices at the EPA and the Food and Drug Administration to support the idea that negotiations between scientists and the public are important to the success of a policy process. Researchers have identified collaborative water management in the US (Williams, 2001), UK (Brown and Damery, 2002; Brown and Rosendo, 2000), Australia (Finlayson and Brizga, 2000) and New Zealand (Mosley and Jowett, 1999) as a new phase that moves away from an “engineering paradigm” (Hillman and Brierley, 2002) towards more holistic water management that integrates local participation at a watershed scale. As Keulartz stresses from his research about managing nature to fulfill specific cultural views of landscape: “Science is in no

position unilaterally to lay down the criteria for nature policy” (1999:14).

Nevertheless, different types of scientific and technical information are ascribed varied power in a decision-making process. For example, substantial levels of power are often attributed to information presented through technical simulation models, seeking to predict future changes to an ecosystem. Rosenau highlights the dominance of models as a powerful tool for presenting information stating, “the ‘science of muddling through’ may well give way to the science of modeling through” (1990:324). The presentation of information in simulation models produces an aura of official authority coupled with detailed complexity that often obscures consideration of uncertainty. Latour (1987) calls such presentations of information “black boxes”, which are “facts or claims that other scientists view as too impregnable to be worth contesting or deconstructing” (Jasanoff, 1990:79). For example, research on a Saharan Desert simulation model found that “the logic of the model works to supply simplicity and economy of explanation by screening out important concepts at the expense of others” (Taylor, 1999:16).

The three types of scientific activities that together constitute a policy-making process are knowledge production, synthesis, and prediction. The most difficult is prediction, which includes simulation modeling, because it “involves so many elements of uncertainty and discretionary judgment” (Jasanoff, 1990:77). Weale hypothesizes that decision-makers also “characteristically pay more attention to some types of information rather than others not because of the substantive merits of the evidence addressed but because the selection is influenced by the background and the disciplinary specialism of policy elites and perceptions of legitimacy” (1992:18).

Science and technology have dual roles in environmental policy-making processes as the *evidence base* and *source of solutions*. Litfin explain the interaction of the two roles of science in policy-making processes: “the cultural role of science as a key source of legitimation means that political debates are framed in scientific terms; questions of value become reframed as questions of fact, with each confrontation leading to the search for further scientific justification” (1994:4). Hence, science becomes the foundation of evidence that rationalizes need for policy change while also serving as a mechanism for finding governance solutions. In a water management policy-making context, monitoring technology may identify problems of depth, flow volume or timing. To develop a water management policy to resolve issues identified by monitoring may then require inclusion of technical solutions. Hence, science both identifies the problem and then is necessary for

creating a tenable solution (Majone, 1989). Only through grappling with scientific debates can such policy processes unfold. As Weale notes:

policy discussions involve a process of evidence, argument and persuasion in which a central part of policy choice is determined by the core elements of belief systems that function like scientific research programmes, determining what counts as evidence and how potential contradictory information is to be interpreted and reconciled (1992:58-9).

Therefore, in such science policy processes where an underlying goal is “sound science” specific types of science determine the framing both of the problem, as the evidence base, and also the framing of the solution. Science and technology are powerful resources for actors in policy-making arenas.

The dual roles of science are notable in the framework of a shared-power world because actors, working in the second dimension, may leverage science and technology as a powerful tool for shaping a policy-making process. Actors with expertise in simulation modeling tools, specific types of science, or a range of technical solutions are better able to exert influence in the policy-making process both to guide the questions that are asked and the range of solutions considered. However, the passage of policy in the context of a shared-power world encounters impediments unless the wider range of stakeholder groups is included in collaborative management. A policy-making process that fails to allow non-scientists to debate science using the softer infrastructure of forums presents potential for residual conflicts due to the lack venues for debate aside from the hard infrastructure of the courts. As courts are largely a post-facto social setting, a policy-making process is more effective if it includes forums for stakeholder group communications. Forums of sectional interests actors can yield the range of socio-political acceptability in both framing the problem and potential solutions. Common good actors can influence the information about the problem and potential solutions available to sectional interests and thereby leverage their expertise to effectively shape the scientific and social definition of the problems and its solutions. Collaborative management requires a “reflexive understanding of science as a situated and ongoing social practice, as the basis for a more balanced assessment of its knowledge” (Demeritt, 2001:309).

Actors must grapple with how to approach *uncertainty* and *inequality*. While some science is more certain than others, uncertainty is an inherent quality of science. “Decision making in the face of scientific uncertainty involves a rich and complex set of interactions among facts and values, knowledge and interests” (Litfin, 1994:115).

In addition, “a major source of uncertainty is lack of knowledge” (Ostrom, 1990:33). In Australia collaborative water management is seeking to institutionalize an approach to address recommended water flows “in a manner that permits the identification of a particular discharge and water volume to achieve certain objectives, while accepting that, in all cases, there will be uncertainty” (Dollar, 2000:393). Collaborative water management approaches also stress the need for procedural fairness in allocation decisions (Allan and Lovett, 1997; Joss, 1999; Syme, et al., 1999). Those engaged in a science driven policy of a collaborative management process must consider how scientific uncertainty transfers to policy decisions. Actors leading the process are under pressure as a result of “*uncertainty* about the consequences of [scientific] developments and with the plurality of values and interests about them” (Eijndhoven and Est, 2003:234). Jasanoff stresses the need for both expert and lay knowledge participation:

With the accumulation of evidence that “truth” in science is inseparable from power, the idea that scientists can speak truth to power in a value-free manner has emerged as a myth without correlates in reality. At the same time...broad citizen participation along cannot legitimate decisions that do not command the respect of the scientific community” (Jasanoff, 1990:17).

Adaptive management, described as “learning by doing” (Haney and Power, 1996:880), is an approach to addressing uncertainty by agreeing a policy approach, but includes flexibility for modifications based on additional information collected during implementation. Adaptive water management specifically requires four types of information:

- 1) baseline on current condition;
- 2) links between various flow parameters and ecological functions;
- 3) information to allow framing decisions within broader social, political, economic and cultural context;
- 4) monitoring data for operational requirements (Hillman and Brierley, 2002:619).

Adaptive management has been criticized as “trial and error” (Mitchell, 1998:152). However, with the complexities of ecosystem restoration science for collaborative water management, adaptive management offers a primary response to addressing uncertainty (Dovers and Mobbs, 1997; Habron, 2003; Haney and Power, 1996; Mitchell, 1998). Further, adaptive management presents “the alluring prospect of combining the rigor of the scientific method with the contingent realities of policy and

politics” (Dovers and Mobbs, 1997:39). In fact, adaptive management can be understood as part of the continuing recursive transformations in a shared-power world. Adaptive management should include:

...not only biophysical monitoring but also the way in which previous data have been used and developed into knowledge (or not) by the stakeholders. In other words, data collection should evolve and change with the knowledge base and institutional context itself. It is necessary to have both of these if institutional growth and learning is to be sustained in the face of the inevitable turnover of committee members and support staff (Hillman and Brierley, 2002:625).

For example, analysis of the East Everglades planning process highlighted that collaborative forums with “an informed constituency should be continued after completion of plans” (Abrams, et al., 1995:253). Similarly, in the Chesapeake Bay an advisory commission was essential not only to planning but also to effective implementation (Horton, 2003; Meyers, et al., 1995). The process of adaptive management can be enhanced through the integration of appropriate forums for involvement of stakeholder groups during implementation of a water management policy developed through collaborative management.

2.4 Research Questions

This chapter has focused on an exploration of environmental governance in collaborative water management. Emergent from this literature review this thesis raises compelling questions about how actors and institutions shape governance of collaborative water management policy-making processes. The central question of this thesis is: *How can we better understand environmental governance through investigating the case study of the policy-making process of a water management plan in the greater Everglades watershed?*

A series of corollary questions for inquiry include:

- Water management in a US context is generally highly contested with conflict between different actors from competing stakeholder groups. Can an institutional analysis of this CPR in the Everglades help to better understand the specific policy spaces (rules, resources and social-settings in which they happen) of the Restudy process?
- What role does actors’ agency have in the Restudy policy-making process?

-
- Given the theoretical drive to collaborative management as an approach to governance, how does collaborative water management occur in practice in the case of the Everglades' Restudy process?
 - What roles do different types scientific knowledge and expertise have in relation to other knowledges in the Restudy?

The next chapter focuses on the methodological approach designed to explore these questions towards understanding the greater Everglades ecosystem as a case study of a governance process at a watershed scale.

Chapter 3: Methodological Approach

“Policy is like sausage – you like it much better if you don’t know how it was made.”
- Anonymous

Introduction

This chapter presents the methodological design of the empirical research to explore questions raised from the literature review in Chapter 2. The objective of this thesis is to explore the roles of institutions and actors in an ongoing process of environmental governance, specifically the development process of multi-purpose water management policy in the greater Everglades ecosystem. The chapter discusses methodological approaches to policy evaluation and considers the challenges of investigating an ongoing process. Presented next are the methods deployed in this thesis and the data collected. Then discussed are challenges of implementing these methods in the specific context of this case study. Finally, this chapter discusses approaches taken to analyze data.

3.1 Research Methods for Investigation of Policy-making Processes

Researchers have used both quantitative and qualitative approaches to analyze policy-making processes. This section provides an overview of qualitative methods pertinent to investigation of policy and focuses on the specific methodological challenges of researching an ongoing process. One challenge is the determination of a start and end point for research and another is how to gather data. Often resolutions to these two challenges are co-dependent. It is worth noting that many researchers have used quantitative methods to analyze policy processes. For example, US agricultural watershed management has been evaluated by quantitatively linking national and international agricultural markets with survey results of owners’ land use decisions and spatial patterns of land use at the watershed scale. This methodology attempted to link environmental consequences of policy at a localized scale to economic and socio-political decisions at larger spatial scales (Lant, et al., 2001). Other quantitative

methods of policy analysis, such as cost-benefit analysis (Munda, 1996; Pearce, 1998) and contingent valuation (Carson and Mitchell, 1993; Lant, 1994; Mitchell and Carson, 1989; Pate and Loomis, 1997; Powe, et al., 1997) are econometric-based approaches that seek to link the economic, environmental and socio-political either to develop or evaluate policy.

Quantitative methods address policy from a technical or econometric perspective but fail as mechanisms to consider the socially constructed qualities of the problem definition and delineation of potential solutions. For example, small group research has raised questions about the effectiveness of contingent valuation as a mechanism for determining policy or evaluating policy outputs (Burgess, et al., 1998). While quantitative methods may offer meaningful approaches to some policy questions, they are inadequate and inappropriate for the questions posed by this thesis. The thesis focus of exploring *how* governance of a policy-making process unfolds requires a qualitative research design that investigates interactions of actors and institutions. Qualitative research design may include a variety of methodological approaches: archival investigations, focus groups, participant observations and interviews.

3.1.1 Archival Investigations

Archival investigations can be organized through a variety of strategies for effective policy analysis. One strategy is tracing the historical evolution of a policy. For example, Brulle (2000) researched transformation of US environmental policy and Shaiko (1999) investigated the changing roles of public interest groups in the 1990s. Case studies are another approach to archival investigations, and can have an institutional, geographical, or thematic focus. The case study is an effective approach to in-depth studies of a singular institution, geography or theme, and also serves as a tool for comparative studies. For example, Rydin (2003) uses archival investigations to focus on the role of media institutions in constructing environmental conflicts. A collection of case studies about European countries examine individual nations, as well as offering comparative findings about the European sustainability transition (Kousis and Gooch, 2001; O'Riordan, 2001). Jasanoff (1990) uses case studies about the EPA and Food and Drug Administration as a method to investigate science in regulatory policy. The science and policy pertinent to these government agencies continually evolves; Jasanoff's use of case studies demarcates the beginning and ending point of a given investigation. Hence, Jasanoff frames her research with

institutional case studies featuring specific events, like Love Canal, that offers a “snapshot” (Kousis and Gooch, 2001:97) of the agency policy approach at a given time where: “Individual regulatory proceedings are presented as stories with a temporal dimension corresponding to changes in national politics and scientific knowledge” (Jasanoff, 1990:17).

Case studies also may be delineated by, and minimally will possess, a geographical focus. Case studies can range from global to local scales. For example, at a global scale Litfin (1994) explores the Montreal Protocol, while other case studies examine local government (Dixon and Ericksen, 2000). Case studies often occur at a geographical scale pertinent to the thematic focus. Water management policy is increasingly developed, and also researched, at the watershed scale (Finder, 1995; McCreary and Adams, 1995; Meyers, et al., 1995; Salvesen, 1995a, 1995b), while endangered species’ policy is investigated at habitat scale (Barrows, 1996; Camacho, 1996; Marsh and Lallas, 1995; Tetteimer, 1996). Ostrom (1990) deploys archival policy investigations for a range of case studies to elucidate principles of (un)successful collective action policies and demonstrates that geography is a consequential attribute in policy processes. The combination of geographical, thematic and institutional attributes of a case study often point to logical investigation parameters. Ostrom explains that when analyzing CPR case studies it is sensible to “first try to understand something about the structure of the resource itself – its size, clarity of boundary, and internal structure” (1990:56).

3.1.2 Field Qualitative Methods

The above examples of archival investigations present different approaches to framing institutional analysis. Some researchers rely strictly on written sources for such policy analysis. An exclusively archival investigative methodology offers material for tracing the formal path of the policy process and has been called more “factual” (Kousis and Gooch, 2001:97) than qualitative research as it relies on published sources rather than anecdotal information. However, a methodology based solely upon archival investigations has the detriment of lacking information about unpublished, informal communications that are part of the policy-making process. As discussed in Chapter 2, such informal communications are integral to the evolution of a policy-making process in a shared-power world (Bryson and Crosby, 1993). To obtain such data requires incorporating more interactive qualitative research methods, such as participant observation, focus groups or semi-structured interviews.

Participant observation is the least interactive field method as it entails observing actors engaged in the governance process. The method's lack of interaction with actors engaged in the process offers an empirical approach beneficial towards discerning the communication and power dynamics of actors in the different organizational arenas and communication forums that collectively are part of the policy-making process. Participant observation requires research to be ongoing with the process being studied. Interviews are a more interactive qualitative field method and, depending on the research question, interviews may occur before, during or after a process. Interviews allow the researcher to interact directly with actors engaged in a process and the format can vary in group size, length and level of structure. Semi-structured interviews offer thematic guides to the interviewee, while allowing for a high degree of flexibility for the interviewee to raise issues (Creswell, 1994). In-depth focus groups are small group meetings that allow participants to discuss a specific topic. This methodology allows the research to gather detailed information on a prompted topic, and particularly has been applied towards gaining public comment on policy at various stages of development (Burgess, et al., 1988a, 1988b; Limb and Dwyer, 2002). These three action-oriented research methods are particularly effective at gathering data on informal communications for an ongoing process.

3.1.3 Triangulation

While some qualitative studies are based solely on archival investigations (Ostrom, 1990), it is preferable to approach the problem using different qualitative techniques, so evidence may be tested against other evidence (Limb and Dwyer, 2002). Hence, empirical designs that feature qualitative field methods often triangulate, combining a number of different approaches (Denizen and Lincoln, 2000). For example, Litfin's (1994) archival research was complemented by interviews with actors engaged in the process of drafting the Montreal Protocol. A methodological mix is a logical empirical strategy to gather data on both formal and informal communications that are part of a policy-making process. Past researchers have emphasized the benefits:

“The mix of formal and intuitive approaches to the methodologies used in this study highlight the relationship between ‘factual’ data, derived from reports, documents and minutes of meetings, and the ‘judgmental’ evidence of individuals and social networks who play out social-local identities. The result was a healthy re-evaluation of

the 'factual' evidence, found in every case study, and much more insight into how groups actually form views and build up their distinctiveness" (Kousis and Gooch, 2001:97).

Building from this overview of qualitative methodologies, the next section discusses the methodological design of this thesis and presents the data collected.

3.2 Methodological Design and Data Collected

This thesis deploys a qualitative methodology to investigate *how an ongoing* policy-making *process* unfolds. The empirical design consists of:

- archival investigations,
- participant observations, and
- semi-structured interviews.

Archival investigation included extensive review of documentation, such as government documents, peer-reviewed literature about science in watershed management, media coverage and monitoring of actors' discussion on the Everglades Commons listserv.³⁰ The foundation of archival investigations was an exhaustive review of the 4000 pages of the *Central and Southern Florida Project Comprehensive Review Study (Restudy) Final Integrated Feasibility Report*. Other archival data collected include review of WRDA and other federal water management legislation and supporting documentation from organizations with a role in the Restudy process. Such supporting documentation included reports from the Governor's Commission for a Sustainable South Florida, information from the Task Force, Working Group and Science Sub-Group, as well as materials provided by interviewees pertinent to improved understanding of the different stakeholder groups' positions.

Qualitative data was collected in the field using the methods of participant observation and semi-structured interviews. Rather than fieldwork occurring in a single unit, empirical data collection occurred during four phases of fieldwork, detailed in Box 3.1. Archival investigations occurred in London between the fieldwork phases. The pilot study phase verified the appropriateness of the Restudy process as the thesis focus. The first and second phases were the core phases of data collection. Multiple benefits were experienced from undertaking iterative phases of fieldwork. Firstly, it allowed for my own reflexive development in gathering data.

³⁰ Hosted by the Sierra Club. Archives available: <http://lists.sierraclub.org/Archives/commons-everglades.html> [January 10, 2004].

Box 3.1: Fieldwork Dates

Pilot Study Phase	April 23 – May 17, 1999
First Phase	April 3 – May 10, 2000
Second Phase	January 31 – February 16, 2001
Follow-up Phase	January 2 – January 9, 2002

Secondly, the two core fieldwork phases were either ongoing with the Restudy process or immediately following authorization of WRDA 2000. Collecting qualitative field data ongoing with the process yielded data contemporary to actor engagement in the Restudy. Data collected immediately following authorization captured interviewees’ reflections on the Restudy process before the actors switched their focus to implementation of CERP. The follow-up fieldwork phase focused on participant observation at the Everglades Coalition Conference, where it was clear that within the year since the second fieldwork phase, actors engaged in water management had decisively shifted attention from the Restudy process to implementation of CERP.

Participant Observation Data

Participant observation occurred while attending a range of meetings by different organizations relevant to the Restudy process (Table 3.1).

Table 3.1: Meetings Where Participant Observation Data Collected

<u>Meetings Attended</u>	<u>Location</u>	<u>Date</u>
First Fieldwork Phase 2000		
SFWMD Governing Board Meeting	West Palm Beach	April 12th
Intl. Assoc. of Landscape Ecologists	Ft. Lauderdale	April 15-19th
Environmental Advisory Committee (EAC)	West Palm Beach	May 5th
Second Fieldwork Phase 2001		
Committee on the Restoration of the Greater Everglades Ecosystem (CROGEE)	Everglades National Park	February 1st
Taylor Slough Bridge Dedication	Everglades National Park	February 7th
Working Group Meeting	Homestead	February 6-7th
CERP Implementation Planning Meeting	West Palm Beach	February 13th
Follow-up Fieldwork Phase 2002		
Everglades Coalition Conference	Ft. Lauderdale	January 3-5th

Semi-structured Interview Data

A total of 77 semi-structured interviews were conducted with actors representing the gamut of stakeholder group interests including scientists, federal, state and local level public servants, environmentalists, farmers, Native Americans and local residents. For a list of interviewees and their primary stakeholder group affiliation see Table 3.2.

Table 3.2: Interviewees and Primary Stakeholder Group Affiliation

<i>Pilot Study Fieldwork Phase 1999</i>				
Interviewee	Affiliation	Title	Date	Taped
James Billie	Seminole Tribe of Florida	Chairman	May 10th	yes
Roberta D'Amico	ENP	Head of Interpretive Division	April 26th	untaped
Karyn L. Ferro	ENP	Ecosystem Planning and Compliance	April 26th	untaped
Brian Heron	Amfac Parks & Resorts	Naturalist	April 28th	untaped
Jennifer Huber	Amfac Parks & Resorts	Manager	April 29th	untaped
Ester McCulloch	Local Resident		May 5th	untaped
Robert Moehling	Local Farmer		April 28th	untaped
Deb Nordeen	ENP	Public Affairs	April 26th	untaped
Nanciann Regalado	COE	Public Affairs	May 9th	phone
Donna Ridewood	Museum of the Everglades	Manager	May 4th	untaped
Mechtild Rossler, PhD	UNESCO	Program Specialist	May 15th	untaped
Philip Selleck	ENP	Head of Law Enforcement	April 26th	untaped
Barbara Home Stewart		1950s Everglades explorer	May 14th	untaped
Ann Wech	Amfac Parks & Resorts	Retail	April 29th	untaped
Pat Wickman, PhD	Seminole Tribe of Florida	Director	May 6th	yes

<i>First Fieldwork Phase 2000</i>				
Interviewee	Affiliation	Title	Date	Taped
Ibel Aguilera	8.5 Square Mile Residents	Homeowner	May 9th	yes
Carlos Aguilera	8.5 Square Mile Residents	Homeowner	May 9th	yes
Ronnie Best, PhD, PWS	US Geological Survey (USGS)	Branch Chief & Supervisory Ecologist	May 2nd	yes

Dan Childers, PhD	Florida International University (FIU), Wetland Ecology Lab	Associate Professor	May 4th	yes
Billy Cypress	Miccosuke Tribe	Chairman	April 11th	untaped
Gene Duncan	Miccosuke Tribe	Water Resources Director	April 7/10/11	untaped
Alan Farago	Sierra Club	Miami Group Conservation Chair	May 8th	yes
Karyn L. Ferro	ENP	Ecosystem Planning and Compliance	May 2nd	yes
Dale Gawlik, PhD	SFWMD, Everglades Division	Sr. Environmental Scientist	May 5th	yes
William L. Kramer	Sugar Cane Growers	Senior VP - General Manager	May 3rd	yes
John Marshall	Arthur R. Marshall Foundation	President	April 26th	yes
Nancy Marshall	Arthur R. Marshall Foundation		April 26th	yes
Christopher McVoy, PhD	SFWMD	Senior Environmental Scientist	April 27th	yes
Robert Moehling	Local Farmer		May 2nd	yes
Jack Moller	Florida Wildlife Federation & Everglades Coordinating Council	Sportsmen (hunters and fishermen)	May 8th	yes
Bob Mooney	USGS & Evergladesvillage.net	Research Scientist & Webmaster	May 5th	yes
Philip Nott, PhD	Institute for Bird Populations	Research Scientist	April 17th	untaped
Jayantha Obeysekera, PhD, PE	SFWMD modeling	Director, Hydrologic Systems Modeling	April 28th	yes
John Ogden	SFWMD	Lead Scientist	May 1st	yes
Germaine Ploos	ENP	Policy Scientist	May 2nd	yes
Karsten A. Rist	Tropical Audubon Society	President	May 4th	yes
Jose Schmidt	Pompano Beach Farmers Mkt.	Manager	April 28th	untaped
Tom Schueneman, PhD	U. of FL Extension, Institute of Food and Ag. Sciences	Extension Agent IV	May 3rd	yes
Glen Simmons	Lifelong Resident		April 7th	yes
Buffalo Tiger	Miccosuke Tribe	Tribal Elder (Ex-Chairman)	April 11th	untaped
Various Tribal Members	Miccosuke Tribe		April 10-11th	untaped
Susan Uhl Wilson	Arthur R. Marshall Foundation	Member	April 26th	yes

Second Phase Fieldwork 2001				
Interviewee	Affiliation	Title	Date	Taped
Sue Alspach	Miami-Dade County, Dept. of Environmental Resources Management (DERM)	Special Projects Administrator	Feb 13th	yes
Stuart Appelbaum	COE	Chief, Ecosystem Restoration Section	Feb 1st	yes
Nick Aumen	ENP	RECOVER Team, Ecologist	Feb 14th	yes
Sonny Bass	ENP	Ecologist	Feb 7th	yes
Billy Causey	Keys Natl. Marine Sanctuary	Director	Feb 7th	yes
Mike Collins	SFWMD Governing Board	Chairman	Feb 13th	yes
Michael Davis	Department of Interior/ Formerly with Department of Army for Civil Works	Director of Everglades Restoration/ Formerly Deputy Assistant Secretary	Feb 7th	yes
Bill Dobson	Miami-Dade County	Water Utilities Official	Feb 13th	yes
Shannon Estenoz	Everglades Coalition/WWF	Co-Chair/Regional Coordinator	Feb 15th	yes
Frank Finch	SFWMD	Executive Director	Feb 14th	yes
Richard Harvey	EPA	South Florida Officer	Feb 12th	untaped
Bob Johnson	ENP	Chief Hydrologist	Feb 7th	yes
Bonnie Kranzer	GCSSF	Executive Director	Feb 7th	yes
Cynthia Laramore	Active Citizens Together Improving Our Neighborhoods	Executive Director	Feb 2nd	phone
Joette Lorian	Miccouske Tribe/local residents	Local Activist	Feb 5th	yes
Tom MacVicar	MacVicar, Frederico, and Lamb Consulting	Water Management Consultant	Feb 13th	yes
Agnes McLean	SFWMD	Planner	Feb 9th	yes
Mary Munson	National Parks Conservation Association (NPCA)	South Florida Field Representative	Feb 15th	untaped
Peter Ortner, PhD, JD	Natl. Oceanographic and Atmospheric Assoc. (NOAA)	Director, Ocean Chemistry Division	Feb 15th	yes
Lori Nance Parrish	Broward County	Commissioner	Feb 15th	yes
Bo Pelham	Hendry County	Commissioner	Feb 14th	phone
Audrey Peterman	African-American Community	Writer and Activist	Feb 2nd	yes
Armando Pomar	League of United Latin American Citizens (LULAC)	Florida State Director	Feb 14th	yes

Mary Ann Poole	Florida Fish and Wildlife Conservation Commission	Everglades Protection and Restoration	Feb 1st	yes
Various Local Residents	Homestead	Local resident	Feb 6th	untaped
Terry Rice, PhD, PE	Army Corps of Engineers	Colonel	Feb 2nd	yes
Mike Richardson	Homestead	Local resident	Feb 6th	untaped
Rock Salt	Army Corps of Engineers	Colonel	Feb 9th	yes
Rick Smith	Governor's Office	Office of Environmental Affairs	Feb 6th	untaped
Tom Teets	SFWMD	Head Planner	Feb 16th	yes
Craig Tepper	Seminole Tribe of Florida	Water Resources Director	Jan 30th	yes
Tom Van Lent	ENP	Hydrologist	Feb 7th	yes
Malcolm 'Bubba' Wade	U.S. Sugar Corporation	Senior Vice President	Feb 6th	yes
Patti Webster	Broward County	Environmental and Land-Use Lobbyist	Feb 16th	phone

Follow-up Fieldwork Phase 2002

Interviewee	Affiliation	Title	Date	Taped
Billy Causey	Keys NMS	Director	Jan 5th	untaped
Michael Collins	Governing Board	Chairman	Jan 5th	untaped
Michelle Diffenderfer	Lewis, Longman & Walker	Attorney	Jan 5th	untaped
Pamela Brooks Thomas	Governing Board	Member	Jan 5th	untaped

Contacted, but Unable to Interview

Name	Affiliation	Title
Barnett, Ernie	FL Dept. of Environmental Protection (DEP)	Director of Ecosystem Projects
Barbara Carey-Shuler	Miami-Dade County	Commissioner
Steven Davis	SFWMD	Scientist
David Guggenheim	Conservancy of SW Florida	President and CEO
Ron Jones, PhD	SE Env. Research Center (SERC)	Director
Bonnie MacKenzie	City of Naples	Mayor
Dick Pettigrew	GCSSF	Chairman
Fred Rapach	Palm Beach County	Water Utilities Officer
Bob Smith	Congressional Environment & Public Works Committee	Chair, NH Senator
Katy Sorenson	Miami-Dade County	Commissioner
Rebeca Sosa	West Miami	Mayor
Janet Taylor	Hendry County	Commissioner
Harkley Thornton	Governing Board	Member, Developer

Semi-structured interviews focused on thematic sets of questions towards fulfilling the research objective of investigating the Restudy process. As discussed in Chapter 2, environmental governance understands “public interest” in community affairs not as a monolithic position, but rather as consisting of plurality of interests. Collection of the opinions and perspectives from the plurality constituting the public interests in the Restudy process illuminated the range of values and knowledge engaged in the Restudy. Questions revolved around the aim of understanding *how* the Restudy process unfolded (Box 3.2).

Box 3.2: Types of Questions Asked

- How were you involved in the Restudy?
- What were your experiences during the Restudy process?
- What do you think is important for me to understand about the Restudy?
- What do you think about the role of science in the Restudy?
- What do you think about the inclusion of stakeholder groups in the process?
- What do you think about the role of public participation?
- What do you see as the strengths and weaknesses of the Restudy process?
- Is there anything that I have not asked which you would like to discuss?

Each actor had a different set of experiences, and it was essential to have flexibility in the interview content. The interview length and topical focus varied dependent upon the interviewee’s available interview time, involvement in the Restudy process and areas of expertise and interest.

For example, the interview with Audrey Peterman, activist from the African-American community, had an entirely different focus of discussion than the interview with Dale Gawlik, SFWMD avian ecologist. These differences were expressed not only in the information shared, but the different rationalities (Rydin, 2003) used to support their positions. Peterman’s interview focused on the need for environmental justice, especially for minority communities, including education and job creation as a feature that should be incorporated into CERP as a result of the Restudy process. In contrast, Gawlik’s interview focused on how scientific research was integrated into

the Restudy process. As a result of the semi-structured interviews, the primary purview and concerns of different actors became more evident. In the cases of Peterman and Gawlik, their topics of discussion existed in distinct spheres of concern. Gawlik did not mention environmental justice; Peterman explicitly stated she did not have the experience to comment on the use of science.

Hence, the data collection method of semi-structured interviews allowed not only for the gathering of experiences, concerns, insights and values about the Restudy process, but also how statements were conceptualized through use of different communicative rationalities. Semi-structured interviews also identified some unexpected relationships between different stakeholder groups. For example, farmer Robert Moehling was a vocal advocate for the protection of Everglades National Park (Plate 3.1). Moehling's farm stand was located on the access road to the Park and he was reliant on business from tourists traveling to the Park. He also was raised locally and valued the natural ecosystem both for as habitat for wildlife and a water source.

Plate 3.1: Moehling Advertising Everglades National Park



(Photograph by author).

By the conclusion of field phase two I had the opportunity to interview representative actors from the majority of key stakeholder groups. Potential shortcomings of the range of actors I recruited for interviews include not interviewing a representative from the National Audubon Society (NAS), Friends of the Everglades (FOE) or one key actor, Dick Pettigrew. While I recognize that both NAS and FOE have unique positions among environmental groups, I interviewed Shannon Estenoz,

Chair of the Everglades Coalition (EvCo) of which both the NAS and FOE are member organizations. It would not have been possible to interview an actor from each of the forty-one EvCo member organizations and both FOE and NAS released written statements about the Restudy, which I reviewed during archival investigations. I did attempt to interview Pettigrew, but was unable to contact him. Additionally, I gained exposure to Pettigrew's perspective from his detailed cover letters accompanying each Governor's Commission for a Sustainable South Florida (GCSSF) document. As the semi-structured interviews were intended to supplement existing documentation, the use of my limited time and resources were best allocated to interviews with actors from stakeholder groups lacking such written documentation. The following section discusses challenges encountered with implementation of the thesis' qualitative methodology and considers solutions developed to address these challenges.

3.3 Challenges of Methodological Implementation

The selected research methodology presented three particular challenges:

- 1) scale issues,
- 2) complexity and range of stakeholder groups, and
- 3) access to actors.

As discussed above, other researchers have encountered and addressed various challenges when using a triangulated qualitative methodological design. This section seeks to explore the specific challenges presented with implementation of this thesis methodology. While insights can be gathered from the literature to approach issues raised through the empirical studies of this thesis, as Miles and Huberman emphasize: "No study conforms exactly to a standard methodology. Each one calls for the researcher to bend the methodologies for the peculiarities of the setting" (1984:5).

3.3.1 Scale Issues

A fundamental challenge throughout the development and implementation of the methodology was the issue of scale. As discussed in Chapter 1, the greater Everglades' ecosystem offers a formidable geographical scale for investigation. In addition to the spatial extent, the ecosystem contains a range of landscape types and uses. The thematic issue of interest was water management policy development, so

the watershed was selected as the spatial scale for investigation. Another scalar challenge was demarcating the temporal limits of the thesis focus. Evolution of water management policy in Florida has occurred as an integral feature in the State's development since initial settlement (McCally, 1999). The large spatial scale of the watershed as well as the primary objective of investigating the dynamics of policy evolution in a shared-power world prompted demarcation of a limited temporal focus.

The Restudy, ongoing at the start of the thesis, was expected to conclude by the closing of the 106th Congress in December 2000. The timing of qualitative fieldwork offered the opportunity to gather actor insights about the Restudy contemporary with the unfolding of the process. The Restudy process was a project that evolved out of past water management policy, which presented a challenge of identifying a temporal starting point for the thesis. Similarly, the Restudy process was only the initial stage in the fundamental shift of water management policy to multi-purpose governance of water resources in South Florida. Ultimately, the starting point of the Restudy process and this thesis was delineated as the initial federal legislation that authorized the Restudy: WRDA 1992. The conclusion was signaled by WRDA 2000, the legislation that authorized CERP. Demarcation of the starting point and conclusion of the thesis focus by the passage of federal legislation allowed in-depth exploration of the unfolding of an ongoing policy-making process at the watershed scale. State laws also pertain; however, as relevant state laws are often linked to the passage of federal policy, federal legislation is a more appropriate point to delineate the thesis research focus.

3.3.2 Complexity and Range of Stakeholder Groups

Once the issues of spatial and temporal scale were addressed, implementation of methodological design presented the challenge of how to identify and incorporate actors from the range of stakeholder groups. Water is a basic need so in fact everyone within the watershed is a stakeholder. However, only a limited number of individuals were actively involved in the Restudy process. Involvement of these actors varied from those who had core roles in the process to those that contributed selectively, on the periphery of the process. The wider public, the majority of people, were not engaged and perhaps were not even aware of the Restudy process. With the objective of better understanding the policy-making process for the shared community concern of water management and to gather a range of values, knowledge, and experiences it was empirically relevant to interview actors both core and peripheral to the process.

I turned to the literature to discern if there were existing methods that I could apply to interviewee selection. Surprisingly, the literature often failed to adequately discuss this issue (Haughton, 1998; Litfin, 1994; Moore and Lee, 1999; Slocombe, 1998; Wolosoff and Endreny, 2002). Some studies that did discuss their methodological approach to participant selection for either interviews or focus groups used pre-selected sets of actors, such as those that had already participated in a contingent valuation survey (Burgess, et al., 1998) or a questionnaire (Connelly, et al., 2002; Fall, et al., 2003). Other studies used geographical criteria for selection of small groups (Harrison and Burgess, 1994; Stein, 1999) or developed sets of interviewee selection criteria (Rickenbach and Reed, 2002; Schuett, et al., 2001). To select interviewees, I applied principles of the methods deployed in other studies.

First, I identified that the *goal* of the interviews was to obtain direct insights from the range of stakeholder group interests within the watershed to supplement the information that could be gathered through archival investigations. Next, I delineated the following broad *characteristics* of interviewee qualities required:

- Awareness of the Restudy process
- Affiliated with a definable interest or sub-segment of population

From this point I brainstormed a list of identifiable segments of the population within the watershed, identified as *broad categories*. See Box 3.3 for a list of broad categories.

Box 3.3: Broad Categories of Interests

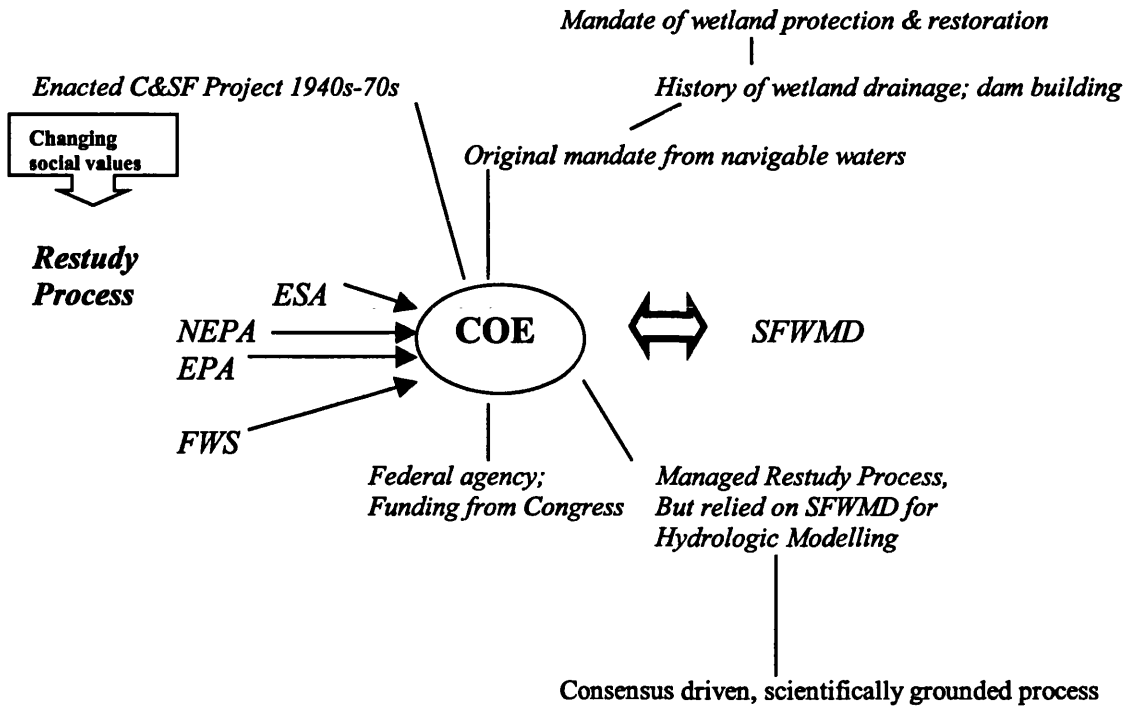
Federal Government	State Government
Local Government	Tribal
Local Citizens	Agricultural
Developmental	Environmental

These broad categories of interests were further sub-divided into distinctive sub-segments of *stakeholder groups*, with a distinguishable perspective on a given concern. For example, stakeholder groups within the category of ‘Tribal’ include the Miccosuke Tribe of Florida and the Seminole Tribe of Florida. Table 3.3 shows the stakeholder groups classified under the different categories. The roles, rules and relationships of each stakeholder group were mapped onto schematic diagrams to better understand the different stakeholder groups’ current viewpoint, how this had changed from past positionality, role in the Restudy and linkages to other interests. Figure 3.1 shows a sample stakeholder group map.

Table 3.3: Stakeholder Groups Classified by Categories

<u>Categories of Interests</u>	<u>Stakeholder Groups</u>
Federal Government	US Army Corps of Engineers (COE) Department of Interior (DOI) <ul style="list-style-type: none"> -National Park Service (NPS) -Everglades Natl. Park (ENP) -Biscayne Natl. Park -Big Cypress Natl. Preserve -Fish and Wildlife Service (FWS) -US Geological Survey (USGS) -Bureau of Indian Affairs Environmental Protection Agency (EPA) Natl. Office of Oceanic and Atmospheric Admin. (NOAA) US Congress <ul style="list-style-type: none"> -House of Representatives -Senate
State Government	South Florida Water Management District (SFWMD) Governor's Office <ul style="list-style-type: none"> -Governor's Commission for a Sustainable South Florida State Legislature Florida Fish and Wildlife Conservation Commission Florida Department of Environmental Protection
Tribal	Miccosuke Tribe Seminole Tribe of Florida
Local Government	County governments from sixteen counties within SFWMD
Local Citizens	African American Community Hispanic American Community Sportsmen Homeowners
Agricultural	Everglades Agricultural Area (EAA) Homestead area produce farmers Farm Bureau
Developmental	Developers Water Utilities
Environmental	Everglades Coalition (EvCo) <ul style="list-style-type: none"> -Audubon of Florida -Tropical Audubon Society -Sierra Club -Friends of the Everglades (FOE) -Arthur R. Marshall Foundation -Nature Conservancy -National Parks Conservation Association (NPCA) -World Wildlife Fund (WWF)

Figure 3.1: Stakeholder Group Map for the COE



Next, I identified individual actors who could be considered representational of the various stakeholder groups. Hence, to address the issue of scale I used the concept of *representational actors*, who are individuals with some degree of awareness of water management issues and can be identified as affiliated with one or more specific stakeholder groups. The question of representation is highly debated in the literature (for example see, O'Neill, 2001). While individual agency is a quality of interviewees, this does not diminish the strength or weakness of individual affiliations to specific stakeholder groups. Some affiliations are more definitive than others. For example, an ecologist at the SFWMD clearly represents that agency but also is conversant in the viewpoints of other ecologists about the role of ecology in a water management plan. Another example is Jack Moller, who I considered representational of lifelong residents, hunters and members of the GCSSF. Interviewing Moller provided an opportunity to gain various stakeholder groups' perspectives including how South Florida had changed in the past half century, viewpoints held by the sportsmen organizations he belonged to including the Florida Wildlife Federation and Everglades Coordinating Council, as well as insights about his experience of membership on the GCSSF.

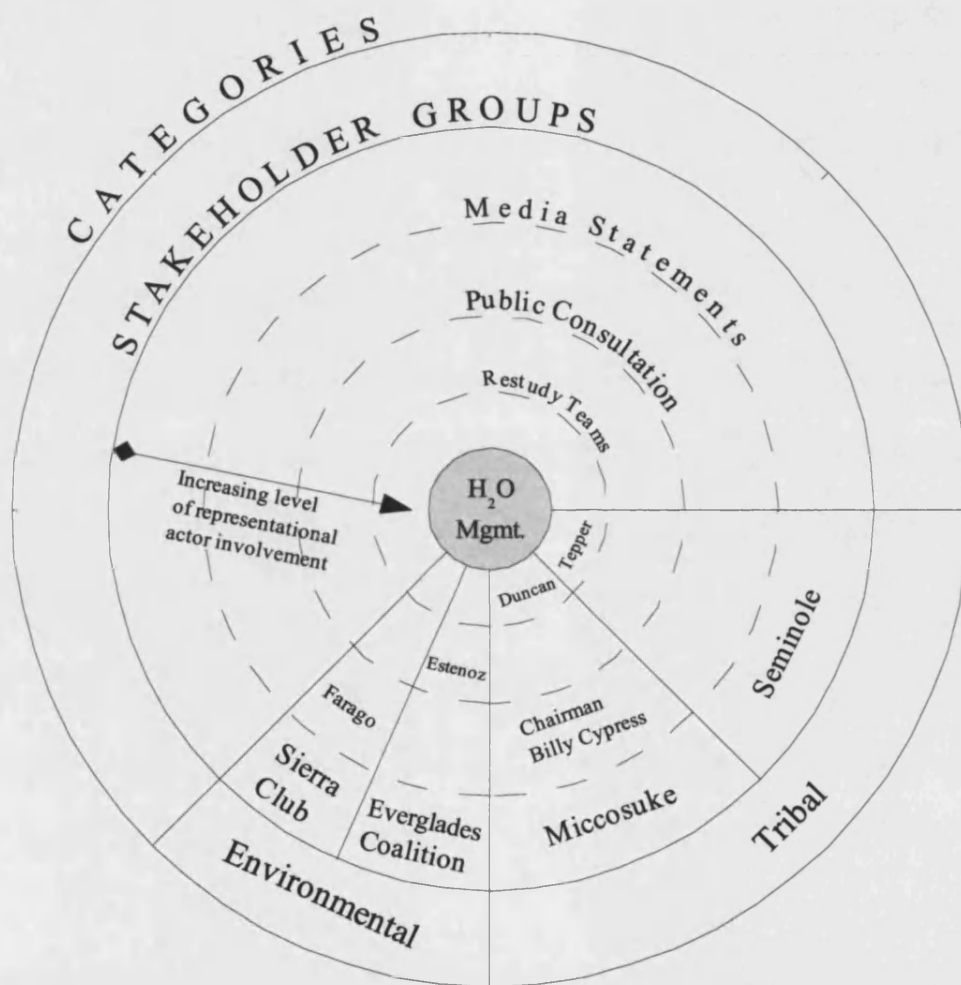
Identification of individual interviewees through the rubric of representational

actors was reflective of the fact that those actors aware and engaged in the complex process of water management decision-making did so from some existing experience, employment or cause, i.e. from one or more stakeholder groups. Furthermore, the identification of representational actors reflects that stakeholder groups consist of positions created by the actors who are part of them. For these reasons I argue that the concept of representational actors is a legitimate approach to gain insights into the distinct perspectives of the many stakeholder groups that exist within the greater Everglades watershed. I developed a conceptual interviewee selection map to assist in the identification of representational actors to contact for interviews (Figure 3.2).

The conceptual interviewee selection map consists of a series of concentric rings surrounding the central hub of water management. The concentric rings indicate level of involvement; involvement decreases with movement away from the hub. Radiating from the hub across the concentric circles are pie shaped segments of *stakeholder groups*. Within the stakeholder group segments individual *representational actors* are plotted based on their level of involvement in water management decision-making. This model offers a tool to help identify a range of individuals from different rings (level of involvement) and segments (stakeholder groups). Plotting individuals allowed me to better seek a balance amongst the limited number of actors I could approach for interviews. The other benefit to this conceptual approach was reflexivity of interviewee selection.

Returning to the two prerequisites for interviewee selection, interviewees should be related to one (or more) of the identified stakeholder groups and the actual actor interviewed required an awareness of the water management issues. However, “awareness” meant that individuals could, and in fact should, have varying degrees of knowledge, engagement and power in decision-making. Varying levels of knowledge and engagement by different actors was reflective of the reality that some actors were central to water management decisions and others were more peripheral, yet still had a definitive stake and a voice, albeit more limited, in water management. Hence, to understand the dynamics of decision-making it was imperative to identify interviewees across this spectrum of engagement. I imposed the additional interviewee selection criterion of individuals accessible within South Florida. This eliminated stakeholder groups without actors based in South Florida, such as the international community or interests based in Washington D.C. This additional interviewee requirement defined the role of interviews as a mechanism for inclusion of the voices of locally based actors who were involved with the Restudy, either

Figure 3.2: Conceptual Interviewee Selection Map by Stakeholder Groups³¹



³¹ For illustrative purposes Figure 3.2 locates representational actors from the stakeholder groups under the broad categories of 'Tribal' and 'Environmental'.

directly or indirectly, an aspect that could not be readily obtained through the extensive existing documentation. I applied my selection criteria and used the conceptual interviewee selection map as a guideline for identification of actors to interview during fieldwork. The next section discusses the challenges of honing the list of actors approached for interviews and accessing these individuals.

3.3.3 Access to Actors

This section discusses methods used to flexibly identify and then access actors. Implementation of the methodology featured deployment of a grounded theory approach. Access to certain actors, especially the powerful, required negotiation. Researcher positionality as an outsider, reflexivity of the data collection process, and transparency were methodological design features that enhanced access to representational actors. These features enabled application of “follow-the-actor” fieldwork methodology to gather interview data from a range of stakeholder groups.

Grounded Theory Approach

Grounded theory is an approach to qualitative research whereby the theme studied obtains higher specificity as a result of data collection and analysis. Developed by Glaser and Strauss in the 1960s³² the term is derived “because of its emphasis on the generation of *theory* and the *data* in which that theory is *grounded*” (Glaser, 1978; Strauss, 1987:22). As described by Strauss and Corbin it is:

“...theory that was derived from data, systematically gathered and analyzed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another. A researcher does not begin a project with a preconceived theory in mind...Rather, the researcher begins with an area of study and allows the theory to emerge from the data”(Strauss and Corbin, 1998:12).

Use of grounded theory was a logical choice for this thesis because it allowed for the emergence of increasingly nuanced questions as data collection and analysis occurred. As Strauss and Corbin explain, when seeking to understand a societal phenomenon grounded theory is beneficial because: “Theory derived from data is more likely to resemble the ‘reality’ ...[and] is likely to offer insight, enhance understanding, and provide meaningful guide to action” (1998:12). Three key features were grounding principles of the research methodology: reflexivity, transparency, and positionality.

³² Examples of their early work include Glaser and Strauss (1965; 1967).

Reflexivity, Positionality and Transparency

Reflexivity is integral to the recursive nature of the methodology whereby information learned during the course of research improved subsequent data collection and analysis. Establishment of neutral positionality³³ was of critical importance in the highly political context of South Florida. I presented myself as an observer of events and stressed my research interests as understanding how the Restudy process occurred. I declined to offer my opinions on the Restudy and avoided affiliation or alliances with any stakeholder groups. Hence, I positioned myself in the role of a neutral observer, effectively an 'outsider' to the process. Recognition of my outsider status was assisted through being based in the UK. Neutral positionality enhanced access to the range of stakeholder viewpoints and was a critical feature to my research.

While no researcher is entirely free from subjective perceptions based on life experiences, I designed my research attempting to be as objective as possible and constantly made a conscious effort to maintain neutrality.³⁴ Exposed to viewpoints of varied perspectives during interviews I sought to become engaged and empathetic with the different viewpoints. I began my fieldwork as a genuinely uninformed outsider; throughout my research I strived to maintain the outsider position despite increasing levels of knowledge. My outsider status was a *critical* ingredient to my methodology because it enhanced my ability to access individuals from the gamut of stakeholder groups. I navigated the social network to gather information, but also negotiated navigation in a manner avoiding dilution of my coveted outsider status. I thought of the situation in terms of the metaphor of a spider on an orb web. I was the spider traveling from actor to actor to gather information on the 'web' of the social network constituting the Restudy. I did not permanently belong to any one point on the web and sought to negotiate it without damaging the social network that I was traversing.

Most interviewees wanted to know my perspective, affiliation and research interest. I provided basic information on my research interest, affiliation with UCL, and stated my intention of interviewing a range of interests to better understand the Restudy from the perspective of stakeholder groups engaged in the process. For

³³I accept the range of points made in the literature about the impossibility of attaining entire objectivity. I contend that establishing neutrality is different than objectivity as the debate about objectivity relates to personal bias from life experiences and beliefs, while establishment of neutrality relates to the realm of action. I acknowledge that as a result of my identity, as any human, I cannot be entirely objective. However, I believe that I established neutrality in the field context to the greatest extent practicable.

³⁴ My notable potential bias at the incipience would have been a preconceived favorable viewpoint towards ENP because of my past experiences of visiting over forty National Parks across the nation.

example, I respond to interviewee Nick Aumen's questions, "Where are you? What institution?"

"I'm at University College London. I wanted to do a project that dealt with water resource management and also dealt with issues of people. So, the theme of the thesis is to look at how science, government policy and local knowledge all work together in the water management process. I chose the Everglades as a case study, and I'm focusing on the time frame from WRDA 92 to WRDA 2000".

Being based in the UK was an undeniable advantage in terms of willingness of actors to be interviewed. Firstly, I was unquestionably perceived as an outsider and actors often noted that they were pleased that their local issues merited and received international attention. Secondly, my lack of present or past local affiliation to South Florida enhanced my credibility as an independent outside observer. The sentiment observed was that local interests preferred qualitative research in South Florida to be undertaken by a researcher without established local affiliations, as such affiliations resulted in de facto research bias. Nevertheless, my identity as an American and familiarity with the political system helped me to understand the nuances of the politics of water management. In the highly political climate of South Florida individuals were sometimes suspicious of my intentions and before speaking with me sought to determine existence of de facto bias. For example, on various occasions I was asked if I was working for or funded by the federal or State government or affiliated with one of the local universities. When I answered that I lacked any of these affiliations individuals were more responsive to talking with me. For example, one actor said, "Since you could answer no to all these affiliations, I will talk to you." Hence, my outsider status balanced with my American identity enhanced the ability to achieve interviews with representatives from each of the major stakeholder groups.

A practical strategy deployed to maintain my outsider status was collecting information from others but not voicing opinions that I developed along the way. This was more challenging as the research progressed because by entering into the network of actors that constitute the active Everglades community, actors at times sought to categorize me (or my research), or in some instances actively attempted to enroll me in their position or organization. One example was John Marshall's encouragement to apply for a fellowship offered by Arthur R. Marshall Foundation. Such an action would have compromised my greatest asset as a researcher, my objectivity, and I declined to apply.

Another example was attending an Environmental Advisory Committee (EAC) meeting immediately after interviewing Robert Mooney, USGS employee and founder of www.evergladesvillage.net (Village). Mooney had asked me to take informational cards to the meeting for distribution and I gave the information to the meeting Chair for distribution, explaining that the information was neither from nor endorsed by me. I was most unhappy when the draft minutes of the EAC were circulated on the Commons indicating that I was a student doing research in the “environment” and had distributed information about the Village. I realized that this seemingly small matter could potentially compromise my outsider status. My response was to circulate a request for revision to the EAC and the listserv.³⁵ The revisions stressed the critical distinction of my identity: I was not a student of environment but rather a student of *society and environment*.³⁶

Interestingly, I received direct emails from some listserv participants supporting my action of clarifying my neutrality. For example Jack Moller wrote, “this is a good concept” (May 18, 2000) and listserv moderator Peter Rauch wrote, “Mary, CONGRATULATIONS! Yes. You are wise to pay close attention to this ‘detail’ of objectivity and neutrality” (May 18, 2000). These statements were further demonstration of the value of my outsider status to the research methodology. Whenever asked my opinion about the Restudy process, I politely declined to offer any feedback until my findings could be presented in the context of this thesis.³⁷ Maintaining neutrality strengthened my position as a researcher. I was told on numerous occasions that it was beneficial and important to have outside analysis of the policy-making process. The fact that participants saw me a neutral observer who could offer an objective source of analysis created a high degree of buy-in to my project as each stakeholder group wanted to be certain that I included and accurately portrayed their perspective. Furthermore, my neutral positionality hopefully established a fertile ground for accepting (and ideally incorporating suggestions for the future implementation) recommendations that emerge from this thesis.

³⁵ This was the only message I ever distributed via listserv. My role was to gather information and I felt that any type of participation had the real potential to compromise my neutral position in the social network.

³⁶ See Appendix 1 for complete wording of message.

³⁷ Because I felt it was crucial for the first presentation of my research and findings to be in the holistic context of this thesis, I have explicitly not sought to have any aspect of my work published prior to completion of my thesis.

The principle of transparency manifested in the willingness of actors to make public statements attributed to their names in this thesis.³⁸ In this regard, individuals identified, whether core or peripheral to the Restudy were all invariably already public personas. They had elected to speak or write in various public forums and had various motivations for becoming engaged in public spheres of discourse regarding the Restudy. Interestingly, the willingness of actors to speak with me was universal and moreover, with a few exceptions, actors consented to taped interviews so the empirical chapters contain direct quotations. The identification of actors by name in this research, and further the desire of the majority³⁹ of actors to be directly attributed to their statements reflect US culture and the social dynamics of South Florida. The willingness of individuals to make a statement and then stand by them may also be reflective of a positive quality of engagement in participatory decision-making processes. Without the feature of transparency not only the research methodology and results would have been dramatically different, but also the Restudy process itself.

During analysis, transparency allowed for better exploration and expression of agency as well as exploration of networks amongst actors and institutions. For readers, the thesis' transparency offers a historical account featuring insights from actors with agency, inhabiting specific institutions, engaged in a complex governance process. Attribution of names to statements in some instances may have resulted in posturing. However, any positions taken during interviews that may appear extreme were most likely consistent with postures assumed during the Restudy, hence concurrent with the social dynamics of the process.

“Follow-the-Actor”

Stakeholder group mapping was useful to understand the different stakeholder groups' positionality, but did not address *how* to select interviewees. One practical application of grounded theory methodology was identification of actors through tracing social networks. This fieldwork method of “follow-the-actor” enhanced the stakeholder group mapping to identify suitable interviewees who met the pre-

³⁸ I followed the social science ethical protocol of inquiring if I could identify them by name in the thesis and asking permission to tape the interviews. I was surprised to find that agreement to be interviewed served as an implicit acceptance to be mentioned by name in the thesis and taping an implicit agreement to be quoted. If an individual did not want to have information attributed to them they would signify it during the course of the conversation. For a variety of reasons such as the public persona of actors and American culture, my data collection methodology positioned me more like a reporter where participation in an interview signaled consent to appear in writing, rather than as a social scientist positioned to gather confidential data from anonymous public. Interestingly, actors used reporting terminology to denote the very few specific statements they did not want to be attributed to them as “off-the-record”.

³⁹ In a few instances actors requested portions of taped material to not be attributed to a given individual and all such requests were honored.

determined interviewee criteria and were also available in practice. “Follow-the-actor” approach meant following the social networks that actors inhabit to identify and contact representational actors. “Follow-the-actor” is an applied methodology theoretically linked to Actor Network Theory (ANT). ANT is a social theory based in the idea that actors possess agency and are linked in social networks (for example see, Burgess, et al., 2000; Davies, 2002; Latour, 1999). Murdoch and Marsden (1995) used network analysis of actor linkages in a rural economy and Schlosberg (1999) considered the role of social networks in the US environmental justice movement.

The methodology of “follow-the-actor” fulfilled the aim of data collection and was theoretically aligned with the principles of grounded theory as it encouraged the incorporation of reflexive data collection and analysis. As Kousis and Gooch note: “Intuitive approaches do not begin without a basic theoretical basis: they may be used and amalgamated, with the capacity for more feasible and exploratory approaches to the theory design” (2001:95). Finally, I continued to use the stakeholder group maps to chart positionality of different actors to verify the inclusion of a diversity of stakeholder groups amongst the affiliations of the interviewees.

A starting point for “follow-the-actor” methodology was use of the Everglades Commons listserv, which offered a logical entrée to identify representational actors and further provided a communication mechanism to initiate contact. An additional benefit of the Everglades Commons is that as the most open forum⁴⁰ for public comment I was able to communicate with actors more on the periphery of the Restudy process, whom I otherwise might have had difficulty identifying. Furthermore, Commons participants had demonstrated viewpoints about water management and as they were already willing to voice them in a public forum they also were likely to consent to participating in an interview. Three of my initial interviewees were identified as a result of their participation on the Commons: Gene Duncan, John Marshall and Jack Moller. Others, such as Dale Gawlik and Glen Simmons, were identified from published material distributed on the Commons.

⁴⁰ Open in that any individual could elect to join and participate without a limitation on the number of messages they could post on this listserv hosted by the Sierra Club. This was particularly appealing to members of the public who would be considered on the ‘periphery’ because in conventional public comment settings they encountered strict time limits to express their viewpoints if they did not have a voice in one or more of the established organizations core to the Restudy process. However, Commons moderators did have the power to censor submissions, which only occurred in what they identified as extreme circumstances. Nevertheless, as a result, unfortunately the openness of the listserv can be questioned. For example, in one instance viewpoints of local residents, who lived in a contested area that the Sierra Club favored reverting to natural lands, were silenced and barred from further participation in the listserv.

Hence, my prior introduction to the listserv during the pilot study phase by one actor, Karyn Ferro, perpetuated my ability to network with other actors. Interestingly, Duncan, Simmons and Moller had, to varying degrees, adversarial relationships with ENP, Ferro's agency. Any given actor had positive (friendly) or negative (adversarial) or, occasionally, neutral relationships with other actors involved in Everglades' issues. The recursive quality of communication with actors was clear. For example, interviewing Duncan led to an invitation to attend the Miccosuke Tribe's Lands' Survey where I had the opportunity to speak with Miccosuke Chairman Billy Cypress and other Tribal members (Plate 3.2). Insights from actors also provided me with an introduction to different types of meetings relevant to water management decision-making. For example, Duncan suggested that observing a Governing Board Meeting would be beneficial towards understanding the SFWMD's policy-making institutions. Prior to Duncan's suggestion I was 1) unaware of the meeting; and 2) did not understand the relevance of the Governing Board. This was the first of many instances demonstrating the steep learning curve I experienced during my research. Each individual I communicated with invariably opened a new facet to my understanding of the Everglades.

Plate 3.2: Buffalo Tiger and Chairman Billy Cypress Near Monitoring Station



(Photograph by author).

In addition to following leads from the listserv, I also used more traditional channels. I had contacted a SFWMD scientist, Garth Redfield, after reading his work about the linkages of science and management on the USGS website⁴¹ (Redfield, 1999). He referred me to another SFWMD scientist, Christopher McVoy. Subsequently, McVoy introduced me to the District's Director of Hydrologic Systems Modeling, Jayantha Obeysekera. I interviewed Obeysekera the following day. Another mechanism for gaining entrée to the world of actors was by attending a relevant conference, International Association of Landscape Ecologists (IALE).⁴² IALE provided a clear opportunity to network with scientists. I interviewed avian specialist Phil Nott, who suggested contacting Sonny Bass at ENP to gain an ecological perspective. I introduced myself to key scientist Ronnie Best and he further introduced me to the Restudy's leader in integration of science and policy, John Ogden. As a result of meeting these individuals at IALE, I was able to successfully arrange subsequent interviews with both of these key actors.

As fieldwork progressed I increasingly recognized multiple levels of interconnectivity amongst the network of actors involved in Everglades' issues and the beneficial aspects of the dynamic methodology of "follow-the-actor" as a mechanism for increased understanding both of issues and their linkages. The path of my fieldwork can be traced as a demonstration of the social networks, visually represented in Figure 3.3.

A number of notable points emerge from Figure 3.3. First, I used various means to identify and arrange interviews with actors. Second, initial communications with actors opened opportunities for additional interviews, reflecting the actor network inherent in the Restudy process. Complementary to the conceptual model I developed for interviewee selection, actor networks emerged from the data collection process and demonstrated the interconnectedness of actors engaged in or knowledgeable about the Restudy. The emergent network also reflected the reality of a researcher's approach towards understanding the complexities of social connections within a policy making process; in fact, the path of my empirical research is a map of my mental grappling with the social phenomenon of the Restudy process. Furthermore, as fieldwork progressed my knowledge increased exponentially rather than linearly because of my increased ability to identify linkages amongst actors, institutions and events.

⁴¹ Available: <http://sofia.usgs.gov/sfrsf/presentations/strategies/> [April 27, 2003].

⁴² April 15 – 19, 2000.

Figure 3.3, Part 1: "Follow-the-Actor" Networks from Initial Communication with Karyn Ferro

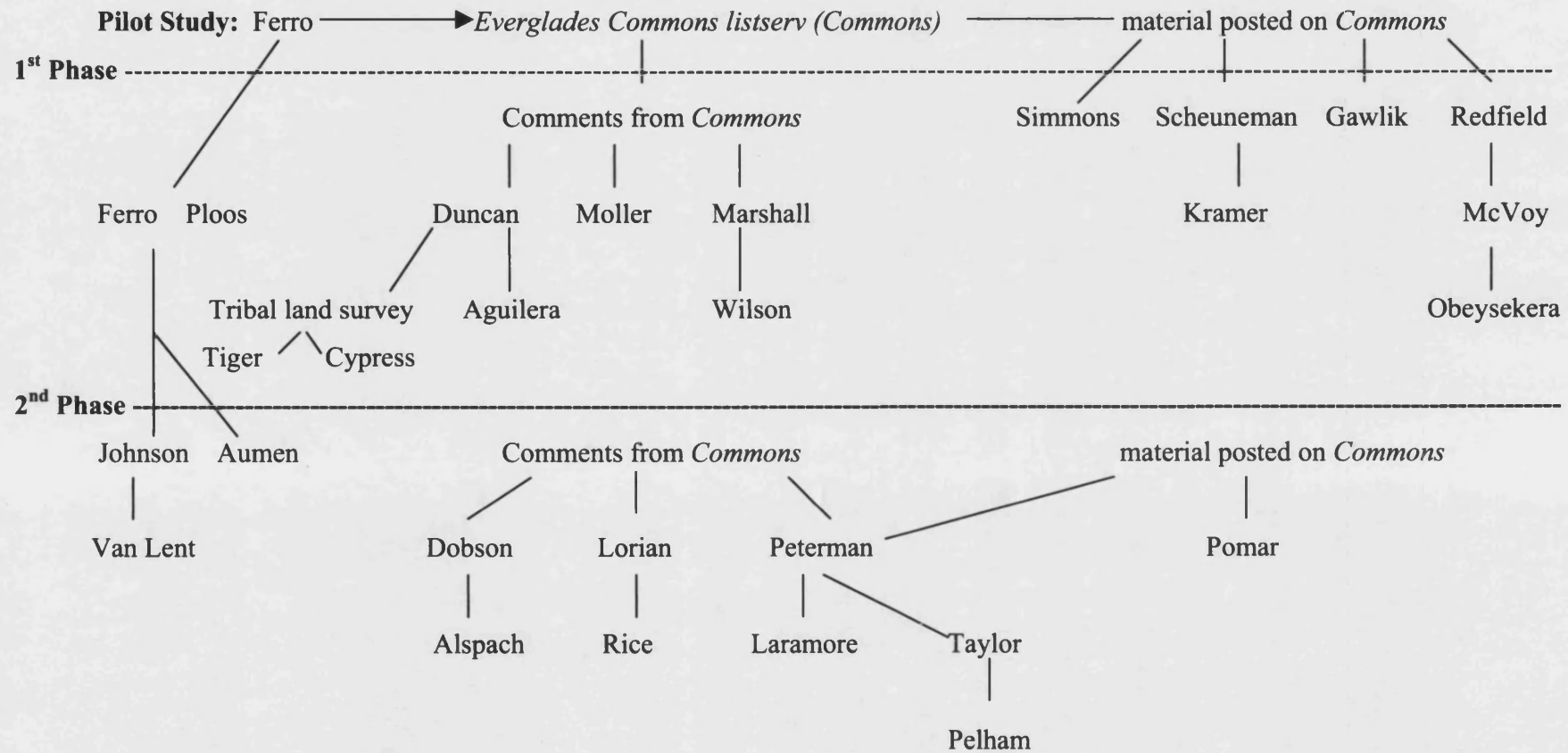
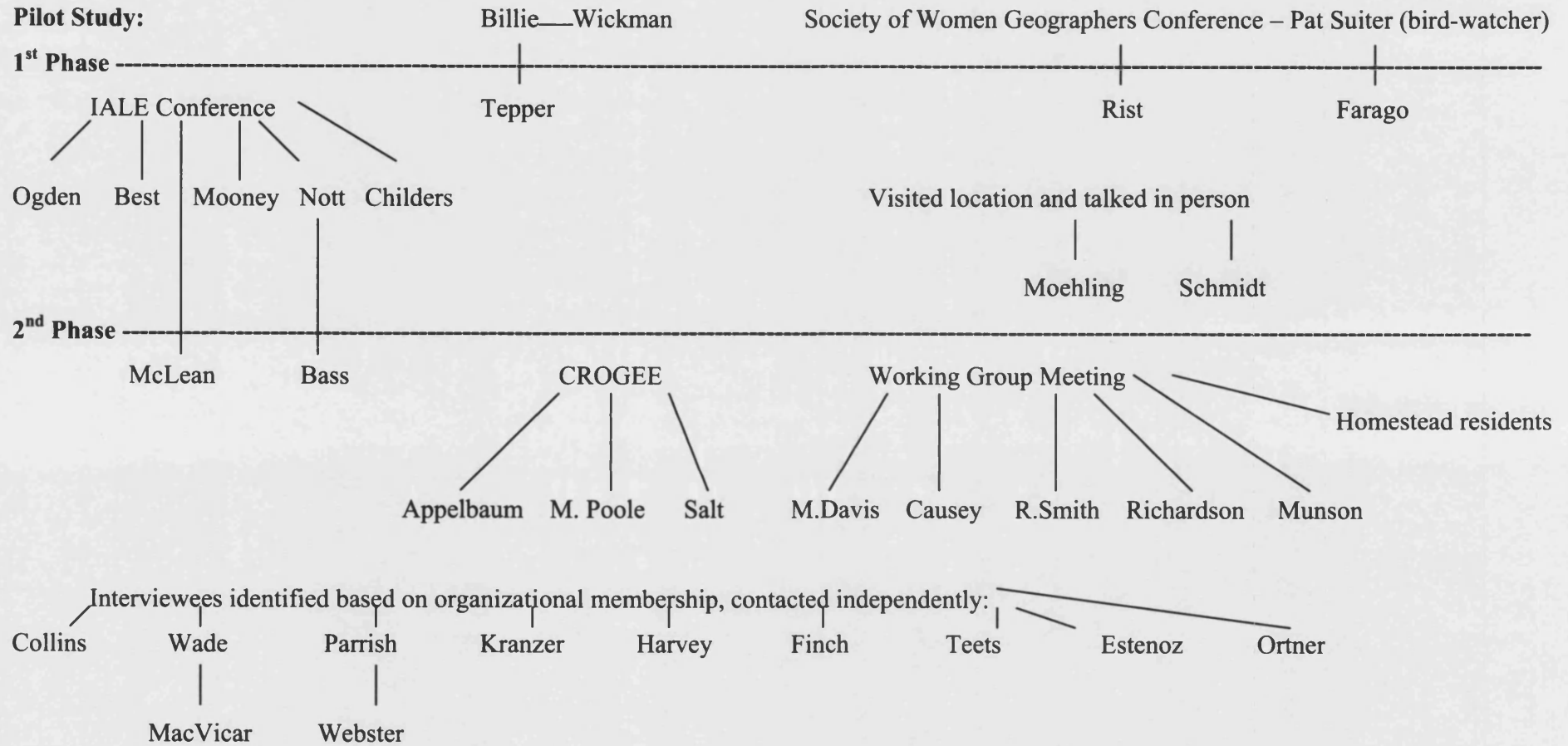


Figure 3.3, Part 2: "Follow-the-Actor" Networks from Meeting Attendance



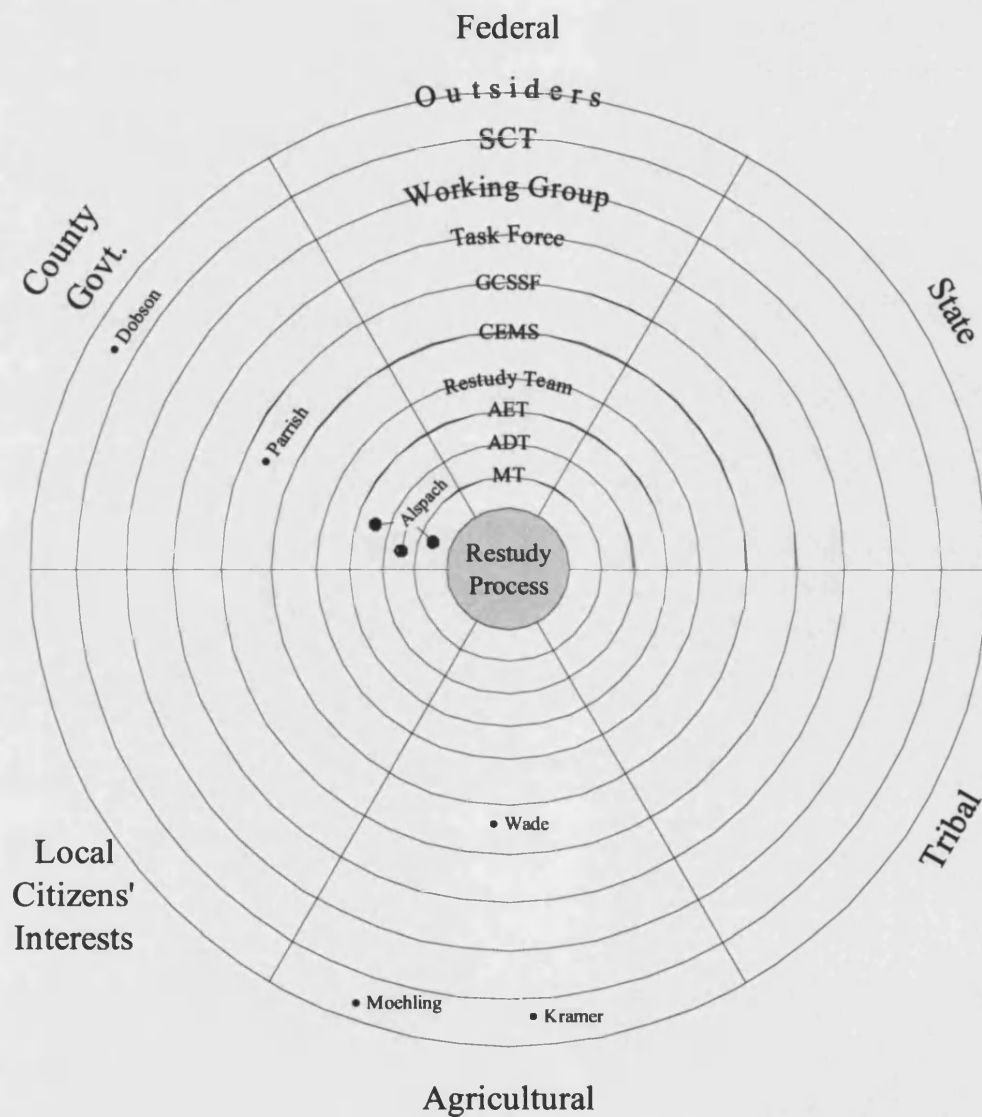
Actor Membership in Key Organizations

Another method deployed to identify representational actors core to the process was modification of the conceptual interviewee selection map to include actor enrollment in key organizations. The decision-making of the Restudy took place within a set of key organizations with a range of different stated purposes for existence. The term organization embodies the concept of actors networking within specific institutions. Hence, in this thesis “organization” is defined as a body of distinctive institutional structures inhabited by actors from a collection of stakeholder groups to fulfill a stated purpose in the Restudy. Many of the organizations were created specifically to fulfill aspects of the governance needs of the Restudy process and organizations evolved as the Restudy progressed. Investigation of organizations provides a set of manageable units from which to consider how actors and institutions recursively constituted the Restudy process.

Key organizations in the Restudy process included: the Restudy Team and its sub-components of the Alternative Evaluation Team (AET), Alternative Design Team (ADT), and Modeling Team (MT); workshops to develop Conceptual Ecological Models (CEMs); the Governor’s Commission for a Sustainable South Florida (GCSSF or Commission); the Task Force and its sub-components the Working Group, Science Sub-Group, which was later re-named the Science Coordination Team (SCT). Figure 3.4 provides a summary version of the revised conceptual interviewee selection map by actor membership in key organizations.

Concentric rings signify level of involvement in the Restudy. Involvement increases with movement towards the center. For example, the most proximate ring signifies participation in the MT, then ADT, then AET, then the Restudy Team, then CEMs, then GCSSF. While the outer ring of participation signifies organizational outsiders. Radiating from the hub across the concentric circles are pie shaped segments of stakeholder groups. Within the stakeholder group segments individual representational actors are plotted based on their level of involvement in the Restudy. This modified conceptual map was a tool towards identification of a range of individuals from different rings (level of involvement based on organizational membership) and segments (stakeholder groups), and was particularly useful towards identifying core actors. This conceptual map offered a tool for seeking a balance of interviewees from varied stakeholder groups that participated in the different key organizations of the Restudy process.

Figure 3.4: Conceptual Interviewee Selection Map by Organizational Membership⁴³



⁴³ For illustrative purposes Figure 3.4 plots interviewees from 'Agricultural' and 'County Government'.

I particularly sought to select representational actors that appeared in multiple organizations. One example of using the process of organizational membership review was the selection of interviewee Peter Ortner, a NOAA scientist who participated in multiple organizations: the Task Force, Working Group, Science Sub-Group and SCT. In terms of representing a stakeholder group, Ortner offered thoughts about the Restudy from the perspective of those who studied the ocean; NOAA had the unique perspective in the Restudy of looking upstream at the water flow into the ocean. Similarly, from an organizational perspective Ortner was involved from the origins of the Task Force and Working Group and further participated in the Science Sub-Group's early reports. For these many reasons, Ortner was a clear interviewee choice as he could converse about the Restudy from a definitive insider perspective.

Accessing Peripheral Actors

Investigation of organizational membership was an effective strategy for identifying core actors, but was not an effective tool for identifying peripheral actors that fulfilled the two criteria of interviewee selection. So, I had to devise a different approach for identifying such peripheral actors. I define a peripheral actor as an individual that speaks on behalf of a given stakeholder group but lacks membership within key organizations. To select peripheral actors I first identified what stakeholder group perspectives were lacking from interviewees. The African-American and Hispanic-American communities are large population segments within South Florida. Having identified these as critical stakeholder groups for inclusion in my research, I sought actors that could represent the viewpoints of these communities. The League of United Latin American Citizens (LULAC) has made previous written statements about environmental justice for the Hispanic-American population so Director Armando Pomar was a logical choice. I also contacted West Miami Mayor Rebeca Sosa. From the African-American community I contacted vocal activist Audrey Peterman, as well as Dr. Barbara Carey-Shuler, Miami-Dade County Commissioner from a district with a predominantly African-American population.

3.4 Data Analysis

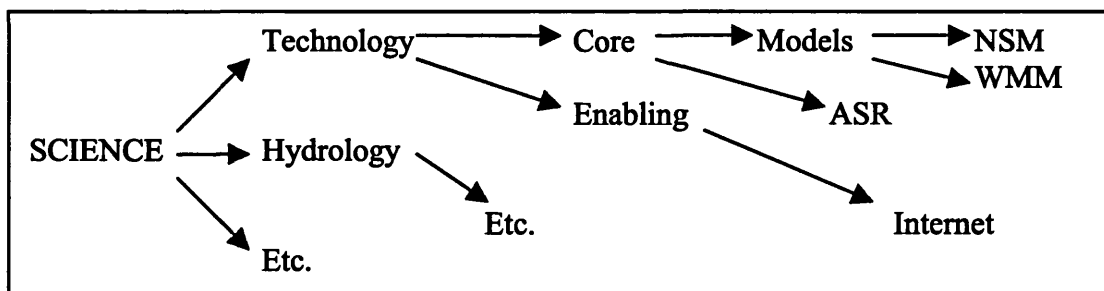
This section presents an overview of the processes and rationale I used for data analysis of semi-structured interviews. As with data collection, my data analysis methodology was an application of a grounded theory approach informed by Giddens

(1984) and Bryson and Crosby (1993). Tasks to analyze the semi-structured interviews included transcript verification, identification of themes, and coding of themes. Subsequent empirical chapters discuss the results derived from data collection and analysis.

Initial Analysis

Forty-nine of the seventy-seven interviews were taped.⁴⁴ These tapes, and interview notes were transcribed and then verified. In tandem with transcript verification I developed preliminary coding themes. The preliminary coding framework was structured into three sets of codes to reflect anticipated content of empirical Chapters 4-6, which at the time were planned to discuss policy, science, and local involvement. For example, the preliminary framework for science had sub-topics such as technology, hydrology, ecology, etc., which were further sub-divided. The result was a tree-like coding framework, such as depicted in Figure 3.5 for the science sub-topic, technology.

Figure 3.5: Initial Tree-Like Coding Framework



However, the tree-like approach had the limitation of presupposing connections amongst data that potentially would obscure more subtle linkages, the discovery of which was a primary objective of qualitative data analysis. Interestingly, my grappling with this question coincided with teaching myself two different software analysis packages: Nudist and Atlas.ti. Nudist used predetermined tree-like structure for analysis framework, whilst Atlas.ti was designed to code as free nodes. I ultimately

⁴⁴ The total interview number of seventy-seven includes the initial, more exploratory interviews during the pilot study. The exploratory nature of these interviews, as well as the follow-up interviews in Field Phase 3 did not merit taping and transcription. Four interviews occurred via phone and were not recorded due to practical limitations.

decided to use Atlas.ti because it was more conducive to building grounded theory, and enabled greater flexibility to identify and explore thematic linkages.⁴⁵

Open-coding Conceptual Themes

I brainstormed a list of broad thematic concepts, which is classified within grounded theory literature as *conceptual ordering*. In contrast to the abandoned tree-like framework, conceptual ordering of *open codes* encouraged more robust analysis whereby linkages were not presumed, but rather were emergent during the course of analysis. To open code I used the auto-code feature of Atlas.ti and began analysis by auto-coding the broadest concepts: *Restudy*, *CERP*, *policy*-most broadly,⁴⁶ *science*-most broadly, *consensus* and *WRDA*. I reviewed the results for each open code and made notations about the content. When reviewing auto-code results, the relevant sentence was highlighted within the transcript text so I always could see the broader context of any given usage of an open code. While I was familiar with the statements of individual actors, conceptual ordering presented the data to me in a new way; the review of open codes compiled *all* interviewees' usage of a given term. I recorded memos within each code's database but did not make notations attached to individual quotes at that point; rather, I found it beneficial to look broadly for similarities or differences amongst actors' statements pertaining to each open code. The purpose was to identify prevalence of ideas, trends, and concepts in connection to specific codes rather than to assign meaning to a given quotation.

I reviewed open codes to identify additional open codes and distinguish themes to later hand-code.⁴⁷ Branching out from the initial auto-codes subsequent open codes had multiple objectives including:

- 1) key themes;
- 2) identification of vocabulary used by actors;
- 3) frequently discussed ideas;
- 4) occurrence of words with meaning to the process (e.g. Natural System Model, model simulation D-13R);
- 5) ascribed feelings (e.g. detrimental, positive, connected);
- 6) overlap of vocabulary and concepts to discern relationship among themes.

⁴⁵ While I preferred the features offered by Atlas.ti to analyze semi-structured interviews NUDIST would be preferable for some qualitative research projects where a higher level of structure was applied to gathering data such as surveys or structured interviews.

⁴⁶ "Most broadly" was an identification I used to indicate auto-code searched for any occurrence of science and policy including plural forms and meaningfully fragments within words, such as "scientist" or "scientific".

⁴⁷ Hand-code refers to closely reading transcripts rather than relying on automated features of Atlas.ti.

In fact, the process by which I identified additional open codes was similar to “follow-the-actor” since auto-code review results provided ideas for subsequent open codes. In total I brainstormed and reviewed 199 open codes. The complete listing appears in Appendix 2. At 199 open codes I reached conceptual saturation where I was no longer discovering new concepts and additional open codes yielded redundant material. Anselm and Corbin discuss “theoretical saturation,” (Strauss and Corbin, 1998:143) but in practice I found that first distinguishing “conceptual saturation” allowed me to subsequently build theory from the results of conceptual ordering without potentially overlooking an important concept for inclusion. Throughout the review of open codes I also identified emergent themes by recording potential themes and quotation references for future hand-coding in a notebook. Upon completion of the open coding process I had identified a series of themes, some of which could be combined with each other. The benefit to maintaining a notebook as well as computer records was that at the completion of the auto-code exercise I had a chronological mental map of themes emergent from my open code analysis.

Questioning the Data

Before undertaking hand-coding, I turned to Strauss and Corbin’s (1998) suggested methodological approach for building theory by identifying a central concept. I reviewed the themes identified through analysis of open codes and synthesized the themes into unified issues, called *phenomena* by Strauss and Corbin and defined as “[c]entral ideas in the data represented as concepts”(1998:101) to identify interesting theoretical points for investigation in subsequent hand-coding. After this process of thematic synthesis the emergent central concept was **communication**. The concept of communication was a unifying strand relevant to institutions, actors and inherent in this policy-making process.

The process of synthesizing themes also led to the identification of questions regarding the roles of science, local involvement, policy, technology, consensus-building, power and uncertainty. Moreover, a key theoretical strand of inquiry emerged: organizational roles, stakeholder groups, and key actor *networks*. Communication, the central concept, was an inherent dimension⁴⁸ of networks and the roles of different phenomenon of the process. Specifically, communication expresses the procedural linkages *within* and *among* different categories⁴⁹ of networks. For example, investigation of communication within actor networks as well as

⁴⁸ Defined by Strauss and Corbin as “The range along which general properties of a category vary, giving specification to a category and variation to the theory” (1998:101).

⁴⁹ Categories are defined as “concepts that stand for phenomena” (Strauss and Corbin, 1998:101).

communication among actors and stakeholder groups or organizations. Hence, the nuances of thematic categories, i.e. their properties⁵⁰, and interrelationship amongst categories emerged as different facets to the common theoretical question of the role of communication in the Restudy.

Emergent from preliminary data analysis was the grounded theory that: *communication had an integral role in the success of the Restudy*. As Strauss and Corbin state:

“theory denotes a set of developed categories (e.g. themes, concepts) that are systematically inter-related through statements of relationship to form a theoretical framework that explains some relevant social, psychological, educational...or other phenomenon. The statements of relationship explain who, what, when, where, how, and with what consequences an event occurs. Once concepts are related through statements of relationship into an explanatory theoretical framework, the research findings move beyond conceptual ordering to theory” (1998:22).

The social phenomenon my research sought to explore was communication within the Restudy process. From this central theoretical question emerged related questions about how communication was a relevant *dimension* to the categories and their properties.

These related questions included:

- What are the roles of new organizations, actors and stakeholder groups?
- What are the key organizations in the Restudy? Why?
- How do actors, stakeholder groups and organizations communicate within social networks?
- How does representation of different values and viewpoints occur?
- How do different types of knowledge (e.g. science, policy, local) manifest through communicative networks?
- Do different types of knowledge have different levels of power in the Restudy?
- Does participation in core organizations by key actors from stakeholder groups mean buy-in?
- What are similarities and differences amongst the creation and evolution of the different organizations of the Restudy?
- How are institutions and the actors that inhabit them reflective of the

⁵⁰ Properties are defined as “characteristics of a category, the delineation of which defined and gives it meaning” (Strauss and Corbin, 1998:101).

different functional purposes of organizations in the policy-making process?

- How do different actors define their role and the role of others in the Restudy?
- Who are key actors with powerful agency in the Restudy?
- Why do these key actors possess agency?
- How does a given actors' sense of inclusion or exclusion in the Restudy relate to their overall satisfaction with CERP?

To answer these questions I began the lengthy process of hand-coding to explore the dimensions of the data.

Mining the Data

With a set of questions for focus of investigation I returned to Atlas.ti and initiated an intensive hand-coding process. To undertake coding in a logical format I began by creating a list of codes related to five broad categories: actor networks, stakeholder group networks, organizational networks, network linkages and open concepts related to process. The first four reflected the categories where communication occurs. Each of these broad categories had multiple dimensions that were coded. For example, actor networks included the following codes: roles of key actors; vision of restored everglades; outsiders; insiders; actors with agency in the Restudy; key actors mention of other actors. Examples of the dimensions coded for the open concepts related to process included: top down vs. bottom up governance; networks need time to evolve, and making everglades more real to people. For a listing of all hand-codes see Appendix 3. I identified the majority of hand-codes in Atlas.ti before hand-coding, but allowed myself the flexibility to input additional codes if concepts or phrases merited inclusion.

In the context of grounded theory literature, this hand-coding included both *axial coding* and *coding for process*. Axial coding is defined as “[t]he process of relating categories to their subcategories...around the axis of a category, linking categories at the level of properties and dimensions” (Strauss and Corbin, 1998:123). Coding for process, defined as coding for “sequences of evolving action/interaction, changes in which can be traced to changes in structural conditions.”(Strauss and Corbin, 1998:163) I disagree with Strauss and Corbin’s limitation of the definition of coding for process to changes in ‘structural conditions’ as a focus of my research was exploration of the dynamics of institutions and actor’s agency. Hence, for the purposes of my analysis I conceived of coding for process as a product of both

institutions and agency. In addition to changes in institutions and agency, the *function* (i.e. purpose) of the process is also subject to change. Due to the nature of my research, coding for process was an integral task to elucidate key events, points of transition, conflict and opportunity in the Restudy. Through application of grounded theory to analyze my empirical findings I mined the data to build theory to explain the dynamics of the Restudy.

Summary

From this review of the methodological approaches to data collection and overview of data analysis this thesis moves into the three chapters featuring the empirical findings from the methodology. Chapter 4 focuses on institutions, and is primarily a factual accounting of the formal events of the Restudy process from archival investigations. Chapter 5 shifts from institutions to the role of actors' agency in the Restudy and draws heavily from semi-structured interview data, exploring the role of informal communications. Finally, Chapter 6 focuses on the role of science in the Restudy process.

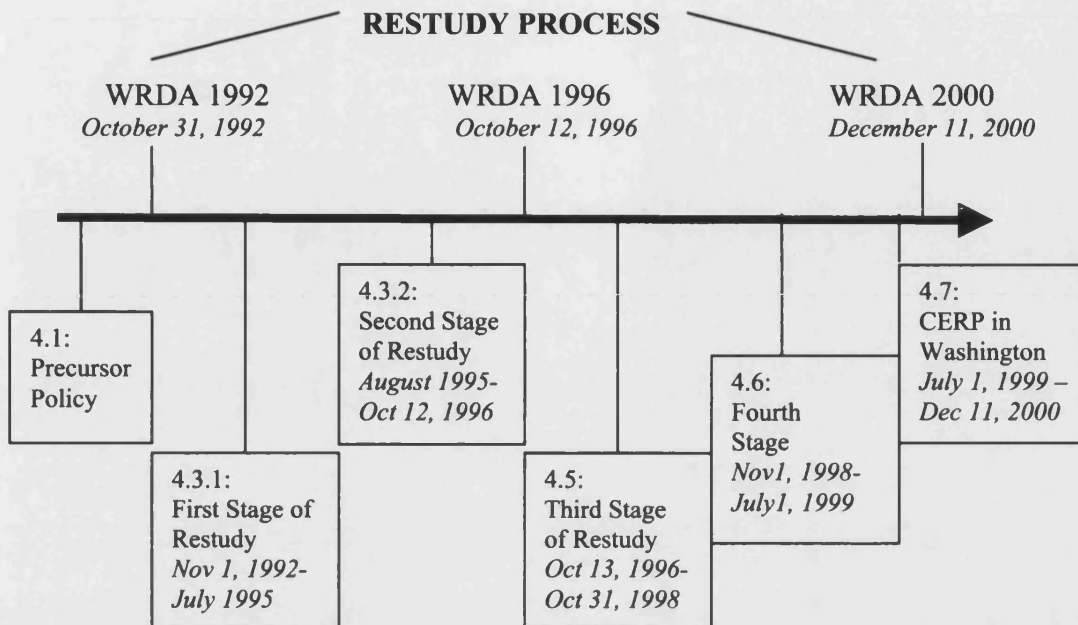
Chapter 4: Restudy Process – Coordinating Policy, Science and Public Involvement for Governance

*We cannot solve the problems that we have created with
the same thinking that created them.
– Albert Einstein*

Introduction

As discussed in Chapter 1, the C&SF Project, developed by the COE and authorized by Congress in 1948, was designed exclusively for flood protection and water supply. In response to changing societal values and growing scientific evidence of environmental destruction within the Everglades, Congress instructed the COE to undertake a Comprehensive Review Study (Restudy) of the C&SF Project. The Water Resources Development Act (WRDA) 1992 instructed the COE to develop a regional water management plan that integrated ecosystem restoration while continuing to meet human water management requirements of water supply and flood protection. WRDA 1992 is the policy demarcation that signaled the start of the Restudy process. The conclusion of the Restudy occurred with the authorization of the Comprehensive Everglades Restoration Plan (CERP) in WRDA 2000. This chapter identifies relevant events prior to 1992 and then focuses on the unfolding of the Restudy process. Analysis investigates how governance of the Restudy mobilized science and the range of socio-political acceptability to create a multi-purpose water management plan in a region with a history of past conflict amongst stakeholder groups about water. Discussion follows the evolution of federal policy and considers transformations of institutions and actors, which were critical to authorization of CERP and specifically focuses on the creation and evolution of organizations through the building of institutions. Figure 4.1 summarizes topics discussed in this chapter.

Figure 4.1: Topics Discussed in Chapter 4



4.1 Precursors to WRDA 1992

This section considers relevant policies and projects prior to WRDA 1992. Rather than approaching water management from a watershed scale, initial attempts at ecosystem restoration were fragmented, regional scale projects. New policies emerged at the state and federal government levels, establishing the social and scientific foundation from which the Restudy process developed.

4.1.1 Regional Scale Restoration

Initial attempts were made to alter South Florida's water management regime to be more inclusive of benefits to the environment in response to: 1) better scientific understanding of the ecosystem functions; 2) increased societal concern about nature; and, 3) the advent of federal environmental protection policies. Initial projects included alteration of water deliveries to ENP and Kissimmee River restoration. While not all were successful, lessons were learned which proved beneficial to the Restudy process. Notably, project failures highlighted the spatial, functional and socio-political inter-connectivity of the greater Everglades ecosystem.

Measures were taken as the C&SF Project was nearly completed to improve water flows to ENP, including the authorization of the Supplemental Appropriations

Act (1984), commonly known as Modified Water Deliveries (Mod Waters) and alterations to the C-111 canals (Map 4.1). Mod Waters was amended in 1985,⁵¹ 1988,⁵² and again in the ENP Protection and Expansion Act (1989) with the stated purpose “to modify the boundaries of [ENP] and to provide for the protection of lands, waters and natural resources within the park” (COE, 1999:L-16).⁵³ Hence, Mod Waters authorized purchase of agricultural lands to be flooded and its significance lay in recognition of ENP’s connectivity to adjacent land. Completion of Mod Waters had still not been achieved by the time of passage of WRDA 2000, and remains one of the most controversial debates in South Florida water management. Examination of further detail is beyond the scope of this thesis; however, it is notable that Mod Waters exposed that the complexities of negotiating water management conflicts transcend boundaries of property ownership. Also relevant is that these initial attempts at restoring the natural environment of the “Everglades” focused *only* on improving water flow to ENP, a downstream fragment of the remnant natural system. The concept of considering ENP in the larger context of its hydrological and ecological connectivity to the greater ecosystem was not contemplated. As a result, initial attempts to improve water management in ENP were largely ineffective.

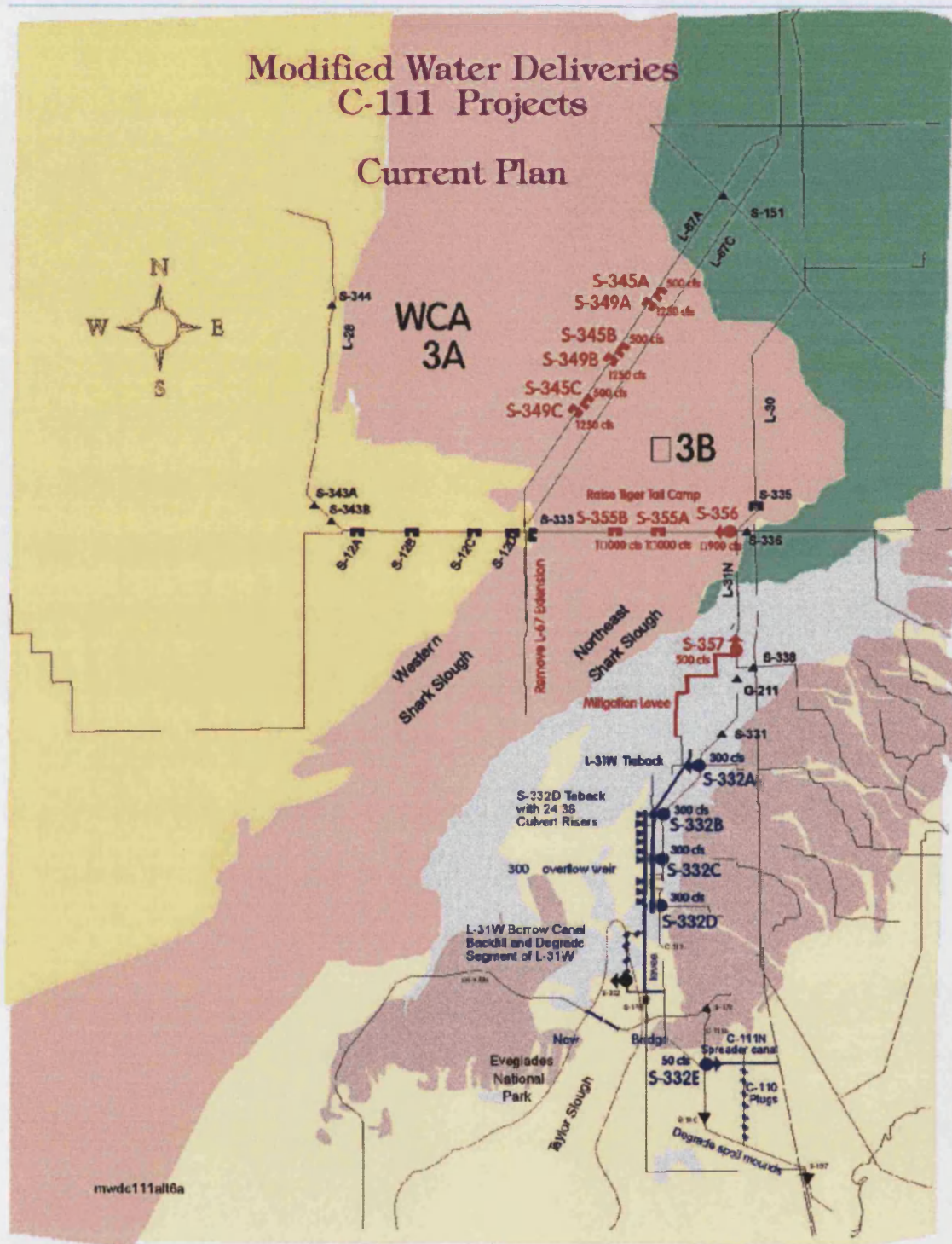
Other attempts at sub-regional restoration did achieve their objectives. The northernmost sub-region of the Everglades is the Kissimmee River, which flows into Lake Okeechobee. The meandering Kissimmee had been straightened beginning in the 1960s with devastating results to the natural environment (Pictures 4.1 and 4.2). The Kissimmee had been channelized from a meandering river and adjacent wetlands into a straight concrete canal for enhanced flood protection. As channelization neared completion the extent of ecological devastation demanded restoration. Efforts to restore the Kissimmee River engaged scientists, government agencies and local interest groups. Kissimmee River restoration demonstrated that it was possible to create conditions favorable for ecological restoration through modifications to hydrological management. The project determined ecological restoration was an achievable objective, and was a critical precursor to attempting larger regional Everglades’ ecosystem restoration.

⁵¹ See Ethics in Government Act Amendments of 1985.

⁵² See WRDA 1988.

⁵³ Excerpt quoted from Appendix L of CERP. Note that page numbers denoted in the format such as “L-16” are the convention appearing in CERP to number pages of appendices. Page numbers appearing in the format such as “7-1” are the convention used (section number followed by page of section) to number pages of CERP.

Map 4.1: Modified Water Deliveries⁵⁴



⁵⁴ Available: http://sflwww.er.usgs.gov/sfrsf/rooms/hydrology/mod_flow/modwater.html [March 15, 2004].

Plate 4.1: Kissimmee River, Channelized in the 1960s⁵⁵



Dredged material pumped onto the floodplain (right) destroyed wetlands.

Plate 4.2: Meandering Kissimmee River, Prior to Channelization⁵⁶



⁵⁵ Available: www.sfwmd.gov/org/erd/krr/photo/changal/krr546.html [February 26, 2004].

⁵⁶ Available: www.sfwmd.gov/org/erd/krr/photo/histgal/img0269.html [February 26, 2004].

4.1.2 Progression of Governance Institutions

While widening the objectives of water management to include environmental benefits, policy initiatives also progressed institutions that were beneficial to improved governance of water in South Florida. WRDA 1988 authorized development of a watershed scale, hydrological simulation model, which would later prove to be a crucial resource in the Restudy process. The Everglades Forever Act (EFA) (1994) was the policy outcome of legal processes to resolve conflict amongst different stakeholder groups. In particular, stakeholder groups in the downstream sub-region of the Florida Keys cited their hydrological connectivity with upstream portions of the watershed as the source of problems in the Keys and as the a rationale to consider upstream practices. Actors from the Keys were catalytic in the movement from traditional management of the Everglades by socio-political sub-regions towards building governance institutions that reflected hydrological and ecological linkages at a watershed scale.

Modeling Capabilities

An essential scientific resource enabling hydrological management to be addressed at a watershed scale was the technical capability to model the watershed. WRDA 1988 authorized creation of a hydrological simulation model of the South Florida ecosystem to:

... develop and operate a simulation model of the central and southern Florida hydrologic ecosystem for use in predicting the effects—
(1) of modifications to the flood control project for central and southern Florida, authorized by the Flood Control Act of 1948,
(2) of changes in the operation of such project, and
(3) of other human activities conducted in the vicinity of such ecosystem which individually or in the aggregate will significantly affect the ecology of such ecosystem, on the flow, characteristics, quality, and quantity of surface and ground water in such ecosystem and on plants and wildlife within such ecosystem (CERP, 1999:L-15).

Hence, the stated instructions for development of the hydrological simulation model yielded a resource that could:

- 1) improve planners' ability to understand the natural and modified greater ecosystem; and,
- 2) consider potential modifications to the system from the context of a large spatial scale and compressed temporal scale.

The *prior* authorization to create a hydrological simulation model of the watershed was an essential precursor to a water management project on the magnitude

of the Restudy. In addition to providing the technical resource to undertake watershed scale analysis, WRDA 1988 instructed the COE to work with State and local agencies, which established a technical basis for collaboration. Finally, the federal government demonstrated its commitment to a new strategy for management of South Florida's water resources by funding the majority of development and operational costs of the hydrological simulation model.

Everglades Forever Act (EFA): 1994⁵⁷

EFA sought to replace years of litigation between the federal and State governments, as well as adversarial stakeholder groups such as sugar farmers in the Everglades Agricultural Area (EAA) and the Miccosuke Tribe, contesting water quality. While review of the water quality conflict is beyond the scope of this thesis, it is pertinent to highlight the influence of EFA on governance institutions in South Florida. Stakeholder groups attempted to resolve water quality issues through the "hard infrastructure" of litigation in court. Vitriolic and expensive litigation was stopped not by a court ruling but by key actor Governor Lawton Chiles "laying down his sword"⁵⁸ in court and agreeing to negotiate a settlement, which became the EFA. Chiles, later a visionary actor in the Restudy process, took this action because he was persuaded that resources of time and money would be better spent on improving water quality than attorneys' fees.

Chiles' action was a turning point, a first step towards building social capital amongst conflicting stakeholder interests. EFA challenged actors involved in water management to consider alternative infrastructures for decision-making: negotiation, whereby no single interest was the "winner" or "loser", was identified as a preferred and practical alternative to litigation. Adversaries were encouraged to become partners to develop a plan for water quality improvement. These initial steps at building social capital were tentative, marked by distrust and animosity amongst the competing interests. However, the fact that these steps were taken and that through negotiation a solution acceptable to all sides and beneficial to the natural system was found, provided the foundation for more collaborative efforts even being contemplated as a possibility for future governance. EFA resulted in the creation of Stormwater Treatment Areas (STAs) and Best Management Practices in the EAA to reduce levels of phosphorus. The need for *further* measures to improve water quality and the determination of the appropriate maximum nutrient levels for the ecosystem

⁵⁷ Fla. Stat. § 373.4592.

⁵⁸ Statement made by a number of interviewees including Causey, Duncan, Rice, Salt and Wade.

remains an ongoing debate. The events leading to EFA have been cited as an example of how *not* to proceed in the future;⁵⁹ as a result stakeholder groups were challenged to look for a better way to resolve conflict, as well as demonstrating that it was important to be engaged in the process in order to have a voice in the results. The EFA outcome offered tangible encouragement to more wide-ranging stakeholder groups to be involved in the Restudy.

Downstream Looking Upstream

The most downstream sub-region of the greater Everglades ecosystem, the Florida Keys, was critical in promoting recognition of ecosystem connectivity. To the east of the chain of Keys is the Atlantic Ocean and to the west is Florida Bay. With both commercial fishing and tourism, Florida Bay is the economic base for Keys residents. Severe problems manifested in Florida Bay in 1987 with extensive algae blooms and sea-grass die-off, threatening the ecology of the Bay and economy of the Keys (Map 4.2). In 1990, adjacent to the still-troubled Bay, Congress created the Florida Keys National Marine Sanctuary (NMS)⁶⁰ stretching from the ENP boundary of Florida Bay, beyond the stretch of Keys and inclusive of Dry Tortugas National Park (Map 4.3).

Congress recognized the need to include a range of local stakeholder group interests in governance of the NMS. A Sanctuary Advisory Council (SAC) composed of different stakeholder groups was established to develop and implement a management plan for the NMS. Billy Causey provides insight on the selection process of some of the key representational actors on SAC:

...[Congress] told us to convene a SAC, made up of various groups in the community: commercial fishermen, recreational fishermen, scientists, the managers, and so on...since President Bush was a part of designating the Sanctuary, we had four names that were given to us by the President to put on our SAC. And those people were Republican leaders in South Florida, people that were very influential in the Keys. One of them was Mike Collins, a fish flats guide who is now Chair of SFWMD Governing Board.⁶¹

Some individuals appointed by George Bush to the SAC, such as Collins with the personal linkage of being the President's fishing guide, themselves were to become powerful actors in the governance of South Florida's water resources. Mike Collins

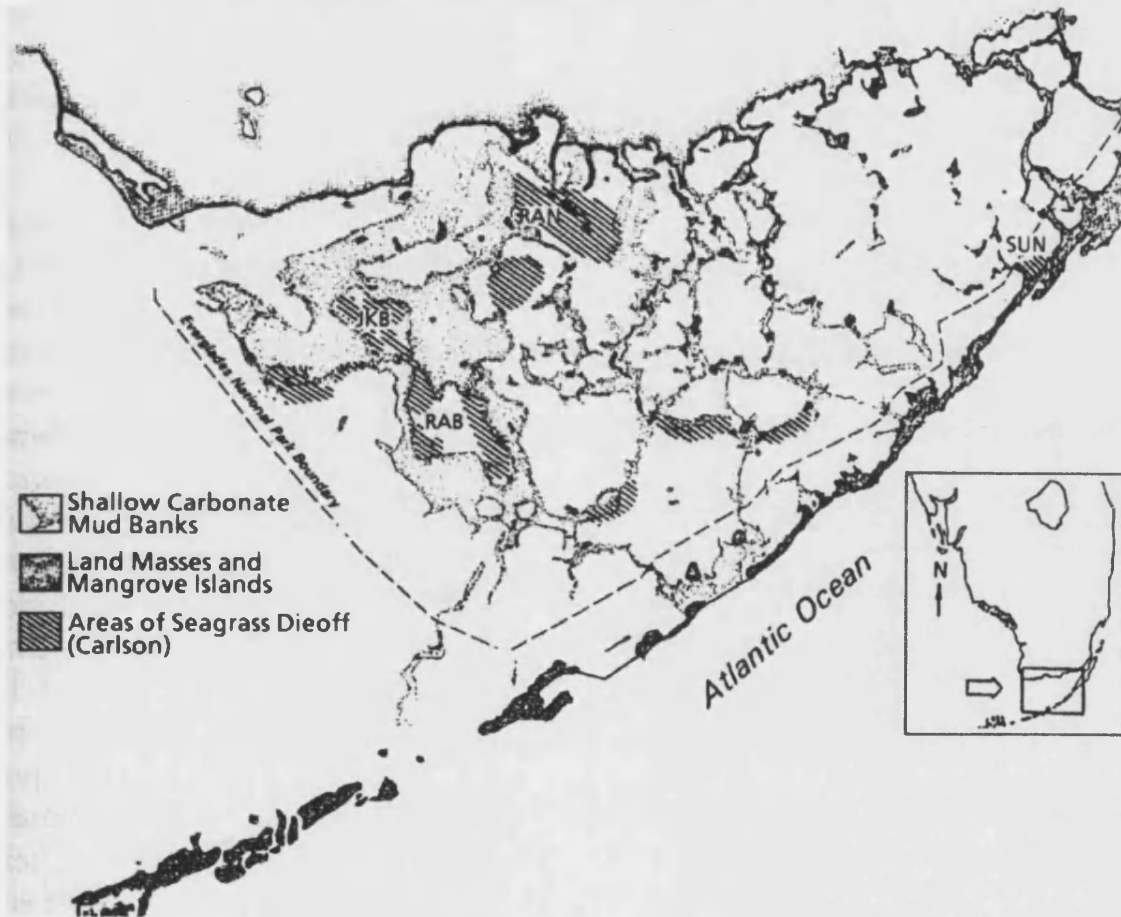
⁵⁹ Point raised by a number of interviewees including Estenoz, Ortner, Rice, Salt, and Wade.

⁶⁰ See the Florida Keys National Marine Sanctuary and Protection Act.

⁶¹ Quoted from Causey's interview. Future statements appearing in Chapters 4, 5 and 6 from interviewees should be assumed by the reader to be taken from interviews, unless cited otherwise. Refer to Chapter 3 for a list of interviewees and the interview dates.

said he began as “a voice in the back of the room” and ended up “running the show”. Collins brought a depth of local knowledge to the SAC and, in the longer term, he brought his SAC experience to the Restudy process. Billy Causey, a leading member of the SAC and Superintendent of the Keys NMS, became another key actor in the Restudy process.

Map 4.2: Extent of Seagrass Die-Off in Florida Bay⁶²

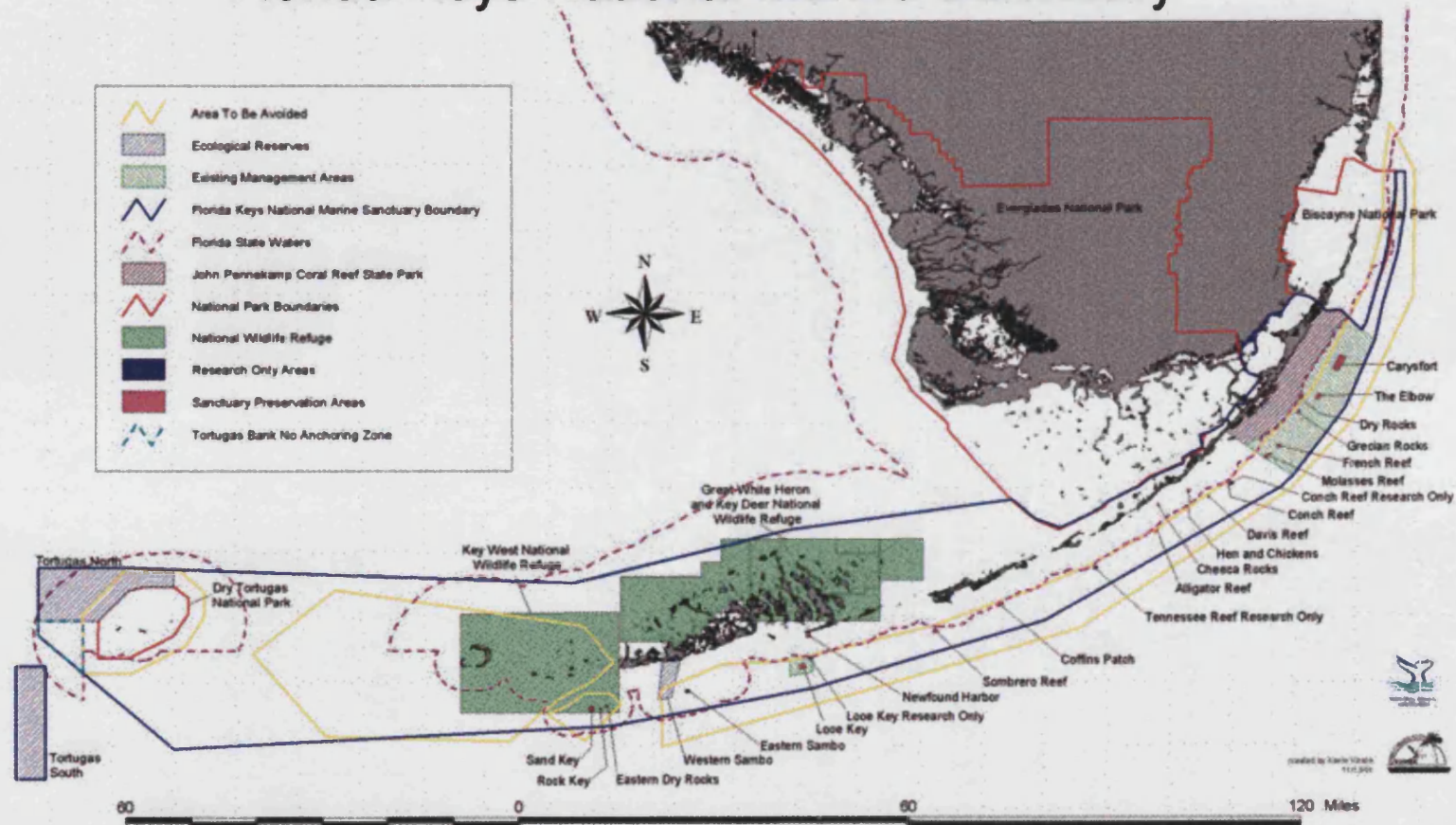


In addition to becoming a seedbed for key actors in the Restudy process, the SAC also provided a model for governance of water management issues, by demonstrating how government agencies could work together with local actors. Finally, the SAC initiated and catalyzed a policy shift away from hydrological management of the Everglades as socio-politically disparate units, towards new policies that reflected hydrological and ecological inter-connectivity at the watershed scale. At that time, an integrated approach was both novel and socio-politically unprecedented (Klingener, 2002).

⁶² As appears in McIvor, et al. (1994). The original source is Robblee, et al. (1991).

Map 4.3: Keys NMS, ENP and Biscayne National Park⁶³

Florida Keys National Marine Sanctuary



⁶³ Available: http://www.fknms.nos.noaa.gov/visitor_information/welcome.html [February 26, 2004].

The emergence of a watershed scale of governance can be tied to the vision and action of key actors.⁶⁴ The February 19, 1992 SAC meeting minutes recorded Chairman George Barley questioning how to manage the NMS without including the flow of water from Florida Bay. Causey recalled: “George Barley was not happy because Florida Bay wasn't mentioned, and that's when he said: ‘We're going into Florida Bay. The feds have spent hundreds of millions of dollars here in the Keys, but if we don't address what's happening in South Florida the Keys won't be fixed.’” A primary challenge to the SAC tackling the question of Florida Bay was that it contravened jurisdictional rules. Certainly, the federal identities of the SAC and ENP made the task feasible; however, new institutions had to be created to enable effective communication. Causey traced the ability of the SAC to develop new institutions to the agency of George Barley. Causey described Barley's strategy as grass-roots action on a federal level:

Barley started banging on doors in Washington. He was *very* effective, and was able to get to Secretary Babbitt. He was able to convince Secretary Babbitt that something had to be done...And it was exciting to watch the genesis of this all take place. But it was also interesting to watch how you mixed local knowledge, local information, with what we knew scientifically. Base it in science, but then to start pushing the political buttons to make it happen, and Barley knew how to do that.

Hence, Barley was an effective actor able to enroll a social network of powerful federal actors to address the SAC concern about upstream Florida Bay. For example, he encouraged individual visits by Congressional leaders and committee hearings in the Keys and, ultimately, Babbitt's June 1993 request for federal agencies to meet to discuss the watershed. Babbitt's instruction led to the establishment of the Task Force, which will be discussed throughout this thesis. Barley's powerful agency also was evidenced through passage of federal legislative resolutions immediately prior to WRDA 1992. The House of Representatives Committee on Transportation and Infrastructure passed two resolutions on September 24, 1992 to determine whether modifications to the C&SF Project were advisable. One resolution specifically addresses the question of hydrological connectivity from the perspective

⁶⁴ That the impetus to think in this provocative way was led from downstream was logical. In accordance with water rights east of the Mississippi, property owners adjacent to rivers or water bodies have the right to use; right to use includes the provision that you cannot take all the water from the stream and the water should be replaced in the channel for downstream users (Rogers, 1993). However, less explicit protection is provided for minimum flows for the natural system and as in this case, the law can result in downstream interests, in this instance Florida Bay itself, not having sufficient water quantity. The law can similarly result in contaminated water being sent downstream as individual pollution from users alone is not sufficient but cumulatively results in water quality concern.

of Florida Bay. From the concern of the connectivity of Florida Bay to downstream Keys NMS emerged the concept of looking at the interconnectivity of the greater Everglades watershed.

Thus, the SAC was a notable precursor to the Restudy process for a number of reasons. Firstly, it provided key actors to the Restudy process. Secondly, it promoted the concept of approaching greater Everglades' water management from a watershed scale. For example, Collins stressed hydrological connectivity across political jurisdictions noting the logic of pressure for watershed scale management originating downstream. Collins emphasized the relevance of Florida Bay as "the recipient of all our Everglades policy. This is where all of it winds up" (Klingener, 2002:22). Thirdly, the SAC originated the idea of creating new institutions that could appropriately address watershed scale governance across the traditional socio-political boundaries in South Florida. Finally, the SAC demonstrated the need to include varied stakeholder groups, such as federal agencies with different mandates as well as local interests, for more effective decision-making.

4.2 Authority to Think of Ecosystem in a New Way

WRDA 1992 signaled the decisive legislative directive to approach water management in the greater ecosystem at a watershed scale. WRDA 1992 was pivotal as the legislative incipience of the actual Restudy *process* by authorizing review of existing water management plans across a massive spatial scale in the context of not only human needs, but also the environment. Section 309(l) of WRDA 1992 states:

The Chief of Engineers shall review the report of the Chief of Engineers on central and southern Florida, published as House Document 643; 80th Congress, 2nd Session, and other pertinent reports, with a view to determining whether modifications to the existing project are advisable at the present time due to significantly changed physical, biological, demographic, or economic conditions, with particular reference to modifying the project or its operation for improving the quality of the environment, improving protection of the aquifer, and improving the integrity, capability, and conservation of urban water supplies affected by the project or its operation.

The stated objective of "improving the quality of the environment" instructed the COE to reevaluate the existing C&SF Project in the context of changed social values since its design and construction. The authorization placed environmental management on an equal status to urban water supply. This single paragraph was to

engage hundreds of scientists, public officials and interested individuals in the creation of a 4033 page *Central and South Florida Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement*, which was authorized as the Comprehensive Everglades Review Study (CERP) in WRDA 2000. The following sections focus on the unfolding of the Restudy process from WRDA 1992 to WRDA 2000.

4.3 Gathering of Knowledge

Following authorization in WRDA 1992, the Restudy process unfolded as two organizational strands of governance: 1) science; and, 2) policy. Peter Ortner described the identity and relationship of these separate strands as “parallel universes”. I found this a helpful metaphor through which to trace the progress of events in organizations with different primary foci. Figure 4.2 shows the relationship of the “universe” strands to stages of the Restudy process. The **science universe** denotes organizations focused on developing a scientifically sound plan. Originally composed of the COE, it broadened to include the SFWMD and then the multi-agency Restudy Team and sub-organizational grouping of the Alternative Development Team (ADT), Alternative Evaluation Team (AET), and Modeling Team (MT). The **policy universe** consisted of the Task Force and its subsidiary organizations such as the Working Group and Science Sub-Group. Obviously policy is addressed in the science universe, and vice versa but each universe had discrete roles in the Restudy process.

Within a short time, the **local voice universe** entered the Restudy’s governance framework through the creation of the Governor’s Commission for a Sustainable South Florida (GCSSF or Commission). This organizational strand focused on building social capital amongst conflicting stakeholder group interests. The Commission effectively created a *range of socio-political acceptability* that any proposed water management plan would ultimately need to fall within in order to be endorsed by the range of powerful local voices. The organizations grouped as part of the respective universes are depicted in Figure 4.3.

This thesis will demonstrate that the existence of these organizational universes as *separate* strands, with distinctive sets of actors and structures, was not redundant but rather a key ingredient in the overall governance framework and the formula for success of the Restudy process. Furthermore, the creation and evolution of new organizations was a critical feature of the process. The existing agencies, with their

individual mandates and jurisdictional limitations, simply did not have appropriate infrastructures for approaching water management at the watershed scale.

Figure 4.2: Universe Strands as Restudy Stages Unfold

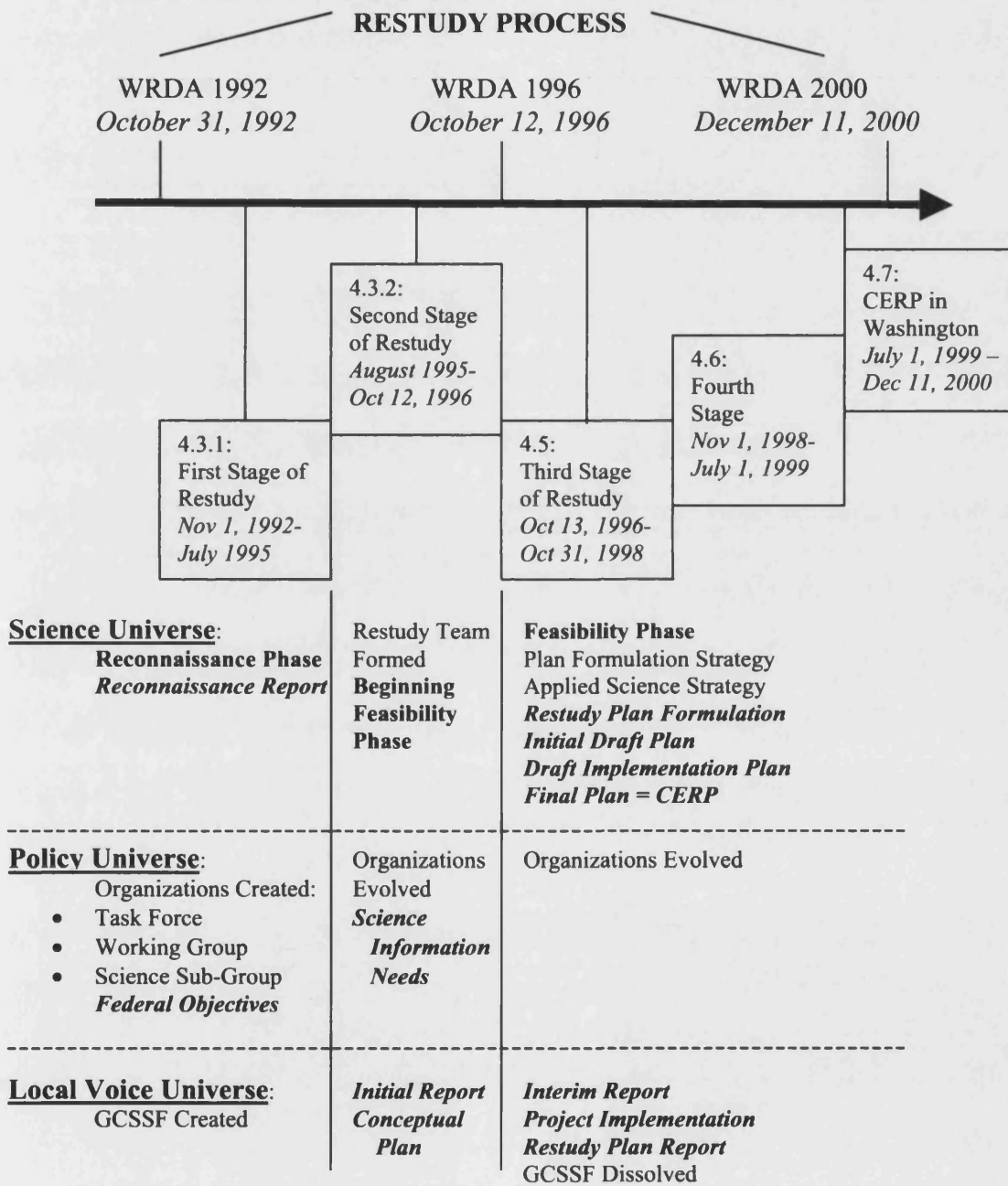
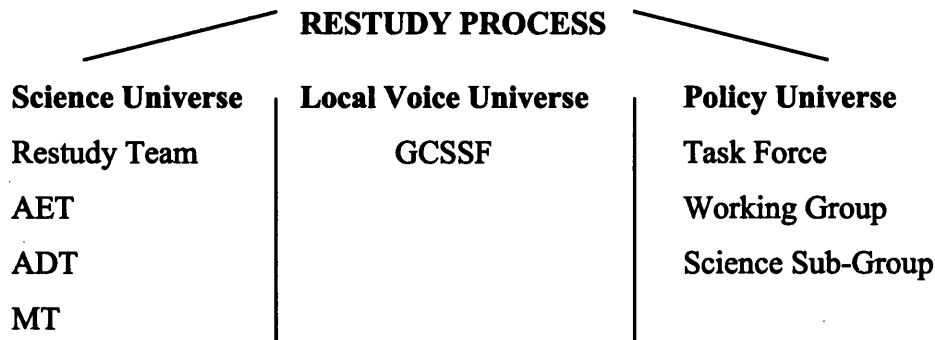


Figure 4.3: Groupings of Organizations by Universes



Fortunately, visionary leaders emerged within the three universes who recognized at the start of the Restudy that new organizations were necessary to provide the infrastructure to fulfill the directives of WRDA 1992. Key actors identified that development of a multi-purpose watershed scale plan required a process with institutions inclusive of stakeholder group interests at the watershed scale as well as grounding in sound science. In the following sections the importance of building new organizations to address emerging and increasingly complex problems is demonstrated as the evolution of the strands of the three universes are woven together in the Restudy process.

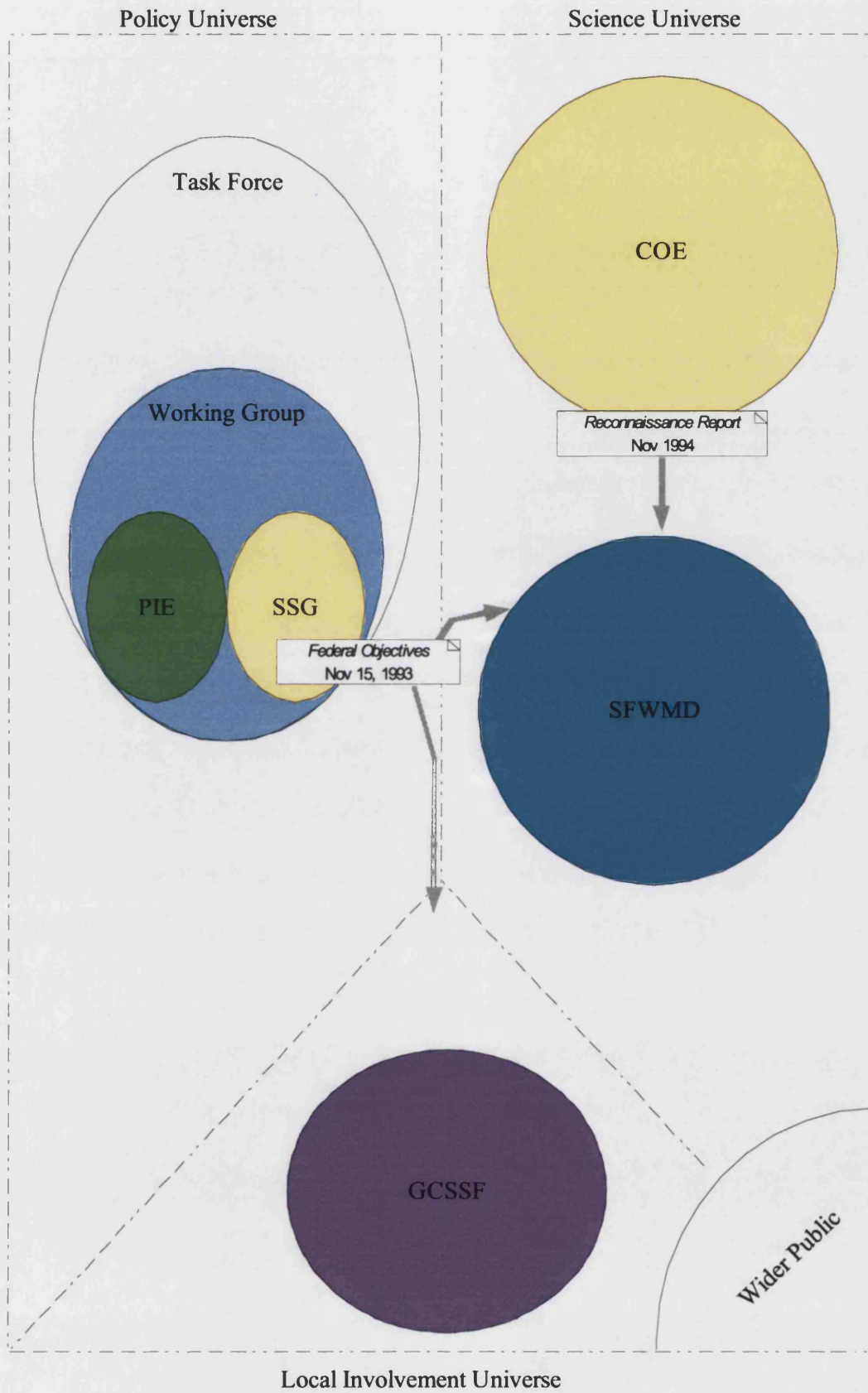
4.3.1 Restudy’s First Stage: November 1, 1992-July 1995

Following authorization of the Restudy in WRDA 1992, the actions of federal agency scientists preceded and then prompted creation of a parallel policy universe. Actors recognized that developing a multi-purpose water management plan on a watershed scale not only required sound science, but also should be socio-politically acceptable to key stakeholder groups. Figure 4.4 shows the organizations within universes during the Restudy’s first stage.

Reconnaissance Phase: June 1993 – November 1994

The Reconnaissance Phase was the first phase of scientific activity and standard operating procedure in the development process of typical COE projects. A reconnaissance phase occurs in coordination with a local sponsor, in this case the SFWMD. The objective is to determine if the proposed project merits development of a detailed plan to resolve identified water management issues (COE, 1997).

Figure 4.4: Restudy's First Stage (November 1, 1992 – July 1995)



Therefore, the Restudy's Reconnaissance Phase decided:

- The concept of modifying the existing system towards restoration was scientifically tenable;
- The necessary conditions existed for the COE and SFWMD to work together;
- The potential environmental and other benefits justified the likely economic costs.

Following standard procedures, the Restudy's Reconnaissance Phase was undertaken only by the COE and similarly was funded strictly by the federal government.

Therefore, the first generation of the science universe is contained within the federal level of government, but has a function of evaluating the future potential of partnership across federal and state government levels. The time to develop the Reconnaissance Report was restricted to eighteen months, so only limited investigation was undertaken. On the surface, the Restudy's Reconnaissance Phase appears to follow standard protocol; in fact, the federal government quickly recognized the complexity because of the project objectives and the number of federal agencies involved with different mandates pertaining to water, land and wildlife. Hence, in addition to the challenge of creating a scientifically viable plan was the very real challenge of developing a viable plan within the context of existing federal policy – a policy universe was required.

Creation of the Policy Universe

Parallel to the Reconnaissance Phase, a policy universe formed. The first stage of the policy universe was establishment of an Interagency Agreement (1993) amongst six federal agencies:

- Department of Interior (DOI)
- COE
- Department of Justice
- Department of Agriculture
- Environmental Protection Agency (EPA)
- Department of Commerce

The Interagency Agreement emerged from earlier efforts in the Florida Keys discussed above (observation, Working Group, February 7, 2001).⁶⁵ Secretary of

⁶⁵ Also see Interagency Agreement (1993b). Working Group meeting notes available: <http://www.sfrestore.org/wg/wgminutes/2001meetings/feb01wgmtg/feb01wgminutes.PDF> [December 18, 2001].

Interior Babbitt prompted formation of an Interagency Agreement amongst federal agencies in South Florida.⁶⁶ Causey recalled:

In June 1993 Secretary Babbitt had asked all of us federal agency managers and scientists to convene. He asked us several things. First, he wanted us to define the extent of the ecosystem. Second, to come up with some restoration objectives, and finally, a way to meet those objectives. We had a series of meetings that summer, and we started recognizing that we had a very difficult task to wrestle with. By September [1993] the Task Force had formalized their Interagency Agreement, but it was still just starting.

While the concept of an inter-agency agreement amongst *federal* agencies only scratches the surface of later coordination required across federal, state, local and tribal government agencies it was critical at the time because it transcended existing jurisdictional rules.⁶⁷

The Interagency Agreement (1993b) established the **Task Force** to “promote and facilitate coordinated Federal actions” with the stated purpose to develop “consistent policies, strategies, plans, programs, and priorities for addressing the environmental concerns of [the] South Florida Ecosystem”. Individuals serving on the Task Force were all senior managers in their respective agencies.⁶⁸ These actors formed a collaborative organization with decision-making authority that could knowledgably establish Everglades’ restoration policy within the broader context of existing federal legislation. The Interagency Agreement also established the **Working Group**, which reported directly to the Task Force. While the Task Force was responsible for developing consistent policies in a strategic manner, the Working Group was responsible for the management and coordination of specific projects and initiatives. Table 4.1 shows membership of the Task Force and Working Group.

Initial composition of the Working Group consisted of eleven agencies from six over-arching Federal Departments. Agency representatives on the Working Group were senior managers based in Florida. For example, under the Department of Interior are the agencies of the National Park Service (NPS), Fish and Wildlife Service (FWS), US Geological Survey (USGS) and Bureau of Indian Affairs. Notably, in this example the sub-agencies have different mandates. For example, the NPS is charged with protecting the spatially distinct area of federally designated Parks

⁶⁶ The formation of the Interagency Agreement followed Babbitt’s January 1993 speech at the Everglades Coalition (EvCo) conference, where Babbitt called for watershed scale restoration of the Everglades (see Langton, 2000).

⁶⁷ At the time the Lieutenant Governor, Buddy MacKay, promised the State would prepare to work with federal agencies (Langton, 2000).

⁶⁸ At level of Assistant Secretary or its equivalent.

and Preserves while the FWS has responsibility for protecting fish, wildlife and its habitat across the greater ecosystem. The Working Group established an organization that fostered communication and collaboration amongst federal agencies with contrasting priorities, as a result of their distinctive mandates. The Working Group's purpose, highlighted in its governing rules, was "to facilitate the expeditious resolution of issues"(Interagency Agreement, 1993b).

Table 4.1: Original Membership of Task Force and Working Group

<u>Departments on Task Force</u>	<u>Department's Agencies in Working Group</u>
Department of the Interior (DOI)	National Park Service (NPS) Bureau of Indian Affairs US Fish and Wildlife Service (FWS) US Geological Survey (USGS)
Department of Agriculture	Natural Resource Conservation Service
Department of the Army	US Army Corps of Engineers (COE)
Department of Commerce	Office of Oceanic and Atmospheric Admin. National Marine Fisheries Service National Ocean Service
Department of Justice	Department of Justice
Environmental Protection Agency	Environmental Protection Agency (EPA)
Department of Transportation	Federal Highway Administration Federal Transit Authority

Why were both organizations necessary? While functionally linked, they have different scales of responsibility. The Task Force manages policy strategy from the broadest context. The Working Group seeks to provide support to the Task Force by approaching issues from a more detailed, technical perspective and by implementing Task Force initiatives. In this regard, one of the responsibilities of the Working Group is to provide annual reports to the Task Force "presented as an integrated plan for ecosystem restoration, maintenance and protection, detailing current achievements, ongoing activities, and projected accomplishments" (Interagency Agreement, 1993b). Hence, the communication between the Task Force and Working Group is bi-directional. Bottom-up, because the Working Group makes recommendations to the Task Force and top-down as the Working Group is also

responsible for implementing Task Force directives.

Beyond the Working Group, the genesis of the policy universe stipulated an additional layer of functional responsibility by allowing the Working Group to establish "Working Sub-Groups"⁶⁹ to fulfill specific roles. Notably, the Working Group was specifically charged with both the development of an ecosystem-based science program and a public information and education program for "encouraging opportunities for public involvement"(Interagency Agreement, 1993b).

Science in the Policy Universe

A demonstration of the critical role of science in Restudy process is that *prior* to the first meeting of the Working Group,⁷⁰ high-level agency scientists organized. This ad hoc group of scientists effectively formed the Science Sub-Group. On November 15, 1993 the Science Sub-Group released a report *Federal Objectives for the South Florida Restoration (Federal Objectives)*, providing a scientific, multi-agency consensus document which advocated a watershed scale approach and restoration objectives. *Federal Objectives* was bold in terms of its vision for restoration by proposing controversial objectives, and extremely powerful as a unified statement from federal agency scientists.

While *Federal Objectives* divided the ecosystem into nine sub-regions and then discussed ecological and hydrological restoration objectives for each sub-region, it presented critical linkages of each sub-region to the others and identified success criteria that often crossed sub-region. The introduction clearly instructed readers to consider use of sub-regions as a tool to look at the system holistically:

The problems and potential solutions identified in sub-regions apply to the entire system; the problems can only be solved by a regional approach. An important lesson from history is that, in this ecosystem, any successful restoration plan developed must encompass the whole regional system, not geographic areas in isolation (1993a:5).⁷¹

In addition to systematically approaching the concept of greater ecosystem restoration, the report also argued that hydrology is the basis of the ecosystem and that ecological restoration was therefore dependent on hydrological restoration.

The fundamental tenet of South Florida restoration is that hydrologic restoration is a necessary starting point for ecological restoration. Water built the South Florida ecosystem. Water management

⁹ In my archival review "Sub-Group" also appeared as "Subgroup". The thesis consistently uses the style "Sub-Group" in the text, but reflects the appearance as "Subgroup" on the title pages of the organization's 1993 and 1996 reports.

⁰ In December 1993.

¹ Available: <http://www.sfrestore.org/sct/docs/subgroupprpt/intro.htm> [December 19, 2001].

changes are seriously damaging this Ecosystem. And restoration begins with the reinstatement of the natural distribution of water in space and time (1993a:5).

In the early stages of the restoration effort, the scientific argument to “get the water right” was popularly embraced by the public as the conventional wisdom of restoration. For a time, car bumper stickers in South Florida proclaimed: “It’s the water, stupid.”

Federal Objectives placed the scientific objectives of restoration in the politically attractive context of not impeding the region’s economic or urban growth, but rather recalibrating the region to an interpretation of sustainability that seeks to be beneficial to the economy and the ecosystem. As neither alligators nor birds vote, rationales for restoration highlighted benefits to humanity and connected the quality of life in South Florida to the health of the ecosystem. It is important to recognize that from the earliest stages, the Restudy process existed in a pro-development context. Therefore, the concept of “restoration” of the Everglades from the beginning can be classified as a weak sustainability agenda,⁷² in which “restoration” was implicitly inclusive of water supply and flood protection. For example, *Federal Objectives* stated, “Although it may place some constraints on land use, the restoration program will reduce constraints on economic expansion by increasing the overall water supply and improving the quality of life” (1993a:5).

Nevertheless, *Federal Objectives* challenged status-quo land use, particularly agricultural interests in the EAA. The contents of *Federal Objectives* were controversial because, despite advocating a weak sustainability framework, the scientific vision of restoration appeared unrestrained by the realities of socio-political limitations. Compared to later documents *Federal Objectives* presented the most radical approach to restoration. For example, the report advocated, in considerable detail, the creation of a restorative flow-way⁷³ through the EAA. The report also identified the impossibility of the “idealized goal” of returning the ecosystem to pre-drainage conditions. At best “what one can hope to recapture is essential hydrologic landscape characteristics that were critical to a sustained...ecosystem” (1993a:21). The report identified the use of the hydrological simulation models, Natural Systems Model (NSM) and the South Florida Water Management Model (WMM), as important tools to evaluate possible modifications to the system. Expressing

² Such as described by Christoff (1996) and O’Riordan (2001).

³ “Flow-way” appears stylistically in varied forms in archival documents. I use the convention of “flow-way,” however I maintain the stylistic variations appearing in direct quotations.

uncertainty about the range of feasible actions, scientists identified both “incremental” (minimal actions) and “unconstrained” solutions for restoration.

Interestingly, the *minimum* plan included the recommendation for a flow-way to reconnect Kissimmee River, Lake Okeechobee and downstream portions of the Everglades. The report stated:

A flowway supporting a tall, dense, sawgrass landscape is an ecologically valuable incremental improvement in restoration design. This vital vegetative component of the predrainage landscape was lost to development and drainage. It is important that the flowway mimic the predrainage function of dynamic storage and sheet flow conveyance facilitated by that landscape. Thus the flow way would provide large conveyance capability, sheet flow, dynamic storage, increased areal extent and heterogeneity of wetlands, and wildlife corridors—all of which are vital to restoring wildlife populations and biodiversity (1993a:29-30).

The concept of a flow-way was extremely controversial because it would require some or all of the EAA to be removed from agricultural production. More detailed discussion of the flow-way concept appears in subsequent chapters. A flow-way was prominent in this early federal, inter-agency scientific vision of restoration. In contrast, future documents do not include a flow-way. Restoration moves from a relatively stronger focus on benefits to the environment in *Federal Objectives* towards an even weaker definition of sustainability where water available for restoration is limited by continuance of unsustainable levels of water consumption. The meaning of the term “restoration” and the extent to which it became a communication strategy to mask a proposition of weak sustainability is further discussed in Chapter 6.

The Science Sub-Group’s 1993 report was the first of a series of documents to offer a communicative bridge between the science and policy universes. Notably, while *Federal Objectives* was intended for communication within the policy universe, it perhaps had larger repercussions outside that policy community. The release of *Federal Objectives* prompted interest in the Restudy from other stakeholder groups who sought to become involved to ensure the resulting plan acknowledged their specific interests. Documents intended for audiences within one universe influencing events and subsequent reports of other universes was a recurrent pattern throughout the Restudy process. For example, hydrological restoration as a precursor to ecological restoration and the mechanism of using an adaptive process to implement restoration are concepts that appear consistently throughout documentation produced by the three universes. The first evidence of the efficacy of *Federal Objectives* was the appearance of these ideas within the Reconnaissance Report. The idea of an

adaptive process deviated markedly from the traditional COE methodological approach to project development and implementation (COE, 1997). These two concepts appear throughout subsequent documentation and finally in WRDA 2000, demonstrating the early emergence of core concepts and methodology.

Early Evolution of the Policy Universe

Following the release of *Federal Objectives* by the Science Sub-Group, the Working Group had its first meeting in December 1993.⁷⁴ Richard Ring, ENP's Superintendent was elected Chair, partly as recognition of the central role that ENP would need to have in the restoration process. The Working Group identified its primary purpose as promoting sustainable development to balancing human activities with the needs of the ecosystem (Langton, 2000). While the science universe specifically focused on the Restudy, the role of the policy universe embraced broader sustainability issues such as development, exotic species management, and land acquisition. The Working Group formed the Public Involvement and Education Sub-Group and established a framework for creation of additional sub-groups for regional issues or special projects.

Creation of the Local Voice Universe

On March 3, 1994 Governor Lawton Chiles formed the GCSSF. The Commission was "constituted to represent major divergent groups historically interested in the Everglades ecosystem...made up of representatives from government (state, regional, local, and tribal), business, agriculture, and environmental and public interest groups" (Chiles, 1994).⁷⁵ Hence, the organizational purpose of the GCSSF was to bring together the non-federal stakeholder groups in South Florida to discuss sustainability. After formation, the primary focus of the Commission became the sustainability of water management.

Interestingly, a number of individuals on the GCSSF also served as their agency representatives on either the Task Force or Working Group. With this apparent redundancy in membership, why was it necessary to establish this new organization? The two universes served different functional purposes that could not have been effectively achieved within the same organizational frameworks. While the primary purpose of the Task Force and Working Group was coordination of government policies, notably at this stage limited to federal agencies, the GCSSF

⁷⁴ The meeting was held in Key Largo, part of the Keys where the local movement for looking at hydrological interconnectivity of the greater ecosystem began.

⁷⁵ State Executive Order 94-54. Available: <http://fcn.state.fl.us/everglades/gcssf/html> [October 8, 2001].

represented a wider gamut of interests with the mission “to develop recommendations and public support for regaining a healthy Everglades ecosystem with a sustainable economy and quality communities.”⁷⁶ Even with the later expansion of the Task Force and Working Group to include tribal, state and local representation, the GCSSF remained the most inclusive, bottom-up forum for communication amongst diverse interests.

I identify the GCSSF as the **local voice universe** because it was the only organization whereby local interests such as agriculture, business, environmentalists, and recreationalists had a seat at the table. Although public comment was incorporated in meetings within the science and policy universes, the CGSSF featured non-governmental local interests as its central reason for existence. The Commission effectively created new institutions for communication amongst local interests.

Governor Chiles’ Executive Order states:

The Commission shall work to improve coordination among and within the private and public sectors regarding activities impacting the Everglades Ecosystem, examine the effects of continued development and agriculture on the natural resources within the Everglades Ecosystem, recommend actions for the restoration, management, preservation and protection of these resources, recommend strategies for ensuring the South Florida economy is based on sustainable economic activities that can coexist with a healthy Everglades Ecosystem, and assist in promoting and monitoring the implementation of its recommendations (1994).

Hence, its stated purpose was to coordinate private interests with governmental interests of the Everglades restoration effort, within the broader context of regional economic sustainability. In addition, the Governor specifically charged the GCSSF with the task of providing recommendations on a way forward, as opposed to merely providing comments on existing efforts by government agencies.

Commission membership was extremely important in terms of establishing its legitimacy as a central organization of the Restudy process. Governor Chiles delineated a membership framework and selected individual participants to include a balance of the wide range of stakeholder group interests. Furthermore, the organizational rules of the Commission prioritized local stakeholder groups’ representatives as voting members. For example, Billy Causey, Keys NMS Superintendent, and Michael Collins, Florida Keys Guide Association, were both selected as members of the Commission. Causey, representing the federal agency

⁷⁶ See the GCSSF mission statement. Available: <http://fcn.state.fl.us/everglades/gcssf/gcssf-mission.html> [October 8, 2001].

NOAA, was a non-voting member, while Collins was one of the core thirty-five voting members. Governor Chiles and his staff carefully selected the actual individuals chosen to fulfill representative roles. As a result, the Commission findings were authoritative and legitimate not only to the other universes, but also enabled personalized communication strategy to (potentially hostile) stakeholder groups from recognized leaders of their respective interests.

According to those who were part of or observed the Commission, Richard 'Dick' Pettigrew, former leader in the Florida State Congress was instrumental in his role as Chair of the Commission.⁷⁷ Pettigrew had the vision, patience and ability to enable adversarial representatives to work together. The first mark of his vision was in the establishment of the procedural rules governing the Commission. He recognized that the Commission would be most effective as a consensus body and, after considerable debate, the representatives agreed to attain consensus recommendations, as opposed to a majority opinion. Pettigrew created an extremely challenging task because the dialogue had to be inclusive of all interests in order to reach consensual recommendations.

Other Events in 1994

In addition to the formation of GCSSF, other notable events occurred in 1994. Within the policy universe, Colonel Terrance 'Rock' Salt, formerly Chief of the Jacksonville District of the COE, was selected as Executive Director for the Task Force. As stipulated in the Inter-Agency Agreement, the Working Group published its first annual report in December 1994. As already discussed, the COE completed the *Reconnaissance Report* in November 1994, completing the first reporting stage within the science universe. Finally, 1994 saw the publication of the benchmarking scientific information resource Everglades: The Ecosystem and Its Restoration (Ogden and Davis). First suggested in 1988, the publication was the realization of an idea among scientists to present their work in a meaningful format to policymakers. Fifty-seven scientists eventually contributed to the publication. This treatise of Everglades' science not only contained a vision for the future of the Everglades ecosystem, but also was one of the first major transfers of knowledge between scientists and policymakers. Furthermore, many of the scientists involved in the production of the publication were also key actors in the Restudy. In particular, Ogden became chairman of the Restudy Team and together Davis and Ogden led the

⁷⁷ Interviewees Causey, Collins, Kranzer, Parrish, Salt and Wade stressed Pettigrew's critical role.

development process of Conceptual Ecological Models.

Transition Period to Feasibility Phase of the Restudy

Following completion of the COE's *Reconnaissance Report*, the COE worked with the SFWMD to establish an agreement on how to proceed.⁷⁸ Prior to entering the Feasibility Phase, the final actions of a Reconnaissance Phase include COE and SFWMD negotiations to address the essential question: *who pays?* The federal and state governments agreed to a 50-50 cost-share for *all* aspects of the Restudy and subsequent implementation. This included the unusual provision that the cost-share agreement included Operations and Maintenance, an expense typically borne by the local sponsor. Operations and Maintenance was included because restoration would require the modified use of existing infrastructures and the building of new infrastructures where federal holdings were a large percentage of property that would benefit from restoration.

Since the Reconnaissance Phase "provides a foundation from which to begin reducing and refining the many ideas that have been proposed to a manageable set of ideas that deserve further evaluation during the ensuing feasibility study" (COE, 1999a:A1-1) an agreement with *how* to proceed in the next phase was a critical aspect of the Reconnaissance Phase. Recognizing the complexity of the ecosystem and the long-range scope of the plan the COE and District agreed that flexibility was important in both the plan development process and subsequent implementation. As a result, the COE and District agreed to a plan formulation process that identified potential components and then considered the coordination of the components for the benefit of the total ecosystem. This approach was similar to the conceptual argument in *Federal Objectives*. Critically, the plan formulation process included iterative development and evaluation of alternatives. This was quite distinct from a typical COE process whereby a number of alternatives would be presented for review by other interested agencies and the public at the *end* of the process. In order to facilitate progressive evaluation, the COE and District designed the Restudy Team to consist of multi-agency and multi-disciplinary scientists.

⁷⁸ At the time, the SFWMD Governing Board passed a resolution to ensure that the Restudy and District water supply plan are cohesive. This effectively broadened the mandate of the SFWMD to make restoration a priority in the context of the District's traditional primary objectives of water supply and flood protection.

4.3.2 Restudy's Second Stage: August 1995 – October 12, 1996

Transition to the second stage of the Restudy was signaled by the start of the Feasibility Phase in the science universe in August 1995 (Figure 4.5). The COE and the SFWMD were now equal federal-state partners in the science universe and events in the policy and local voice universes continued to progress. The second stage is delineated as the time frame between the Reconnaissance Phase and activities prior to the passage of WRDA 1996. The following sub-sections highlight the reflexive nature of the Restudy process as a result of communications between the organizations of the three different universes. During this time period, the GCSSF mobilized to become a particularly active and effective organization in transforming the Restudy process.

Beginning of the Feasibility Phase in the Science Universe

The COE and SFWMD began by establishing the current state of scientific knowledge of the ecosystem and improving the technical capabilities of the hydrological simulation model. The Restudy Team met in January – February 1996 and developed an initial list of *components*, which are “individual building blocks that can be combined in various ways to form alternative plans”(COE, 1999b:7-2).

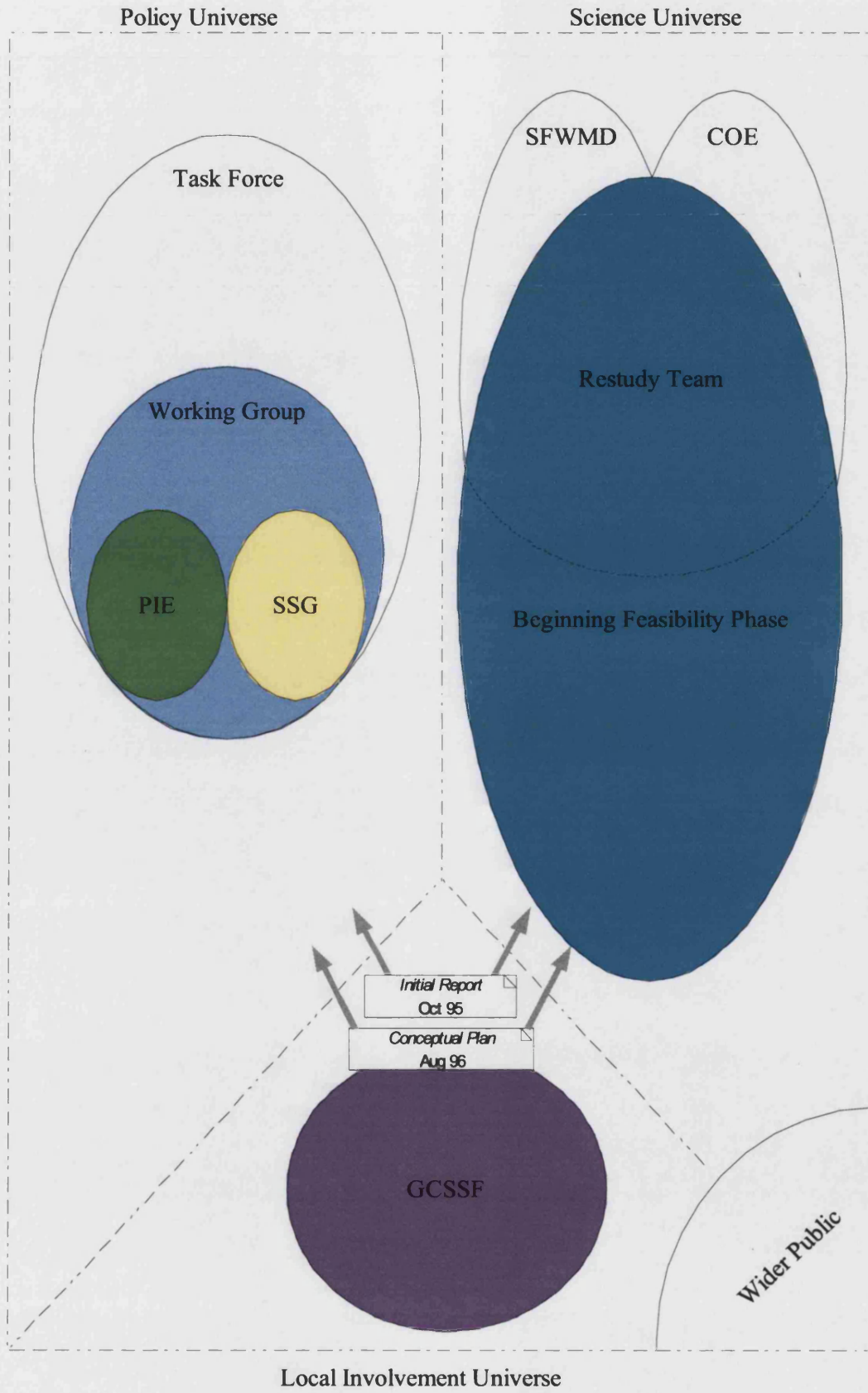
Policy Universe: 1995-1996

The Task Force and Working Group refined their institutions to best facilitate their objectives of coordinating restoration activities. Recall that the scope of these organizations extends *beyond* the Restudy process to include other ongoing issues, such as exotic species management and projects like Mod Waters.⁷⁹ The role of the policy universe was to coordinate the various projects effectively into a cohesive policy context. In this regard, the Task Force and Working Group developed an integrated financial plan that identified the role and costs of the various restoration projects being undertaken by all federal agencies. The Science Sub-Group also produced *Science Information Needs* (1996), which initiated development of an ecosystem-based, science plan inclusive of restoration concerns beyond water management.⁸⁰

⁷⁹ See section 4.1.1.

⁸⁰ Available: <http://everglades.fiu.edu/taskforce/scineeds/index.html> [May 4, 2003]. The month of release in 1996 is unclear, but I believe to be before WRDA 1996 because of ordering in Langton (2000) and identification as product of the Science Sub-Group, rather than SCT.

Figure 4.5: Restudy's Second Stage (August 1995 – October 12, 1996)



Perhaps the most critical measure to progress the institutions of the policy universe was the challenging of restrictions on who could be consulted, which was imposed by the Federal Advisory Committee Act (1972b). Restrictions to communication were mitigated by means of the Unfunded Mandates Reform Act (1995), which allowed the appointment of the first non-federal entities to the Task Force and Working Group. Representatives from the Miccosukee and Seminole Tribes, and the Governor's office joined the Task Force and Working Group. By altering the governing rules the organizations increased their roles and legitimacy in the Restudy. In effect, by having more inclusive membership rules, the role of the policy universe broadened to include coordination of policy with federal, state and tribal governments.

GCSSF's 1995 Report

On October 1, 1995 the Commission provided its first written contribution to the Restudy Process, *The Governor's Commission for a Sustainable South Florida Initial Report (Initial Report)*, which fulfilled the critical role of providing a unified local voice. In its cover letter, Chairman Pettigrew stated that the *Initial Report* was the "product of our first seventeen months of intensive meetings and deliberations. The Report was unanimously approved by the Commission at its last meeting and was strongly endorsed by the Commission's five non-voting Federal members"(1995:1). That the document was unanimous demonstrated both a strict adherence to the initial rules agreed upon by the members and also the effective mobilization of the most valuable resource of the GCSSF: representative local leaders from wide-ranging stakeholder groups.

Beyond the manner in which the *Initial Report* was created, the contents were a resource for further work of the Commission as well as the science and policy universes. The *Initial Report* included 110 specific recommendations broadly based around five principles:

- 1) Restore key ecosystems
- 2) Achieve a cleaner, healthy environment
- 3) Limit urban sprawl
- 4) Protect wildlife and natural resources
- 5) Create quality communities and jobs

Recall that the Commission was formed to address the issue of sustainability in South Florida. It is notable that in the *Initial Report* the Commission achieved consensus that water management was *the* core sustainability issue in South Florida and required

a balancing of urban, agricultural and natural system water needs for effective governance. “Vital to this effort is restoring a healthy Everglades system—the heart and soul of South Florida’s ecosystem and water supply” (GCSSF, 1995:1).

Throughout the *Initial Report* the Commission stressed linkages between health of the natural system and quality of life for people. The Chair’s cover letter stated:

...the Commission agreed that past water management activities in South Florida, geared predominately towards satisfying urban and agricultural demands, have often ignored the many needs of the natural system...[the Commission] recommends reconsideration of present surface water management practices, examination of present operational and conveyance capabilities, and improved coordination between water use and water control entities to increase water storage in the existing system (Pettigrew, 1995:2).

The *Initial Report* emphasized the interdependence of society and environment: “The human community is dependent on the surrounding natural system for public health, safety and welfare; continued economic viability; and enhanced quality of life” (GCSSF, 1995:4).

The Commission stressed that engagement of local interests in coordination with other levels of government as equally critical to sound governance for sustainable water management. One Commission recommendation was to create an Everglades Charter and Partnership, “eventually supplanting the present...Task Force, which is principally made up of federal assistant secretary level officials. The charter would better represent state, regional, and local jurisdictions” (GCSSF, 1995:10). Hence, the local voice universe’s vision for sustainability advocated creation of institutions with a more bottom-up consensus approach as opposed to top-down decisions by high-level individuals in the policy universe’s organizations. In terms of the Partnership, the Commission conceived it as:

...a consortium of public and private institutions and individuals working cooperatively to ensure that the Everglades ecosystem is restored and maintained through an objective, scientific peer-reviewed process involving a “think tank” of federal, state, regional, local, and university resources (1995:10).

Finally, the Commission emphasized the value of its role in the process stating it “believes it should continue to act as a liaison among a variety of stakeholders” (1995:10).

Therefore, the *Initial Report* was a critical document in the Restudy. On one level, it provided an extensive set of recommendations about restoration in the broader context of sustainability. The report advocated a weak sustainability approach and

stressed the necessity of integrating the environmental strand with the socio-economic for governance of the greater ecosystem's water resources. At a deeper level, the *Initial Report* demonstrated the social benefits and power of consensus for organizations involved in the Restudy. In this instance, perhaps even more as a result of social process rather than its actual contents, the *Initial Report* was a bridging resource because it sent the message to the science and policy universes that the GCSSF could provide a unique contribution to the Restudy and established the Commission as a legitimate and powerful organization in the process. The enrolment of diverse interests in a bottom-up style of governance resulted in the building of social capital and ultimately the legitimacy of both the Restudy and its product, CERP, to these stakeholder group interests.

Local Voice Universe Provides Conceptual Framework for the Restudy

Following the *Initial Report*, the Commission released *Conceptual Plan for the Restudy (Conceptual Plan)* (1996). In *Conceptual Plan*⁸¹ the Commission identified twenty-three planning objectives that fall within three general categories of hydrological, ecological and socio-economic. Hydrological objectives include:

- Adequate water quality
- Water supply
- Timing of flows
- Flood control for urban, natural and agricultural needs
- Restoring more natural hydropatterns, including sheetflow
- Regaining lost storage capacity
- Reducing per capita consumption

The Commission recognized that the attainment of the hydrological objectives would further the ecological objectives of restoring the natural environment by working towards the three crucial characteristics of the pre-drainage system:

- Habitat heterogeneity
- Spatial area
- Hydrologic connectivity

In addition, socio-economic objectives were grounded in the idea that improving water management in the ecosystem benefits urban and agricultural interests. In *Conceptual Plan* the Commission agreed that water management was the key theme

⁸¹ Available: <http://fcn.state.fl.us/everglades/gcssf/concept.html> [December 16, 2001]. Note that page numbers are not available for quotes because electronic version of *Conceptual Plan* did not include pages.

of sustainability in South Florida: “The environmental component, born out of the consensus that the health of the Everglades ecosystem must be restored in perpetuity, is dominated by the issue of water management” (GCSSF, 1996). Hence, the initial mandate of the Commission to consider sustainability in South Florida became focused on water management as the necessary precursor to South Florida’s sustainability.

The consensus recognition of the centrality of water management to sustainability was an extremely significant event towards highlighting the ubiquitous nature of water and its pervading importance to *all* stakeholders of the region, and identified the Restudy as *the* core focus for establishing sustainable governance of the region. Water became the reason for the Commission to exist, its mantra: “Because the entire C&SF Project is hydrologically linked, all water management activities impact one another” (1996). In fact, because of the recognized importance of water the local voice universe actively sought a role of continued involvement in the Restudy. The desire to be engaged in the process is a further demonstration that the consensus-based approach resonated with participants and offered a forum for building social capital.

From the planning objectives, GCSSF worked towards development of preferred alternatives. In a series of three workshops, the Commission considered 66 ideas, derived from the *Reconnaissance Study* and *LEC-94*, as well as original ideas by Commission members. The ideas were screened and then grouped together to explore the inter-relationships amongst options. Within this framework, the Commission identified options with consensus support for further technical evaluation. The resulting list of 40 preferred options included conditions to highlight specific issues with taking a given recommendation forward as part of the Restudy. The Commission applied three fundamental criteria to evaluate the preferred options:

- Burden and responsibility for water storage should be shared across the system
- Water quality and treatment should be addressed and optimized
- Support projects that salvage, clean up, and reuse water

The common theme amongst these ideas is the concept of *sharing adversity* both spatially across sub-regions and amongst different stakeholder groups. The Commission then organized the consensus-generated 40 preferred options into 13 thematic concepts (Box 4.1).

Box 4.1: GCSSF's 13 Thematic Concepts

- 1) Regional Storage in Headwaters
- 2) Lake Okeechobee Operational Plan
- 3) EAA Storage
- 4) Water Preserve Areas
- 5) Natural Areas Continuity
- 6) Water Supply and Flood Protection for Urban and Agricultural Areas
- 7) Adequate Water Quality for Ecosystem Functioning
- 8) Increase Spatial Extent and Quality of Wetlands
- 9) Invasive Plant Control
- 10) Aquifer Storage and Recovery
- 11) Protection and Restoration of Coastal, Estuarine, and Marine Ecosystems
- 12) Conservation of Soil
- 13) Operation, Management, and Implementation of the C&SF Project Modifications and Related Lands

The objective was “to provide the Restudy [Team] with sufficient information to evaluate the broad spectrum of options and trade-offs among them without restricting development of new options” (GCSSF, 1996). The Commission’s systematic, consensus-based approach provided a tangible operational framework for the Restudy Team to find solutions that fell within a range of socio-political acceptability. This was a highly beneficial planning tool by allowing the Restudy Team to focus on designing scientifically sound solutions acceptable to competing interests. Hence, it reduced the risk of the Restudy’s derailment by varied, powerful stakeholder group interests that could potentially impede authorization of CERP.

Conceptual Plan recognized ongoing work at a regional scale and emphasized that “these projects, by themselves do not result in restoration...A new and broader perspective is needed to integrate the entire ecosystem” (GCSSF, 1996). The Commission provided specific recommendations on *how* to undertake the Restudy formulation *process* in a manner responsive to the challenges of designing a comprehensive plan for multi-purpose water management. To appreciate the truly innovative nature of the approach proposed by the Commission, one must first recognize the typical COE feasibility phase procedures.

In a typical COE project, the feasibility phase consists of the federal agency designing several different options. These are presented simultaneously for consultation to the local sponsor and general public, at which time one of the options is selected. Typical processes include a feasibility study estimated to take five years,

which, once completed, undergoes a lengthy review process at federal level before being sent to Congress for authorization. Prior to authorization, it would not be possible to initiate land acquisition or construction. In the interim, some lands might be lost to development or become too expensive to purchase as a result of the time delay. The most problematic aspect to the standard COE process is that the project would require detailed construction and operation details *prior* to authorization (COE, 1997). Due to the spatial scale and complexity of the greater Everglades water management the Commission believed that the standard procedural approach would fail. The GCSSF demanded that a new process be developed:

An improved partnership must be utilized that accelerates implementation of portions of the process without compromising good planning, existing laws, or opportunities for public input...An expedited process could both crystallize and focus the decision-making on critical path issues and could provide the forum for a collegial body of integrated decision-making and provide a broader arena for public input (1996).

Hence, in the *Conceptual Plan*, the local voice universe self-defined one of its organizational roles as providing feedback not only regarding which components should be considered in the plan development, but also about how institutions of the *process* should be modified in order for the Restudy to be successful.

Underlying the Commission's statements was concern about the level of authority of the state interests in developing CERP. Recall that federal interests were focused on restoration of water for the environment because federally managed lands are part of the remnant natural system. State stakeholders wanted to ensure watershed management also included the state's traditional concerns of water supply for urban and agriculture users as well as flood protection. The Commission also supported cost-sharing by the state and federal governments. The Commission made seven specific recommendations of how to modify the process (Box 4.2).

The recommendations provided a consensual statement on how to improve the Restudy process and effectively offered guidelines on measures to foster the support of local interests, such as improving linkages between public and private involvement. The underlying theme was the call for the process to be more inclusive, with more extensive communication and collaboration through enhancing organizational roles in comparison to past COE project development methodologies. Therefore, the Commission's recommendations not only included modifications to the COE procedures, but also placed responsibility on both state and federal agencies to utilize their limited resources to expand their roles towards more active participation

in the process.⁸² Effectively, the local voice universe was challenging the science and policy universes to break free of the shackles of conventional bureaucracy to build innovative and dynamic institutions.

Box 4.2: GCSSF's Recommendations to Improve the Restudy Process

- 1) Authorized purposes should include protection and improvement of water quality for natural system protection and restoration and water supply for environmental and economic needs.
- 2) Modifications should be cost-shared on a 50/50 basis between the federal government and the State.
- 3) The feasibility phase of the Restudy should be expeditiously completed and other preparatory steps necessary to implement the Plan should be taken.
- 4) State implementation activities for Everglades' restoration should be expedited.
- 5) Adaptive management strategies should be used to implement modifications.
- 6) Adequate agency resources must be provided.
- 7) Congress should remove impediments to more effective public/private involvement in ecosystem management and natural system restoration.

4.4 WRDA 1996

Enacted on October 12th, WRDA 1996 was a central event in the Restudy because Section 528 authorized development of a Comprehensive Plan:

The Secretary shall develop, as expeditiously as practicable, a proposed Comprehensive Plan for the purpose of restoring, preserving, and protecting the South Florida ecosystem. The Comprehensive Plan shall provide for the protection of water quality in, and the reduction of the loss of fresh water from, the Everglades. The Comprehensive Plan shall include such features as are necessary to provide for the water-related needs of the region, including flood control, the enhancement of water supplies, and other objectives served by the C&SF Project.

Hence, key themes from the earlier work of the three universes appeared in the authorizing language. Specifically, the legislation recognized that restoration efforts must also address flood control and water supply concerns and that the method to attain these objectives was the "reduction of the loss of fresh water" to sea.

The authorizing language instructed the Secretary of the COE to develop the Comprehensive Plan. It is only in the next section of "considerations", where

² Similarly, the Commission noted that measures should be taken to prepare for the actual implementation of the project so that there was a rapid transition from the development process to implementation. As a solution to both these objectives the Commission supported adaptive management strategies.

cooperation with the local sponsor was mentioned. Germane to the discussion about organizational development, this section of WRDA 1996 identified roles for the policy and local voice universes in the Restudy:

- (b.1.A.ii) CONSIDERATIONS- The Comprehensive Plan shall—
- (I) Be developed by the Secretary in cooperation with the non-Federal project sponsor and in consultation with the Task Force; and
 - (II) Consider the conceptual framework specified in the report entitled “Conceptual Plan for the Central and Southern Florida Project Restudy”, published by the Commission and approved by the Governor.

Hence, Congress identified both the Task Force and the GCSSF as organizations with legitimate roles in the Restudy, by stressing the importance of work already done by the Commission. Congress instructed the COE to “consider the conceptual framework” presented by the Commission in the *Conceptual Plan*. In this regard *Conceptual Plan* perhaps served as the most significant bridging document of the Restudy process because of its relevance to all three universes. Similarly, the Restudy Team had a clear organizational role as the forum in which the COE and SFWMD could work together to fulfill the Congressional instruction contained in WRDA 1996 that the COE should work in cooperation with the non-federal sponsor.

Furthermore, in sub-section (f) WRDA 1996 established the Task Force and outlined its roles and governing rules. The legislatively mandated roles included:

- Providing recommendations during the development of the Comprehensive Plan;
- Coordinating “development of consistent policies, strategies, plans, programs, projects, activities and priorities” for South Florida’s ecosystem; and,
- Facilitating resolution of conflicts pertaining to restoration among entities represented on the Task Force.

The formal establishment of the Task Force as a federally legislated organization, as well as the Working Group and other advisory bodies under the Task Force umbrella, codified the legitimacy of the policy universe in the Restudy and highlighted the importance of the complex task of coordinating the scientific efforts within existing policy limitations.

In terms of rules governing the creation of CERP, WRDA 1996 recognized the importance of incorporating adaptive management in the process stating:

“Notwithstanding the completion of the feasibility report...the Secretary shall continue to conduct such studies and analyses as are necessary”. Other aspects contained within WRDA 1996 include:

- Instructions to construct any modifications to the C&SF Project previously authorized
- Water quality
- Inclusion of public review
- Integration of ongoing activities like Kissimmee River restoration and Mod Waters
- Clarification of agencies’ authority
- Formalizing cost-sharing agreement

Finally, WRDA 1996 established the temporal framework for the completion of the Feasibility Study. CERP had to be submitted to Congress by July 1, 1999.

Effectively, WRDA 1996 formally established the *roles* of the three universes in the Restudy and identified key *resources*, such as the *Conceptual Plan*.

Furthermore, the legislation established the *rules* by which the Restudy should proceed. The combination of roles, rules and resources formalized the existing governance institutions for the Restudy process.

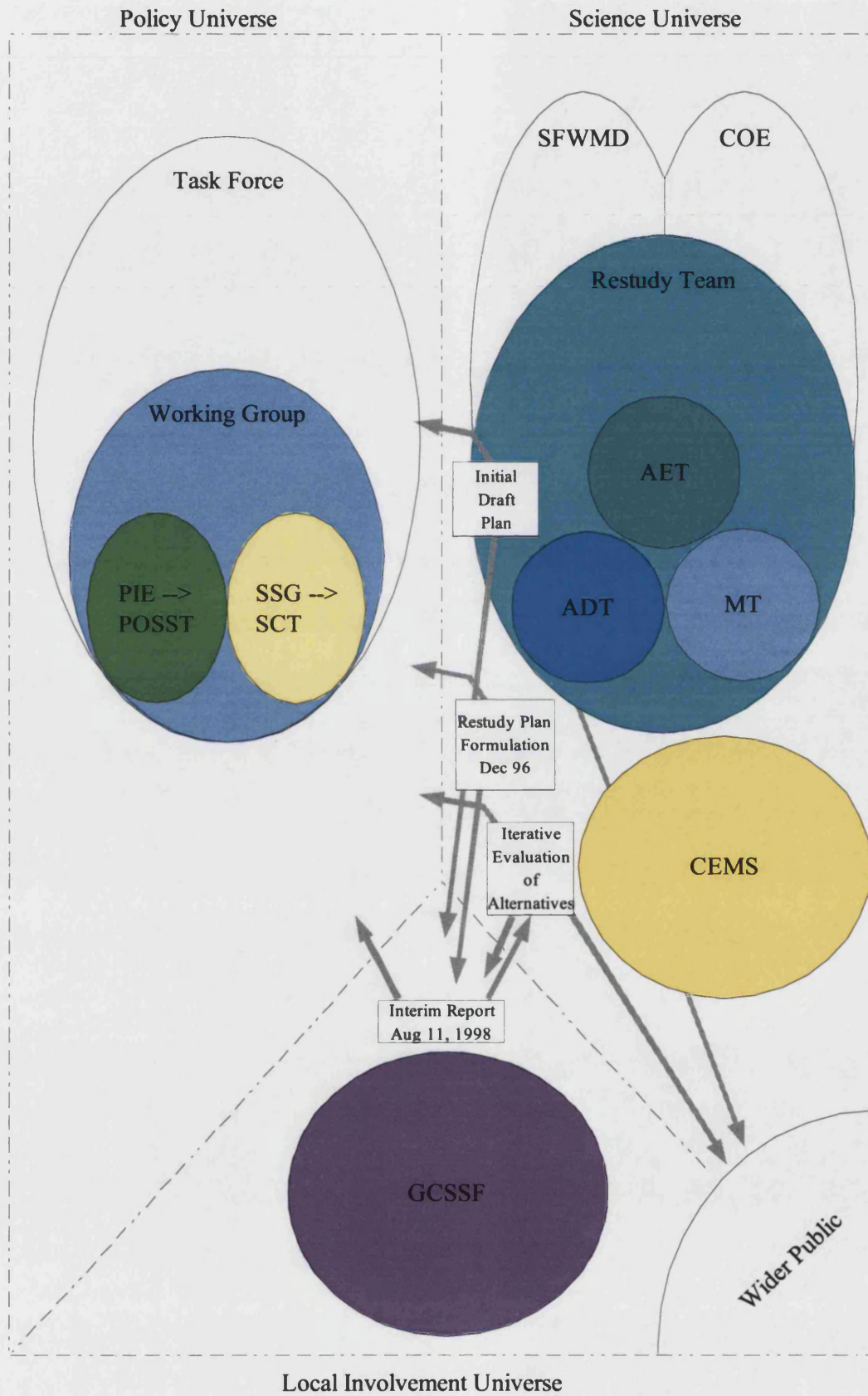
4.5 Third Stage of Restudy: WRDA 1996 – Initial Draft Plan

The third stage of the Restudy process (Figure 4.6) began with the passage of WRDA 1996 and finished with the release of the *Initial Draft Plan* for public review on October 31, 1998. During the third stage, events progressed in the three universes towards development of a scientifically sound and socially acceptable, multi-purpose water management plan.

4.5.1 Mobilizing Scientists and Managers to Organize Existing Information

One challenge was organization of existing scientific and technical information into resources that could enhance restoration efforts in a timely manner so that results could be integrated into CERP. Prior to the Restudy, science had been approached at a sub-regional level with little or no inter-agency coordination. Each agency sought to fulfill its individual mandate. Hence, South Florida’s extensive scientific expertise was decentralized and lacked a forum for coordination.

Figure 4.6: Restudy's Third Stage (October 13, 1996 – October 31, 1998)



Ecological Sustainability Criteria Workshop

In April 1996, the Science Sub-Group held a Workshop on Ecological Sustainability Criteria for South Florida to discuss incorporation of science into the Restudy. The specific purpose was "to review the scientific basis for the selection of indicators and criteria used to evaluate the success of the restoration process and to broaden public and academic participation in the process" (Subgroup, 1997).⁸³ While the workshop findings were not formally published until May 1997, the discussions provided a foundation from which to build the subsequent coordinated development of Conceptual Ecological Models (CEMs) by scientists.

Development of CEMs

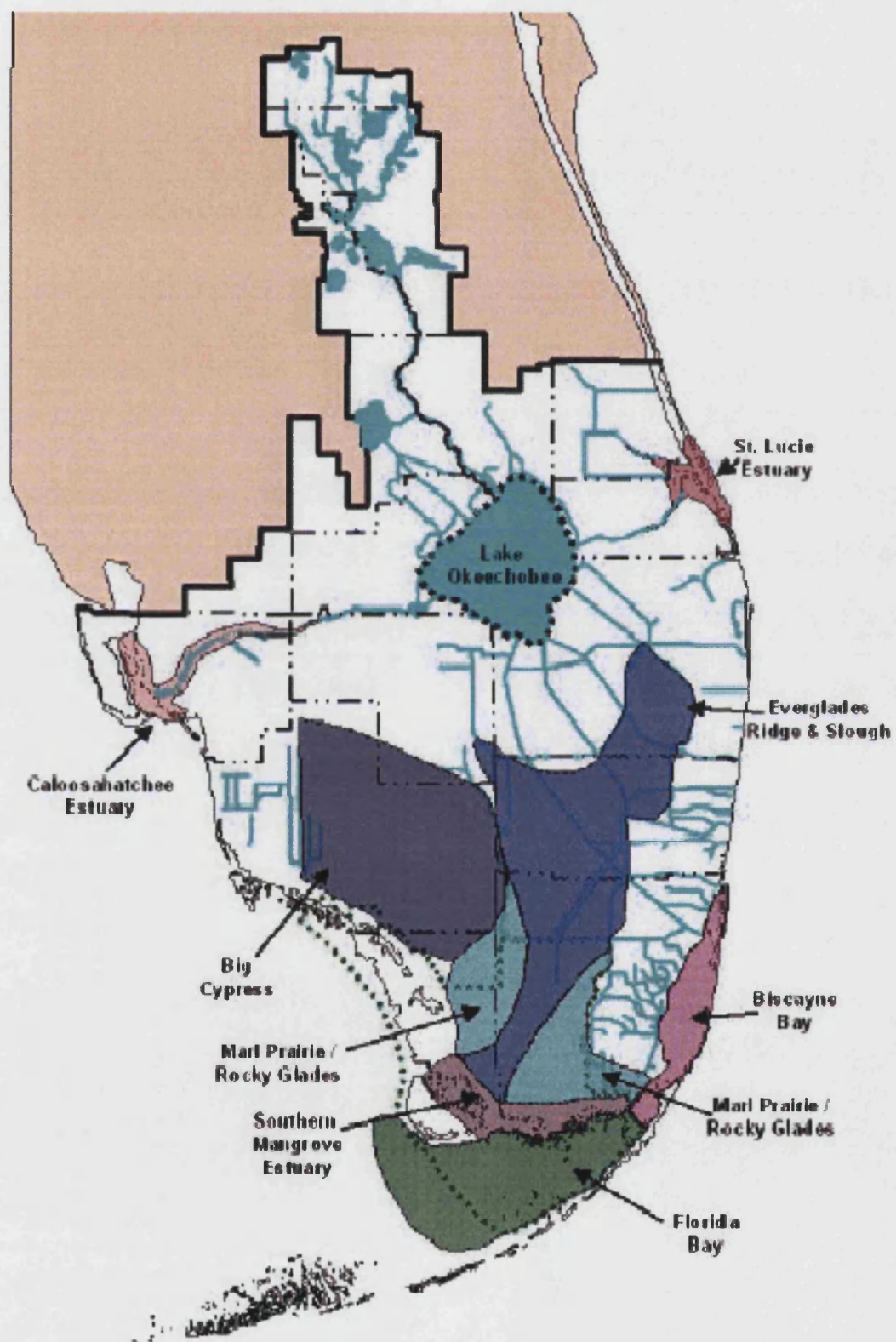
In October 1996 the Restudy Team, consisting of individuals from the COE and SFWMD, in coordination with the Science Sub-Group of the policy universe initiated a series of workshops among scientists across South Florida (Ogden, 1999; Ogden, et al., 1997; Subgroup, 1997, 1996).⁸⁴ John Ogden and Steven Davis led the workshop process. Both were from the SFWMD and recognized as leading science-policy communicators among their peers. Over 100 scientists from different disciplines participated in CEMs workshops, including individuals from federal, state and local agencies, NGOs, and universities. The objective was to synthesize bodies of knowledge about the ecosystem. The CEMs workshop process was unprecedented in South Florida in terms of bringing together different scientific disciplines from governmental and non-governmental entities.

This process of linking sciences and management was called the Applied Science Strategy and was "motivated by the need for a better focused process for organizing and converting large amounts of existing technical information into planning and evaluation tools that would directly support the restoration programs" (Ogden, 1999:1). The daunting task of coordinating scientific information across the entire ecosystem was approached at a landscape scale. The resulting focus was the creation of CEMS for eight major landscape types that together composed the greater Everglades ecosystem (Map 4.4).

⁸³ Available: <http://everglades.fiu.edu/taskforce/precursor/toc.html> [December 19, 2001].

⁸⁴ Despite the centrality of the development of CEMs and interagency coordination in the development of CERP oddly no discussion of CEMs appears in the *Final Feasibility Report*. There is similarly no reference to CEMs role as the necessary precursor to development of performance measures.

Map 4.4: Eight Major Landscape Types in the Everglades⁸⁵



⁸⁵(Ogden, 1999:13).

Ogden wrote that a successful Applied Science Strategy must:

Lay out a scientifically reviewed sequence of steps and tasks for converting research and modeling results into planning objectives, performance measures and evaluation protocols. Serve as a strong catalyst for promoting consensus among scientists and managers regarding the nature of the principle resource issues, and the probable routes for resolving these issues. Be a process that can contribute to the objectives and needs of both the scientific and management communities in the regional restoration programs (1999:1).

To meet these criteria, the Restudy focused on the development of non-quantitative CEMs. CEMs included the following features:

- Drivers
- Stressors
- Ecological effects
- Attributes
- Measures

The *drivers* are the natural and anthropogenic forces with large-scale influences on the natural systems that bring about *stressors* of chemical or physical changes in biological components, patterns and relationships in the natural system resulting in the manifestation of *ecological effects*. *Attributes* are the indicators (such as endangered species, water quality, water quantity, fishing catch) which are selected with the objective of being representative of the overall ecological conditions of the system as an expression of the known or hypothesized results of stressors. Finally, *measures* are the specific features of each attribute that will be monitored to determine how the attribute responds to different modeled solutions or actual projects implemented, in an attempt to determine the success of the project (Ogden, 1999).

Participation in CEMs Development and the Restudy Team⁸⁶

CEMs were developed in a series of landscape-level workshops open to all interested participants. "Special efforts were made to invite the field scientists in South Florida who have considerable hands-on research experience in these landscapes and therefore were well-qualified to bring knowledgeable professional

⁸⁶ Surprisingly, while the *Final Feasibility Report* contains a list of Restudy Team participants it does not discuss in any manner how participation in the science universe evolved from the Reconnaissance Phase, consisting only of the COE, to the partnership between the COE and SFWMD. Details omitted include the point at which the wider Restudy Team of multi-agency and non-governmental participation occurred and the crucial role of the CEMs workshops. This major gap of information about the organization of scientific resources and scientists was resolved with statements from interviewees, an evaluation of the timeline of events, and a comparison of the participation on the Restudy Team with participation in the Applied Science Strategy Workshops to develop CEMs.

opinions on these systems to the modeling discussions” (Ogden, 1999:2). Individual scientists participated in the workshop(s) related to their regional areas of expertise; hence, the workshops were multi-disciplinary for each landscape type, as opposed to being organized around scientific specialty. This organizational structure fostered interaction amongst scientific disciplines, such as hydrology and ecology, which traditionally worked with minimal coordination. The consensus-based approach used to develop the CEMs was an effective tool for fostering coordination among scientists and managers as a result of increased opportunities for communication. In addition, like the GCSSF, the consensus-based approach provided a unified force, offering a valuable contribution to the overall Restudy process. CEMs played a vital role by identifying *measures*, the basis for the agreement of performance measures (PMs), as standards for determining success for the iterative evaluation and development of alternative plans.⁸⁷

Additionally, the development of CEMs ultimately led to inclusion of more scientists and managers on the Restudy Team. Not all individuals who participated in the Applied Science Strategy, especially the field scientists, became part of the Restudy Team. Some, however, were members of the Restudy Team, forming the broader base of interests from multi-governmental agency levels and non-governmental entities that moved the process forward following WRDA 1996. Overlapping membership demonstrated the intensive levels of participation by some individuals, which ultimately allowed CERP to be developed within the time constraints. Because of the complexities of the Restudy process, intellectual talents of highly engaged participants were critical resources in the development of CERP.

4.5.2 Plan Formulation Strategy

Following WRDA 1996, the Restudy Team mobilized to meet the ambitious July 1, 1999 deadline. Before deciding *what* to put into CERP, the Restudy Team established *how* to develop CERP by agreeing a plan formulation strategy. This was defined as a “repetitive, or iterative, process of identifying alternative plans that achieve a set of planning objectives and allows those plans to be modified as more information becomes available” (COE, 1999b:7-1). It is essential to recognize that while institutions for the plan formulation strategy were agreed in principle by actors at the start, it was a skeletal framework with refinements made to the actual plan

⁸⁷ Discussed in section 4.5.2.

formulation process as events moved forward.⁸⁸

This flexibility created a more robust formulation process offering opportunities for refinements not only to the components contained within CERP, but also to the process. While this recursive process had multiple benefits, including the opportunity for multiple refinements to the CERP, the same qualities also presented huge project management challenges such as addressing the flexibility inherent to the process within the time constraints, within budget, and with consistency across the large spatial area. Events post-WRDA 1996 can be diagrammatically represented as a progression of the unique stages of the plan formulation strategy (Figure 4.7).⁸⁹ The following sub-sections (refer to Figure 4.7) discuss the different phases of the plan formulation strategy of the Restudy process.

Agreement of the Restudy's Plan Formulation Strategy

In November 1996 the Restudy Team met to design the plan formulation strategy for the development of CERP. The resulting document, *Restudy Plan Formulation*,⁹⁰ provided a conceptual approach to attain two specific CERP objectives:

- Enhance ecologic values.
- Enhance economic values and social well-being.

As previously discussed, the conceptual approach was based on the premise that hydrological restoration was the necessary precursor for ecological restoration.⁹¹ Nevertheless, *Restudy Plan Formulation* recognized the “issue that remains is how to accomplish the ecologic restoration objectives while allowing the system to serve the economic and social needs of the region” (COE, 1999b:A1-11). The Restudy Team turned to earlier recommendations by the Commission. It was the willingness of the COE and SFWMD scientists to embrace the recommendations of the local voice and policy universes that provided an atmosphere in which to move cohesively forward.

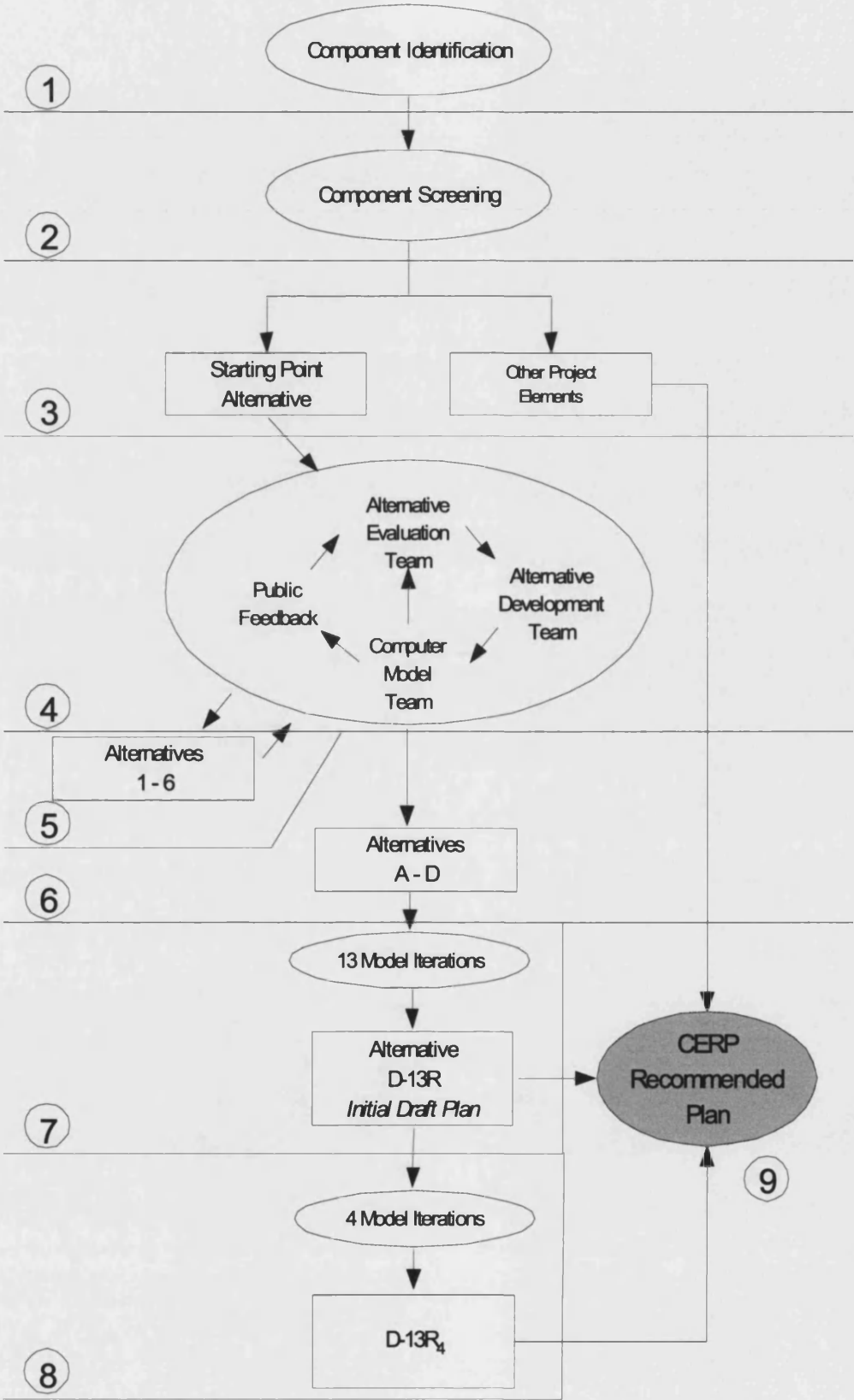
⁸⁸ While the *final* plan formulation strategy does appear in CERP (Section 7; Appendix A1) the discussion contained in this thesis of the evolution of the plan formulation strategy draws from interviews and other supporting documentation to elucidate nuances and better reflect the recursive nature of the process.

⁸⁹ Figure 4.7 is a modified version of the plan formulation strategy diagrammatically depicted in CERP's Figure 7-1 (1999:7-2) to provide more detailed stages of the Restudy process than appears in the *Final Feasibility Study*.

⁹⁰ Contained in CERP as Appendix A1.

⁹¹ The document states: “Numerous studies support the theory that the remaining natural system can be changed in the direction of its pre-drainage wetland character through modifications to the hydrologic features” (COE, 1999b:A1-11).

Figure 4.7: Detailed Alternative Plan Formulation Strategy



The Restudy Team followed Recommendation 5 from the Commission's *Conceptual Plan*, which stated:

The complexity of restoring the South Florida ecosystem requires that the traditional mode of problem solving be modified. Restoration of the Everglades cannot wait until some future time when total understanding of all of the processes occurring in this ecosystem is achieved. Planning, project design, and implementation, based on the extensive knowledge already available, must proceed expeditiously while restoration is still possible...As modifications to the C&SF Project are implemented, changes may have to be made over time so that the process can adjust to new technical information coming from many sources...The Commission recommends that projects be implemented using an adaptive strategy that allows modifications to the C&SF Project to take place in a structured, peer-reviewed way....The entire program; planning, design, implementation, and operations; should be subjected to peer review and interagency scrutiny. The strategy should insure that the concerns of a broad group of people are seriously addressed in a reasonable, productive setting. Maximum flexibility should be built into project designs so that reworking of major components will be avoided (1996).⁹²

Hence, the Restudy Team incorporated the idea of a more flexible approach than traditional COE methodology, based on adaptive management,⁹³ as a key feature of the plan formulation strategy. In CERP's description of the Restudy process, the Restudy Team highlighted that the plan formulation strategy "evolved over three years" (COE, 1999b:7-1) and ultimately resulted in the recommended CERP.

Public Feedback on the Plan Formulation Strategy

The *Restudy Plan Formulation* document was written during the Component Screening Phase, an early stage of the Restudy process. Following completion of the document, the Restudy Team conducted 21 focus group meetings from January – May 1997 throughout different sub-regions with specific interests in the South Florida watershed. The objective was "to provide information to targeted area stakeholders and to get comments about the initial plan formulation effort" (COE, 1999b:11-11). This set of focus groups included discussion of the topics such as the Commission's *Conceptual Plan*, WRDA 1996 and the *Restudy Plan Formulation* document.

⁹² Available: http://fcn.state.fl.us/everglades/gcssf/concept/conc_3-5.html [November 20, 2001].

⁹³ "Adaptive management" was the phrase used extensively throughout the Restudy process documentation. However, Dr. Ronnie Best, USGS, indicated that the appropriate scientific terminology for the plan formulation and evaluation strategy is actually "adaptive assessment and implementation" because adaptive management in fact implies temporally parallel approaches to see which scenario offers the best solution to the same problem. In contrast, adaptive assessment and implementation more appropriately reflects progressive refinements over time to a singular study area, as is the case with the Restudy and CERP. While I recognize Dr. Best's meaningful clarification, for the purpose of this thesis I use the terminology adaptive management for consistency to the terminological conventions of Restudy process documentation.

Amongst the focus groups, there was common concern about inclusion of water quality and the importance of basing the plan on sound science. Other issues included the identification of clear restoration goals, measurement of performance criteria, and the inclusion of peer review. Other concerns can be classified as technical and regional issues, both grounded in the question of “sound science”. Technical issues raised included Aquifer Storage and Recovery wells (ASRs), seepage barriers and water storage.

Component Identification and Screening

Component Identification, followed by Component Screening, were the first two phases the Restudy Team subsequently identified as the start of the plan formulation strategy. As evidence of the evolution of CERP’s formulation strategy the identification of components occurred prior to the publication of the *Restudy Plan Formulation* and the screening of plan components occurred simultaneously with stakeholder focus group meetings.

Iterations of Component Identification

Components are the individual project features that together constitute the recommended structural and operational changes that compose CERP. The *Final Feasibility Report* defined components as “the individual building blocks that can be combined in various ways to form alternative plans. They include both structural measures, such as reservoirs, pump stations, and canals and nonstructural measures, such as reservoir operating schedules” (COE, 1999b:7-2). As previously discussed, from January 1996-February 1996 the Restudy Team generated an initial list of components, drawing from components identified in earlier “bridge” documents. Notably, the range of sources included documentation from the federal sponsor – that at the time constituted the science universe – previous work by the District, as well as work from the GCSSF and the Science Subgroup.

The Restudy Team’s initial list of components was responded to by the Commission with the *Conceptual Plan*, which was then embraced at a policy level in the creation of WRDA 1996. WRDA 1996 instructed the science universe to consult with the Task Force and use the Commission’s *Conceptual Plan* as a framework. The Restudy Team’s actions demonstrated the science universe’s willingness to interpret the legislation liberally because it established institutions for CERP’s formulation strategy inclusive of the organizations from local voice and policy universes. Hence, while the example of past COE projects would only consist of a science universe, the

evolution of the plan formulation strategy demonstrated the science universe's acceptance of organizations from other strands of knowledge not only in name, but also in practice.

It can be argued that Component Identification was in fact Component Screening. The "screening" during the Component Identification stage occurred as a result of communication amongst universes via "bridge" documents leading to continued refinements of the list of components identified for potential inclusion in CERP. As a demonstration of this, the Commission's *Conceptual Plan* was accepted as the "organizing framework for developing and evaluating alternative components and generating the comprehensive plan" (COE, 1999b:A1-1). Nevertheless, the nominal conventions assigned by the Restudy Team for the first two stages are maintained in this thesis to acknowledge the different mechanisms of "screening" that occurred in the first step compared to the second step.

Component Screening

The result of the Component Identification stage was a collection of 112 project options organized by sub-regions. With this number of components the possible combinations, approximately 5.19×10^{33} ,⁹⁴ would be impractical to evaluate. Therefore, the Restudy Team decided to use Component Screening to develop a singular "Starting Point" alternative for subsequent iterative formulation and evaluation to create CERP. To address concern about removing components prematurely from consideration, components were not eliminated from the process. Instead, Component Screening "organizes and prioritizes the components for consideration in alternative plans" (COE, 1999b:A1-33). Screening of components was based on hydrological performance and cost to prioritize different components as part of restoration alternatives. The actual Component Screening process utilized three main tools to identify hydrological connectivity of components on a system-wide level:

- Everglades Screening Model for hydrology,
- Cost-effective analysis,
- Prior results from *Draft, Lower East Coast Regional Water Supply Plan (LEC-97)*(SFWMD, 1997b).

The Everglades Screening Model presented the first, original application of

⁹⁴ In Appendix A1:A1-32 of CERP the number of combinations is calculated at 6.72×10^{30} based on 110 project components. 112 components are used in this thesis as the number of components because it appears in the text of CERP rather than an appendix (COE, 1999:7-3).

modeling in the Restudy specifically for formulating CERP, and was scaled to allow for screening the large number of components rapidly. The Everglades Screening Model was designed to evaluate individual components *prior* to using them in combinations to create a Starting Point alternative. “The [Everglades Screening Model] provided insight into blatant hydrologic realities rather than trying to determine subtle differences” (COE, 1999:B-1). Cost-effective analysis was used to compare similar components to determine the least expensive option to achieve a desired result. However, the economic analysis did not address the potential for multiple desired results from a single component, so could underestimate benefits. It provided a rough index of projected cost for 47 components. In addition to these screening tools the Restudy Team also relied on “best professional judgment” (COE, 1999:7-6) to develop a series of guidelines to develop the Starting Point alternative.

Second Round of Stakeholder Focus Groups

Following the completion of the Component Screening phase, a second round of fifteen focus groups occurred from September – December 1997 throughout sub-regions (COE, 1999b). “Approximately 150 community leaders attended, representing a cross-section of interests including agriculture, the environment, water supply and urban residents” (COE, 1999:11-11). The purpose of the second set of meetings included a review of Component Screening results and a follow-up on how comments from original meetings were being addressed as the Restudy progressed. The types of issues raised at the second set of meetings demonstrated the existence of ongoing concerns, such as how to facilitate water storage, inclusion of water quality and basing CERP on sound science. However, a higher degree of specificity about discrete aspects of CERP’s formulation strategy also emerged as issues of interest amongst stakeholders. For example, the practical question about the level of detail of CERP that ultimately would appear in the *Final Feasibility Report* and the use of the technical models to as an environmental target. Hence, the concerns of the stakeholders also included strategic issues that needed to be addressed by the Restudy Team regarding authorization of CERP in WRDA 2000.

Events in Policy and Local Voice Universes

Parallel with events in the science universe, the Task Force and Working Group continued to evolve to fulfill their roles identified in WRDA 1996. Notably, the Working Group established guidelines for appointment of advisory bodies and subsequently the GCSSF was appointed as an advisory body to the Task Force and

Working Group in August 1997 (Langton, 2000).⁹⁵ This formally established a communication mechanism beyond publication of “bridge” documents and demonstrated recognition of the importance of the Commission as a resource to the policy universe. Attempts at enhancing the role of communication with the wider public was undertaken by updating the Public Involvement and Education Sub-Group’s public outreach strategy. Results included workshops in May and July 1997 with the Public Involvement and Education Sub-Group’s members and representatives from 30 business and non-profit groups to discuss mutual benefits of restoration and potential partnering arrangements to inform and involve the public (Langton, 2000). As a further measure to communicate with the public and internally, the Task Force launched a website in 1997.⁹⁶

To reflect the evolution of the organizational roles of the Science Sub-Group and Public Involvement and Education Sub-Group, new names of Science Coordination Team (SCT) and Public Outreach Steering and Support Team were designated (Langton, 2000). These changes, as well as modifications to Working Group procedures were codified in a Charter adopted December 15, 1997. Drawing from the successes of the organizational rules of the Commission, the Working Group Charter agreed to make decisions by consensus. However, unlike the Commission, the Working Group’s rules allowed an alternative to consensus of a two-thirds majority vote, should consensus be unattainable.

Identification of Starting Point Alternative and Other Project Elements

Following Component Screening, the Restudy Team assembled components into a single restoration plan called the Starting Point Alternative (see Figure 4.7, phases 1-3). The result of screening was identification of different components to approach specific, water management concerns. For example, increased storage of water in the system was a key objective. In the Starting Point Alternative, features to increase water storage included reservoirs throughout the system and extensive seepage barriers. The *Final Feasibility Report* states, “The general philosophy of the Starting Point, and the first few alternatives, was to start small and build components with the intent to provide a clear justification as to why additional components were added in subsequent iterations” (COE, 1999b:7-14). Hence, the objective was to

⁹⁵ See also *Working Group Protocol Regarding Advisors and Advisory Bodies* (1997), available: <http://www.sfrestore.org/wg/adproto.html> [December 19, 2001] and *Task Force Resolution re: GCSSF* (1997), available: <http://www.sfrestore.org/tf/tfresolutions/resolution.htm> [August 7, 2001].

⁹⁶ The website contains information from late 1996 forward in terms of meeting minutes. Two requests to the Task Force for archival minutes were not answered and as a result the early history of the policy universe is recreated from available documents and information from interviews.

provide a general framework of components as the Starting Point Alternative and then work to higher levels of specificity as the iterative plan formulation strategy progressed. Component Screening also led to the identification of Other Project Elements (OPE).

OPE are discrete aspects of ecosystem restoration that were “either outside the boundary of the [hydrological simulation] model or they were too small to be simulated at the scale of the model” (COE, 1999b:7-45). Some examples included eradication of the exotic species *melaleuca*, the Seminole Tribe’s Big Cypress Reservation Water Conservation Plan, and Florida Keys’ tidal restoration.⁹⁷ Identification as an OPE allowed aspects of restoration that could not be effectively incorporated in the hydrological simulation model to be ultimately included in CERP, following the iterative alternative evaluation process. The delineation of OPE cemented the focus of the plan formulation strategy to be based on the hydrological simulation model. Additionally, some OPE were identified as Critical Projects under Section 528.b.3. of WRDA 1996 and authorized for immediate implementation.

Iterative Evaluation and Development of Alternative Plans

The next stage of the plan formulation strategy was iterative hydrological simulation modeling, evaluation and development of alternative plans (see Figure 4.7, phases 1-4). The Restudy’s methodology was designed to be recursive, thereby allowing for the progressive development of CERP with subsequent iterations containing a higher level of specificity.

Restudy Team’s Sub-Teams

The Restudy Team created three sub-teams to progress the process: Alternative Evaluation Team (AET), Alternative Development Team (ADT), and the Modeling Team (MT). The AET was responsible for evaluating each modeling iteration, beginning with the Starting Point Alternative. The ADT then incorporated the AET’s evaluations to design the subsequent alternative to be modeled by the MT.

The AET was a multi-agency team of approximately 50 biological and physical resource scientists, planners and engineers (COE, 1999b:7-9). The AET responsibility for plan evaluation included:

- Developing quantitative indicators of plan’s performance (performance measures) and targets for each indicator.

⁹⁷ Notably, OPEs included issues discussed by the GCSSF under their broader remit of sustainability and parallel the policy universe’s mandate to coordinate different aspects of ecosystem restoration beyond water management.

-
- Comparing model results against performance targets to identify the most significant strengths and shortfalls of each alternative.
 - Providing the “top 10” shortfalls of each plan to the ADT.
 - Performing the evaluation and comparison of the final array of comprehensive alternative plans
 - Collating and considering comments from the public and Restudy Team regarding each alternative plan (COE, 1999b:7-9, 7-10).

Notably, the AET’s review process included not only their own evaluation, but also consideration of feedback from the Restudy Team and wider public. Internet technology allowed the posting of the alternatives with modeling results and performance measures, on a website for wider review (Plate 4.3). Feedback was incorporated at the alternative iteration planning stage. The ADT was a multi-agency team of approximately 30 scientists, planners and engineers. The ADT identified and designed a specific collection of components to be simulated by the MT, based on the feedback provided by the AET. The strategy the ADT used was “to improve the performance of each alternative plan and to test different strategies for component modification identified by the AET” (COE, 1999b:7-9). Finally, the MT was a small group of hydrological modelers led by Jayantha Obeysekera.

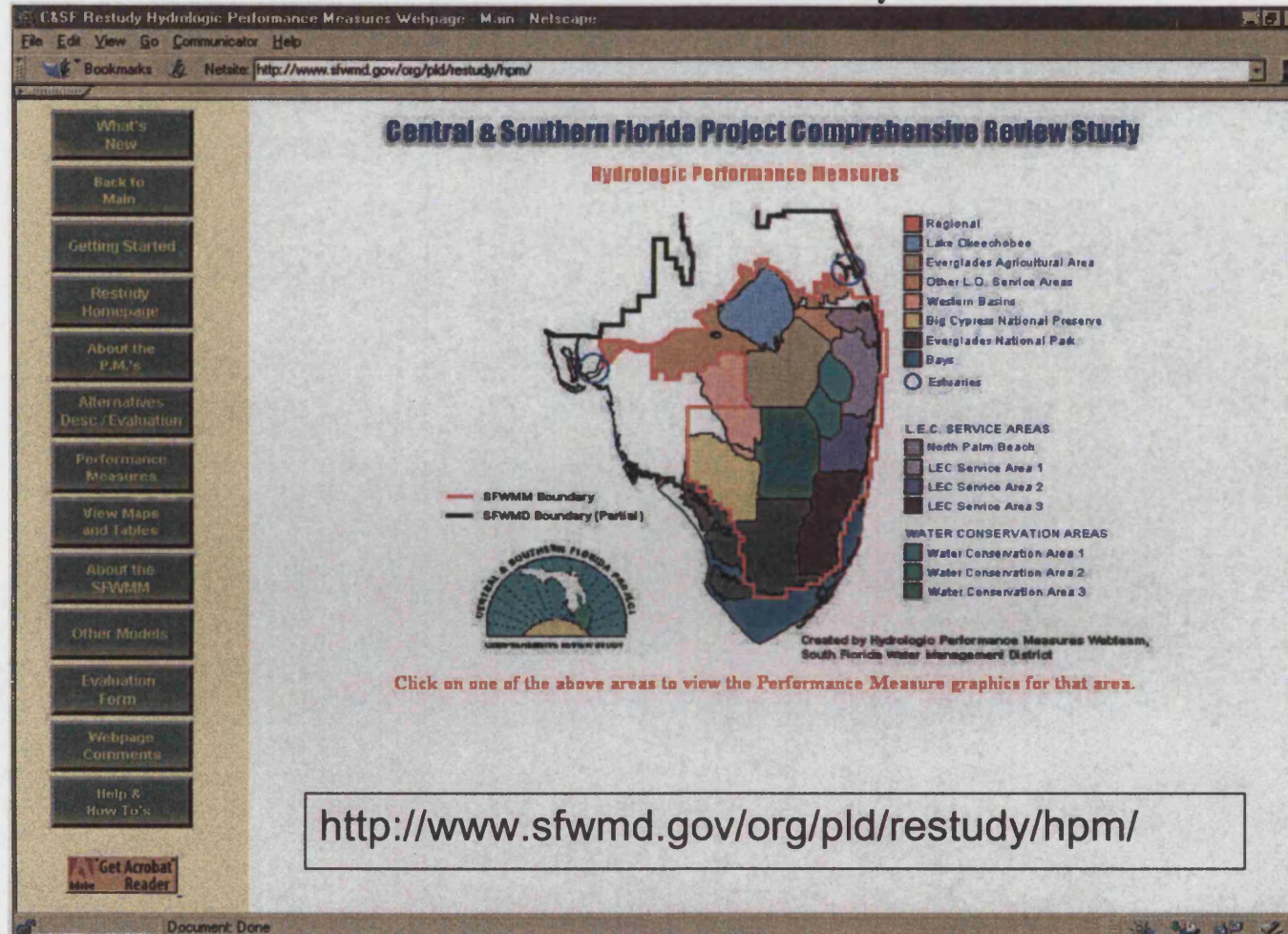
Modeling Tools

While the COE led the actual plan formulation process, the SFWMD led the modeling effort. The partnership evolved in this manner because, interestingly, the District had more sophisticated hydrological modeling tools developed for the watershed than the COE. This was beneficial to the governance of the Restudy because it gave the local sponsor a key, and exclusive, role in the organizational framework of the Restudy Team. The COE’s delegation of technical modeling to the District also allowed the COE to focus on managing the wider context of the overall process, such as how to most effectively include multi-agency and multi-disciplinary perspectives and incorporate public participation.

The two central models were the South Florida Water Management Model (WMM)⁹⁸ and the Natural System Model (NSM). The WMM is an integrated hydrological simulation model, showing the connectivity of surface and groundwater flows throughout the greater Everglades ecosystem from Lake Okeechobee to Florida Bay. The model simulates the features of the hydrologic cycle in South Florida

⁹⁸ In CERP the South Florida Water Management Model is abbreviated as SFWMM. To avoid unnecessarily long acronyms, this thesis refers to it as either the WMM or Model.

Plate 4.3: Public Interface for Review of Restudy's Alternatives⁹⁹



⁹⁹ Provided by Obeysekera, interviewee.

including rainfall, evapotranspiration, overland flow, groundwater flow, canal flow and seepage across levees based on climatic data from 1965 – 1995. The 31 year period of record captured the variety of annual weather conditions, including extremes of drought and hurricanes. These data were incorporated with the Managed System so that the WMM simulated structural features such as canals, levees, pump stations, groundwater well fields, and storage reservoirs. Each model run of the WMM had voluminous output summarized by performance measures (COE, 1999b:7-9).¹⁰⁰

Performance Measures (PMs)

PMs allowed for the meaningful progression of each alternative, by benchmarking how well each alternative met the multi-purpose water management objectives and by identifying strategies to modify an alternative in the following iteration. CEMs were used to develop PMs whereby each attribute had a series of PMs identified to serve as indicators of responses in the natural system. Ogden noted that the PMs must be: “measurable, and their historical patterns, relationships, and functions well enough understood, so that responses can be correctly determined and interpreted” (Ogden, 1999:6). Scientists identified critical linkages among CEMs at a regional level to identify PMs relevant at a watershed scale. Critical linkages are “ecological links between one or more stressors and attributes, which seem to explain most of the ecological and biological changes in the system” (Ogden, 1999:6). The AET assigned a high priority to PMs that reflected critical linkages of the ecosystem, such as decompartmentalization and hydroperiod.

Strategy

The previous sections have identified the sub-teams, the modeling tools, and mechanism to evaluate modeling results for the Restudy. The final critical aspect of the alternative evaluation formulation was the *strategy* of restoration applied as the basis for CERP’s development. The *Final Feasibility Report* noted that the Restudy Team began the plan formulation process with the expectation that it would be possible to meet *all* the PMs and attain total ecosystem restoration. However, during the plan formulation process “it became increasingly apparent that, given the physical, operational, legal, and societal constraints in south Florida, it would not be possible to fully achieve every PM target” (COE, 1999b:7-13). As a result, the Restudy Team realized “tradeoffs” would have to be made among competing objectives. As already discussed, the AET placed priority on PMs that related to multiple CEMs attributes.

¹⁰⁰ Also see Appendix B of CERP (COE, 1999).

Interestingly, the Restudy Team also turned to the NSM in setting priorities among competing PMs: “The pre-drainage hydrological patterns shown by the NSM are the most likely to lead to the recovery of natural systems, and should be a priority for the natural wetlands of south Florida over other targets” (COE, 1999b:7-13). Notably, this statement indicates *hydrological patterns*, hence a conceptual application of the NSM rather than used as a template for restoration. Other prioritization parameters included the tenet that “restoration should not cause additional, long-term ecological damage...[however, the Restudy Team] is willing to see additional local community shifts (short-term “damage”) occur if these would allow realization of larger scale restoration targets” (COE, 1999b:7-13). With this understanding of the methodology for undertaking the iterative plan formulation process, the following section summarizes the progression of the different alternatives.

4.5.3 Iterative Alternative Evaluation Process

This intensive stage in the Restudy process began in September 1997 and was completed in June 1998. Including the *Starting Point Alternative*, a total of 24 plan iterations were formally investigated, ending in the selection of *Alternative D-13R* as the preferred alternative for the *Initial Draft Plan*. Alternatives were grouped into discrete sets, based on progressive plan formulation themes of focus. Further details about the progression of components in the alternatives appear in Appendix 4.

Alternative D-13R was selected by consensus of the Restudy Team as the *Initial Draft Plan*. Despite agreement that this was the best choice amongst alternatives thus far, some stakeholder groups were not satisfied with the performance of *Alternative D-13R* and requested that the iterative process proceed with subsequent refinements.

4.6 Attempts to Further Modify *Alternative D-13R*

The local voice universe and some individual agencies sought to influence the contents of the *Initial Draft Plan* while it was being written, *after* consensus agreement by the Restudy Team that *Alternative D-13R* was the preferred alternative. Hence, as discussed in throughout this section, following a consensus decision within the Restudy’s formal institutions significant efforts were made through informal communication channels to modify the contents of the *Initial Draft Plan* before it was released for public comment. These pre-emptive communications demonstrate the

power of some interests to influence the Restudy through informal communications, outside the rules governing formal public comment. The *Initial Draft Plan* was formally released for public comment on October 31, 1998. December 31, 1998 was the official closing date for receipt of comments.

4.6.1 Commission's *Interim Report*

The Commission produced another "bridging" document *An Interim Report of the C&SF Project Restudy (Interim Report)*. Following its procedural rules, *Interim Report* was a consensus document, agreed on July 24, 1998 and presented to the Restudy Team on August 11, 1998. The *Interim Report* was the result of a four month process initiated March 1998 for the "expressed purpose of providing broad based recommendations and comments...prior to the initial release" [of the *Initial Draft Plan*] (Pettigrew, 1998).

The *Interim Report* made 35 specific recommendations for further improvements to *Alternative D-13R* that can be categorized into the following themes:

- Water storage flexibility
- Land procurement
- Hydrological connectivity
- Water quality
- Maintaining adequate water supply
- Provision of assurances to current water users regarding water supply and flood protection
- Inclusion of southwest Florida issues
- Optimizing coordination of ongoing research

The Commission had considerable power at this stage of the Restudy process as a result of its diverse membership, consensus decision-making rules, recognition in WRDA 1996 legislation, and its official advisory roles to the Task Force and Working Group. Failure to respond fully to its recommendations was tantamount to disregarding key local stakeholders whom collectively determined the range of socio-political acceptability for CERP. Furthermore, many of these key stakeholder groups, such as agriculture, environmental organizations or urban constituencies, had individual power of lobby at a federal and state level. The *Initial Report* reminded the Restudy Team of the Commission's authority:

The aforementioned recommendations are hereby transmitted to assist the Corps and the SFWMD in improving the draft Comprehensive

Plan that will be completed by October 1998. *We wish to re-emphasize that these concerns should be addressed in the October Report* (GCSSF, 1998:36, my emphasis).

Finally, the Commission concluded the *Interim Report* by offering further assistance to the Restudy Team and making clear that it intended to fully review the subsequent drafts of CERP before the final draft for submission to Congress was agreed.

4.6.2 Attempts by DOI Agencies to Modify *Alternative D-13R*

On August 7, 1998 DOI agencies, including ENP and FWS, officially presented their concerns about *Alternative D-13R* in the first draft of *Fish and Wildlife Coordination Act Reports (Draft FWCA)*. *Draft FWCA* highlighted DOI agencies' concerns about the degree to which *D-13R* achieved the PMs of natural areas including northeast Shark River Slough, WCAs, Biscayne Bay, and St. Lucie Estuary and water quality system-wide. Following an expression of the DOI's willingness to work with the COE appeared the core sentence of *Draft FWCA*'s cover letter: "The DOI has every confidence that these issues can be satisfactorily addressed, resulting in a feasible conceptual strategy for south Florida ecosystem restoration that the DOI can fully endorse" (Ring and Forsythe, 1998). This statement can be interpreted as a not too veiled threat by DOI agencies to impede the authorization of CERP, if DOI "suggestions" were not addressed prior to sending CERP to Congress. Lack of DOI endorsement was a credible impediment to the authorization of CERP. Recall that the DOI is the umbrella for a collection of federal agencies that address protection of natural resources including the FWS, USGS and NPS, which manages ENP. DOI agencies' support of CERP was essential for efficacy of the Restudy process. Since the plan included water supply and flood control measures as well as restoration, natural resource management agencies' failure to support CERP would have raised the question of whether the stated purpose of restoration was merely a façade to authorize a water management plan to support growth in Florida at federal expense. In this instance, Congress almost certainly would not have authorized CERP.

4.6.3 Response by Restudy Team

For political reasons, the *Final Feasibility Report* downplayed the significance of the August 7th document stating that of the matters raised by the *Draft FWCA* "some...were considered critical to acceptance of the Comprehensive Plan [by Congress]" (COE, 1999b:7-68). In addition to points made by *Draft FWCA*, issues

raised in the *Interim Report* were also considered. The Restudy Team identified components of *D-13R* that needed further refinement into six issues:

- Increase total overland flow to Florida Bay, Northeast Shark River Slough and Taylor Slough to meet NSM depth and duration targets.
- Improve ecological performance in the WCAs by eliminating damaging high and low water conditions.
- Improve ecological conditions in Biscayne Bay by restoring more natural freshwater inflows.
- Examine risks and uncertainties associated with using wastewater re-use as a water source for Biscayne Bay.
- More closely meet restoration targets in the St. Lucie Estuary.
- Improve ecological PMs in the C-111 Basin by providing adequate freshwater to maintain target hydropatterns (COE, 1999b:7-69).

Motivated by the DOI demand for additional refinements to *D-13R*, the Restudy Team ran four subsequent iterations (Figure 4.7, phases 1-8), identified as *Alternatives D-13R1-4*. Of these four iterations, which occurred rapidly over four days, *D-13R4* was determined to be the best alternative. *Alternative D-13R4* differed from *Alternative D-13R* by providing “peak flood attenuation, reduction of freshwater discharges to tide and increased flows to Northeast Shark River Slough, WCA-2A and Biscayne Bay while recharging Miami-Dade County’s coastal canals” (COE, 1999b:7-70, 7-71). *Alternative D-13R4* succeeded in providing an additional 245,000 acre/feet of water annually to ENP. However, it was detrimental to some non-federal remnants of the natural system with negative effects including higher water levels in WCA-2A and WCA-3B in contrast to *D-13R* and the backpumping of untreated¹⁰¹ urban runoff directly into the remnant natural WCAs.

The debate about *D-13R4* versus *D-13R* pitted powerful stakeholder groups against each other, such as ENP and the Miccosukee Tribe, who already had existing conflicts over past water management practices. The question of 245,000 acre/feet emerged as the most volatile and potentially damaging conflict to the success of the Restudy. A more detailed discussion about this debate appears in subsequent chapters. Because of the shortcomings of *Alternative D-13R4*, *Alternative D-13R* in complement with 21 OPE, was ultimately released as the recommended alternative in the *Initial Draft Plan* for public comment on October 31, 1998.

¹⁰¹ “Untreated” meaning water has not entered STAs to reduce phosphorus load.

4.7 Fourth Stage of the Restudy Process: November 1, 1998 – July 1, 1999

The fourth stage of the Restudy process was signaled by the start of the formal public comment period on the *Initial Draft Plan* and concluded with submission of the *Final Feasibility Plan* to Congress on July 1, 1999. The following sections discuss events within the science, policy and local voice universes (Figure 4.8).

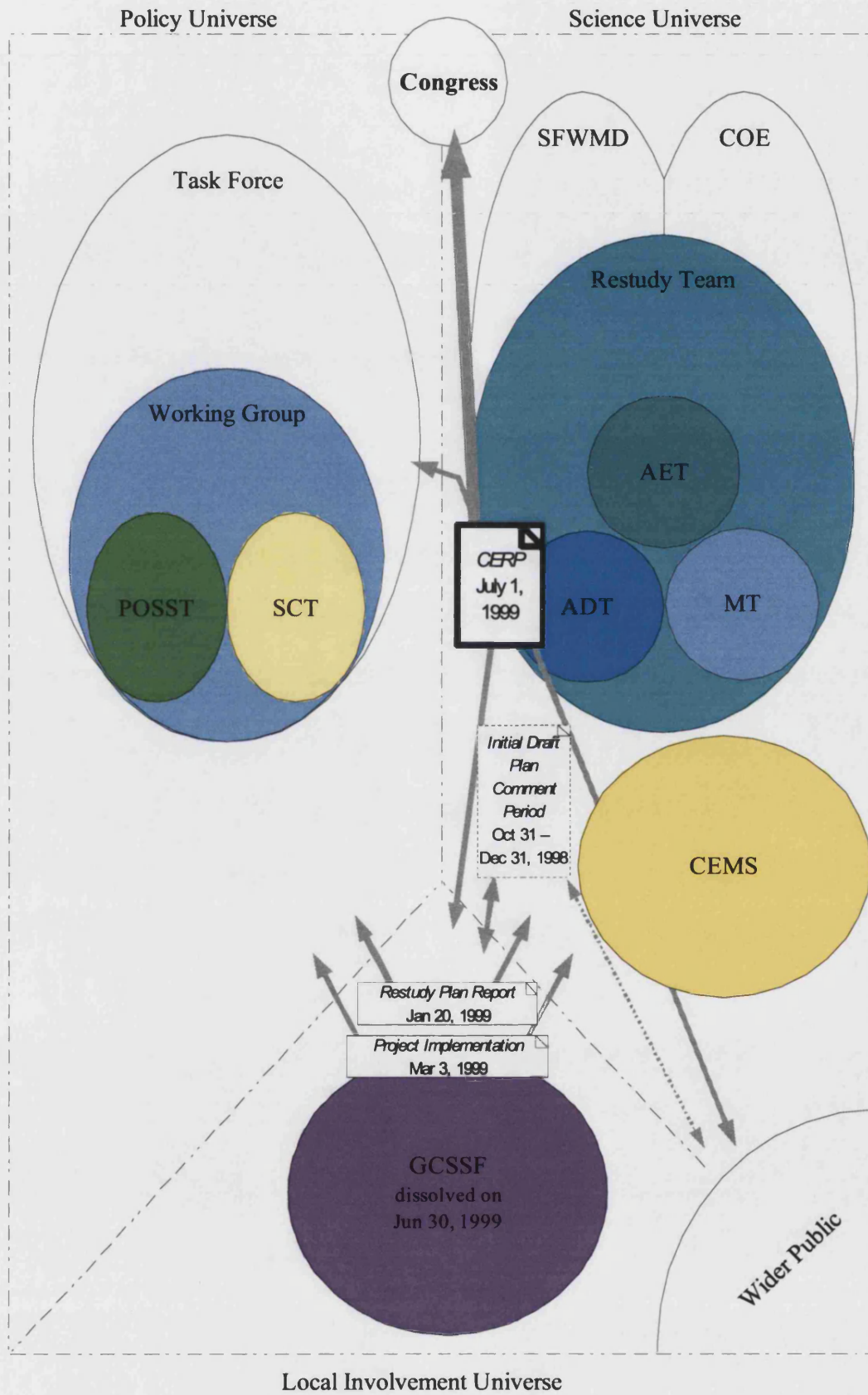
4.7.1 Public Involvement and Outreach: October 1998 – February 1999

A public comment period for the *Initial Draft Plan* was required by NEPA (1969). The *Initial Draft Plan* consisted of 500 pages with more than 3,000 pages of appendices and was available at public libraries, or to individuals by request, in hard copy and CD as well as via the Internet (COE, 1998b). The breadth of the *Initial Draft Plan* was an asset, but also a potential deterrent for readers. In order to reach more people the Restudy Team summarized the *Initial Draft Plan* in the much more accessible *Overview* document, also released in October 1998. To visually illustrate the complex *Initial Draft Plan* to the general public, this 29 page glossy brochure had maps, photographs and diagrams and was designed as a public outreach tool. As further public outreach measures, an effort was made to inform the regional and local media about CERP. For example, seven region-specific articles were written for local newspapers (COE, 1999b:11-23).

As part of public outreach strategies, from January 1, 1998 through February 12, 1999, 66 meetings were held with specific stakeholder groups across South Florida as well as interest groups in Washington. These meetings were designed to provide a forum of interaction for public feedback. From 1998 – 1999, 129 public outreach events were held either as meetings or as radio broadcasts at locations throughout the region. The Restudy Team made a specific effort to reach the large Hispanic and African-American communities, including message delivery in Spanish. These public outreach events were designed to function as an opportunity for information dissemination from the Restudy Team to the public, rather than as a more interactive forum to gather public feedback. Finally, during November – December 1998, twelve public meetings¹⁰² were held, specifically designed to be interactive forums for public feedback about the *Initial Draft Plan* (COE, 1998c). SFWMD

¹⁰²Held in Clewiston, Stuart, Okeechobee, Miami, Ft. Lauderdale, West Palm Beach, Marathon, Homestead, Kendall, Naples, Ft. Meyers and Washington DC.

Figure 4.8: Restudy's Fourth Stage (November 1, 1998 – July 1, 1999)



planner Tom Teets recalled:

We took a different approach than we would normally do for traditional public meetings required by NEPA. We knew we had to have the public comment period, where people give their perspective, but half the meeting actually was committed to more interactive communication. We had a series of displays set up around the rooms with staff at each of the displays, so that people could just come in and have answers to their questions in a very informal fashion. I thought that was *really* a kind of a neat interaction, and people who we had not engaged before had just seen the ad in the paper and showed up. If they didn't want to stick around for the big public hearing, if they didn't feel comfortable doing that, they were able to talk to staff more informally. That was a really useful exercise and [as a result] we were able to get a lot of good perspectives from people.

Attendance ranged from 75 to 190 people at each meeting for a total approximate attendance of 1550 people. The format of the meetings was an "open house" from 5-7 pm for interested members of the public to talk directly with Restudy Team members, as well as view exhibits explaining CERP. At 7 pm there was a presentation about CERP followed by a formal public comment period.

During the review period comments were received from approximately 200 federal, state, local agencies, the Miccosukee and Seminole Tribes, NGOs and individuals (COE, 1999b:11-39). Notably, the comments received during the public comment period were largely affiliated with stakeholder group interests. SFWMD planner Agnes Maclean highlighted the point that "public comment" occurred on a stakeholder group basis: "I wouldn't say that members of the *public* made comments. I would say that stakeholders make comments".

4.7.2 Events in Policy Universe: 1998-1999

Within the policy universe, the *Initial Draft Plan* was the point of focus in 1998-1999. Responsive to issues it raised, the Working Group held a workshop to identify social science issues relevant to ecosystem restoration and to discuss strengthening public participation. In both the Working Group and Task Force, technical issues, such as the role of ASRs, were discussed. The Working Group published *Success in the Making* in November 1998,¹⁰³ identifying the Restudy's project goals and what overall modifications were proposed to the ecosystem. In terms of building institutions, the Working Group continued to evolve by opening its

¹⁰³ Langton and Rosenbaum (2000) cite this as being published in April 1998. A draft version was released in April, but the actual illustrated brochure was published in November.

membership to five local government representatives. On February 3, 1999 the Task Force passed a resolution stating that it “remains committed to science as the foundation of the Restudy plan and its implementation.” The Task Force also published a biennial report, *Maintaining the Momentum* to summarize the progress towards restoration (1999a).

4.7.3 Revisions to *Initial Draft Plan*: December 31, 1998 – July 1, 1999

Following the formal NEPA public review period, the fourth stage of the Restudy process consisted of the Restudy Team making modifications to the *Initial Draft Plan* based on agency, tribal, NGO and public input. NEPA required that the final version of CERP be released for public review for not less than thirty days before being sent to Congress. From January – March, the Restudy Team worked to improve the plan. The question of the 245,000 acre/feet remained a volatile point of debate and documentation suggests that, in some instances, the objective of *greater* ecosystem restoration was obscured by participants’ agency perspective. For example, individuals who were part of the Restudy Team – ENP scientists Tom Van Lent (ADT) and Sue Perry (AET) – presented a draft “issue paper” on January 8, 1999 to “Increase total overland flow to Florida Bay, Northeast Shark River Slough, and Taylor Slough to more fully meet NSM targets” (Heisler). A collection of January 11, 1999 peer reviews unanimously criticized the content of the draft paper as “unfounded and technically flawed” (S. Davis) for misuse of PMs, poor application of science and failing to follow the process for “issue paper” development. Heisler wrote:

The arguments in the paper are logically weak, with a number of unsupported claims, errors and misleading statements. The PMs that had been developed by the AET in advance of planning have been abandoned, and replaced with an ad hoc set of new targets that appear to have been chosen not for their scientific validity but for their efficacy in supporting the specific position advocated in this paper. The overall presentation of information is biased to case D13R in an excessively negative light, using language that manages to imply that D13R will cause environmental damage in cases where PMs actually predict benefits. Overall, the paper appears contrived, highly subjective, and imprecise (1999).

Furthermore, regarding the conclusions contained in the paper Davis wrote, “without major revision, they may seriously thwart Everglades ecosystem restoration and undermine the credibility of the National Park Service in the south Florida community of ecologists” (1999).

The largest technical flaw the reviewers identified was the “issue paper’s” proposed management of the central Everglades consisting of the WCAs, also partly Miccosuke Tribal land. As Steven Davis wrote:

The Park proposes managing WCA-3 at pre-drainage water levels despite an acknowledged 3-foot loss in ground elevation. What they are suggesting would obliterate the remaining mosaic of sawgrass stands, wet prairies, sloughs and tree islands, in an area of the freshwater Everglades that exceeds that of the Park, in order to increase flows to the Park...It fails to recognize that the Everglades north of the Park, in their present state, are an integral part of the greater Everglades ecosystem. It fails to acknowledge that the wetlands within WCAs have intrinsic ecological values and restoration objectives equal in importance to those of the wetlands within the Park...An objective of the Restudy and the AET is to restore ecological values to the extent possible in as much of the remaining greater Everglades ecosystem as possible, not to restore hydrology to the benefit of Everglades National Park and to the detriment of the conservation areas. The position of the Park in this paper violates that objective (1999).

The consensus of peer reviewers in this instance was that representatives on the Restudy Team sought to further the interest of their specific area of concern – ENP – at the expense of the WCAs. The co-chair of the AET, Cheryl Buckingham, was from FWS, another agency under the DOI umbrella. Buckingham argued that the process used by ENP actors circumvented the organizational rules of peer review that govern the AET and she specifically criticized the failure of the ENP to minimally work with other DOI agencies.¹⁰⁴

As the above example illustrates, a key challenge during the Restudy process was that each agency had its own mandate and priority objectives for CERP. Participation in organizations within different universes to develop CERP was not a proscribed activity in the agency mandate. As a result, individual actors were often conflicted in terms of working to further their agency’s mandate rather than the bigger picture of developing an integrated water management plan for the watershed. The NPS mandate is to protect National Parks and Preserves. In this instance, ENP scientists sought to interpret data to fulfill the NPS mandate at the expense of greater ecosystem restoration. From a bigger picture view, this stance is ironic because the hydrological and ecological connectivity of ENP to the upstream ecosystem means that in the long term ENP would benefit from the restoration of areas beyond its

¹⁰⁴ Buckingham wrote: “The agreed upon review process was not followed...It was not sent to the Everglades Basin Issue team as agreed, but was received by a much broader audience prior to any review. It was characterized as a DOI document without permission of the other DOI agencies, particularly the [FWS]” (1999).

borders. As John Ogden wrote in response to the paper Van Lent and Perry submitted:

I continue to be mystified that the Park staff are unwilling to become full partners with the AET and other multi-agency, multi-disciplinary teams that are working so diligently to plan, implement and evaluate a successful Everglades restoration program. I am convinced that the success of this effort will only come through the combined talents and energies of all the participating agencies...the unwillingness of the park to fully meet its commitments to participate in the multi-agency planning process, continue to both divide our talents and to add to the work loads of all concerned (January 12, 1999).

Ogden's statement highlights the importance of the creation of organizations to address the Restudy process from a multi-disciplinary and multi-agency approach that would not be possible without new institutions. Furthermore, the extensive critique of the contested paper through peer review is a demonstration of the important role of peer review in science, a topic discussed further in Chapter 6.

On January 14, 1999 ENP Superintendent Richard Ring sent modifications to the ENP's December 31, 1998 comments on the *Initial Draft Plan*. ENP's original (December) NEPA submission appeared markedly similar to the January 8, 1999 draft issue paper submitted by Van Lent and Perry.¹⁰⁵ The modifications sent by Ring responded to detailed comments in the January 11th and 12th reviews by other AET scientists to Van Lent and Perry's "issue paper". The unfolding of events demonstrated that ENP's input through formal governance institutions, such as NEPA, occurred in tandem with more informal communications. As a result of Van Lent and Perry floating the January 8, 1999 draft "issue paper", ENP had peer-reviewed comments from the AET to make informed modifications to the formal comments submitted as part of NEPA.¹⁰⁶ In his cover letter to the January 14th submission, Ring stated that the additional comments "are an attempt to address the needs of the everglades as an ecosystem, not simply the needs of Everglades National Park." In his letter he requested the opportunity to meet Colonel Miller and his staff to discuss ENP's comments.

¹⁰⁵ I have been unable to obtain a copy of the January 8th draft issue paper. I requested the paper from both Tom Van Lent and his supervisor, Bob Johnson, and received no response. Hence, the discussion here is based on a careful comparison of the text references in the reviewers' comments and ENP's NEPA review documents.

¹⁰⁶ Note that the modifications were received *after* the formal public review deadline. The justification used to allow the changes to the December 31, 1998 document submitted by ENP was that since *a* document had been submitted by the deadline it was acceptable to submit subsequent modifications. In addition, the modifications were identified as conceptually linked to the production of the *Final FWCA* report produced by ENP and FWS. Nevertheless, it is notable that the powerful stakeholder of ENP was able to make modifications to written submissions after the end of the formal public comment deadline.

Ring and Steve Forsythe, FWS, quickly gained entrée and met with Colonel Joe Miller on January 22, 1999 (Miller, 1999). On February 19th Miller sent a follow-up letter to Ring and Forsythe stating¹⁰⁷:

The Corps is committed to implementing the final plan in a manner that provides improvements to the operation of the WCAs as well as providing more water for Everglades National Park and Biscayne Bay. In addition, the Corps is committed to solving the remaining operational problems of the WCAs associated with the comprehensive plan. The final comprehensive plan that is implemented will provide for an improved capability for delivery of additional water to Everglades National Park and Biscayne Bay by capturing urban runoff (approximately 245,000 acre-feet) from urban areas. The Implementation Plan includes a phased approach to provide for substantial improvements...[the] ultimate amount of additional water recaptured and its distribution will be determined based on this phased approach and the ability to obtain maximum ecological benefits in [WCAs, ENP, and Biscayne Bay] (1999:2).

Therefore, the plan that appeared in the *Final Feasibility Report* was a refined version of *Alternative D-13R*. However, the COE expressed a commitment to provide more water for ENP in implementation's "phased approach". The concept of applying adaptive management to the implementation strategy as a mechanism for future modifications to CERP was a popular theme among stakeholder groups. Effectively, adaptive management extended stakeholder groups' window of opportunity to influence the contents of CERP to implementation, after the conclusion of the Restudy process.

4.7.4 Development of *Draft Implementation Plan*

Simultaneous with the review process was the development and review of the *Draft Implementation Plan*. Initial development began in June 1998 by the newly organized Implementation Team consisting of representatives from federal, state, local and tribal government. The Implementation Team held four public workshops (July, August, November, December 1998) where guidelines for component prioritization and the process for continued refinements were discussed. Development of the *Draft Implementation Plan* followed earlier principles established in the Restudy process of relying on the best available science and public input with an iterative methodology.

A consideration of the actual prioritization of components is beyond the scope

¹⁰⁷ This letter does not appear in CERP, despite the inclusion of other correspondence.

of this thesis; however, it is important to note that guidelines “include management strategies for ensuring that the comprehensive plan is implemented in a manner consistent with the goals and objectives of the Restudy effort” (COE, 1999b:10-3).

The guidelines for developing and refining CERP presented in the *Draft Implementation Plan* included:

- Utilize inter-disciplinary and inter-agency teams
- Incorporate outreach and public involvement
- Maintain regional system focus
- Integration with ongoing and future projects
- Integrate contingency planning
- Plan evaluation through adaptive assessment
- Assurances to water users
- Refinement of modeling tools

The *Draft Implementation Plan* was opened for public review on January 25, 1999 and a workshop was held on February 1, 1999 to present and hear public comment. The comment period closed on February 5, 1999.

The critical feature of the *Draft Implementation Plan* was that unlike a typical COE project with a clearly defined timeline, it was intended to rely on adaptive management to continually improve the implementation schedule. In order to transition from the conceptual plan outlined by CERP to a detailed design for construction of the project components, Project Implementation Reports were created, which contained detailed technical parameters and were accompanied by Project Management Plans for the sixty-eight project features. While these were undertaken on a regional project level scale, system-wide assessment would continue. The Restoration, Coordination and Verification (RECOVER) Team was developed to undertake this system-wide adaptive management and was charged with the role of identifying if future revisions to CERP were advisable.

4.7.5 Finale of the GCSSF

Prior to the release of CERP, the Commission provided final consultation to the Restudy Team through its *Restudy Plan Report*. Released January 20, 1999 this document drew on wider public consultation by the Commission in November – December 1998. The *Restudy Plan Report* included the issues of water storage, coordination with other restoration efforts, water quality and highlighted provision of

water assurances to current water users so “that they will not suffer loss of existing water use from the Restudy” (GCSSF, 1999b). Hence a primary concern of the Commission was loss of current water supply allocation to users as a result of restoration. In addition to this, the Commission released a consensus response to the *Draft Implementation Plan* (1999a). The Commission also provided a letter on December 23, 1998 to the newly elected Republican Governor, Jeb Bush,¹⁰⁸ who was replacing Democrat Lawton Chiles. The letter summarized the Commission’s activities since its formation and stated that Bush’s “new administration will need to determine the longevity of the Commission, its form, composition, and/or future role(s), in the new administration” (Pettigrew, 1998:1). In addition, in the letter Chairman Pettigrew noted that the existing Commission appointments ceased June 30, 1999.¹⁰⁹

Governor Bush terminated the Commission, which ceased to exist and created an organizational gap in the local voice universe. However, Bush recognized the important organizational role of the Commission and its power in the Restudy. On June, 24, 1999 he established the Governor’s Commission for the Everglades (GCE), which began on July 1, 1999, to coincide with the dissolution of Governor Chiles’ Commission. Why did Governor Bush create the new organization of GCE rather than just continuing the GCSSF? His action was politically motivated. The Republican Bush wanted to establish a new commission, with his own choice of members, divorced from the institutions established by the Democrat Chiles and the actors selected by former Governor. Further discussion about the differences between GCSSF and GCE appears in subsequent chapters.

4.8 Fifth Stage of the Restudy Process: July 1, 1999 – December 11, 2000

As required by NEPA, CERP was released on April 19, 1999¹¹⁰ for final public review before being submitted to Congress. This included results of the Restudy (*Final Feasibility Report*), as well as the *Draft Implementation Plan*, the final *FWCA*, NEPA documentation, a series of appendices and a one page covering draft Chief of Engineer’s letter. On July 1, 1999 CERP was sent to Congress. The 4,033

¹⁰⁸ Son of President George H.W. Bush, and brother of President George W. Bush.

¹⁰⁹ Recall that CERP must be sent to Congress by July 1, 1999, so the rules governing the Commission aligned with the closure of local events in the Restudy process.

¹¹⁰ CERP is cited as April 1999. The more specific date is derived from the accompanying draft Chief of Engineer’s letter (Ballard).

page document was presented with two covering letters: (1) from Assistant Secretary of the Army Joseph Westphal to President of the Senate,¹¹¹ and (2) from Joe Ballard, Chief of Engineers.¹¹² The following sub-sections provide a brief overview of the political process from the submission to Congress until CERP was authorized in WRDA 2000 (Figure 4.9). Of some importance were contents of Ballard's letter, which came to be widely known as the "Chief's Letter".

4.8.1 Summary of Components in CERP

This thesis is centrally concerned with the Restudy policy-making process and a review of the technical merits of the *output* is not within its purview. Therefore, this thesis does not seek to analyze the technical merits of individual components contained in CERP. However, for completeness, an overview of included components is presented. Components of CERP can be classified as four categories:

- Construction features
- Operational features
- Pilot projects
- Land acquisition

68 project components together constitute CERP. A spatial reference of key components is presented (Map 4.5). Both the hydroperiod (Plate 4.4) and surface flows (Plate 4.5) of the current managed system were moved closer to the pre-drainage system patterns by *Alternative D-13R*. A hydrological animation compares estimated projections of *Alternative D-13R* with an approximated natural system and the current managed system (see Attachment 2). The animation shows that CERP increased hydrological inter-connectivity of the remnant "natural" areas in the watershed.

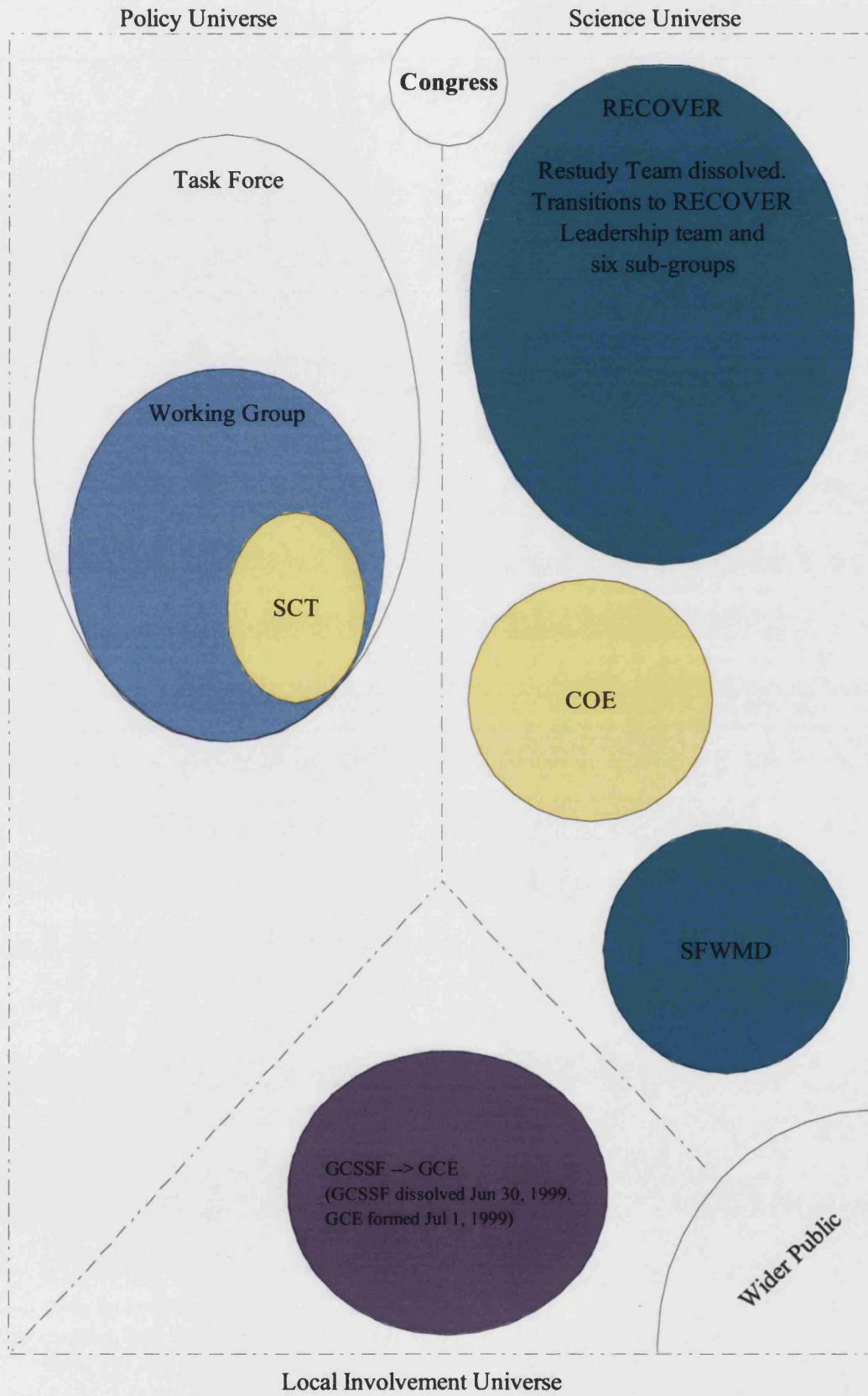
4.8.2 The Chief's Letter

Inclusion of the Assistant Secretary and Chief of Engineer's covering letters is standard practice when a feasibility study is submitted to Congress. The covering letters are intended to summarize the contents of the overall feasibility study and to serve as a tool to guide Congressional authorization of the given project. The contents of the Chief's Letter for CERP outraged a number of stakeholders groups who had

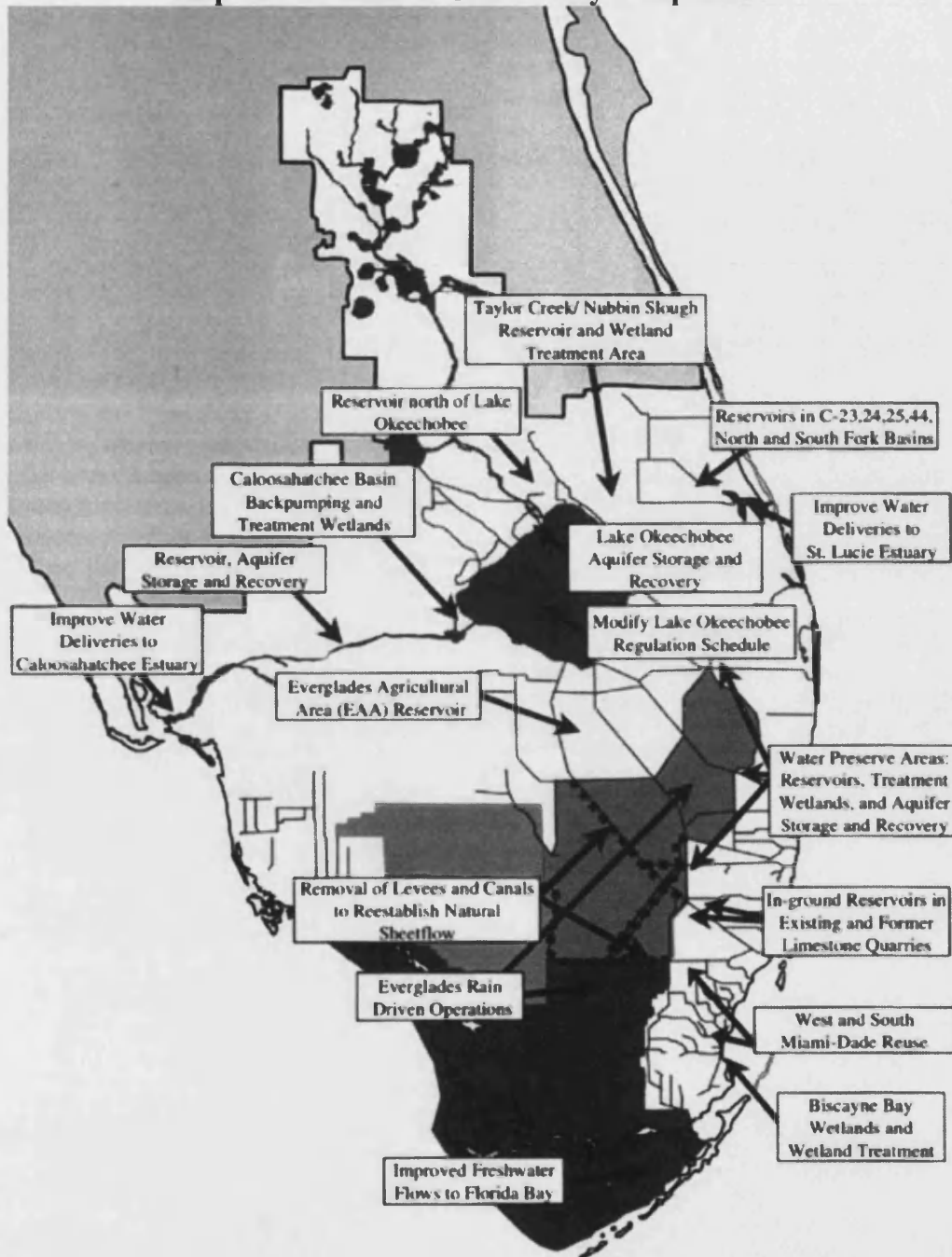
¹¹¹ Interestingly, President of Senate was at the time Vice President Al Gore, who was also Democratic Presidential Candidate.

¹¹² Ballards' letter was dated June 22, 1999 rather than July 1, 1999.

Figure 4.9: Restudy's Fifth Stage (July 1, 1999 – December 11, 2000)

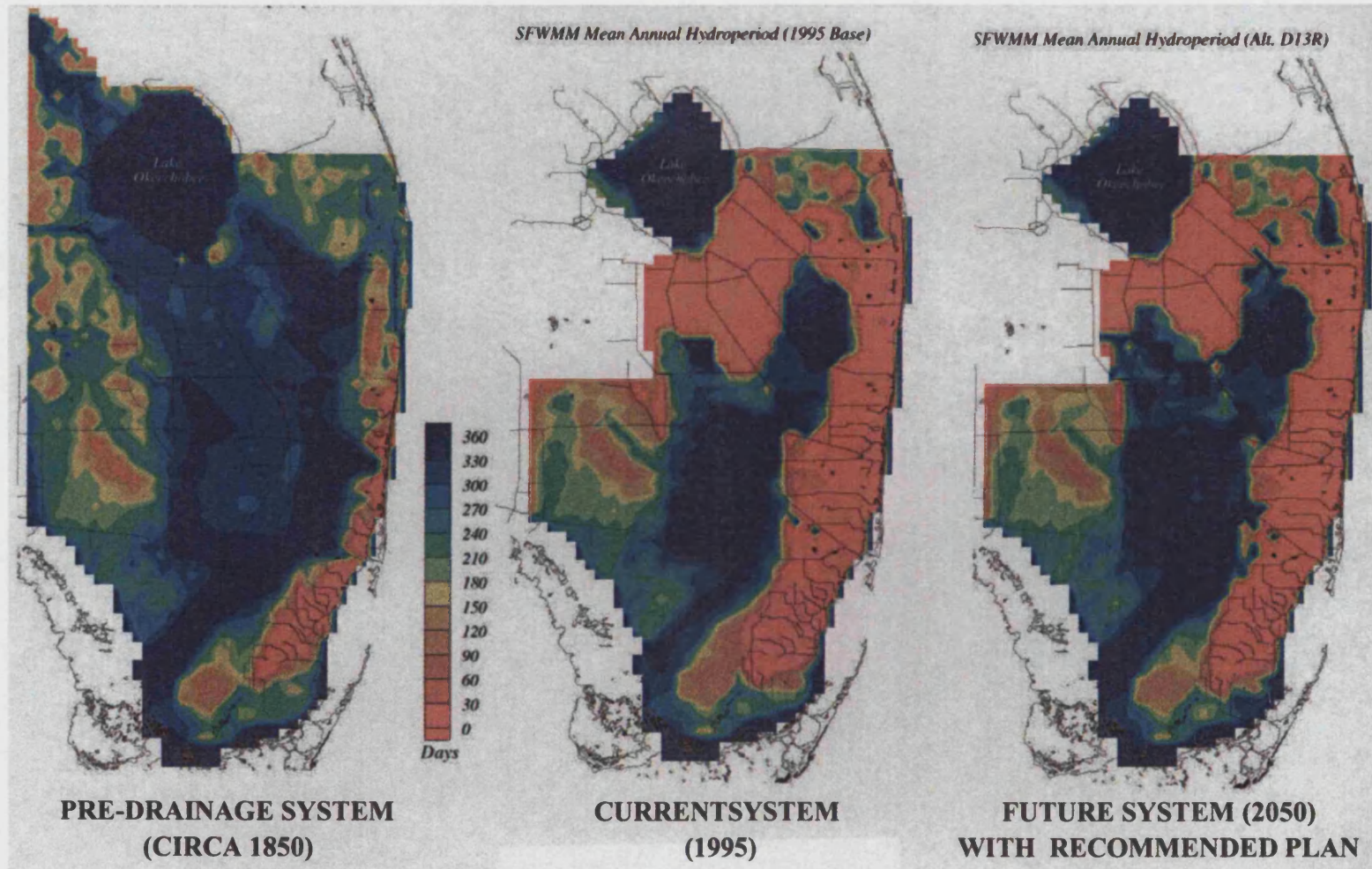


Map 4.5: Location of CERP's Key Components¹¹³



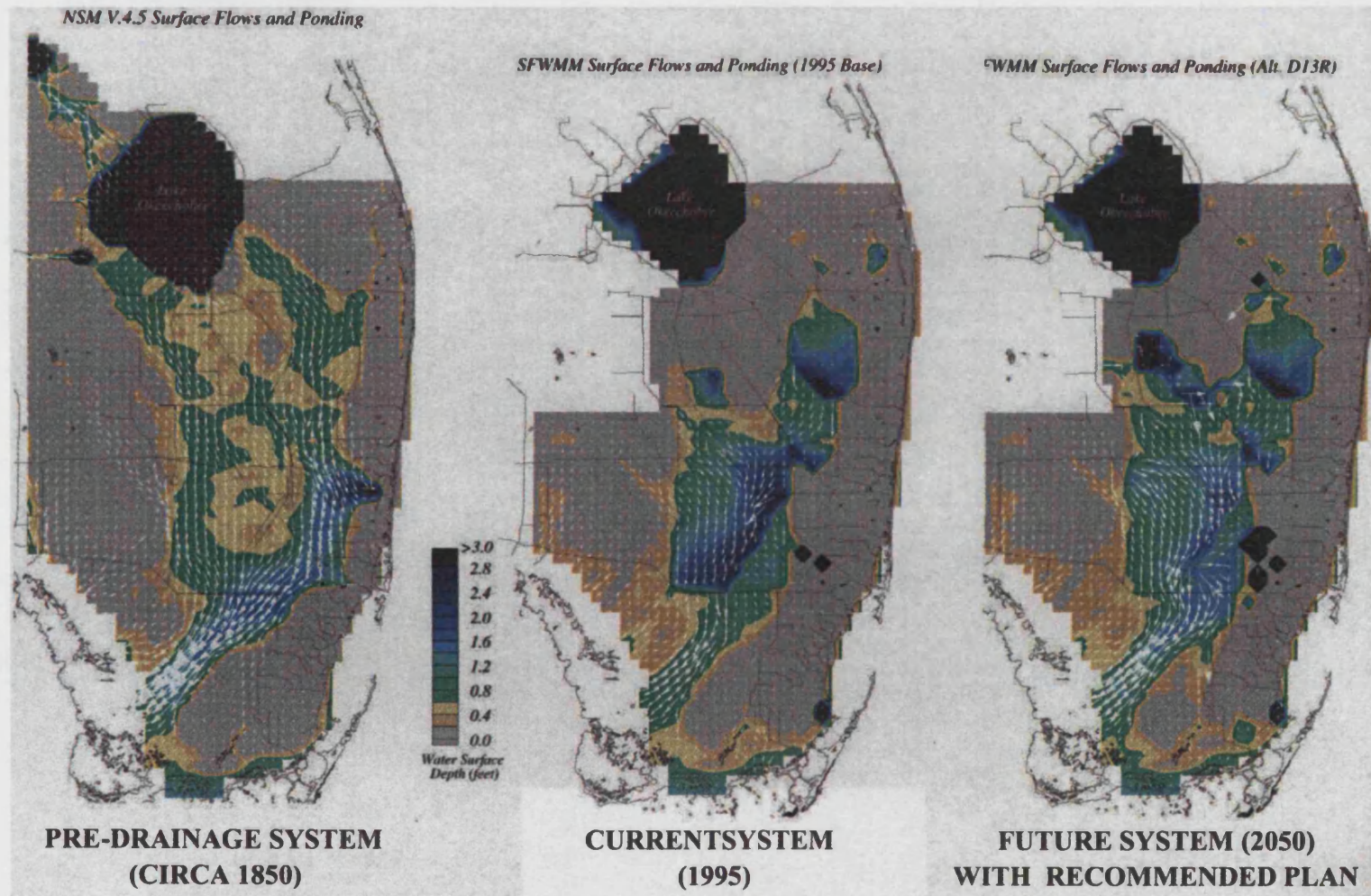
¹¹³ Available: <http://sofia.usgs.gov/sfrsf/plw/restudy.html> [March 15, 2004].

Plate 4.4: Mean Annual Simulated Duration of Inundation (Hydroperiod) in Pre-Drainage, Current and CERP Conditions¹¹⁴



¹¹⁴ Provided by Obeysekera, interviewee.

Plate 4.5: Mean Annual Simulated Surface Water Ponding Depths and Overland Flows in Pre-Drainage, Current and CERP Conditions¹¹⁵



¹¹⁵ Provided by Obeysekera, interviewee.

been engaged in the Restudy process.¹¹⁶ The Chief's Letter had expanded from a one page draft released for public review in April to a 27 page letter. In effect, there was no public review of the actual Chief's Letter submitted to Congress. The majority of the letter was a concise and meaningful summary drawn directly from CERP to introduce the contents of the lengthy document. However, inclusion of some particular points was highly contested by some stakeholders.

Most contentious was point 13 of the letter, which stated the COE:

“...is committed to implementing the final plan in a manner that provides more water for ENP and Biscayne Bay. The Corps is also committed to solving the remaining operational problems of the WCAs...The Corps will complete additional analysis that is necessary to refine the Comprehensive Plan to provide for an improved capability for delivery of additional water (approximately 245,000 acre-feet) to ENP and Biscayne Bay, either by capturing additional runoff from urban areas or by some other means. The implementation plan includes a phased approach to provide for substantial improvements and the maximum ecological benefits to the WCAs, ENP and Biscayne Bay...” (Ballard, 1999:9).

Point 13 was highly contested because it was interpreted as a COE assurance to increase the water allocation to ENP, which was made outside of the knowledge or participation of the organizations that had governed the Restudy process.¹¹⁷ By including the commitment to provide more water to ENP and Biscayne Bay¹¹⁸ stakeholder groups, particularly those with an interest in the WCAs, felt betrayed by the COE. They saw the COE statement of commitment as an attempt to circumvent the contents of CERP, agreed by the organizations engaged in the Restudy. Point 13 seemed to violate actors' understanding of what constituted legitimate governance of the process.¹¹⁹ While the COE position was that Point 13 was designed to provide an *example* of adaptive management during plan implementation, stakeholders such as some environmental groups and the Miccosuke Tribe were concerned that the statements could be interpreted as legally binding commitments to benefit ENP at the expense of the WCAs. Interviewee Joette Lorian commented that the Miccosuke Tribe saw Point 13 as evidence of agreements made “behind closed doors”. As a

¹¹⁶ Mentioned by interviewees Duncan, Moller, Rice and Salt.

¹¹⁷ Point 13 of the Chief's Letter included explicit commitments to themes discussed in the February 19, 1999 letter from Colonel Miller to Ring and Forsythe. Stakeholder groups in opposition to the letter cited this as evidence that point 13 was specifically designed to benefit ENP and Biscayne National Park to the detriment of other remnant natural areas.

¹¹⁸ Biscayne Bay includes Biscayne National Park so also consists of space managed by the NPS.

¹¹⁹ Furthermore, the Chief's Letter explained that the methodology of implementation included a phased approach and that as a result of adaptive management new findings could be incorporated. Stakeholder groups saw this as a COE statement of intention to use adaptive management to benefit ENP and Biscayne National Park at the expense of other geographic sub-regions of the greater Everglades ecosystem.

result, the Miccosuke Tribe filed a lawsuit that the Chief's Letter was in breach of both the public review required by NEPA and Florida's Sunshine Law.

4.8.3 The Washington Game

After submission of CERP to Congress on July 1, 1999 individuals who had worked together during the Restudy as members of different organizations turned to lobbyists in an attempt to further their individual interests in Washington DC. While interests' lobbying is standard protocol of Congressional legislative processes, in this instance lobbying was politically problematic. Particularly notable was the use of independent lobbyists by interests represented on the GCSSF. The consensus presentation of CERP was not breached by a single interest, but by the *majority* of interests, including urban, agriculture, environment, Tribal and government agencies. Recall that Congress had imbued power to the Commission through prominent recognition in WRDA 1996 legislation. Subsequent dissolution from a unified stance by the plurality of interests raised questions about the efficacy of the Commission and, more broadly, the Restudy process as a whole.

The individual lobbying by former stakeholder groups with representatives on the GCSSF was seen as serious threat to authorization of CERP because the strength of the rationale for inclusion of water supply and flood protection was directly based on the ability to present the Restudy process's output as a consensus product with the buy-in by the plurality of stakeholder groups in South Florida. The purported underlying message from the more inclusive and deliberative governance of the Restudy process was that restoration of the greater Everglades ecosystem was socio-politically infeasible if water supply and flood protection, issues that were normally state rather than federal purview, were not addressed in co-ordination. Independent lobby for additional concessions for individual stakeholder groups raised Congressional questions about efficacy of the output of the Restudy process – Congress did not want to be “duped” into enhancing water supply and flood protection as the primary goals under the façade of restoration.

Former Commission members soon realized that their individual opportunistic strategies failed to increase their individual benefit and had the potential to undermine authorization of CERP. As a result, the competing stakeholder groups agreed to curtail independent lobbying. The consensus documentation produced by GCSSF, coupled with recognition that a return to their prior consensus agreements as the format for CERP was preferable to not having CERP authorized at all, encouraged a

return to collaboration. Interviewee Mike Collins stressed the centrality of the Commission's *Conceptual Plan* during the legislative process to draft the wording of WRDA 2000:

Again, it was because those years of the Commission working together where people had reached an agreement. The State, in particular this Governor, myself¹²⁰, David Struhs, the Secretary of DEP, just every time questions arose we said, 'we still stand behind the principles and the positions adopted in the Governor's Commission report.'

Therefore, the GCSSF proved critical not only in the creation of the range of socio-political acceptability by establishing the conceptual framework for CERP, but also by providing a set of principles around which the cacophony of voices could return to singing from the same hymn sheet when consensus was challenged. Intervention by super-agents was crucial to bringing disparate interests back to the unified position presented in *Conceptual Plan*, advocating CERP as created through the collaboration of wide-ranging public interests in South Florida. The lobbyists for individual interests shifted from advancing the position of specific stakeholder groups towards promoting the authorization of CERP in accordance with the principles contained in the *Conceptual Plan*. Various interviewees told me that environmental, agricultural and utility interests lobbying jointly to advocate CERP was highly unusual event in the practice of Congressional lobbying.¹²¹ Terry Rice and Rock Salt said the return to the consensus agreements was evidenced by exemption of the Chief's Letter from the normal protocol of stating: "authorized in accordance with the Chief's Report" in the resulting legislation. Instead, WRDA 2000 excludes any mention the Chief's Letter.

4.8.4 Legislative Steps to Authorization

On September 25, 2000 the Senate approved 85-1, its version of WRDA 2000,¹²² committing \$7.8 billion over 35 years to Everglades restoration. The next step in the "battle against the clock" (Associated Press, 2000) was for CERP to be authorized before the adjournment of the 106th Congress by the House of Representatives. Recall the highly political climate in the autumn of 2000. November 2000 saw the national elections for some seats in the House and Senate, and critically, the Presidential Elections where Florida was a known "swing" state.

¹²⁰ At the time the legislation for WRDA 2000 was being drafted in Washington, former Commission member Collins was Chair of the SFWMD Governing Board.

¹²¹ Including Appelbaum, Collins, Duncan, Estenez, Moller, Parrish, Rice, Salt, Tepper, and Wade.

¹²² Introduced in Senate as S. 2796, on June 26, 2000.

Both before and after the election, Everglades Restoration was cited as a critical issue in determining the winner of the Electoral College votes in Florida. On October 19, 2000 the House of Representatives passed, 394-14, *their* version of CERP.¹²³ For the next step in the legislative process, the bill went to a House-Senate conference to negotiate a resolution to the differences in their respective versions of the bill. One of the main points of debate was the presence of approximately \$1 billion in wider-ranging provisions for spending not related to restoration. The joint House-Senate committee version of the bill passed first in the Senate on October 31, 2000¹²⁴ and then passed in the House, 312-2, on November 3, 2000, only days before the national elections. The extent to which Florida was *the* deciding state in the Presidential election of George W. Bush, Florida Governor Jeb Bush's brother, versus sitting Vice-President Al Gore, manifested on November 7, 2000, election day. Finally, on December 11, 2000 President Clinton signed WRDA 2000 and authorized Everglades Restoration.¹²⁵ WRDA 2000 authorized an initial \$1.4 billion for 4 pilot projects and construction of 10 of the 68 components. Subsequent spending authorization will be applied for in future WRDA.

Summary

Ultimately, the activities in the three universes resulted in the creation of a scientifically sound, multi-purpose, water management plan for the greater Everglades watershed that fell within the socio-political range of acceptability. This chapter has presented the governance of the Restudy process and highlighted the role of different organizations as events unfolded. The chapter has particularly focused on the institutions (rules and resources) of the Restudy, and further raised a number of questions about the roles of specific actors who participated in the various governance organizations. Chapter 5 turns to a more detailed consideration of roles of the actors that inhabit the organizations of the Restudy process.

¹²³ Introduced in House as H.R. 5121, on September 7, 2000.

¹²⁴ Senate agreed to conference report by Unanimous Consent.

¹²⁵ P.L. 106-541. Section 601 focused on CERP.

Chapter 5: Actors' Agency in the Restudy Process

*What one sees on the surface is not the only thing going on –
and very well may not be the most important thing.*

– Bryson and Crosby (1993:191).



An American alligator blends with its habitat. (Photograph by author).

Introduction

Chapter 4 focused on the creation and evolution of specific institutions by tracing the role of different organizations in the science, policy and local voice universes of the Restudy. Chapter 5 turns to consider the roles of different actors' agency in the Restudy process. First, actors are classified as insiders and outsiders, by membership in organizations. Following classification, actors' membership in organizations is traced through the different stages of the Restudy. These analyses of actors occurs though consideration of *relational data*, which are “the contacts, ties and connections, the group attachments and meetings, which relate one agent to another” (Scott, 1991:3). Then case studies illustrate the differential experiences of insiders and outsiders through analysis of events in some of the varied social settings that are part of the Restudy. This section of the chapter turns to *attribute data*, which Scott

defines as the “attitudes, opinions and behaviour of agents, in so far as these are regarded as properties, qualities or characteristics which belong to them as individuals or groups” (1991:2). Finally, this chapter explores key themes to investigate the effectiveness and fairness of the Restudy from the perspectives of different actors.

5.1 Identification of Insiders and Outsiders

Actors inhabit and, through their agency, which is based on different kinds of social interactions, recursively transform institutions in environmental governance processes. Since the methodological design (Chapter 3) included interviews with actors both core and peripheral to the Restudy, the data collected allows for comparison of the different experiences of individuals with varied roles and levels of engagement in the process. Meaningful comparisons of different actors’ experiences are aided through application of a network analysis approach (see Scott, 1991) of relational data to first delineate actors as either insiders or outsiders. Hence, this section classifies actors as either insiders or outsiders based on their membership in organizations. Insiders are actors who were members of one or more of the organizations that governed the unfolding of the Restudy process. In contrast, individuals classified as outsiders lacked a seat at the table of these organizations.

As a result of their organizational membership, insiders had the opportunity to engage in more interactive communication processes: participation or empowerment. In contrast, outsiders typically did not attain a level of communication action above consultation in the Restudy.¹²⁶ Using the same criteria, some key insiders are further differentiated as “super-agents” because they are members of organizations in all three universes and also attain high levels of communication action in multiple universes. Recall that a primary mechanism of agency manifests through actors’ use of different types of communication processes (see Chapter 2), which occur in various social settings in a shared-power world (Bryson and Crosby, 1993). Chapter 4 defined social settings where communication occurs as *organizations* – specific institutions and actors that inhabit them. Based on organizations’ primary communicative focus, this thesis classifies organizations of the Restudy process into one of three thematic universes: science, policy or local involvement. Hence, the concept of a universe is further an expression of the *bounding of networked*

¹²⁶ Qualities of the four types of communication processes appear in Chapter 2.

relationships amongst actors around a specific communicative theme within different social settings. Therefore, insiders, and also super-agents, are classified as belonging to primarily one of the three thematic universes also based on the organizations they inhabited. If an individual belonged to organizations in multiple universes then I assigned their universe based on their primary communicative focus. Finally, the categorization of actors as insiders and outsiders was further explored by investigating interviewees' communicative linkages to other actors with primary affiliations to one of the three different universes. Appendix 5 provides a point of reference for the reader by presenting the names and primary affiliations of actors mentioned throughout this chapter.

5.1.1 Insiders and Outsiders Classified by Organizational Membership

Some actors inhabited organizations within one or more universes while other individuals engaged in the Restudy lacked a seat at the table of any organization. Actors' enrollment in one or more universes through organizational membership was used as a determinant of insider status in the Restudy process and a factor in my sampling strategy (see Chapter 3). The rationale for using organizational membership to delineate insiders and outsiders is that in a shared-power world those actors with greater access to social settings in which the process occurs will also have greater opportunity to influence how the process unfolds. Membership in organizations potentially increases actors' agency through:

- Extensive exposure to information¹²⁷
- Increased understanding of the participating stakeholder perspectives
- Promotion of informal communications with other insiders
- Increased responsibility and power to more directly influence Restudy

Actors with membership in multiple organizations within the same universe had an increased level of agency within the functional focus of the given universe. Based on the organizations they inhabited and also their primary communicative focus, insiders are classified as belonging to one of the three thematic universes: science, policy or local involvement. For example, actors whose primary organization was the GCSSF appear in the local voice universe. A small number of highly influential actors were

¹²⁷ Florida's "Government-in-the-Sunshine Law" (1967), which requires that state and local government meetings be open to the public, and the federal Freedom of Information Act (1966), both make governance in Florida, compared to some other states, and the US, compared to other countries, more transparent. However, despite these laws for public accessibility actors with a seat at the table are more influential and have greater ability to engage in powerful formal and informal communications.

part of two universes and an even smaller number of “super-agents” appeared in all three universes. These actors also had a primary insider universe affiliation. For example, although Billy Causey served in an advisory capacity to the Governor’s Commission, his primary involvement and communicative focus was in organizations that were part of the policy universe.

Outsiders

Chapter 4 traced events occurring within key organizations that were part of the science, policy and local involvement universes. For the purposes of this thesis, interviewees that lacked a seat at the table of these organizations are classified as outsiders. Outsiders include: Ibel Aguilera, Nick Aumen, Bill Dobson, Shannon Estenoz, Alan Farago, William Kramer, Joette Lorian, Tom MacVicar, John Marshall, Robert Moehling, Bob Mooney, Audrey Peterman, Armando Pomar, Karsten Rist, Tom Scheuneman, Glen Simmons and Susan Wilson. Lack of organizational membership did not necessarily mean that these actors were either inconsequential or ineffective agents in the Restudy process. However, it did mean that these outsiders encountered the institutions of the Restudy from a different perspective than insiders.

Insiders

At the other end of the organizational involvement spectrum, super-agents had seats at the table of multiple organizations within the three universes. Super-agents in the Restudy process were Mike Collins, Terry Rice and Rock Salt. An actor that acquired super-agent classification through gaining membership in organizations in all three universes of the Restudy in October 1997 (Stage 3) was Colonel Joe Miller, who replaced Terry Rice as COE Colonel responsible for the Restudy. In addition, though not personally appearing in all three universes, throughout this chapter Billy Causey, John Ogden and Dick Pettigrew are also identified as super-agents as a result of their extensive and continual involvement throughout the duration of the Restudy process. Specifically, their leadership occurred in their communicative specialty focus of policy, science and local voice universes, respectively. In addition to the qualities of insiders listed above, actors that appeared in more than one universe possessed extensive procedural knowledge with the potential to better understand the roles of different organizations and how their interaction constituted the Restudy process. Table 5.1 summarizes the organizational membership, listed by primary universe affiliation, of interviewees and other selected key actors. Other actors include individuals who either preceded or replaced interviewees within organizations.

Table 5.1: Insiders' Membership in Organizations¹²⁸

	Name	Affiliation	Restudy Team	AET	ADT	MT	CEMs	Task Force	Working Group	SCT	POSST	GCSSF
Science Universe	Alspach, Sue	Miami-Dade DERM	X	X	X				X			
	Appelbaum, Stuart	COE	X									
	Bass, Sonny	ENP	X				X					
	Best, Ronnie	USGS	X				X		X	X		
	Davis, Steve	SFWMD	X	X			X					
	Duncan, Gene	Miccosukee Tribe	X						X	X		
	Ferro, Karyn	ENP	A									
	Gawlik, Dale	SFWMD					X					
	Johnson, Bob	ENP	X							X		
	Mazzotti, Frank	University of Florida	X				X					
	McLean, Agnes	SFWMD	X	X	X							
	McVoy, C.	SFWMD	A									
	Nott, Phil	ENP consultant	A									
	Obeysekera, J.	SFWMD	X			X	X					
	Ogden, John	SFWMD	X	X	X		X			X		
	Perry, Sue	ENP	X	X			X					
	Poole, Mary Ann	FL Fish and Wildlife	X	X			X		X	X		
	Rapach, Fred	Palm Beach County	X		X				X			
	Teets, Tom	SFWMD	X		X							
Tepper, Craig	Seminole Tribe	X						X	X			
Van Lent, Tom	ENP	X		X								
Policy Universe	Barnett, Ernie	FL DEP					X					
	Causey, Billy	Keys NMS							X		X	A
	Davis, Michael	COE						X				
	Finch, Frank	SFWMD	A*						X			
	Harvey, Richard	EPA							X	X		
	May, James	COE							X			
	Miller, Joe	COE	X**						X		X	A
	Ortner, Peter	NOAA					X			X		
	Poole, Sam	SFWMD	A						X			
	Rice, Terry	COE	X***						X	X		X
	Ring, Dick	ENP							X	X		A
	Salt, Rock	Task Force	X****						X	A	A	A
	Smith, Rick	Governor's Office							X		X	
	Local Voice Universe	Collins, Mike	SFWMD	A					X			
Kranzer, Bonnie		GCSSF							A	X	X	X
Moller, Jack		Sportsmen										X
Parrish, Lori Nance		Broward County										X
Pettigrew, Dick		GCSSF										X
Wade, Bubba		US Sugar										X

X signifies membership; A signifies advisory role; *Replaced Sam Poole

**Colonel Miller served from 10/97 - 8/2000. Replaced by Colonel James May.

***Rice COE Colonel responsible for Restudy from 7/94 - 10/97. Replaced by Colonel Joe Miller.

****Rock Salt was COE Colonel responsible for Restudy at time of WRDA 1992 until 7/94.

¹²⁸ Table 5.1 includes organizational membership from any time between 1992-2000.

5.1.2 Evolution of Organizational Membership Over Time

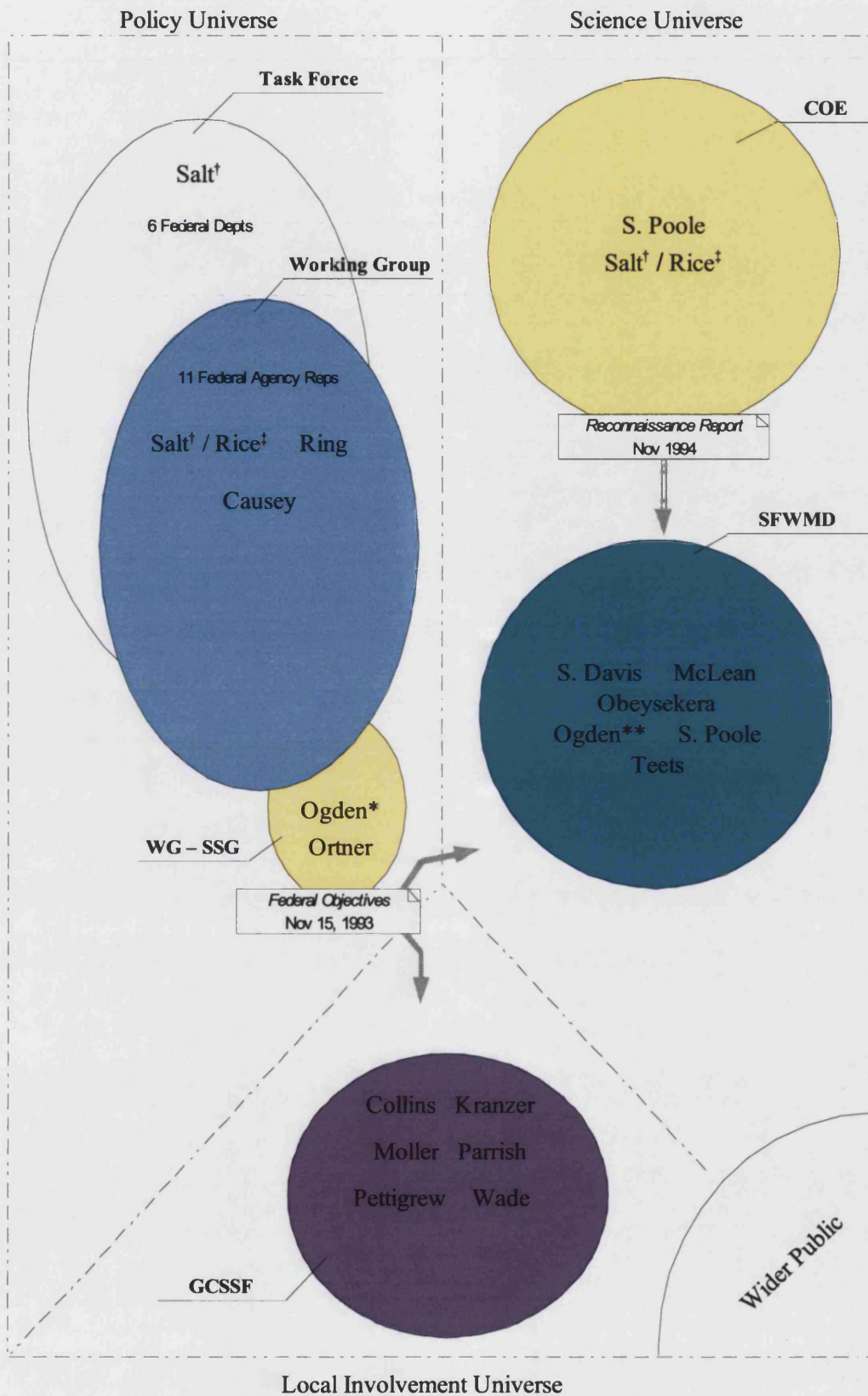
Figures 5.1 – 5.5 superimpose the organizational membership onto Figures 4.4, 4.5, 4.6, 4.8, and 4.9, which traced the evolution of organizations within universes in Chapter 4. Consideration of organizational membership throughout the different stages of the Restudy highlights the centrality of actors' agency to shaping the process. Key points discussed include issues of representation and procedural rules at different stages of the Restudy. Review of Figures 5.1 – 5.5 particularly reinforces identification of super-agents as these powerful individuals assumed major roles in driving the Restudy process to completion. Narration is provided to illuminate key points of interest from analysis of changing organizational memberships throughout the stages of the Restudy process.

Stage 1 (November 1992 – July 1995)

During Stage 1 (Figure 5.1), the initial organizations within the three universes were created. Notably, individuals identified above as super-agents were members of organizations from the beginning of the Restudy process. For example, Dick Pettigrew assumed the role of Chair of the Governor's Commission in the local voice universe at the request of Governor Lawton Chiles, and Billy Causey was one of the original federal agency representatives on the Working Group of the policy universe. John Ogden had the communicative focus of integrating science into the Restudy process. He first appeared representing ENP as part of the Science Sub-Group in the policy universe. During this time Ogden was recruited by the SFWMD to assume a leadership role in the translation of science for use by policy-makers in the Restudy process. Similarly, Rock Salt began the Restudy process as the COE Colonel responsible for the Reconnaissance Phase in the science universe. Leadership of the COE was passed to Colonel Terry Rice in August 1994. Secretary of Interior, Bruce Babbitt, and the six federal Departments that formed the original membership of the Task Force, created an Executive Director position and selected Rock Salt to fill this role with responsibility for shaping the direction of the policy universe. Salt's selection was linked to his past experience with the COE and specifically his work in the greater Everglades watershed during the Reconnaissance Phase.

Hence, during the first stage the powerful "super-agents" assumed crucial leadership positions that they would largely hold throughout the duration of the Restudy process. Creation of new organizations was directly linked to mobilization of

Figure 5.1: Restudy's First Stage (November 1, 1992 – July 1995)



† Salt moved from COE & Working Group to Task Force Executive Director in August, 1994.
 ‡ Rice became COE Colonel and member of Working Group in August, 1994.
 * Ogden represented the NPS and ENP.
 ** Ogden changed employment from the NPS and ENP to the SFWMD.

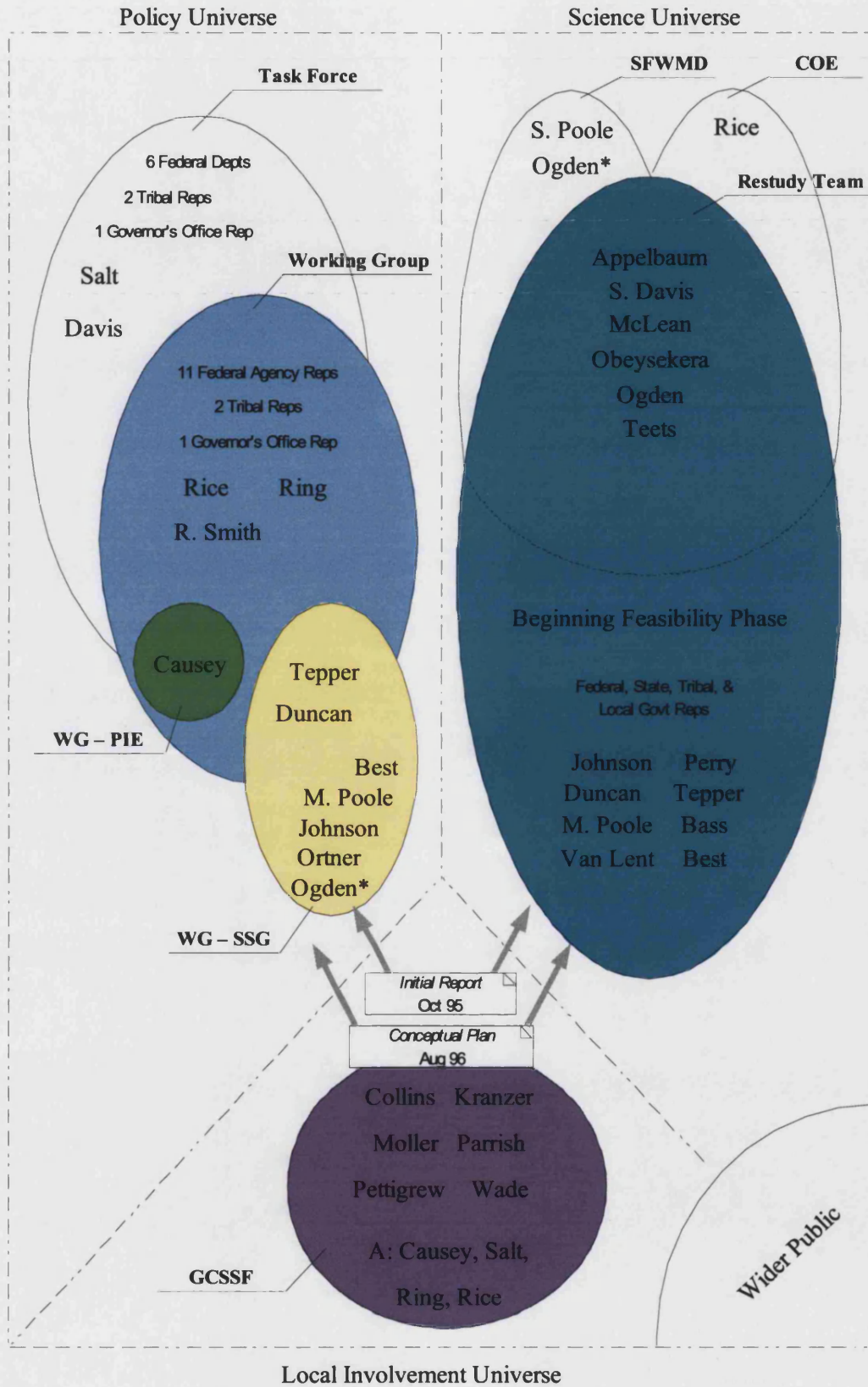
key actors within the watershed. During Stage 1 there was limited representation by actors from wider stakeholder groups. The science universe consisted solely of actors from the COE and SFWMD, while the policy universe was limited to federal actors. The GCSSF was the most inclusive of the organizations created with membership drawing from intra-Florida stakeholder groups. Notably, membership of the GCSSF was determined at the discretion of Governor Lawton Chiles. Guided by Pettigrew, actors on the Governor's Commission agreed to procedural rules that required unanimous consent before release of position statements.

Stage 2 (August 1995 – October 12, 1996)

Over time the organizations of the Restudy and their membership became more complex. Notably, super-agents within the science and policy universe were already in positions of power at the start of Stage 2 (Figure 5.2). During Stage 2, rather than consolidating their individual decision-making authority, these super-agents used their agency to make the institutions of organizations more inclusive, expanding the number of individuals with the power and responsibility of decision-making. For example, Stage 2 saw expanded involvement by the Native American Tribes responsive to the more inclusive membership rules in both the policy universe and the science universe. The alteration in the rules of the organizations increased agency of the Tribal representatives. Gene Duncan and Craig Tepper gained seats at the tables of both the Working Group and Restudy Team. Expansion of organizational membership beyond the federal agencies in the policy universe, and the COE and SFWMD in the science universe was a significant step in the inclusion of a wider range of stakeholder groups.

During this stage the Restudy Team was formed and included federal, state and Tribal government representatives. Federal interests on the Restudy Team expanded beyond the COE to include other relevant federal agencies, for example including Bob Johnson, Sonny Bass, Tom Van Lent and Sue Perry from ENP and Ronnie Best from the USGS. State interests on the Restudy Team expanded beyond the SFWMD to include individuals such as Mary Ann Poole, with the Florida Fish and Wildlife Conservation Commission. The expansion of these organizational memberships beyond the COE and SFWMD was an innovation rather than standard protocol during the feasibility phase of water management policy-making process. Interestingly, through empowering other individuals from a wider range of stakeholder groups by expanding membership of various organizations, super-agents furthered their own leadership power. The power of super-agents derived from their

Figure 5.2: Restudy's Second Stage (August 1995 – October 12, 1996)



* Ogden represented the SFWMD on the SSG.
A: Advisory role.

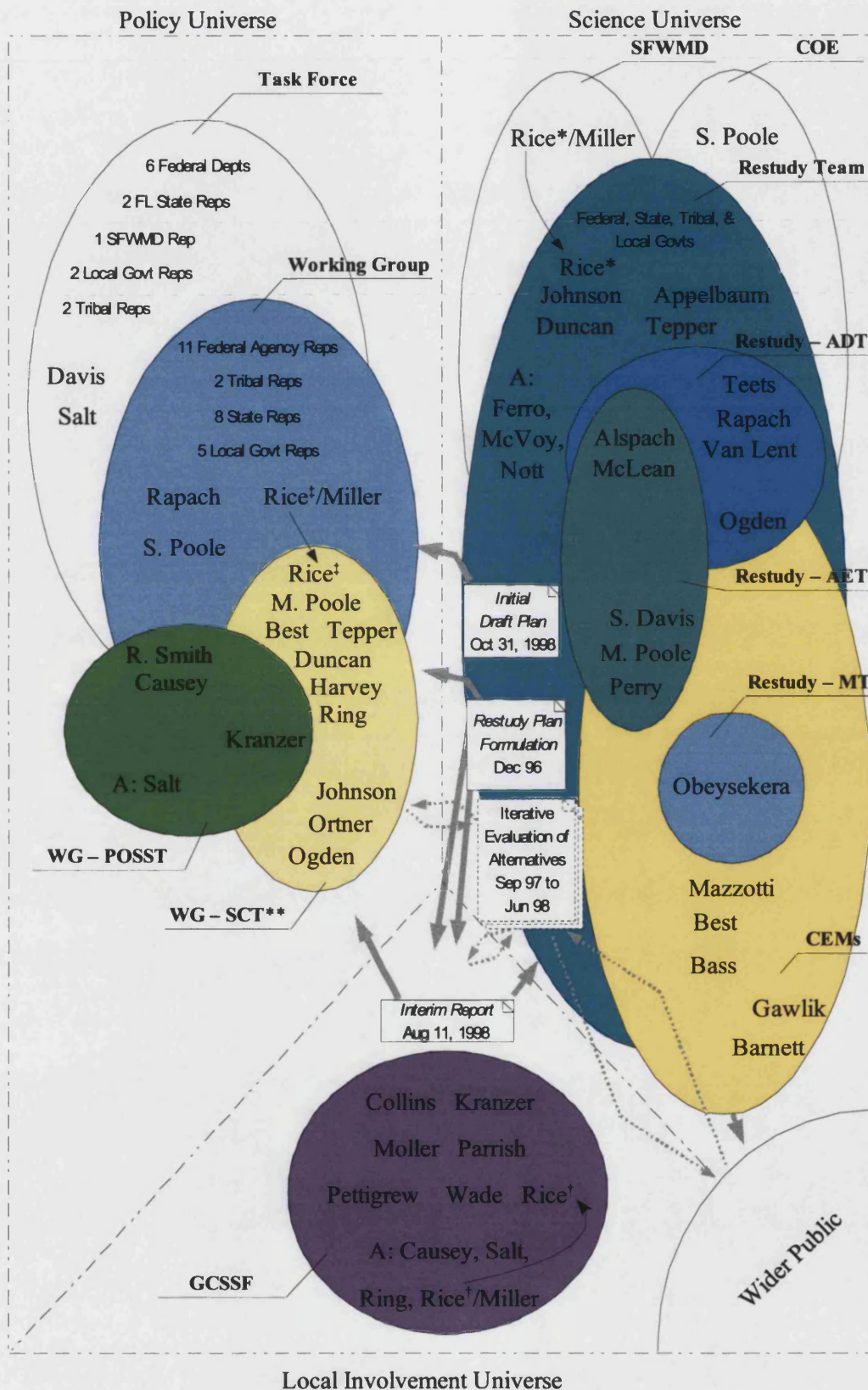
leadership of organizations that had greater legitimacy amongst stakeholder groups because of more inclusive organizational membership. During this time the GCSSF also became a powerful organization in the Restudy process as a result of successful mobilization of diverse stakeholder groups to present consensus statements. The collective agency of the Commission's statements was powerful partly as a result of the influential individual agency of the actors that served as representatives for stakeholder groups; individual actors were well-respected by the stakeholder groups that they represented on the Commission. Consensus statements had legitimacy because of the actors' individual agency and were powerful because of the actors' collective representation of an amalgamation of the range of prominent and powerful public interests. The collective agency of the Commission was further widely attributed to the leadership of Pettigrew and was enhanced as a result of Congress' prominent recognition in WRDA 1996. Super-agents Salt, Rice and Causey also were selected as advisors to the GCSSF during this stage.

Stage 3 (October 13, 1996 – October 31, 1998)

During Stage 3 (Figure 5.3), institutions of the policy and science universes became even more inclusive, resulting in more stakeholder groups inhabiting organizations of the two universes. Specifically, both the organizations of the policy universe and the Restudy Team expanded to include local government representatives. For example, Fred Rapach from Palm Beach County utilities gained a seat at the table of the Working Group (policy universe) and the Restudy Team (science universe). During Stage 3 the science universe increased the number of organizations to fulfill specific roles. For example, John Ogden led workshops with intra-disciplinary scientists from multiple stakeholder group affiliations to develop Conceptual Ecological Models (CEMs). In addition, the Restudy Team also underwent additional differentiation into multiple sub-organizations with specific roles: Modeling Team (MT), Alternative Evaluation Team (AET) and Alternative Design Team (ADT).

As depicted by Figure 5.3 and Table 5.2, some actors participated in one or more of the Restudy Team's multiple sub-organizations, while others only participated in the umbrella organization of the Restudy Team. Consideration of different actors' organizational membership demonstrates John Ogden's powerful agency in the science universe. Amongst all actors only Ogden participated in the Restudy Team and all three of sub-organizations (MT, AET, ADT) as well as CEMs. The science universe was effective at development and evaluation of alternatives under the combined leadership of Ogden, Michael Davis, Stuart Appelbaum, Jayantha

Figure 5.3: Restudy's Third Stage (October 13, 1996 – October 31, 1998)



* Miller replaced Rice as responsible COE Colonel in October 1997; assumed Rice's roles on the Working Group and as COE lead in the Restudy process.
 † Rice transitioned from an adviser on the GCSSF to a voting member representing the Miccosuke Tribe.
 ‡ Rice transitioned from a member of the Working Group to a member of the SCT representing the Miccosuke Tribe.
 ** Used membership from SCT website: <http://www.sfrestore.org/sct/sctmember.htm> [June 1, 2003].
 A: Advisory role.

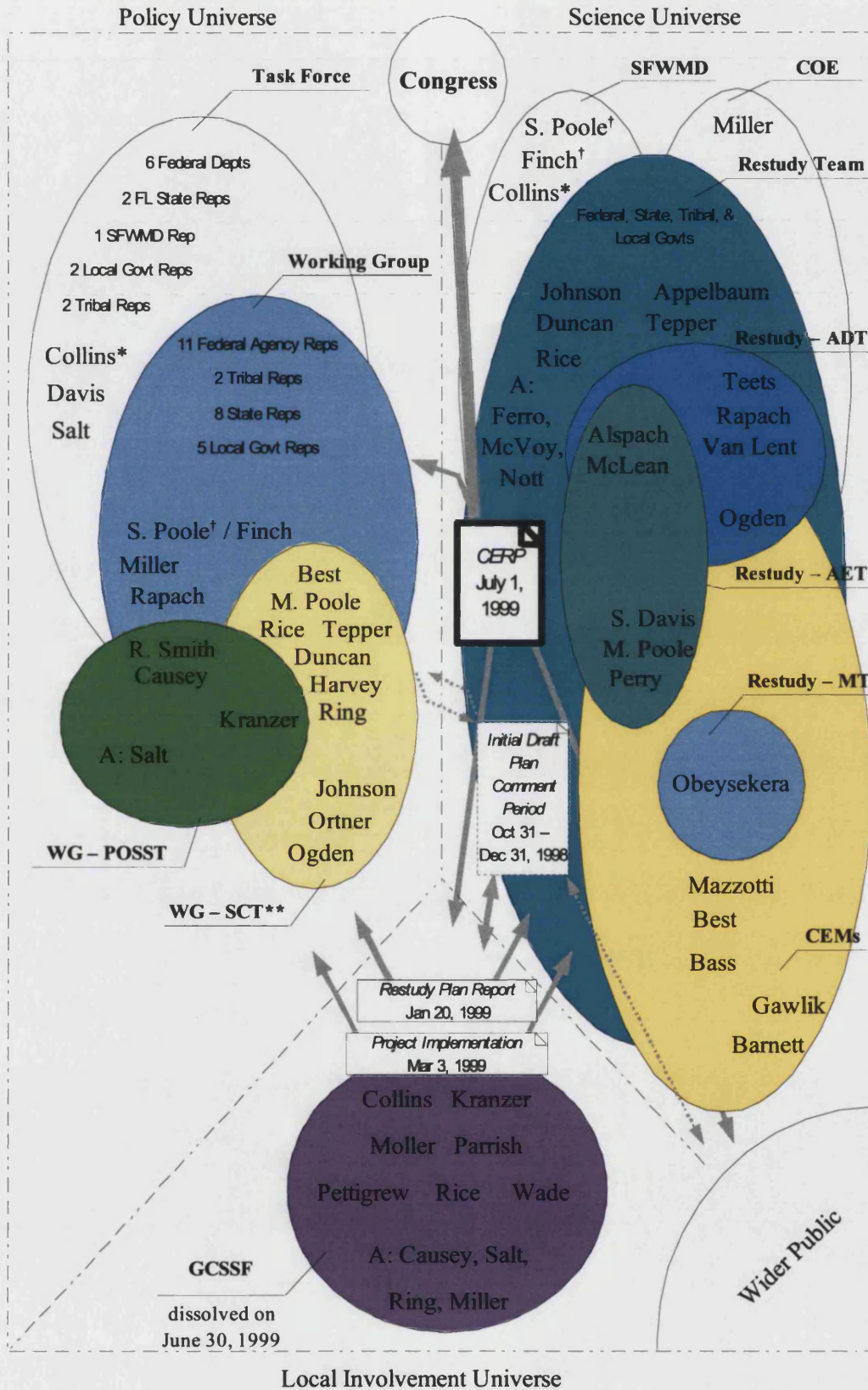
Obeyskera, Terry Rice and Joe Miller. These key actors understood their specific leadership roles in the science universe and together coordinated the range of scientific actors' contributions to yield a defensible scientific position. The reality of scientific uncertainty was mitigated to an acceptable level through involvement of multi-agency and multi-disciplinary scientists. For the stakeholder groups in the greater Everglades ecosystem, inclusive membership of the organizations offered greater legitimacy of the organizations' decisions. Both the applied science strategy to develop CEMs and the iterative alternative development and evaluation process produced a scientific plan from collective agency of representatives from a diversity of stakeholder groups.

The movements of super-agent Terry Rice are also notable. When he passed the responsibilities of COE Colonel to Joe Miller, rather than exit the Restudy process Rice was hired as a consultant by the Miccosuke Tribe. Rice retained membership in organizations by changing affiliation from the COE Colonel leading the process to becoming a representative of the Miccosuke Tribe. Interestingly, Rice went from an advisory capacity in the GCSSF as COE Colonel to an active member in the organization representing the Tribe. Within the policy universe Rice relinquished his seat on the Working Group to COE Colonel Joe Miller and gained membership in the Science Coordination Team (SCT) for the Tribe. Rice also passed on to Miller his leadership role in the science universe, but retained a seat at the table of the Restudy Team by representing the Tribe. Like Salt's earlier movement from the science universe to leadership of the Task Force, Rice's change of affiliations in organizations reflects recognition of his experience, knowledge and powerful agency by a stakeholder group that wanted to increase their power in the Restudy process and who could afford to hire a consultant.

Stage 4 (November 1, 1998 – July 1, 1999)

During Stage 4 (Figure 5.4), no new organizations were created and the rules governing institutional membership remained the same; membership within organizations also remained relatively constant. Notable movements of super-agents included the appointment of Mike Collins to the District's Governing Board by the newly elected Governor Jeb Bush. Jeb Bush was a republican, replacing past democratic Governor Lawton Chiles. Following his appointment to the Governing Board, Collins was elected Chairman by the other appointees. As a result of his election to Chair of the Governing Board, Collins also gained a seat on the Task Force. Hence, Collins moved from the local voice universe organization of the

Figure 5.4: Restudy's Fourth Stage (November 1, 1998 – July 1, 1999)



† On March 11, 1999, the newly appointed Governing Board of the SFWMD fired S. Poole as Executive Director. Thus he left the SFWMD and the Working Group. Replaced by F. Finch on June 10, 1999.
 * Collins appointed to SFWMD Governing Board March 10, 1999; elected chair March 11, 1999. As chair of Governing Board, he became a member of the Task Force.
 ** Used membership from SCT website: <http://www.sfrestore.org/sct/sctmember.htm> [June 1, 2003].
 A: Advisory role.

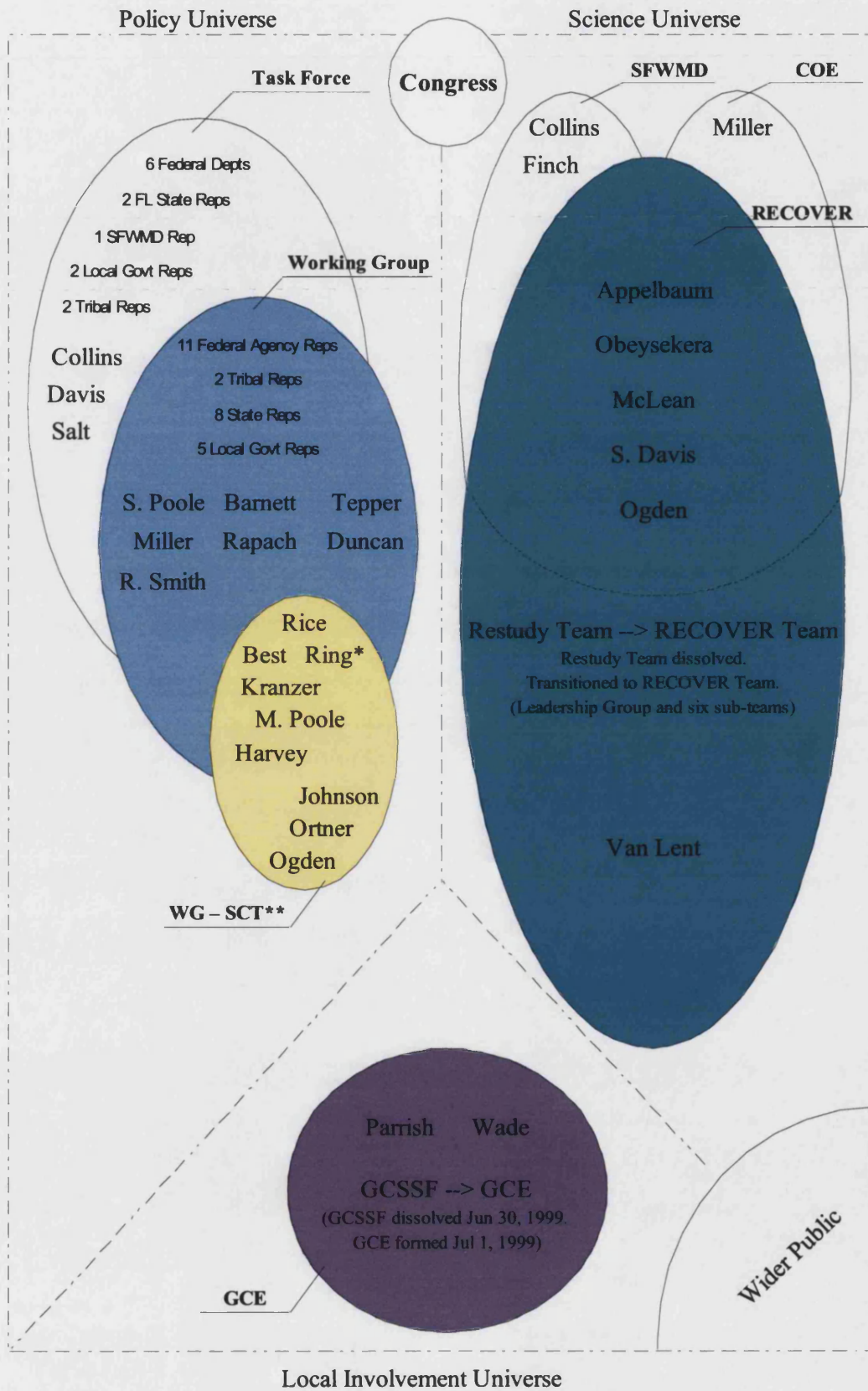
GCSSF to the science universe and then the policy universe. Collins' Chairmanship of the Governing Board resulted in the immediate firing of the existing SFWMD Executive Director, Sam Poole, who was replaced by Frank Finch. Collins' movement from the local voice universe to a critical leadership role in the science universe and membership in the policy universe demonstrated his powerful individual agency across water management governance networks. Also as a result Jeb Bush's election to Governor, the GCSSF dissolved on June 30, 1999, leaving an organizational void in the local voice universe that silenced the powerful collective agency of intra-state stakeholder groups.

Stage 5 (July 1, 1999 – December 11, 2000)

Stage 5 (Figure 5.5) was signaled by the submission of the Restudy process' result, CERP, to Congress. A number of the key organizations of the Restudy process were dissolved and new organizations were created with a forward-looking focus of implementation. For example, Governor Jeb Bush sought to re-create the powerful collective agency offered by the GCSSF in the local voice universe by establishing the Governor's Commission for the Everglades (GCE). GCE proved to be ineffective and unable to fill the vacuum left by the dissolution of GCSSF. The resulting lack of collective agency was officially linked to a lack of a definable role for a local voice organization after CERP was sent to Congress, but also widely attributed to change of rules that governed GCE and questionable legitimacy of the individuals selected by the Governor as representatives. Governor Lawton Chiles had sought a balance of Republicans and Democrats on the GCSSF, as evidenced by membership inclusive of Republicans Jack Moller, Mike Collins and Bubba Wade. In contrast, Governor Jeb Bush largely included republicans in the GCE. In addition, the GCE adopted governance rules for decision-making by majority vote, rather than agreement of consensus statements by representatives from diverse stakeholder groups. Finally, the GCE lacked the charismatic and effective leadership of Pettigrew, which had been integral to the GCSSF.

Within the policy universe the organizations remained the same, as well as the membership, but the focus shifted to implementation of CERP. In the science universe the Restudy Team and its sub-organizations dissolved, reflective of the completion of its purpose of developing CERP. Under the leadership of John Ogden, Stuart Appelbaum and Joe Miller, members of the Restudy Team were reconstituted into a newly formed organization in anticipation of the needed focus on implementation of CERP: Restoration Coordination and Verification Team

Figure 5.5: Restudy's Fifth Stage (July 1, 1999 – December 11, 2000)



* Ring resigned June 2000.

** Used membership from SCT website: <http://www.sfrestore.org/sct/sctmember.htm> [June 1, 2003].

(RECOVER) Team. While the role of the RECOVER would only be required if CERP was authorized, these key actors prudently planned ahead so that the organization would exist and be operational upon anticipated authorization of CERP. Ogden's powerful agency was evidenced by being selected by the SFWMD and COE to lead the multi-agency and multi-disciplinary RECOVER Team, where Ogden's role was to mobilize other actors' expertise and interests around the objective of implementation in an organization that mirrored the successful Restudy Team.

5.1.4 Engagement by Actors' in Types of Communicative Action

Qualities of the four types of communication processes: dissemination, consultation, participation and empowerment, have been discussed in Chapter 2. A characteristic of insiders was their opportunity to engage in more interactive types of communication, enabling participation and empowerment. In comparison, outsiders rarely attained a level of engagement beyond consultation and contributed through formal public comment mechanisms. In a shared-power world (Bryson and Crosby, 1993) engagement in both formal and informal communications are recognized as relevant to power dynamics of actors' agency. Insiders' membership in organizations and outsiders' lack of a seat at the table served respectively as positive and negative feedback loops in more informal and private communications. Insiders' connections to actor networks in organizations within the three universes allowed them not only to engage in the more formal, but also informal communications. Actors had greater ability to speak to influential actors if they themselves already participated in an organization. Insiders had organizational forums to meet other insiders, which also provide a venue to engage in more informal communications around meeting schedules.¹²⁹ Super-agents particularly demonstrated this principle. Actors often sought out super-agents for informal communications based on recognition of super-agents power and influence in the Restudy. Engagement by super-agents in informal conversations further reinforced their powerful agency as knowledgeable and influential agents in the Restudy.

The more public the communication, the more likely the actors' caution during information exchange. Hence, the response by an actor to a question at a public meeting was likely to be more guarded than a one-to-one conversation with another actor over drinks following a meeting. Dryzek stressed both the powerful influence

¹²⁹ As discussed in Chapter 3, I networked based on this principle as introductions at organizational meetings proved to be an effective strategy for securing interviews.

and pervasive occurrence of informal communications in governance: “Quiet conversations in the bar may matter as much as speeches to parliament. These interactions occur whether or not constitutions, laws, rules and organization charts say they should”(1997:92). Terry Rice highlighted the importance of such informal communications amongst insiders in the Restudy process:

Rock and I used to debate all the time. Here you have ad hoc organizations, which we think are very important to the future because they brought people together. It wasn't just sitting around tables. Being in the same hotel gave all these opportunities to have side-bar conversations with people you would never talk to unless brought together in that environment. In matter of fact, most business got taken care of outside of the room where we met.

Rice's statements identified opportunity for engagement in *informal* communications as linked to actors' membership in organizations with responsibility for the Restudy.

Another example of private, informal communications were conversations between Mike Collins and President George H.W. Bush on Collins' fishing boat. It is commonly known that Collins was Bush's fishing guide and widely speculated that they discussed restoration. Certainly personal connections prompted Bush to select Collins, rather than another fishing guide, to participate in the Keys' Sanctuary Advisory Council. Later, George H.W. Bush's son, Governor Jeb Bush, selected Collins for the SFWMD Governing Board. As a result of access to this powerful family of key leaders in both the federal and state government Mike Collins was no mere Florida Keys' fishing guide. Collins' private and informal connection to powerful actors provided his initial entrée to water management governance networks and in turn made him a powerful local actor in the Restudy process. Also notable amongst insiders in the Restudy process were private, formal communications. For example, debates in the empowerment forum of the GCSSF were closed to members of the organization and invited advisors or guests. While the results of these discussions were ultimately disseminated in the form of written reports, the nuances of the actual dialogue were private. Comparison of the experiences between insiders and outsiders as related to their engagement in different types of communication processes is further discussed in the case studies appearing later in this chapter.

5.1.5 Analysis of Actors' Mention by Other Actors

The above sub-sections identified actors as insiders and outsiders and discussed their engagement in different types of communicative action. This sub-section deploys a network analysis (Scott, 1991) approach to explore the classifications of outsiders and of insiders' primary affiliation to one of the three universes. The frequency with which an individual was mentioned by interviewees is used as an indication of the perceived agency of that individual by other actors engaged in the Restudy process. Additionally, actors identified by a given individual may also demonstrate that individual's universe affiliations. Two questions are asked of the network analysis to explore the relationships among actors in the Restudy:

- Firstly, is an individual that inhabited organizations within one of the universes more likely to mention and be mentioned by other actors that also were affiliated with that universe?
- Secondly, does an actor mentioned by individuals in all three universes have greater connectivity in actor networks than an actor not mentioned?

These questions have been investigated by recording the *non-prompted mention* of other actors by individuals *during semi-structured interviews*.

The results are contained in Table 5.2, Parts 1 – 5. Large amounts of data are contained within the Table 5.2, so the following narrative explains how to read the table and then takes the reader through analysis of the different sections. Table 5.2 is divided into parts based on the investigation of actor networks by unprompted mention of actors that appear within the thematic groupings of one of the three universes or classification of actors. The thematic focus of each part's investigation appears across the horizontal axis of each table. For example, Part 1 focuses on the mention of science universe actors by *any* of the interviewees. Part 2 focuses on the mention of policy universe actors. Part 3 focuses on actors that do *not* appear within the three universes but that I have grouped under the classification of "high-level government representatives." Part 4 has three sub-divisions that respectively depict mention of actors within the local voice universe, outsiders and the author-generated classification of "historical" actors.

Hence, the horizontal axis for each part depicts *any* interviewees' reference to the set of actors that are the given part's thematic focus of investigation. Notably, actors along the horizontal axes may not have been interviewees. Individuals qualify

Table 5.2, Part 1: Actors' Mention of Science Universe Actors

		Interviewees	Science Universe												
			Alspach	Appelbaum	Best	Duncan	Heisler	Johnson	McLean	McVoy	Obeysekera	Ogden	Pimm	R.Reed	Sklar
Science		Alspach, Sue													
		Appelbaum, Stuart													
		Best, Ronnie													
		Gawilk, Dale										x			x
		Johnson, Bob													
		McLean, Agnes								x	x				
		McVoy, Christopher													
		Obeysekera, Jayantha							x			x			x
		Ogden, John	x												
		Poole, Mary Ann							x						
		Teets, Tom	x												
	Tepper, Craig														
Policy		Causey, Billy	x												
		Davis, Michael													
		Ortner, Peter													x
		Rice, Terry		x											
		Salt, Rock							x						
		Kranzer, Bonnie										x			
Local		Collins, Mike													
		Parrish, Lori Nance													
		Moller, Jack				x	x			x					
		Wade, Bubba				x									
Outsiders		Aguilera, Ibel													
		Aumen, Nick				x	x		x						
		Dobson, Bill	x												
		Estenoz, Shannon	x												
		Farago, Alan										x			
		Kramer, William													
		Lorian, Joette				x									
		MacVicar, Tom													
		Marshall, John												x	
		Moehling, Robert													
		Mooney, Bob													
		Peterman, Audrey													
		Pomar, Armando													
		Rist, Karsten				x									
		Scheuneman, Tom													
	Simmons, Glen														
	Wilson, Susan														

Key: Comment		Universe	
	positive		science
x	neutral		local
	negative		policy

Table 5.2, Part 2: Actors' Mention of Policy Universe Actors

		Policy Universe Actors													
Interviewees		Browder	Brown	Causey	M. Davis	Doyle	Finch	Finnerty	Lehtinen	MacKay	S. Poole	Rice	Ring	Salt	R. Smith
Science	Alspach, Sue						x	x							
	Appelbaum, Stuart														
	Best, Ronnie														
	Gawilk, Dale														
	Johnson, Bob														
	McLean, Agnes														
	McVoy, Christopher														
	Obeysekera, Jayantha														
	Ogden, John													x	
	Poole, Mary Ann														
	Teets, Tom														
Tepper, Craig															
Policy	Causey, Billy		x												x
	Davis, Michael					x									
	Ortner, Peter	x	x		x	x		x	x			x	x		
	Rice, Terry										x				x
	Salt, Rock											x	x		x
	Kranzer, Bonnie														
Local	Collins, Mike														
	Parrish, Lori Nance							x		x					
	Moller, Jack	x						x	x						
	Wade, Bubba								x						
Outsiders	Aguilera, Ibel														
	Aumen, Nick														
	Dobson, Bill														
	Estenoz, Shannon														
	Farago, Alan														
	Kramer, William														
	Lorian, Joette				x					x	x				
	MacVicar, Tom								x						
	Marshall, John								x						
	Moehling, Robert														
	Mooney, Bob														
	Peterman, Audrey				x										
	Pomar, Armando														
	Rist, Karsten														
	Scheuneman, Tom								x						
Simmons, Glen															
Wilson, Susan															

Key: Comment		Universe	
	positive		science
x	neutral		local
	negative		policy

Table 5.2, Part 3: Actors' Mention of High-Level Government Representatives

Interviewees		High Level Government Representatives												
		Babbitt	G. Barley	G.H.W. Bush	G.W. Bush	Jeb Bush	Chiles	Clinton	Fascell	Frampton	Gore	Graham	Leary	Meeks
Science	Alspach, Sue				x				x					
	Appelbaum, Stuart													
	Best, Ronnie													
	Gawilk, Dale	x												
	Johnson, Bob													
	McLean, Agnes													
	McVoy, Christopher													
	Obeysekera, Jayantha	x												
	Ogden, John											x		
	Poole, Mary Ann													
	Teets, Tom				x	x		x						
Tepper, Craig														
Policy	Causey, Billy			x								x		
	Davis, Michael							x			x		x	
	Ortner, Peter					x	x	x			x			
	Rice, Terry	x					x							
	Salt, Rock			x	x	x		x						
	Kranzer, Bonnie													
Local	Collins, Mike								x					
	Parrish, Lori Nance	x				x								
	Moller, Jack	x				x	x							
	Wade, Bubba		x				x							
Outsiders	Aguilera, Ibel													
	Aumen, Nick	x				x								
	Dobson, Bill													
	Estenoz, Shannon													
	Farago, Alan													
	Kramer, William													
	Lorian, Joette								x				x	x
	MacVicar, Tom													
	Marshall, John												x	
	Moehling, Robert													
	Mooney, Bob													
	Peterman, Audrey													x
	Pomar, Armando							x						
	Rist, Karsten													
	Scheuneman, Tom													
Simmons, Glen														
Wilson, Susan												x		

Key: Comment		Universe	
	positive		science
x	neutral		local
	negative		policy

Table 5.2, Part 4:
Actors' Mention of Local Voice Actors, Outsiders, and Historical Actors

		Local Voice Actors							Outsiders					Historical						
		Collins	Kranzer	C.Lee	Moller	Pettigrew	Strahl	Wade	Estenoz	Fanjul	J.Jones	R.Jones	J.Marshall	MacVicar	Tipton	Webster	M.S. Douglas	A.Marshall	T.Roosevelt	
		Interviewees																		
Science		Alspach, Sue																		
		Appelbaum, Stuart																		
		Best, Ronnie									x									
		Gawilk, Dale																		
		Johnson, Bob																		
		McLean, Agnes																		
		McVoy, C.																x		
		Obeysekera, J.																		
		Ogden, John																		
		Poole, Mary Ann																		
		Teets, Tom																		
	Tepper, Craig																			
Policy		Causey, Billy		x																
		Davis, Michael																		
		Ortner, Peter	x																	
		Rice, Terry									x			x						
		Salt, Rock															x	x		
	Kranzer, Bonnie																			
Local		Collins, Mike						x												
		Parrish, Lori Nance						x							x					
		Moller, Jack						x		x							x	x	x	
		Wade, Bubba																		
Outsiders		Aguilera, Ibel																		
		Aumen, Nick																		
		Dobson, Bill						x						x						
		Estenoz, Shannon													x					
		Farago, Alan																		
		Kramer, William																		
		Lorian, Joette									x	x			x	x		x		
		MacVicar, Tom																		
		Marshall, John										x						x	x	
		Moehling, Robert																		
		Mooney, Bob											x							
		Peterman, Audrey																		
		Pomar, Armando																		
		Rist, Karsten																		
		Scheuneman, Tom																x		
		Simmons, Glen																		
	Wilson, Susan										x							x		

Key: Comment		Universe	
	positive		science
x	neutral		local
	negative		policy

Table 5.2, Part 5: Actors' Mention of Other Individuals¹³⁰

	Interviewees	Other Actors Mentioned
Science	☞ ☞ Alspach, Sue	Alex Penelas, Sandy O'Neill
	☞ ☞ Appelbaum, Stuart	
	☞ ☞ Best, Ronnie	Gene Odum, H.T. Odum, Ramesh Reddy
	☞ ☞ Gawilk, Dale	Steve Davis
	☞ ☞ Johnson, Bob	
	☞ ☞ McLean, Agnes	
	☞ ☞ McVoy, C.	William Hart
	☞ ☞ Obeysekera, J.	
	☞ ☞ Ogden, John	Art Harwell
	☞ ☞ Poole, Mary Ann	Joel Treckford
	☞ ☞ Teets, Tom	Frank Mazzotti
	☞ ☞ Tepper, Craig	
Policy	☞ ☞ Causey, Billy	Ron Smolla, Allison Fair, Mike Richardson, Mary Plumb, Allison Defoor, Doug Hall, Tom Lee, John Pinkerton
	☞ ☞ Davis, Michael	Clay Shaw
	☞ ☞ Ortner, Peter	Sue Markley, Debbie Peterson, Dave Rudnick
	☞ ☞ Rice, Terry	Gail Norton
	☞ ☞ Salt, Rock	Rachel Carson, Hank Hatch, Ralph Nader, Newt Gingrich
	☞ ☞ Kranzer, Bonnie	
Local	☞ ☞ Collins, Mike	David Struhs
	☞ ☞ Parrish, Lori Nance	Rod Tirrell, Bob Rosenberg, Carol Browner, Tom Weeson, Alan Miledge, Joseph Garcia
	☞ ☞ Moller, Jack	Freddy Fitzkelly, Joe Podgor, Cal Stone, Manny Fuller, Phil Parsons, Aaron Higer, Dave Balman, Tom Shirley, Wally Hibbard
	☞ ☞ Wade, Bubba	Mary Barley
Outsiders	☞ ☞ Aguilera, Ibel	Vera Carter
	☞ ☞ Aumen, Nick	Bob King, Neil Santinello, Mike Walden
	☞ ☞ Dobson, Bill	Mike Black
	☞ ☞ Estenoz, Shannon	Karsten Rist, Mike Tenneway, Debbie Harrison, Jim Webb, Mary Munson, Brad Sewall
	☞ ☞ Fargo, Alan	Nancy Payton, Barbara Lange, David Guest, Karl Woodstrum, Craig Diamond, Tim Searchinger
	☞ ☞ Kramer, William	Napoleon Broward, Thomas Jefferson, Lewis & Clark, Earl Shannon, Jim Shine, Dave Wedgeworth, George Wittern
	☞ ☞ Lorian, Joette	Rosa Durado, Nancy Brown, Ernest Coe, Wayne Nelson
	☞ ☞ MacVicar, Tom	Jim Webb
	☞ ☞ Marshall, John	Pete Rosenthal, Su Wilson, Bob Holt, Larry Harris, Tim Kaiser
	☞ ☞ Moehling, Robert	
	☞ ☞ Mooney, Bob	Aaron Higer
	☞ ☞ Peterman, Audrey	Cynthia Laramore, Wayne Rawlings, Leola McCall, Al Calloway, Bob Bullard, Rev. Leon Sullivan, Jerry Fernandez, Lesley Wetterburn
	☞ ☞ Pomar, Armando	Billy Cypress, Father Vienas
	☞ ☞ Rist, Karsten	Daniel Beard, Jim Cushioner, Jerry Lorenz, Jack Moorhead
	☞ ☞ Scheuneman, Tom	Paul Whelan, George Richardson
☞ ☞ Simmons, Glen	Craighead, Tebow, John Griffin, Bill Ashley	
☞ ☞ Wilson, Susan	Pat Bidol	

³⁰ Individuals mentioned by less than two interviewees.

for inclusion on a horizontal axes if they meet the criteria of 1) participation in an organization within the universe of focus, and 2) were mentioned by at least two interviewees. The classification of “high-level government representatives” actors reflects the collection of individuals mentioned that were government employees at a high-level of either the federal or state government, but not members of organizations within the three universes. Similarly, the classification of “historical actors” delineates individuals deceased at the time of the Restudy process, but cited by interviewees for past achievements.

The vertical axis of Table 5.2 lists the interviewees from whom data was collected and analyzed. The interviewees are listed based on *primary* universe affiliation: science, policy, local, and outsiders. In addition, all universe affiliations for each interviewee are denoted by symbols: glasses for science, hand for local involvement, and, flag for policy. In the grid next to each interviewee’s name appear the actors they mentioned, based on the theme of the part of the table. Hence, in Parts 1 – 5 each have the *same* vertical axes, and a *different* horizontal axis. An interviewees’ mention of another actor is signified as either positive, neutral or negative. Part 5 presents “other individuals” mentioned by the interviewees. For the purposes of Table 5.2, “other individuals” include actors that were not mentioned by more than two interviewees, and hence do not appear elsewhere in the matrix.

Part 1: Interviewees Mention of Science Universe Actors

Science universe interviewees mentioned each other as well other scientists that are part of organizations in the science universe. Selected policy actor interviewees, primarily super-agents Terry Rice, Rock Salt and Billy Causey, also favorably mentioned key actors in the science universe: Stuart Appelbaum and John Ogden. Local voice interviewees that mentioned science actors do not mention super-agents, but rather individuals with whom they have specifically interacted in the past. For example, Jack Moller and Bubba Wade both mentioned Gene Duncan from the Miccosuke Tribe. Interestingly, scientists were also mentioned by ten of the seventeen outsider interviewees. Those scientists mentioned receive either neutral or positive mention and super-agent John Ogden received two favorable comments by outsiders. Notable overall is mention of science universe actors by interviewees across the three different universes as well as outsiders. This shows recognition of the science universe actors’ participation by those involved in different communicative action foci within the Restudy process.

Part 2: Interviewees Mention of Policy Universe Actors

In contrast, very few science universe interviewees mentioned policy universe actors. This may imply that those engaged in the science universe saw their activities on the Restudy Team and CEMs as more primary to the Restudy process than events within the policy and local voice universes. Policy universe interviewees frequently, and often positively, mentioned other policy universe actors. For example, Billy Causey favorably mentioned Terry Rice, Dick Ring and Rock Salt. Similarly, Rock Salt favorably mentioned Billy Causey. All four local voice universe interviewees also mentioned policy universe actors. Interestingly, while interviewees from the local voice universe also favorably mentioned Terry Rice and Billy Causey, both Dick Ring and Rock Salt were negatively cited. Nine out of seventeen outsider interviewees mentioned actors from the policy universe. Three local voice interviewees mentioned Dick Ring negatively, while Terry Rice and Rock Salt were cited positively. Policy universe actor Dexter Lehtinen, who is the Miccosuke Tribe's attorney, was cited five times by outsiders. Lehtinen was mentioned both positively and negatively, depending on the perspective of the individual interviewee. Hence, overall policy universe actors were mentioned by policy, local voice and outsider interviewees and largely ignored by science universe interviewees.

Part 3: Interviewees Mention of High-Level Government Representatives

High-level government representatives were the most frequently mentioned by policy universe interviewees. For example, all six of the policy universe interviewees mentioned high-level government representatives and many of the references are positive. For example, Governor Lawton Chiles, Bruce Babbitt and George Frampton were each mentioned positively by three policy universe interviewees. Under the Clinton administration Bruce Babbitt was Secretary of Interior and George Frampton was Assistant Secretary of Interior. Notably, although Frampton left his position in 1997, his agency in the Restudy process was clear through the continued, unprompted mention of him by policy universe interviewees in 2000 – 2001. Local voice and outsider interviewees also, often favorably, mentioned high-level government representatives. Interestingly, outsiders particularly mentioned state government representatives: four mentioned former Governor and current Senator Bob Graham; three mentioned Governor Jeb Bush; and, two mentioned Governor Lawton Chiles. Across the policy, local voice and outsider interviewees Governor Lawton Chiles was particularly highly mentioned. In total he was mentioned ten times, notably six of which were favorable and the other four were neutral. Overall, local voice and

outsider interviewees were familiar with high-level government representative actors, particularly at the state level.

Part 4: Interviewees Mention of Local Voice Actors, Outsiders and Historical Actors

Science universe interviewees largely did not mention local voice actors, outsiders or historical actors. Policy universe interviewees also largely did not mention either outsiders or historical actors. Policy universe actors did selectively mention local voice actors: two mentioned Mike Collins and two mentioned Dick Pettigrew. Interestingly, both Collins and Pettigrew were super-agents and their mention by interviewees from other universes reinforces the recognition of their agency in the Restudy process. Not surprisingly, local voice universe interviewees also favorably mentioned Collins and Pettigrew. The three other local voice interviewees all mentioned Bubba Wade from US Sugar Corporation, demonstrating the strength of network linkages between individuals within the same organizations. In contrast, two local voice interviewees mentioned negatively outsiders that were leaders within the same industry as Wade: Pepe and Alfie Fanjul. Perhaps Wade was mentioned neutrally rather than negatively because the other interviewees had interacted with him formally and informally as a result of the GCSSF. The only local voice interviewee to mention historical actors was Jack Moller, an individual who represented sportsmen on the GCSSF. Historical actor Marjory Stoneman Douglas was mentioned by outsiders that are environmentalists as well as by Tom Scheuneman, affiliated with agriculture in the EAA. Outsider interviewees often mentioned other outsiders at the periphery of the Restudy process. Outsider interviewees also selectively mentioned local voice universe actors. The most frequently mentioned was Dick Pettigrew, who was cited favorably by three outsider interviewees. Amongst all interviewees Pettigrew is mentioned seven times, all of them favorably, showing his wide recognition and popular appeal to other actors due to his leadership that empowered stakeholder group interests in the process.

Part 5: Interviewees Mention of Other Individuals

This portion of Table 5.2 depicts other individuals mentioned by interviewees who were cited less than three times. Notably, some outsider interviewees mentioned large numbers of individuals who are not cited by other interviewees. While this is also true of selected local voice (Lori Nance Parrish and Jack Moller) and policy (Billy Causey) interviewees, these three interviewees also cited numerous individuals within the matrix. In the case of outsider interviewees, the large numbers of other

actors mentioned by a single interviewee points to the given outsider's primary connections being outside of the Restudy process.

Summary of Findings from Table 5.2

The analysis suggests that interviewees who inhabited one universe were more likely to mention and be mentioned by other actors also affiliated with that universe. Within each of the categories, interviewees most frequently mentioned actors within the universe they themselves inhabit. Science universe interviewees were of particular interest as they had no negative mentions by other science universe actors and widely failed to mention either outsiders or actors from other universes. In contrast, interviewees from the other categories did mention some science universe actors. The reflexive quality of networks is highlighted as actors' connections to other actors reflected both the organizations they inhabited and their knowledge focus. For example, insiders who had organizational membership *only* in the science universe, such as Dale Gawlik, Agnes McLean, Christopher McVoy, and Jayantha Obeysekera, predominately mentioned other actors in the science universe and, more broadly, other scientists. Similarly, outsider interviewees rarely mentioned scientists. The exception is outsider scientist Nick Aumen, who lacked a formal seat at organizations in the three universes of the Restudy process. Nonetheless, Aumen was informed about the Restudy and was linked to the scientific actor network through employment at the SFWMD, and later the ENP. In comparison to actors in the science universe, outsiders more frequently mentioned actors in the policy universe, high-level government representatives, actors in the local voice universe, historic actors and other outsiders. Hence, the outsiders are more frequently aware of key actors in the more publicly accessible spheres of knowledge of the policy and local voice universes than the specialist knowledge focus of the science universe. Policy universe interviewees' mention of other actors is also reflective of their organizational membership and knowledge focus. Policy universe interviewees most frequently mentioned each other and high-level government officials.

Generally, interviewees that mentioned super-agents or other insiders were also more likely to be an insider, while outsiders often mentioned other outsiders. Insiders that inhabited organizations from more than one universe generally commented on actors from multiple universes and were also mentioned more frequently by other interviewees. The most powerful actors in the Restudy process, super-agents, had a high-level function of bringing different types of knowledge to the process. The different types of knowledge ultimately were integrated into a policy

context. Hence, regardless of their core knowledge focus, super-agents were intensively integrated into the policy networks, as demonstrated by the frequent positive comments about super-agents made by interviewees in the policy universe, as well as the mention by super-agents of high-level government representatives.¹³¹ Additionally, an actor mentioned by individuals in all three universes likely had both a greater connectivity to other actors through formal and informal communications, and powerful agency in the Restudy process. For example, super-agents Mike Collins, John Ogden, Dick Pettigrew, Terry Rice and Rock Salt were all widely mentioned by interviewees from the three universes as well as by outsiders. Additionally, as expanded upon in Table 5.3, when interviewees mentioned super-agents they often highlighted the importance of super-agents to the shaping of the Restudy process.

Table 5.3: Interviewees' Comments About Super-Agents

☞☞☞☞☞	Pettigrew was "more than a catalyst." (Salt)		
☞☞☞☞☞	"Salt brought resolve to the Jacksonville District and changed the entire tenor of the attitude, culture, opened up much more dialogue with outside interests and agencies, and took their ideas very seriously. It just happened that I followed him with the goal of taking what he had started even further." (Rice)		
☞	Ogden a senior level scientists positioned at high policy decision-making level. Innovative approach to bringing science to the table. (Gawlik)		
	"Pettigrew had a long history of being a person who was very much a consensus builder." (Rist)		
	Salt and Rice made the Restudy process much more open than past COE projects. (Rist)		
☞☞☞☞☞	Collins "brought a greater respect for the environment to the District's Governing Board." (Parrish)		
☞☞☞☞☞	"Individual personalities played a large role in the Restudy." (Johnson)		
Actor(s)' Universe			
☞	Science	☞	Local Voice
		☞	Policy
Actor(s)' Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

Super-agents Rice and Salt also demonstrated overall knowledge of the Restudy because they made comments about actors in each of the three universes as well as the high-level government representatives. Generally, Table 5.2 shows the greatest

¹³¹ Note that Ogden's communication style during the semi-structured interview did not include mention of other actors, aside from Appelbaum. However, Ogden's powerful agency in the Restudy is clear because he was mentioned positively by actors in the science, policy and local voice universes as well as by outsiders.

mention of super-agents and also more comments about other actors *by* super-agents. Next, the following section considers case studies that highlight the different experiences of insiders and outsiders.

5.2 Case Studies Featuring Insiders' and Outsiders' Experiences

This section explores four case studies to highlight some actors' experiences during the Restudy process. The case studies investigate communications and power relations that occur amongst actors in different types of social settings. Firstly, two case studies focus on examples of insiders' experiences. One case study considers the qualities of the Governor's Commission that led it to assume a powerful role in the Restudy process. The next case study compares the transparency of communications in the GCSSF with events surrounding the controversy of the Chief's Letter, which was the highly contested covering letter that accompanied the final version CERP sent to Congress. The following sub-sections then consider the role of public outreach and involvement in the Restudy process, particularly focusing on the perspectives and experiences of outsiders. The first of these outsider case studies analyzes the formal and informal communications that occurred at a public outreach meeting in Homestead, Florida. Finally, the perspectives of various outsiders are considered through their experiences with the public consultation of the *Initial Draft Plan* and their involvement more broadly in the Restudy process.

5.2.1 The Governor's Commission

A high-level public involvement organization, the GCSSF established a powerful role in the Restudy process through presentation of a unified statement of collective public interest. Through its *Conceptual Plan* the GCSSF provided a conceptual framework for CERP that outlined the range of socio-political acceptability a multi-purpose water management plan needed to fall within to be acceptable to the diversity of stakeholder groups who together constituted influential public interests in South Florida. The GCSSF was powerful because legitimate representatives from the range of public interests offered a collective position of what they agreed formed an equitable approach to balance water supply with restoration for a multi-purpose water management plan at a watershed scale.

The Commission presented consensus on a weak sustainability position, which

was criticized by some environmental interests outside the Commission as having too much emphasis on water supply rather than restoration. Sue Alspach¹³² provided a summary description of the Commission's role in the Restudy that addresses this criticism:

It was fabulous and I don't know if it was Pettigrew or the people that were actually sitting around the table. Some people disliked the organization because they felt that the Commission kind of white-washed things. But any time you get the gamut of sides represented around a table, you're going to end up on middle ground. The Commission did so much to be able to pull people to the same line of thinking, to sit down and actually come up with consensus documents. I still feel the Governor's Commission was really what turned the Restudy into CERP.

The fact that these disparate interests could agree, albeit on a weak sustainability agenda, was an impressive demonstration both of Chair Pettigrew's powerful individual agency and the realization by the conflicting interests that they had to work together to find a common ground for all interests to have some benefit of water management. Interestingly, Pettigrew exercised his agency by empowering the representatives on the GCSSF through persuading them that a consensus position from the key stakeholder groups was a powerful mechanism for them to collectively influence the Restudy.

Commission representatives recognized the common demand for water and looming potential for litigation if any single powerful interest was marginalized. Rather than delineating clear winners or losers, representatives developed boundaries that constituted a collective public interest, based in weak sustainability, whereby the range of public interests shared in the benefits and adversity of water management. Sharing adversity as well as the benefit was cited as an important feature by actors towards achieving the objective of equitable allocation of the water resources. Alspach said, "You wouldn't find nearly the level of satisfaction among the different stakeholders if they had not shared benefit and shared adversity in CERP." Hence, actors were interested in protecting their interests not only through gaining direct benefits, but also by preventing any other interests from gaining more than their "fair share" out of the Restudy. Sharing adversity as well as benefit was ultimately the incentive and basis for the acceptance of Commission members to participate in an organization with rules that required a consensus statement. The governance rules of the Commission meant collective action of the representatives was only possible if

¹³² She was an insider to the Restudy process, but an outsider to the Commission.

each representative attained some benefit as well as shared adversity.

The unanimity of the Commission's statements provided a valuable resource of negotiated, unified public interest for the planners and scientists involved in the Restudy process. The representatives of individual public interests gained a more powerful position in the Restudy as a result of pooling their individual agency into presentation of an integrated collective agency of public interests. Table 5.4 groups interviewees' comments about the GCSSF into relevant themes. The comments are coded by the interviewees' classifications as super-agents, insiders and outsiders and symbols represent the universe affiliation of the interviewee: glasses for science; hand for local voice; and, flag for policy. The following sub-sections discuss in greater depth some of specific attributes of the GCSSF relevant to its positioning as an organization of powerful collective agency in the Restudy process.

Table 5.4, Part 1: Interviewees' Comments on GCSSF










Identity of Representatives		GCSSF demonstrated that with investment of time public representatives, who were not professional resource managers, could produce the conceptual framework for multi-purpose water management. (Collins)
		Stakeholder groups from different perspectives at the table. (Estenoz, Finch, Moller, Parrish, Wade)
		"Authentic representatives." (Salt)
		Considered GCSSF top-down as only had one representative from the environmental community. (Farago)
Leadership		Commission had great leadership with Chair Pettigrew. (Alspach, Collins, Dobson, Kranzer, Rist, Salt)
Legitimacy		Success of GCSSF tied to actors' recognition and legitimacy to represent their communities. (Kranzer)
Transparency		After GCSSF's <i>Conceptual Plan</i> the COE would brief the GCSSF monthly so the stakeholder groups stayed informed of the Restudy. (Salt)
		"GCSSF really was the best organization because it was the most inclusive." (Rice)
Efficacy		Throughout the legislative process when questions would arise, or somebody would try to change the deal, we had the principles that we'd all sworn to and adopted and supported from the Governor's Commission to fall back on. That helped hold that coalition together. (Collins)
		An interactive organization where local perspectives really had influence on Restudy. (Rist)
		Consensus on language in WRDA 1996 happened 1993-1996 in the GCSSF. (Rice, Salt)

Table 5.4, Part 2: Interviewees' Comments on GCSSF

Collective Agency	🌀 📄	"Particularly effective as a consensus building group." (Finch)	
	🌀 🖐️ 📄	"If the GCSSF could get together and give me what they thought South Florida should look like, the concept of what I was doing should lead to, and it was within my authority to execute what they saw this vision to be, why wouldn't I let them do that?" (Rice)	
	🌀 📄	GCSSF allowed the diversity of stakeholder groups to discuss different perspectives and come to a common agreement. (Alspach, Teets)	
Relevance in Restudy Process	🌀 🖐️ 📄	GCSSF one of the most important organizations in development of CERP. (Alspach, Appelbaum, Estenoz, Rice, Salt)	
	🌀	GCSSF provided zone of political acceptability as framework that allowed for success of Restudy. (Appelbaum)	
	🖐️ 📄	Incorporated social concerns into Restudy process. (Kranzer)	
	🌀	"GCSSF great educational tool for a huge number of stakeholders to really be on a level playing field." (Teets)	
	🖐️ 📄	"There is a difference between outreach actually going out and trying to bring people in versus who we happen to have on the GCSSF." (Kranzer)	
		"Commission was <i>really</i> important, and I don't think we knew how important it would be when it was first proposed." (MacVicar)	
Actor(s)' Universe			
🌀	Science	🖐️ Local Voice	📄 Policy
Actor(s)' Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

Variations to the rules governing organizations allocated different levels of power to specific sets of stakeholder groups in the three universes. For example, the structures of the GCSSF were designed to empower representatives from diverse public interests into a unified local voice. Billy Causey stressed that unlike the policy universe, the five federal representatives on the GCSSF served in an advisory role, without a vote in determining the Commission's position. Hence, variation of governance rules amongst the universes' organizations appropriately reflected the different functional roles of the universes. The Commission's legitimacy as an organization and resulting power in the Restudy process was directly linked to the identity of representatives selected by Governor Chiles.

Legitimacy of individuals as representatives for their respective communities empowered the Commission as an organization with the resource of many voices from the local stakeholder groups. The Commission's membership and institutions created an organization to fill the local involvement functional role, which had been a gap in the governance capabilities of the organizations in the policy and science universes. Causey attributed the agency of Governor Chiles with the creation of an organization that would contribute meaningfully to the Restudy: "It was wise of the Governor to form the GCSSF because he brought more stakeholder groups to the table than what we [in the policy universe] had been working with. The GCSSF assumed a very active role in helping shape the future of South Florida."

While the Commission's results were widely praised in hindsight, it is essential to recognize that empowerment to attain the objective of a unified position by the diversity of representative positions was extremely difficult and took a large time investment. Bubba Wade, Commission member representing the sugar industry, emphasized: "Don't think of the Commission as all fun and games, because it was pretty combative for the first couple of years." Wade's statement reinforces that more interactive the type of communication process are more challenging and time consuming, yet also have greater potential for a substantive contribution to a governance process. Rock Salt identified the first task of the Commission as establishing trust amongst the organization's membership of representatives from stakeholder groups. Salt recalled that when the GCSSF began the representatives:

...could not break into sub-groups for six months because nobody *trusted* each other enough. So they had to keep *whole* for six months, just getting briefings and having dinners together and being together and getting to know one another enough for a long period of time, *just* to get to the point where they could break into smaller sized groups so they could do some work.

Hence, before the Commission representatives could attempt to develop consensus policy recommendations, they first had to build social capital through investment of time and both formal and informal interactions amongst representatives to move beyond their starting point of adversarial distrust.

To build social capital, the Commission provided a forum for representatives from competing stakeholder groups to have access to the same information and scientific facts, while also being exposed to variable stakeholder group perspectives. Mike Collins stressed the importance of both formal and informal interactions over time:

That's why GCSSF had to meet for six years. One of the things you find out is if you've got to sit next to somebody and deal with them once a month for two days, for five or six years, you're going to have to start dealing with them as people and start dealing with the world they really live in rather than the fantasy or the philosophy or whatever else it is that you *think* is going on.

After a substantial time investment, the exposure to and consideration of the range of perspectives prompted Commission representatives to recognize that underneath apparent differences their interests shared the common concern of water management. Furthermore, as a result of the ubiquitous nature of water, the different stakeholder groups' water management concerns were inextricably interconnected.

Representatives realized that to find a solution to a given concern required a watershed scale strategy inclusive of restoration, water supply and flood protection.

Collins emphasized:

I'm absolutely convinced, that the only way we were going to get Everglades' restoration was if we were all on the train when it left the station, and everybody went along. That has been called by some of the more radical environmentalists as a sell out, but I don't think it is. I think it is recognition of the fact that we're all here.

Collins' experiences unequivocally indicated the benefits of taking the time necessary for empowerment of stakeholder groups: together they could better influence the outcome of a governance process. As Collins said, the GCSSF "demonstrated that you could take people who were not professional resource managers, put them together and have them work out a resource management plan. It takes a lot of time to do it that way, but by educating and including them you get a better product."

Jack Moller agreed, noting that the GCSSF provided the institutions needed to negotiate a public vision for water management with "everybody at the table on all sides of the issue." The organization resulted in empowerment, though institutional structure alone was not sufficient; the right representative actors need to be seated at the table. Rock Salt stressed the importance for the membership of the Commission to consist of "authentic representatives". As a result of the authenticity of the individual representatives the overall organization had clear legitimacy and powerful collective agency. Salt said that the collective power of legitimate representatives resulted in "the language in WRDA 1996. All of that consensus, all of the buy-in for everything that you see in CERP happened really between 1993 and 1996, both with the GCSSF and early Task Force".

Hence, after the production of the Commission's *Initial Report*, federal

advisory members to the Commission, particularly Rock Salt and Terry Rice, advocated the federal government's formal inclusion of the Commission to fulfill the central role of determining the collective public vision for the Restudy. Salt's recollections provide evidence of the critical role of super-agents in the prompting of federal decision-makers in Washington to include the GCSSF's *Conceptual Plan* as a prominent guideline for the Restudy in the WRDA 1996 legislation:

I remember the [Commission] meeting when Terry and I asked them, [if they wanted a continued role in the Restudy]. Terry said 'We're going up to Washington to talk about this, are you ready to step up for another year's worth of *hard work*,' because they had just spent a year and a half doing the *Initial Report*. They talked about it for a little bit and they said 'Yes, this is really important. This is what we ought to do.' So Terry and I went up to Washington, and met with George Frampton [President Clinton's Assistant Secretary of Interior], who was Chair of the Task Force, and the Assistant Secretary of the Army of Civil Works¹³³. Frampton asked, 'What are the chances that the Commission can come to this sweet spot, this range of acceptability?' And Terry and I said, 'We believe they can.' So the federal government agreed as a *policy* issue to defer to the local organization to come up to this zone [of social acceptability].

The Commission, which had legitimacy as a result of the identity of individual representatives and the rules by which it was governed, was propelled to assume an influential role in the Restudy process as a result of the advocacy of super-agents in political circles in Washington DC. Rice identified the centrality of the GCSSF's work in the eventual authorization of CERP in WRDA 2000, emphasizing, "*Conceptual Plan is CERP*. The concepts contained are almost 100% the same." In addition, as discussed in Chapter 4, a return to the principles of the Commission's *Conceptual Plan* and intervention by super-agents was necessary to re-establish the diverse stakeholder groups' unified position after stakeholder groups initially undertook independent interest group lobbying of Congressional representatives.

Pettigrew's Leadership

Collective agency of the Commission was a product of Pettigrew's powerful individual agency. Similar to the above discussion about Rice and Salt's use of their agency to advocate a central role for the Commission in WRDA 1996 legislation, the Commission demonstrated the reflexivity of agency and institutions needed to realize Pettigrew's "vision" (Collins) of a collective position negotiated amongst diverse stakeholder groups. Interestingly, Pettigrew increased his individual agency as a key

¹³³ John Zirschky was Acting Assistant Secretary until the Senate confirmation of H. Martin Lancaster in January 1996. Joseph Westphal was Assistant Secretary when WRDA 2000 legislation was being drafted.

figure in the Restudy process as a result of shaping the institutions of the GCSSF to empower other actors.

Evidence of Pettigrew's powerful agency was the wide recognition of his role by actors outside the Commission. For example, outsider Karsten Rist said:

Pettigrew had a long history of being a person who was very much a consensus builder. Chiles had put together his Commission to be as comprehensive as he could make it and then put Dick Pettigrew at the top of it, feeling that Pettigrew could bring this very diverse group to a common consensus, and then build the kind of large support that CERP would need to succeed.

Hence, Governor Chiles recognized the necessity of selecting an appropriate Chair with the leadership skills to make the Commission inclusive of the diverse, adversarial interests and an effective organization. Rock Salt stressed that the vital role of Pettigrew reflected his powerful individual agency:

Pettigrew was more than a catalyst. I mean he was the leader, he was the shepherd, and he was uniquely suited. There probably aren't five people in the world that could have done what he did. He was the former Speaker of Florida's House of Representatives at a time when the whole State government had been fundamentally reorganized. So he was experienced in taking big, big problems and working the disparate interests into some sort of a way. His skill and his demeanor, and just his whole way he approached leadership.

Therefore, Pettigrew's agency was not only a result of his past experiences but also reflected his individual personality. Salt's statements demonstrate that *who* participated and was entrusted with leadership played a critical role in the success of the Commission.

Salt expanded on Pettigrew's ability to finesse communications to empower diverse interests, noting that "local knowledge is very heterogeneous, so how do you consolidate that? How do you bring that to bear into some kind of a viable way, and I'm suggesting that Dick Pettigrew was *the* reason that the interests came together." Pettigrew's leadership was widely seen as instrumental to facilitating the participatory processes in the Commission. Notably, by successfully managing a forum conducive to bottom-up types of communication processes Pettigrew's agency further increased. The wide recognition of Pettigrew as a central leader in the Restudy was ultimately as a result of his transformation of the typical top-down role of the Chair's position into a role that empowered other actors. Bill Dobson linked Pettigrew's powerful agency to the empowerment of representatives on the Commission:

...the fact the Commission had a charismatic and wonderfully able Chair who actually managed to get sugar to sit down with

environment to sit down with utilities and create a consensus document that was the basis for CERP. It was a remarkable, *remarkable* piece of diplomacy in running meetings and getting people to buy-in.

Hence, by shifting the paradigm of power to bottom-up institutions governing the Commission, ironically Pettigrew heightened his own influence in the Restudy process. His power was inextricably intertwined with the empowerment of other key actors.

Organization's Efficacy

The efficacy of the GCSSF in the Restudy process was reflective both of its institutions and actors' agency (Box 5.1).

Box 5.1: Features of the GCSSF that Imbued Efficacy

- Membership of legitimate representatives from diversity of stakeholder groups
- Individual actors' agency unified into collective agency as result of organizational rules that produced consensus statements
- Organizational governance rules, guided by Pettigrew, that offered the Restudy process a public involvement resource complementary to events in the organizations of the science and policy universes
- Super-agents advocacy of the Commission to the federal government

Evidence of the Commission's efficacy was the prominent recognition by the federal government in WRDA 1996 as well as the frequent mention of the Commission's significance in the Restudy process by both insiders and outsiders. Furthermore, efficacy of the Commission, with membership and leadership appointed by Governor Chiles was linked back to the Governor's informed use of his powerful agency.

Bonnie Kranzer said, "I really applaud Governor Chiles for picking the people he did and appointing Pettigrew, because it was just a stellar group. And as you've probably heard, it'll probably never be repeated again, unless things change. And I doubt it."

The sub-text of Kranzer's comments is that not only did the right people need to be *included*, but also no key interest could be *excluded* for the result to be meaningful, legitimate and influential.

Despite the widespread proclamations of Pettigrew's essential role, his leadership was a complementary feature to interaction of the selected representatives from stakeholder groups. Recognition of his leadership should not obscure the equally important selection of Commission's membership. Rock Salt clarified the meaning and significance of representative organizational membership: "The point was not representation in a strict sense, but could these individuals express views broadly enough for their community and have enough credibility to *explain* it back in the language of their constituent groups." Therefore, legitimacy of representatives within their individual stakeholder group communities established the collective efficacy of the Commission.

So, the collective agency of the insiders on the Commission was tied to their individual agency within the community they represented. Bonnie Kranzer highlighted this point saying: "Most of our great success was due to the fact that the representatives were very well known in their fields and their communities. They were good about bringing their perspectives to the table and discussing them."

Governor Chiles made selections for the Commission based on a desire to:

- 1) balance inclusion of the diversity of stakeholder group interests; and,
- 2) select individuals recognized as possessing agency within the community that they represented on the Commission.

As Kranzer explained:

...because we *had* all those people on the Commission we were able to really duke out the issues and come up with all the compromises and assurance language and address issues everyone was nervous about. We were able to work it out and that's what helped get the Plan written, adopted and approved.

Super-agents and many other insiders universally attributed acceptance and unified promotion of CERP by the diverse range of stakeholder groups to the successful integration of the GCSSF into the Restudy process.

Additionally, both insiders and outsiders of the Restudy process identified the Commission as the mechanism to integrate the socio-economic concerns of the range of stakeholder groups that together constituted the public interest of South Florida. Without high-level public involvement provided by the GCSSF the highly charged politics of conflicting demands for water allocation presented real potential for litigation or other obstructions by one or more interests. Hence, inclusion of an organization that furthered high-level local involvement was an essential attribute of the Restudy. Mike Collins explained why empowerment of the representatives on the

GCSSF was necessary to obtaining stakeholder groups' support for the Restudy process and acceptance of CERP: "Well, sure, you can put planners in the room and have them design a wonderful plan that was not going anywhere unless there was political buy-in. So the Commission was critical, absolutely *essential*."

In addition to the formal communications of representatives at the Commission meetings, having a seat at the table also served to establish personal connections among representatives of divergent interests. The formal and informal communications that occurred in the varied social settings were integral to the evolution of collective agency in shared-power world. Hence, agency of individual representatives in the Restudy increased not only by empowerment through formal communication processes and membership to collective agency statements, but also through the opportunity for informal communications with leaders from other stakeholder groups and exposure to other representatives' perspectives. Over time, access to the range of perspectives and scientific information fostered recognized modifications in representatives' perspectives. Transformation through communication was evidenced in the overall accomplishment of multiple unified statements of collective agency in documents and the return to the collective position of the Commission when consensus was challenged in Washington DC. The collective transformation of stakeholder groups represented on the Commission was possible as a result of the modifications of perspectives at the scale of individual representatives.

For example, one of the points of conflict was the responsibility of different interests for the existing condition of the ecosystem. Bubba Wade attributed the Commission's eventual move beyond the assignment of complete culpability to "Big Sugar" as a result of the change in perspectives by individual actors. Wade recalled:

For the first two years we faced the battle that a lot of the Commission members *believed* [the problems in the Everglades were all a result of the EAA]. I'll never forget, it was like about two and a half years after the Commission had been going on, and Mike Collins who's now the Chairman of the SFWMD [Governing Board] and was a fishing guide in the Keys, stood up in front of the Commission and said 'When I first came on this Commission, I believed in my heart that to save these Everglades we had to get rid of sugar farming and get them out of this place.' And then he said, 'I'm tired of sitting here and listening to people stand up in public comment and tell us that we need to take more land because we've all come to the realization that we know the best solution for us is to make sure these guys are sustainable, keep them in farming, do the things we have to do to keep them in farming and provide incentive for them to stay in farming, and not think about driving them out of farming with

additional costs. Or we're going to get development, exactly what we don't want.'...Then, after that, the Commission started focusing on the entire big picture asking, 'What are the real problems that we've got to face in the Everglades?'

This example demonstrates the importance of communication to build social capital towards overcoming myths and finding shared solutions to common problems. To navigate the turbulent sea of stakeholder group interests, the GCSSF looked beneath the surface to find common connections and devise collective principles. To do this collaboratively required shifting of positions through individual agency. Collins also recalled this point of transformation saying, "So to me somebody had to stand up and say, 'No it's not all them, and we're not going to destroy them. No, we're not all saints, and we're just going to go forward together.'" Empowered and informed through the Commission, Collins used his agency to express his personal radical shift in understanding to move the debate of the Commission forward from accusations towards finding a shared solution. Hence, the GCSSF was a high-level public involvement forum that established the range of socio-political acceptability for CERP and was an integral organization in the Restudy process as a result of the individual and collective legitimacy of representative membership and efficacy of its institutions with a focus on building social capital.

5.2.2 Transparency – Comparison of the GCSSF and the Chief's Letter

This sub-section builds from the above discussion by comparing the transparency of the Commission's governance to the highly contested alterations of the Chief's Letter. The rules that governed the Commission promoted a transparent organization with clear objectives established by Governor Chiles and a set of procedures advocated by Pettigrew and accepted by the representatives to govern communications. Each representative had a seat at the table, access to detailed information, clarity about the rules of involvement and agreement to the over-arching objective of establishing a collaborative position statement. Furthermore, because of the transparency of the Commission and the efficacy of its output, the Restudy Team shaped and justified its own decision-making in alternative development and evaluation to reflect the publicly accepted Commission's work as the conceptual framework of CERP.

In contrast to the inclusiveness, transparency, legitimacy and efficacy of the communication processes that yielded the *Conceptual Plan*, the events surrounding

the expansion of the Chief's Letter were seen by many actors as a serious breach in the agreed procedural governance of the Restudy process. As presented in Chapter 4, recall that the Chief's Letter was the covering letter of the *Final Feasibility Report* submitted to Congress on July 1, 1999. The Chief's Letter can be interpreted as endorsing *Alternative D-13R4*, which provides 245,000 additional acre/feet of water to ENP, rather than *Alternative D-13R*, which was the plan agreed by actors on the Restudy Team through the alternative evaluation and development process. The Chief's Letter was highly offensive to the range of stakeholder groups engaged in the process as it circumvented the transparent rules and the collective output produced by both the inclusive high-level public involvement of legitimate representatives on the Commission and actors that were part of the Restudy Team and its sub-teams. Rock Salt said it "sent the sugar industry to the ceiling, sent the State off the roof, sent the Water Management District to the mattresses. Everybody was upset over the Chief's Letter."

Alterations to the Chief's Letter did not follow the formal procedures for public review required by the federal government in NEPA. In addition, the Chief's letter was seen as an attempt to trump the widely agreed informal rule that the collaborative governance, consisting of the consensus conceptual framework of the Commission and preferred alternative selected by the majority of the Restudy Team, would produce the output of CERP. As evidenced by the Restudy process, it is permissible for the COE to engage in consultation with stakeholder groups. However, according to NEPA, such consultation or public review cannot be inappropriately limited to only selected interests. In this instance some stakeholder groups, primarily ENP and some environmentalists, gained exclusive access to the COE without the knowledge or potential for participation of other stakeholder groups. While the failure of the Chief's Letter to meet NEPA requirements provided the legal basis for a lawsuit by the Miccosuke Tribe, in practice the failure to follow NEPA was seen as a less serious offense than the dissolution of trust that surrounded breach of the informal, widely subscribed roles of the ad hoc organizations that governed the Restudy process with efficacy. As Bill Dobson explained: "The Chief's Letter really irked a lot of people because, basically after work on CERP as a consensus document, all of a sudden an engineer made changes behind closed doors."

The events surrounding the Chief's Letter illustrated that despite the clear buy-in by stakeholder groups to inclusion and transparency, informal and private insider communications superseded agreed consensus-building procedural rules.

Rock Salt explained:

Pursuant to the lawsuit there were a number of Freedom of Information Act requests on email traffic and the like and it would appear, from reading a lot of that information, that the Army and the Clinton administration, in an attempt to secure the support in the environmental community for CERP, shared drafts of the Chief's Letter with the environmental community, which then sent over number of suggested edits to the transmittal letter, that appeared verbatim in Chief's Letter.

Terry Rice was more explicit in his criticism of the Chief's Letter as "collusion" between federal agencies and environmental groups. Hence, concurrency of the Restudy process with preparation for Presidential elections allowed the Department of the Interior (DOI) and environmental interests to credibly threaten impeding authorization of CERP unless steps were taken by the COE to provide further benefit to the natural system. So, interestingly and also ironically, the federal agencies responsible for managing natural resources and environmental interests presented the largest impediments to the authorization of CERP.

The perspective of DOI and environmental interests was that CERP was intended to be a restoration plan, but provided first for the multi-purpose human water supply needs. Bob Johnson explained ENP's position:

It's difficult because CERP was developed by political compromise. So for an agency whose mandate is restoration, like ours, we do not have a lot of wiggle room to work out a compromise to trade-off benefits in ENP to benefit another area, particularly if the trade-offs are with water supply and flood control.

The DOI and some environmental interests saw their actions to impede consensus developed CERP by advocating an additional 245,000 acre/feet to ENP as justified and necessary to better meet the environment's needs. Shannon Estenoz, leader of the Everglades Coalition and local representative of the WWF, noted that the desired modification of "245,000 acre/feet is *D13R4*, but can be more generally stated as just enough water to ENP." Mary Munson, from the National Parks Conservation Association, indicated that the 245,000 acre/feet of additional water was included for ENP, because of environmental groups' work in Washington DC. Despite good intentions, in practice these actions mainly served to severely undermine their own credibility with the other stakeholder groups that had been engaged in the Restudy process to develop CERP collaboratively through the activities of the ad hoc governance organizations in the different universes.

Furthermore, some scientists questioned the ecosystem's ability to accept

additional water. For example, super-agent Terry Rice stated:

The April plan, the Corp's document is wonderful. It's the Chief's Letter that came a few months later, which gave commitments that never were discussed in public, never were committed to and were unreasonable. That was an interest that wanted something not only unreasonable, but totally outlandish. Just because they wanted to go to an extreme, which not only demanded water that they could never possibly ever utilize, it would drown the whole system. In the report in April it addressed that adequately because it said we'll look at it and if there's reason this should happen we will do it. Not just demand it and make it mandatory. And then it went further than that, they said and if we have to, we'll flood people – and that's not reasonable. That was our premise the whole time – we would never take anybody's flood protection away from them. But when interests start getting unreasonable, they destroy consensus. That's what almost happened, but there was a lot of people that worked hard and we got it back on track.

Rice and other insiders attributed the return to consensus to the agency of super-agents and a return to the commitments made in the *Conceptual Plan* and to *Alternative D-13R*. Rock Salt particularly credited Dick Pettigrew with resolution of the Chief's Letter conflict as Pettigrew "wrote a letter that brought everybody back to the consensus documents." Therefore, the collective agency of the Commission, represented by Pettigrew, proved to be an essential organization for *maintaining* consensus despite adversity. Similar in approach to the resolution of individual lobby by stakeholder groups in Washington DC was a return to the Commission's consensus statements contained in the *Conceptual Plan*.

The GCSSF proved critical not only in the creation of the range of socio-political acceptability by establishing the conceptual framework for the Restudy, but also by providing a set of principles around which the cacophony of voices could regroup when consensus was challenged. A very interesting social dynamic of the GCSSF is that it attained prominent recognition in federal legislation as a result of super-agents advocacy of the ability of the Commission to fulfill the role of providing a range of socio-political acceptability through their collective agency. Congress imbued power to the Commission through prominent recognition in WRDA 1996 legislation; but, ironically, the unified stance of collective public interest initially dissolved when presented to the federal government in Washington DC because the same stakeholder groups engaged in individual lobby.

When CERP's authorization was threatened by the same stakeholder groups represented on the Commission, super-agents were able to bring interests back to the unified position presented in *Conceptual Plan*, advocating CERP as created in the

collective public interest of South Florida. As a result of the GCSSF, the stakeholder groups collaborated to undertake a unified lobby for CERP based on the principles agreed by the Commission. Various actors recounted environmental, agricultural and utility interests lobbying jointly to advocate CERP as a surreal event in Washington DC. Stuart Appelbaum recalled: "Sugars' lobbyist going literally arm and arm with the environmental lobbyist to *jointly* approach members of Congress!" The individual stakeholder groups recognized that a tactical compromise cloaked in the positive terminology of consensus was preferable to each interest losing any potential benefit through Congress not authorizing CERP. The behavior of the representative actors illustrates Ostrom's (1990) theory that individual behavior within collective action is complex and highly tactical.

The GCSSF proved to be a politically powerful mechanism to preserve the competing stakeholder groups' political buy-in for a collaborative, multi-purpose water management plan that followed a weak sustainability position based in the concept of shared adversity. Tom MacVicar noted the Commission was "*really* important and I don't think people knew how important it would be when it was first proposed." MacVicar's statement is of particular interest as he is a scientist with professional training in engineering and modeling who highlighted the essential role of integrating public involvement into decision-making. Bonnie Kranzer emphasized that one of the essential achievements of the Commission was demonstrating that successful development of a multi-purpose water management plan required high-level public involvement, integrating social sciences, as well as engineers and ecologists. Mike Collins said: "Some of us have become big believers in local involvement. It's not the whole answer obviously, but it's a necessary part of how to really get the political buy-in."

In fact, the willingness of actors to engage in a collaborative management approach towards building consensus among stakeholder groups appears to have emerged from an unwillingness to go down the same long, difficult road of litigation experienced to resolve the issue of water quality. With regards to the experience of litigating water quality Rock Salt told me:

...there was a sense of, we don't ever want to do that again. And so there was a great *resolve* to figure out a way to work together better. At one level there was that going on, but on the other side there was a huge amount of scar tissue from all the people who had been called liars in court. It's kind of like a divorce – when matters are settled by lawyers there's a huge psychological impact that scars people. There are still people who carry baggage back from those early days and

can't work with someone because called to testify he said he doesn't know what he's talking about, his science is wrong, he's in the pocket of this or that. I mean that litigation created all kinds of residue. So on the one hand it was hard, on the other hand it was the basis from which the Governor's Commission understood we didn't need to do it again.

Actors wanted to find a better way forward and were willing to attempt to work together to avoid litigation because past resolution through the hard infrastructure of courts was problematic.

Above Salt described the rationale for movement away from courts towards decision-making in the softer infrastructures of ad hoc organizations. Participation in such ad hoc organizations was not legally required but rather was grounded in the motivation of stakeholder groups not wanting their perspective to be excluded from the decision-making process. John Ogden speculated that a consensus approach through soft infrastructure had not been feasible in terms of water quality because “we just hadn’t developed the attitude and the mechanism to work together in a really integrated way. It just hadn’t evolved to that point yet”. In that regard, I believe without the antagonistic precursor of water quality that stakeholder groups may have lacked the incentive to engage in participatory processes towards finding a new way to develop a common solution to quantity, timing and distribution. Additionally, attempts to incorporate water quality as a core point of debate in the Restudy would have been not only redundant, but also threatened potential for consensus among stakeholders towards resolution of the other hydrological issues not being discussed elsewhere.

5.2.3 Outsiders’ Experiences

The above sub-sections have focused on the power of the collective agency of centralized, high-level public involvement. Overall these two case studies explore experiences of insiders. The following examples turn away from the focus on such high-level public involvement to lower-level public involvement by outsiders. This section seeks to explore more traditional engagement with the wider public through outreach, as well as consultation through formal public comment. A marked contrast exists between the overall positive experiences of actors from stakeholder groups that were insiders as a result of their membership on the Commission, and feelings of exclusion by outsiders that lacked a seat at the table of organizations (Table 5.5). The following sub-sections explore case studies that specifically focus on the experiences

and sentiments of outsiders about the Restudy process.

Information dissemination, through the release of documents, material on the Internet and coverage in the news media, was the most basic mechanism for public outreach in the Restudy. The Restudy process also incorporated public meetings designed for outreach of information, as opposed to actively seeking consultation by the public. By definition information dissemination has a minimal level of interaction as the strategy expresses the objective of one-way information transfer. Insiders and outsiders overall expressed different opinions on the quality of the outreach in the Restudy. Insiders called the outreach effort of the Restudy “extensive” (McLean) and “unprecedented” (M. Davis). In contrast, outsiders, such as Homestead residents, often felt that there was a need for public outreach to be better targeted at the community level to address local concerns.

Table 5.5, Part 1: Comments on Public Outreach and Involvement








Description		Difference between outreach and actual involvement. (Causey, M. Davis, Kranzer, Peterman, Teets)
		Interest by international media because Everglades have "world-wide resonance". (Appelbaum)
		Public outreach occurred in regional meetings and through the media. (Teets)
		Involved in outreach through mass media of TV and radio. Across Tri-County area talked to business groups, church groups, home owner groups, civic organizations in minority community about restoration. (Peterman)
Outreach Strategies		Different outreach messages to public after CERP authorized than during Restudy. (Kranzer)
		"If the public thinks the Everglades is part of who they are, including their drinking water when they turn on their faucet and all those good things, then it's part of them. The public is part of this ecosystem." (Lorian)
		Part of outreach is letting people know that CERP will make new jobs available. (M. Davis, Kranzer, Peterman)
		Need education, not just PR. (Aumen, Causey Mazzotti)
		"Goal for people think about Everglades in different way: 'America's Everglades' instead of 'Florida's Everglades'." (M. Davis)
		Environmentalists position the EAA as a menace to catalyze public support for restoration. (Kramer)
		To cut costs the COE and District are using their people to try to communicate with public when instead they should hire people better able to relate to the communities for more effective outreach. (Peterman)

Table 5.5, Part 2: Comments on Public Outreach and Involvement

Consultation	☞☞	To improve public involvement at Working Group rearranged meeting room differently and after every agenda item engaged the public. (Causey)
		Insiders ignored public comment unless public said what insiders wanted to hear. (Marshall, Peterman)
	☞	NEPA required public comment and we incorporated the formal comment period with poster displays at meetings to engage the public in more informal discussion. "Really a neat interaction." (Teets)
Acceptance of Outreach as Necessary Activity	☞☞	Some agencies "just <i>rolled</i> their eyes at anything dealing with people" as thought public outreach should not be their concern. (Kranzer)
	☞☞	Struggle to get the Working Group to treat public outreach seriously. (Causey, Kranzer)
	☞	"Benign neglect and indifference and not understanding and knowing enough about why we need public outreach and <i>how</i> to do public outreach." (Kranzer)
Effectiveness	☞☞	"Sometimes the public don't realize the complexity of what we're wrestling with and think that finding solutions should be easier." (Causey)
		Need for more public outreach, particularly to minority communities. (Peterman, Pomar)
	☞	"What COE did in terms of outreach and involvement was unprecedented." (M. Davis)
		Restoration complex process presented in sound bytes by media. (Aumen)
	☞	" <i>Extensive</i> public involvement and public outreach effort during the Restudy." (McLean)
		Need for more public outreach targeted at concerns of local communities. (Homestead Residents)
		"By talking to COE people I realized that the environment will not be compromised <i>at all</i> . So the way LULAC sees it is that we have not to compromise [between water supply and the environment]." (Pomar)
Need for Public Involvement	☞☞☞☞	"Public involvement is not the whole answer but is a necessary part of getting political buy-in and the big picture." (Collins)
		"Scientists can scream and yell and provide good science all they want, but until the general public recognizes the need to restore something, or to put money into protecting the environment, the legislators, the policy makers, are not going to respond just to scientists." (Aumen)

Table 5.5, Part 3: Comments on Public Outreach and Involvement

Level of Involvement	☞☞☞☞☞	Difficult to incorporate feedback from public that "is a level of sophistication that's below the level at which we are working." (Salt)
	☞	"Because there's so much interaction from the public and involvement of other agencies in the core decision making, it can be very uncomfortable because you can feel that you've lost a sense of control." (Appelbaum)
	☞☞☞☞☞	"It's hard for some agencies and scientists to buy into public involvement. First, it's a lot more work, second you've got to filter through all the garbage that the general public comes up with that isn't accurate, but I think it's worth the effort." (Collins)
	☞	Public meetings are not an effective public involvement tool. Need to incorporate other methods. (Appelbaum)
	☞ ☞	Public involvement effort made but "one of the failings was the tendency just to attract certain stakeholder groups and their representatives." (Tepper)
		Opposed to complaints about lack of public involvement by the people that get paid to participate. More active public involvement if public also was paid to participate. (Peterman)
	☞☞☞☞☞	"Probably the weakest link of public involvement was minority communities and under privileged." (Kranzer)
		Lack of private organizations to serve as advocates of environment as public disconnected with environment of South Florida as retirees and other immigrants remained emotionally connected to place of origin. (Farago)
Actor(s)' Universe		
☞	Science	☞☞☞☞☞ Local Voice
		☞☞☞☞☞ Policy
Actor(s)' Classification		
	Insider	Super-Agent & Insider
	Outsider	Super-Agent & Outsider
	Insider and Outsider	Super-Agent, Insider & Outsider
		Super-Agent

The disconnection between perceptions of insiders – responsible for outreach – and the experiences of outsiders – the target of outreach – partly reflects varied expectations for the outreach. Insiders widely differentiated between outreach and public involvement efforts, while outsiders often mistakenly viewed outreach exercises as a forum to express their detailed concerns and offer substantial suggested modifications to the Restudy. Consultation is the most basic type of multi-directional communication process. Interaction is low and information transfer is greatly disproportionate. For example, in interviews or Q&A sessions the questioner guides

the topic of conversation, but the main transfer of information is directionally from the interviewee to the questioner. Consultation provides a mechanism for interests that are not actively engaged in the decision-making through organizations but want to provide feedback to the process. Public consultation did occur in the Restudy, but in smaller meetings with specific interest groups rather than the social setting of large public meetings. Stuart Appelbaum contrasted the levels of interaction between outreach and more interactive public involvement:

Public meetings tend to be kind of stilted, but it's an absolute necessity for the general public. Most of the input you're going to get comes from the stakeholders, and you're going to do that through a small group meetings. I mean a big public meeting you get the pot stirring. But in terms of having a dialogue, understanding issues and working them, it's not a big public meeting for that. Small stakeholder focus group meetings or essentially one to one meetings, you're going to get a lot more interplay.

The practicality of outreach compared to inclusion was reflective of the scale of the Restudy and the difficulty of deliberation with large numbers of individuals. As discussed in Chapter 2, if large numbers of individuals are included, the depth of possible deliberation diminishes.¹³⁴ Public outreach was designed to be inclusive towards fulfilling the objective of information dissemination to the maximum number of individuals, but does not provide a forum for deliberation. The one-way information transfer of public outreach moves towards greater levels of deliberation in more interactive communication, but notably with fewer actors engaged in the more interactive the communication types. The first case study about outsiders' experiences focuses on information dissemination to outsiders. Based on participant observation, the following sub-section analyzes an example of a public outreach meeting convened in the city of Homestead to discuss implementation of CERP.

Information Dissemination: Public Meeting in Homestead

Events at the February 6, 2001¹³⁵ public outreach meeting in Homestead by the Working Group depicted different perceptions by insiders and outsiders of the success of outreach practiced.¹³⁶ The community outreach meeting was organized by

¹³⁴ See Figure 2.3 for a depiction of the contradiction in practice between inclusion and deliberation.

¹³⁵ A criticism by some local residents was that the meeting coincided with another meeting to discuss implementation of Mod Waters for the Tamiami Trail. Some speculated that the conflict was planned to limit attendance at the Tamiami Trail meeting, a topic that the local area was concerned about in the context of what the upstream alterations would mean for local flood protection.

¹³⁶ While this meeting occurred after WRDA 2000 the actors at the meeting were generally the same as during the Restudy process and the topical focus of the implementation of CERP provides a suitable parallel to how public meetings expressed the proposed contents of CERP prior to authorization.

local citizens, such as Mike Richardson, who had followed the Restudy process and wanted to promote a greater awareness of CERP and its relevance to the Homestead area. The local community made clear efforts to welcome the members of the Working Group and the planners from the COE and District scheduled to present a community based talk on CERP. Homestead Women's Club hosted the public meeting at their facilities and provided generous hospitality by serving a hot meal featuring products grown in the Homestead area.

The initial failure at public outreach was in the striking lack of *informal* interaction between the representatives from the COE and District and the local community. The dinner served prior to the presentation portion of the meeting would have been an ideal time for the individuals from the COE and District to mingle and communicate informally with local residents. Instead, the COE and District representatives segregated themselves by sitting exclusively at tables with other actors from the COE, District and Working Group.¹³⁷ They selected tables in the center of the room, while actors from the local community filled in tables at the margins. COE and District actors could argue that the local people *could* have chosen to sit with them.¹³⁸ However, a clear locally perceived power differential existed between expert scientists, and the Homestead farmers, fishermen and local business owners who should not have had the burden of prompting integration with the experts. The community had already provided a meeting forum, audience and a meal; the responsibility for prompting interaction was with the experts to outreach to the local community. Rather than actively seeking to break down the clear communication barriers between scientists and the local community the experts perpetuated the communicative chasm not only by not sharing a table with the local actors over a meal, but also by assuming an aloof demeanor of an unapproachable expert. I had observed these same actors interact in the context of the formal structure of the Working Group. Strangely, the expert actors largely appeared more relaxed in the formal structure and assumed a more formal persona at the public meeting.

Over 100 people attended the meeting, evidence of definite local interest in the of future water management in Homestead. The objective of the meeting from the perspective of the Homestead residents was to learn more about the implementation of CERP relevant to their specific locality. However, rather than tailor their presentation

¹³⁷ The only exception I noted to this was Craig Tepper of the Seminole Tribe of Florida who did sit with Homestead residents.

¹³⁸ It is questionable whether the local actors could have chosen to sit with experts because the expert guests were all served at the buffet first and then filled tables together before the local actors were served.

to the local areas of interest the experts presented the complete picture of implementation. While perhaps relevant for Homestead residents to learn how components in their area connected to the bigger picture, the presentation began with components of other areas and, running out of time, discussed the local specifics in less time than was spent on other areas. The disproportionate length of the initial material that was not particularly relevant to the local community also severely limited the time available for the audience to ask questions.

The presentation's highly technical language and level of detail also made the information inaccessible to the local community. Moreover, while the Homestead residents were specifically interested in how the proposed implementation of components in CERP would affect their flood protection and water supply, these concerns were not directly addressed nor connected with the components. During the course of the meeting the substantial disconnect between the experts' communication strategy and the audience was abundantly clear. Rather than fostering greater understanding of CERP and confidence in those who would be implementing it, the meeting served to further alienate the local community who already had existing distrust of the experts they perceived as working to benefit Everglades National Park and Biscayne National Park at the expense of people in Homestead.

Hence, observations of the Homestead public meeting raised a number of concerns about the effectiveness of the public outreach. The quality of outreach is important because poorly administered outreach strategies can lead to distrust and feelings of exclusion by the public. Also evident through this discussion is the challenge of how to meaningfully communicate a highly technical water management plan to the general public. Some interviewees suggested use of visual images, such as maps or computer simulations (Aumen, Gawlik, Obeysekera, Teets). Another strategy John Ogden saw as effective were newspaper articles written by journalists that specialize in packaging scientific information in a presentation comprehensible to the wider public. Gawlik also noted that some performance measures (PMs) offer a good tool for connecting to the public:

To make a case to the public that restoration is important then wading birds are an excellent tool. Wading birds are something that everybody sees around here - in the ditches, golf courses, flying over your house. They have some kind of appeal. They're pleasant to look at. They're not mean, so kids wouldn't perceive them as being a threat. So, I think in that sense the public can connect with wading birds.

Hence, the message of restoration can be packaged more effectively to the public as

having the objective of increasing wading birds rather than through more technical hydrological PMs. Joette Lorian, local activist and affiliated with the Miccosuke Tribe, reinforced the need for information dissemination to have a relevance to the intended audience:

I used to tell people we needed to do outreach of the message “Everglades are us.” And in fact Marjory [Stoneman Douglas’s] big thing was taking restoration out of the bleeding heart category...if we don’t have the Everglades the drinking water supply is going to be diminished. Some of the environmental groups now yell that Everglades’ restoration is a water supply project. Well, Marjory used to say restoring the Everglades will help your water supply. And I understand what those environmental groups are saying – that at the expense of the ecosystem for all these utilities to get all this water, but I think it’s hard for the public to understand what that means. If you start saying it should be Everglades and not for water supply, that’s problematic in terms of what the public hears.

Lorian’s advocacy of connecting restoration to water supply offers an effective strategy for connecting the public to restoration and cautions about confusing the message of restoration as being in conflict with water supply. The message that the health of the Everglades is linked to water presents restoration in a publicly relevant context.

Outsiders’ Experiences of Outreach and Consultation

This sub-section turns to consideration of the experiences of some outsiders engaged in consultation as part of the Restudy process: Karsten Rist, John Marshall, Audrey Peterman and Armando Pomar. One typical mechanism of consultation is release of a document for public comment. The release of the *Initial Draft Plan* for public consultation was a legislative requirement of NEPA and outsiders engaged in consultation during the Restudy process had variable comments. Rist, President of Tropical Audubon Society was satisfied with the consultation process: “The Corps had said if you have any ideas, or questions let us know. We may or may not use your ideas but we certainly want to discuss them.” In contrast to Rist’s experience John Marshall was clearly dissatisfied with consultation in the Process. Marshall stated:

I discovered that despite all the government’s claims of public outreach and public involvement, what the government’s really doing is adhering to NEPA by having all these public comment periods, but turning their hearing aids off as soon as we start talking, unless it’s something they want to hear.

Hence, Marshall’s criticism was based in the lack of attention given to formal public comment by the wider public.

Insider Tom Teets, active in the public outreach and consultation by the Restudy Team, noted that various mechanisms were attempted to enhance the consultation:

We took a different approach to traditional public meetings required for NEPA. We knew we had to have the public comment period, where people just kind of give their perspective, but we also had a series of displays set up around the rooms with staff at each of those displays so people could come in and have answers to their questions in a very informal fashion.

In addition, technological innovation can enable consultation to occur more widely. The best example of “enabling” technology in the Restudy was the posting of progressive iterations on the internet during the Restudy Team’s plan formulation strategy which allowed for real-time public consultation. Jayantha Obeysekera, leader of the Modeling Team, highlighted the important role that enabling technologies can have in allowing for wider consultation:

There was no way we could print hundreds of PMs. So, we used the web as a medium and attracted the stakeholders. Current technology made a *big* difference, because there was no other way aside from the Internet that we could get this much information to the public in a timely manner and then get the public’s feedback.

However, as previously identified, although it was “public” consultation members of the Restudy Team noted that actual feedback primarily came from stakeholder groups. Hence, technology was not a panacea to public consultation and face-to-face meetings remained part of the integrated strategy of public involvement.

Despite the traditional and internet based consultation forums used in the Restudy, John Marshall’s personal experience led to feelings of exclusion. Marshall said that comments he submitted were not mentioned in CERP:

Basically, when the COE came out with CERP all the contributors that had sent in comments were listed, except they did not list the Arthur R. Marshall Foundation. I had put the commentary in written form into multiple hands...and by not acknowledging our comments they did not have to react to them.

Marshall was greatly dissatisfied that his comments were not included, but also disillusioned with the ability of public consultation to influence the Restudy. Yet, as presented when discussing characteristics of the types of communication processes, consultation’s ability to initiate substantive change is relatively limited. Marshall wanted to affect more change to the Restudy than would ever be conceivably possible within the limitations of consultation. Perhaps his dissatisfaction reflected his

frustration at being unable to meaningfully engage in more interactive types of communication, which offer greater ability to influence results.

In contrast, it is worthwhile to consider how a super-agent with power in the process said he responded to public consultation. Colonel Rock Salt stated:

If you were a public citizen and said, I think this is important, I'd write that down. If someone else came back and said just the opposite, I'd write that down too, and I'd say to my staff, go and figure out what we can do to address these points. Most of the public comments are saying different versions of the same thing. The harder one is where input is a level of sophistication below the level that we are working. A comment talking about a fine point, when really we're dealing in a much broader scale and your point is lost in the air by the noise of a much bigger policy argument.

The comments by Salt and Marshall demonstrate a dissonance between how insiders can use public comment and an outsider's desire to fundamentally alter the approach to restoration through consultation.¹³⁹ Notably, Salt identified the solution to this issue as engaging in more interactive types of communication processes to build consensus amongst stakeholder groups. Yet, despite Marshall's desire to influence change in the Restudy he lacked organizational membership to engage in more interactive communication processes. The lack of an organization for an actor like Marshall to participate in more interactive communication processes, despite an expressed desire to do so, further strengthened Marshall's sense of exclusion.

Outsider Audrey Peterman also experienced exclusion during the Restudy process. Peterman was an advocate of community level outreach, saying that it was "crucial" to tailor outreach strategies to the specific concerns of the target audience. "Telling people how this whole thing affects *them*...that resonates with people." Yet, in stark contrast to Peterman's strategy of connecting with the public's concerns she provided the following example about ineffective and alienating attempts of organizations that governed the Restudy to outreach to the African-American community:

The name 'Eastward Ho'¹⁴⁰ was rejected and repudiated in the African-American community. We told them: 'anybody who even knows a thing about this community would know that you can't come in here talking no "Ho" thing.' 'Ho' is a very common expression in the African-American community, meaning whore, so that's very disrespectful.

¹³⁹ The flow-way Marshall advocated is discussed in Chapter 6.

¹⁴⁰ Name for strategy to promote eastern urban re-development rather than continuing to encroach on remnant natural system by moving westward.

Peterman's statement demonstrates the importance of the language selected for communication and understanding the culture of the outreach audience. Armando Pomar, Florida State Director of the League of United Latin American Citizens (LULAC) also identified the need for better community level outreach during the Restudy process. One mechanism that enhanced community outreach to the Hispanic-American community was availability of outreach materials in Spanish.

Pomar also observed that he was aware of CERP only because of his leadership role in South Florida's Hispanic-American community. He indicated that better outreach strategies are needed so that the wider public, not just representatives from the community are more informed. While the intention of information dissemination strategies certainly would not be exclusion, the experiences of these actors demonstrate that it is a potential and grievous result if outreach mechanisms are ineffective. Peterman and Pomar's experiences demonstrate that even the most basic type of communication process at times can be extremely difficult to execute successfully.

Like John Marshall, outsider Audrey Peterman's dissatisfaction can also be partly be explained by the limitations of dissemination and consultation. Peterman endorsed outreach and consultation with local organizations, but also wanted to be involved in more interactive types of communication. She directed her frustration into organizing specific types of outreach and consultation events, such as "stories in the mass media, TV, radio and talks to business groups, church groups, home-owners, and civic organizations to tell them about restoration." These events could be classified at best as low-level consultation in the context of the Restudy because while there was interaction, the information was gathered by Peterman rather than insiders. As a key actor from her community she received consultation feedback but the information exchange ended at Peterman. She did not have a mechanism to infuse the information into the organizations or network of actors that were responsible for the Restudy process.

Also similar to Marshall, Peterman felt that the conventional mechanisms of public comment to express her findings were inadequate:

I'm giving testimony about what the issues are for the African-American community and how they should be addressed...and how they are being consistently overlooked. And they say, 'Oh, thank you, so let's get back to the agenda. What is next?' Like I haven't even been there.

So, despite the extensive outreach and consultation efforts cited by insiders, Peterman

remained extremely critical of communication to the African-American community, nearly shouting: "No outreach, no inclusion, none, none!" What Peterman was actually criticizing was not simply information dissemination, but rather the lack of engagement of the black community in more interactive communication processes by insiders who could effectively incorporate the information into the Restudy process. Her statement mentions both inclusion and outreach; however, outreach has characteristics of minimal interaction, while inclusion increases with parity of information exchange and level of interaction.

The lack of a communication mechanism at a higher level of interaction is another demonstration of how the paradigm of power and influence is linked to engagement in more interactive types of communication processes. Similar to Marshall, Peterman wanted to engage in more interactive types of communication processes to have a greater ability to affect change in the Restudy process. Both of these outsiders experienced anger, frustration and feelings of not being heard as a result of being unable to engage in more interactive communications. What prevents them from engaging in more interactive types of communication? Their lack of a seat at the table of an organization within the three universes of the Restudy and weak connectivity with the actor networks of the three universes limits their ability to effectively engage in more interactive communication processes. Armando Pomar and Karsten Rist were also outsiders; the feature that distinguishes them from Audrey Peterman and John Marshall was the former's satisfaction with consultation as an appropriate role to provide feedback in the process. Peterman and Marshall felt excluded because there was no forum where they could engage in more interactive communication processes despite their clear desire to do so. Hence, outsiders' different sentiments about the quality of public involvement in the Restudy were reflective not only of their experiences, but also their (sometimes unrealistic) expectations of what can be achieved through public comment and consultation.

5.3 Evaluation of Key Themes Emergent From Chapter

Finally, this chapter turns to consideration of some of the key themes raised through the above analyses. Issues raised throughout the case studies revolved around two key themes: effectiveness and fairness of the Restudy process. The theme effectiveness asks if the process achieved a successful outcome. As previously

presented, this thesis defines “success” for the Restudy process as achieving the objective of authorization of CERP through WRDA 2000. Hence, the Restudy process does successfully achieve the desired outcome and can be identified as effective. The question about the fairness of the Restudy process is more difficult to assess as it asks the qualitative question: were the procedures that yielded an effective outcome fair? From the above analyses the degree of fairness of the Restudy process appears to vary in relation to interviewees’ classification as an insider or outsider. Insiders widely praise the process, while outsiders identify shortcomings in the procedural approaches deployed for public outreach and involvement. Ultimately, the Restudy process did provide greater opportunities for *stakeholder groups’* involvement than traditional COE planning processes. However, as would be anticipated for a complex process over a large spatial area with many competing interests, the opportunity exists for continued improvement to public outreach and involvement. To further investigate the procedural strengths and weaknesses this section considers interviewees’ comments on three qualities of fairness: inclusion and exclusion; representation; and consensus-building through shared adversity.

5.3.1 Inclusion and Exclusion

Insiders and outsiders had widely divergent sentiments about the inclusiveness of the Restudy. The insiders, particularly the super-agents, perceived the Restudy process as an “inclusive strategy” (Salt). Insider Sue Alspach noted that the COE “welcomed [local government representatives] to the table and valued our contributions, not just for appearance's sake.” In contrast, outsiders experienced the Restudy as an exclusionary process. Audrey Peterman felt “inclusion was more apparent than real” and John Marshall’s experiences produced the sentiment that public comment was only listened to by the insiders with decision-making authority if “the comment was what they wanted to hear.” Actors’ experiences of the Restudy as an inclusive or exclusive process are highly reflective of the given actors classification as an insider or outsider.

Outsiders, the target audience of a more inclusive process design, expressed experiences of exclusion and also varying levels of distrust about the process. Exclusion and distrust were reflexive of the fragmented information base of outsiders as well as fewer opportunities to engage in formal and informal communications with the actor networks that constituted the process. Most of the wider public was indifferent to the Restudy, and not interested in the details. However, those members

of the public who were particularly interested in being engaged in the Restudy, such as Marshall and Peterman, experienced great frustration at the lack of mechanism to meaningfully contribute to the Restudy beyond consultation through formal public comment. Exclusion of the few members of the public that actively sought to become more involved in the Restudy, as a result of the lack of appropriate institutions to incorporate their feedback, fostered sentiments of distrust and dissatisfaction with the process and skepticism about CERP.

So, was the Restudy process procedurally fair? A basic question of procedural fairness asks if inclusion of interests, as well as exclusion of different interests, was equitable. In a watershed the procedural question of whom to include in decision-making is difficult because, indeed, all interests have some stake in water management. Qualitative measures of inclusiveness include:

- comparison of the Restudy to traditional COE approaches;
- diversity of stakeholder groups that had representatives participating in organizations;
- access to information and other resources that enable effective participation.

As Table 5.6 indicates, in comparison with past COE planning processes the Restudy was more inclusive of stakeholder groups. Super-agents, insiders and even outsider Karsten Rist noted the increased level of procedural inclusion. Procedural fairness is also evidenced through the diversity of stakeholder groups with representatives participating in organizations. Interestingly, the diversity of interests included was cited as an important feature of organizations within the local voice and science universes. The empirical evidence of changing organizational membership highlights how institutions within the science and policy universe became increasingly more inclusive of diverse interests over time. In terms of the GCSSF, Terry Rice, COE Colonel leading the Restudy process said it “really was the best organization because it was the most inclusive.” Super-agent Rice’s comment emphasizes the value super-agents placed on inclusion during the Restudy process.

However, in practice outsiders that lacked membership in organizations found the process to be exclusionary. Ironically, this perhaps was partly the experience of outsiders because the Restudy process had successfully integrated more inclusive organizations for stakeholder groups. Members of the wider public who were not part of these inclusive organizations within the three universes governing the Restudy felt more excluded as some of the functions of more interactive traditional public

involvement methods were moved from the public sphere to existing organizations with stakeholder groups. Another measure for inclusion and exclusion was the ability of interested individuals to access information and resources. Insiders widely noted their experiences of relative easy access to extensive information. In contrast, despite the information available on the internet and in written documentation, outsiders had more limited access to information. Limited access was partly a result, again, of lack of membership in an organization. Not only were representatives in organizations provided with materials to contribute to achieving the tasks of the given organization, but also insiders had a greater opportunity to engage in informal discussions.

Table 5.6, Part 1: Interviewees' Comments on Inclusion and Exclusion

Comparison to Standard Process	☞☝☞	Restudy used more interactive and inclusive strategy for plan development than traditional COE methodology. (Salt)
	☞☞	The Restudy, without a doubt, was very unique and probably the first time, that the Corps had tried to do something at a scale that involved all the partners in the conceptual design phase. (Best)
		COE encouraged communication from stakeholder groups for input into Restudy. "Thought it was neat as it had <i>never</i> happened before." (Rist)
	☞	"Going into the Restudy with the stakes so high COE could not afford a policy of business as usual. We had to <i>invent</i> a process that was going to be a lot more inclusive." (Appelbaum)
Inclusiveness of Organizations	☞☝☞	"GCSSF really was the best organization because it was the most inclusive." (Rice)
	☞	Having the diverse group of people on the Restudy Team, the different agencies and the different disciplines involved, was very valuable. (McLean)
	☞☞	"To develop CEMs we used the expertise of everybody gathered in the workshops and integrated what we already knew and what we suspected was going on. CEMs offered an approach local scientists and the managers felt comfortable with as a process." (Ogden)

Actor(s)' Universe			
☞	Science	☝	Local Voice
		☞	Policy
Actor(s)' Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

Table 5.6, Part 2: Interviewees' Comments on Inclusion and Exclusion

Reasons Need Inclusive Process		"The <i>result</i> is not inclusive, unless the <i>process</i> is inclusive." (Collins)			
		General consensus about CERP achieved because the Restudy Team did not ignore stakeholder groups. (MacLean, Obeysekera, Rice, Salt)			
		Need to involve range of stakeholder groups as it only would have take one dissenting interest to follow the route of litigation to have slowed or stopped the process. (Salt)			
		With level of familiarity you know limits of CERP from involvement in organizations, while from outside greater doubt and mistrust about Restudy and CERP. (M. Poole)			
		Involvement of actors with different types of expertise was a benefit and "one of the challenges too, because engineers think in one way, and ecologists think in a different way." (McLean)			
		Decision-making processes need to be inclusive or they do not work in South Florida. (Collins)			
Experiences of Inclusion or Exclusion		"COE and District very inclusive of local government. They welcomed us at the table and valued our contributions, not just for appearance's sake." (Alspach)			
		"I was on the GCSSF, but inclusion does not necessarily mean acceptance." (Moller)			
		"Began to see that public involvement in Restudy was a charade. The inclusion was more apparent than real." (Peterman)			
		EvCo conference had "a lot of white males in suits, even on the panels. There weren't many women who had places of being able to say much in the environmental movement, and there certainly weren't any minorities." (Lorian)			
		Important to integrate stakeholder groups as process ongoing. (McLean, M. Poole, Teets)			
		Expressed exclusion and distrust of process. (Kramer)			
		Those in charge do not listen to public comment, unless the comment is what they want to hear. (Marshall)			
Actor(s)' Universe					
	Science		Local Voice		Policy
Actor(s)' Classification					
	Insider		Super-Agent & Insider		Super-Agent
	Outsider		Super-Agent & Outsider		
	Insider and Outsider		Super-Agent, Insider & Outsider		

Insider membership alone though does not make all actors equal. One of the most telling statements in Table 5.6 is Jack Moller's comment: "I was on the GCSSF, but inclusion does not necessarily mean acceptance." Although Moller had organizational membership and equal access to the materials, he lacked a staff of technical analysts and attorneys that representatives from other stakeholder groups on the Commission had to support them in negotiations. Extremely articulate about the details of water management control structures, Moller brought the perspective of local knowledge informed by science to the table of the GCSSF. However, despite Moller's knowledge he indicated that he contributed for the sportsmen "as best I could." He detailed the practical limitations of his participation:

When I would go to a Commission meeting it would be me. I wouldn't have two or three engineers and a secretary and a lawyer sitting behind me like Bubba [Wade] did. Or like Rock Salt did, or urban water supply guys did, or even the Indians. So mostly I had to read, evaluate, digest and process everything myself. So while we were at the table we were not at the table as equal players. There was only one of me.

Hence, Moller clarified that a seat at the table of an organization does not necessarily mean *equity* of representation. Some representatives have greater access to expert advice or staff support to enhance effective presentation of their stakeholder group's perspective. The following sub-section focuses on representation.























5.3.2 Representation

In the context of procedural fairness, why is legitimacy of representation important? As Collins said, "The *result* is not inclusive, unless the *process* is inclusive." Hence, inclusive representation in organizations was a critical strategy to establishing legitimacy of the Restudy process and, ultimately, CERP. Table 5.7 presents interviewees' comments on representation.

Insiders on the Restudy Team identified that the practice of representation occurred on multiple levels. One level was the agency or stakeholder group affiliation and another level was representation of different types of scientific knowledge. McLean said: "The Restudy Teams was not only inter-agency, but it was interdisciplinary, so we had ecologists, engineers, modellers, economists, everybody sitting in the same room and working together." SFWMD planner, Tom Teets, stressed that inclusive institutions had clear benefits, but also presented the challenge of convincing representatives to step back from their specific mandate to focus on the

bigger picture of the Restudy. In addition, because there was not an explicit requirement for participation in government agencies' mandates, there were various levels of individual participation amongst representatives and a range of commitment and comfort with involvement by the different agencies (Ogden). Hence, the governance of the Restudy encountered issues of differential *quality* of representation related to the variable commitment to the process by the insiders representing varied interests.

Table 5.7, Part 1: Interviewees' Comments about Representation

Legitimacy of representatives	  	GCSSF consisted of "authentic representatives." (Salt)
	 	Restudy Team inter-agency, multi-disciplinary. (McLean, Ogden)
		"Agencies consist of people reflective of society." (Appelbaum)
	  	GCSSF membership were not elected representatives but were well recognized members of their community so could carry information about the Restudy back to their communities. (Salt, Teets)
Inclusion of Varied Agency Mandates	 	Wide range of comfort for time and level of commitment by different agencies to Restudy Team and CEMs. (Ogden)
		"EPA and DEP were more water quality focused. ENP was focused on ENP, and Fish & Wildlife Conservation Commission focused more on WCAs and Lake Okeechobee." (Teets)
	 	So a mix of perspectives and legal mandates for the different agencies. (McLean, Ogden, Teets)
	 	FL Fish and Wildlife Conservation Commission was only agency concerned with recreation. Had two sometimes competing mandates of recreation and habitat conservation. (M. Poole)
		During process stressed representatives on Restudy Team should leave agency hat at the door and focus on the big picture. (Teets)
Representatives Direct Input in Process	  	Government interests agreed to let the GCSSF establish range of social acceptability. "A <i>consensus</i> of local knowledge was very hard for government policy people to disregard." (Salt)
		Like "Biosphere Everglades" when intensive modelling with ecologists, hydrologists, and modellers all present. (Teets)
		"We needed that collective brain power." (McLean)




Actor(s)' Universe			
	Science		Local Voice
			Policy
Actor(s)' Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

Table 5.7, Part 2: Interviewees' Comments about Representation

Representation of Stakeholder Groups	☞☞	"Because we <i>had</i> all those people on the Commission we were able to really duke out the issues and come up with all the compromises and assurance language that everyone was nervous about." (Kranzer)
	☞☞☞	"Stili some scientists that are very disdainful of the local input as it was called anecdotal and it was viewed as less than full value." (Collins)
	☞ ☞	During alternative evaluation fifty scientists present and 5-8 stakeholder group representatives that observed. (McLean, Ogden)
		In South Florida "with so many entities, so many interests, so much uniqueness to people involved and the organizations" they are part of, that getting collective action is "very hard to come by and takes a lot of effort to reach." (Mooney)
		Before Restudy process not a large presence in South Florida of national environmental groups. (Lorian)
		MacVicar a "tremendous asset" to EAA interests because of his scientific and technical knowledge. (Kramer)
Representation of Different Knowledge Types	☞ ☞	CEMs forum of communication amongst scientists with different types of expertise. (Ogden)
	☞	"Scoured the countryside" looking for scientists doing research to include in CEMs development. (Gawlik)
		Talk to Jack Moller for an informed local perspective. (Rist)
		"If I'd spent my time getting the education or sitting in an office making money I wouldn't know what I know about the 'glades." (Simmons)
		Balance of local and national environmental groups allowed for inclusion of knowledge of local politics and tie-in to national networks. (Lorian)
		"From a policy perspective you almost see things in black and white, you either do them or you don't. Whereas within ecological science there are many of shades of grey." (Aumen)
	☞ ☞	Engineers and ecologists think about water management in different ways. Necessary to have both types of science in the Restudy. (Appelbaum, Johnson, McLean, Ogden, Teets)
	☞☞	"Restoration effort could not be done just by biologists and ecologists and hydrologists sitting in a room trying to figure out what CERP should be, but included all the public participation and involvement, looking at the economics and looking at how to intertwine transportation." (Kranzer)

Table 5.7, Part 3: Interviewees' Comments about Representation














Representation of Public	☞ ☞ ☞	"Public" comments were primarily from stakeholder groups and submitted by internet. (McLean, Obeysekera, Ogden)	
	☞ ☞ ☞ ☞	Local knowledge gives "essential input" as balance to science and provides the necessary political buy-in to the Restudy and CERP. "Never could have gotten CERP to succeed without the local." (Salt)	
	☞ ☞ ☞ ☞	GCSSF high-level public involvement organization. (Alspach, Appelbaum, Causey, Kranzer, Rice, Salt)	
		Very few people who are not paid by agency or group were able to invest time to attend all the public meetings. (Lorian)	
Actor(s)' Universe			
☞	Science	☞ ☞ Local Voice	☞ ☞ Policy
Actor(s)' Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

Insiders distinguished that despite the iterative public comment capabilities during evaluation of alternatives it was stakeholder groups, rather than members from the wider public, that provided public comment. McLean observed, "I wouldn't say that members of the *public* made comments, I would say that stakeholders make comments." Hence, insiders recognized that during the Restudy process the plurality of public interest was in practice represented by stakeholder groups. Stakeholder groups as the primary participants in public comment highlight a rationale for the power of the GCSSF: the members of the organization together offered a collective position developed by representatives from a plurality of public interests. Rather than requiring scientists and planners to attempt to synthesize individual stakeholder group comments to divine a range of socio-political acceptability the presentation of consensus statements by the GCSSF provided a valuable resource.

5.3.3 Shared Adversity Through Consensus-Building

Another element of procedurally fair process is the equitable allocation of costs and benefits. Such sharing of benefits and costs is summarized by the phrase "shared adversity," and was widely mentioned and largely advocated by interviewees. Table 5.8 summarizes interviewees' comments about shared adversity. Recall that Ostrom (1990) stressed that the equitable distribution of positives and negatives is a feature of successful common-property resource management as often competing interests agree to engage in collective action because they have calculated a larger

Table 5.8: Interviewees' Comments about Shared Adversity

Buy-In to Concept	 	Two strategies for deciding how to allocate adversity: 1) benefit core areas and treat others like buffer; 2) alternative that performs best in all parts of system. AET used second strategy of sharing adversity and benefit across ecosystem. (Ogden)
		"Everybody bought into shared adversity." (Dobson)
	 	Seminole's have "principle of sharing adversity, but at same time do not want it disproportionately." (Tepper)
		Term shared adversity is "like the story of the chicken and the pig that gave the farmer breakfast, some bacon and eggs. It's a nice gesture from the chicken it's a real serious gesture for the pig." (Kramer)
	 	"Since nobody is perfectly happy, CERP is probably a pretty good compromise." (Best)
		All users in systems should "be a little more sharing of adversity." (Marshall)
Practical Application	 	Dade County believes has undue share of burden by having two wastewater reuse plants located in the county and none located in Broward or Palm Beach counties. (Alspach)
		"There is not really such a thing as consensus-building. I call that an academic term. I think in the real world you survive and try to build up momentum and leadership, and then through leadership, move forward." (Mooney)
	 	ENP has national and international designations and should receive priority for restoration. "If there was enough water throughout the entire system we would all acknowledge, yes, it's a good thing to restore the entire ecosystem." (Johnson)
		EAA had already been through adversity with water quality, and "now others want to act like sharing adversity should start now." (Scheuneman)
		Local communities have already paid their fair share for water quality. (Parrish)
	"I think we can find solutions that reach a balance between the needs of agriculture, the needs of environment and the needs of urban areas." (Kramer)	
		"We had to balance flood protection, water supply, and environmental needs and restoration things all at the same time." (McLean)
		Comparing sugar with development interests, agriculture has had to incorporate STAs and had to sell some land, whereas urban gets benefits for increasing population without any adversity. (Childers, Farago, Wade)
		There has already been adversity placed on EAA community with loss of land, jobs and at times inability to pump water to save crops. "I think that sharing adversity is in the eye of the beholder." (Kramer)

individual benefit by making strategic concessions on their position. Hence, interests attain a preferred individual benefit through engagement in collaborative management where they agree to share adversity with other interests. Bob Mooney offers a telling statement about consensus-building in practice: “There is not really such a thing as consensus-building. I call that an academic term. I think in the real world you survive and try to build up momentum and leadership, and then through leadership, move forward.” Consensus-building through sharing adversity does not occur for altruistic reasons by competing interests. Rather, sharing adversity is a highly pragmatic tactical philosophy adopted by individual interests to gain as much as possible, while simultaneously relinquishing as little as possible. Interviewees’ used the phrase ‘shared adversity’ to signify the concept of procedural fairness. For example, Craig Tepper said that Seminoles follow the “principle of sharing adversity, but at the same time do not want it disproportionately.”

The DOI and some environmental groups attempts to circumvent the consensus built CERP is evidence that consensus-building through shared adversity served as a pragmatic tactical behavioral philosophy during the Restudy process. DOI and some environmental groups’ independent, private negotiations with the COE occurred because the DOI and the environmental groups possessed the power to adopt different tactical behavior that they believed would help them to attain greater benefits and fewer negatives for their interests. As evidenced by initial attempts at independent lobby by stakeholder groups with membership on the GCSSF in Washington DC, other interests also attempted to adopt opportunistic tactical behavior. The return to the consensus position of CERP reflected the need for a unified position amongst stakeholder groups. Such a unified position was grounded in the principle of shared adversity as a central feature of collaborative management. Ronnie Best, USGS, appropriately summarized that a test of procedural fairness was considering the outcome. In terms of the Restudy process, Best noted: “Since nobody is perfectly happy, CERP is probably a pretty good compromise.”

Summary

This chapter has analyzed the role of actors’ agency in the Restudy process. Identification of outsiders, insiders, and super-agents allowed for exploration of these different types of actors’ experiences during the Restudy through analysis of case

studies. The underlying issues raised by actors were regarding the effectiveness and fairness of the Restudy process. Interestingly, those who found the process effective and expressed general satisfaction with the outcome, CERP, also had buy-in to the procedural fairness of the process being grounded in the concept of shared adversity. In contrast, those individuals critical of the effectiveness of the outcome, mainly outsiders, were dissatisfied with the procedural fairness of the process. An issue this chapter identified as a potential impediment to a procedurally fair process was the varied abilities of different stakeholder groups to access, interpret and mobilize science and technology. The next chapter moves to a detailed consideration of the role of different types of sciences and technology in the Restudy process.

Chapter 6: Role of Science in the Restudy Process

“Restoration is not rocket science - it’s much harder than that”.
–Nick Aumen, Ecologist

“What needs to be done? Most importantly: communication.”
–Frank Mazzotti, Biologist¹⁴¹

Introduction

A stated objective of the Restudy was to create a science-based solution to ecosystem restoration. However, the legitimacy and roles of different types of sciences in the Restudy process and the resultant product, CERP, are highly contested, raising questions about what and who determines the roles and “soundness” of science. The word “science” is imbued with power, conveying knowledge and expertise in public discourse. While some scientific laws, such as in mathematics, are almost incontrovertible this degree of certainty in scientific knowledge at best is provisional knowledge, marked by considerable uncertainties. This provisionality is particularly acute when addressing complexities of ecosystem restoration science in a watershed inclusive of multiple traditional ecosystem types. As Nick Aumen explained: “Ecosystems are complex entities that we do not even begin to know everything about”.

In terms of fulfilling the definition of restoration for the Everglades, “the act of bringing back to a former position or condition”, the geography of South Florida strictly prohibits the ability to truly restore the ecosystem. Approximately half of the original landscape has been altered by agriculture and development. The coastal ridge, including Miami, is presently home to over six million people and accompanying urban development. As a result of such practical limits to complete restoration, Keulartz presented the term “nature development” where restoration objectives for an ecosystem are reflective of a social construction of what nature should be at any given time and place (1999). Rather than *restoring*, more appropriate terminology to explain the Restudy would be *revitalizing*, “to give new life or vigor to” the

¹⁴¹ Statement made during presentation to CROGEE, February 1, 2001.

Everglades. Establishing a feasible expectation for “restoration” objectives is important for measuring “restoration” success.

In addition to delineating appropriate parameters by which to consider restoration of the Everglades, it is important to recognize that scientific endeavors are a continual process of exploring, testing and refining understandings of an inherently complex ecosystem. Further, knowledge is not demarcated within a singular discipline but transcends traditional disciplinary boundaries. The multi-disciplinary quality of restoration presents an inherent complexity with the development of a shared understanding of the many interwoven facets of ecosystem function. This chapter explores the centrality of science to the Restudy by first identifying the scientific *inputs, processes, outputs* and *outcomes*. The core of this chapter then seeks to answer a series of questions to evaluate the roles played by different types of science and scientists within the Restudy process.

6.1 Science as Inputs, Processes, Outputs, and Outcomes

The overarching scientific discipline of the Restudy process can be broadly labeled as *ecosystem restoration science*, which is: 1) an amalgamation of conventional scientific disciplines of hydrology and ecology; 2) inclusive of social sciences; and, 3) technology. In the Restudy technology was an especially influential component that provided a mechanism for conceptualizing the ecosystem as a functional whole through simulation models and further offered the capabilities for technical solutions such as Aquifer Storage and Recovery wells (ASRs), Stormwater Treatment Areas (STAs) and wastewater treatment facilities. In addition to these core technologies, enabling technologies, such as hydrological monitoring and internet, enhanced information collection and dissemination during the Restudy.

Ecosystem restoration science turns to these *inputs* in various *processes*. Processes include data collection and analysis of hydrological, ecological and social science information within and across these disciplines. For example, the development of Conceptual Ecological Models (CEMs) required integration of hydrological and ecological knowledge amongst scientists through social scientific methods. Another central process within ecosystem restoration science was use of technology for a range of simulation models. *Output* of ecosystem restoration science was CERP’s authorization through WRDA 2000. *Outcomes* included the legal mandate and a set of parameters to transition to a new phase of ecosystem restoration

science in the Everglades: implementation of CERP. Further outcomes emergent from the process are the importance of adaptive management, establishment of forums for dialogue amongst different interests, and reinforcement of different levels of power accorded to various sciences. Summary of inputs, processes, outputs and outcomes appears in Box 6.1.

Box 6.1: Ecosystem Restoration Science in the Restudy

Inputs	Hydrology, Ecology, Technology, Social Sciences
Processes	Data Collection, Data Analysis, Models
Outputs	CERP authorized through WRDA 2000
Outcomes	Implementation Parameters Adaptive Assessment Tradition of Stakeholder Dialogue Assignment of Power to Different Sciences

Table 6.1 presents actors' comments about inputs, processes, outputs and outcomes. Two key actors in the Restudy process from the SFWMD were Agnes McLean and Jayantha Obeysekera. Both McLean and Obeysekera highlighted the importance not only of the core technologies of the hydrological simulation models, but also the necessity of enabling technology for improved communications amongst the many different interests involved. Outsiders acknowledged the greater level of potential communication offered through the internet platform, but emphasized that the ability to communicate via the internet was not equal because of varied connection quality and lack of universal access. From a planning perspective McLean stressed that restoration began with "tried and true technologies" and it was only after these traditional water management structures failed to provide enough additional water that the more "unproven technologies" of ASRs and wastewater treatment facilities were added to CERP to meet both the environmental and human water supply needs.

Bonnie Kranzer, Executive Director of the GCSSF and member of the Working Group, emphasized that though social sciences were often overlooked or misunderstood they were central to the Restudy. Super-agent Rock Salt concurred that through attention to social sciences the methodology of the Restudy offered a more inclusive and effective strategy for decision-making. Although they did not describe it as a social scientific process, scientists Nick Aumen and Dale Gawlik as well as super-agents John Ogden and Terry Rice recognized social scientific methods when they cited the importance of positioning key scientists in policy-making

organizations to yield more scientifically informed policy. CEMs were also widely cited by interviewees as an effective process for bringing peer-reviewed scientific knowledge into decision-making. CEMs were developed through applying deliberative social scientific methods to communications amongst multi-agency and multi-disciplinary scientists. Hence, social scientific methods governed the collective presentation of the individual work by hydrologists, biologists, and ecologists for effective integration of different types of knowledge into CERP. Use of social scientific methodology to develop a cohesive presentation of the current understanding of different types of science was also successful by providing a template for integration of future scientific findings during implementation of CERP. The principles and practices that governed the CEMs process would be transferred to the institutions governing the work of the Restoration Coordination and Verification Team (RECOVER) to continue to refine performance measures (PMs). One notable outcome of the Restudy was the agreement by interests that details of implementation would be negotiated in the future, making the social scientific methods that governed RECOVER central to the actual implementation of CERP.

Table 6.1, Part 1: Interviewees' Comments on Scientific Inputs, Processes, Outputs, and Outcomes







Inputs: Simulation Models Core		Simulation modeling technology allowed focus to shift from taking land from EAA to bigger picture. (Wade)
		Questioned baseline assumptions of models including topography. (Moller)
		Simulation modelling technology crucial to success of Restudy. (McLean, Obeysekera, Rist)
Inputs: Other Core Technologies		ASR technology reflects "the paradigm of power" and will have negative effects on the African-American community. (Peterman)
		Started with "tried and true technologies" and after these exhausted had to use modern "more unproven technologies" to reach water management goals. (McLean)
Inputs: Enabling Technology		Enabling technology critical as it enabled coordination of meetings and communications. (McLean, Obeysekera, Teets)
		Internet technology not equally accessible by all. (Moller, Mooney)

Table 6.1, Part 2: Interviewees' Comments on Scientific Inputs, Processes, Outputs, and Outcomes

Inputs: Science		"Real key to long term good stewardship of our resources and our environment is getting back to letting science help us make the decisions, not so much political emotion."(Kramer)	
	⌘	"Developed by best Everglades' scientists alive." (M. Davis)	
	⌘⌘	Mainly people do not think of the social sciences as legitimate science despite centrality to Restudy process. (Kranzer)	
	⌘⌘⌘	Restudy used methodology of greater involvement and resulted in an overall more inclusive strategy for plan development. (Salt)	
	⌘⌘	POSST successful in getting Working Group to think about social sciences, such as outreach and communication, as part of the sciences. (Kranzer)	
Processes: Integrating science into policy-making	⌘⌘	Restudy used progressive approach to bringing science to table by positioning key scientists in policy organizations. (Aumen, Gawlik, Ogden)	
	⌘⌘⌘	"A challenge is trying to figure out how to effectively integrate science into the decision making process." (Rice)	
	⌘⌘	Sound science critical to Restudy. Even if individuals did not understand the details of CEMs, "they could see a package of models and they knew had been used for making decisions." (Ogden)	
	⌘⌘	CEMs determined PMs. (Gawlik, Ogden, Teets)	
	⌘⌘	CEMs logical way to incorporate science in the Restudy process. (Gawlik, M. Poole, Ogden)	
	⌘	"Science is problematic when it becomes interlinked with politics." (Moller)	
	⌘	PMs are way to present benefits of hydrological restoration to the public. Wading birds are an excellent example because they are highly visible and have an appeal to public. (Gawlik)	
	⌘⌘	CEMs established a means to integrate science into the process that "was so strong, so compelling, in terms of what the process is and its output" that the contribution could not be ignored. (Ogden)	
Actor(s)' Universe			
⌘	Science	⌘ Local Voice	⌘ Policy
Actor(s)' Classification			
Insider	Super-Agent & Insider	Super-Agent	
Outsider	Super-Agent & Outsider		
Insider and Outsider	Super-Agent, Insider & Outsider		

Table 6.1, Part 3: Interviewees' Comments on Scientific Inputs, Processes, Outputs, and Outcomes

















Processes: Plan Formulation Strategy	 	Plan formulation strategy very labor and time intensive. Created insiders that had extensive knowledge of process. (M. Poole)
		AET-ADT process not just for decision-making but for ongoing communication with stakeholder groups. (Obeysekera, Rist, Teets)
	 	Investment of time in process yielded "psychological benefit and comfort level derived from being part of the process." (M. Poole)
		"The AET-ADT process was a very important way to get through a lot of work in a fairly short period of time." (Appelbaum)
		At first only restoration PMs and then included PMs to measure success of alternatives for water supply and flood protection. (MacVicar)
	 	Organized development of PMs to evaluate alternatives. (Ogden)
Processes: Peer Review		"Very important that science being done to support the Restudy be done the way we normally do science: well designed experiments, good monitoring programs, good modelling, and publish the results in peer-reviewed journals so the science is as good as it can be." (Aumen)
	 	National Academy of Science's panel, CROGEE fulfills role of high level independent peer review. (Best, Gawlik)
		Local stakeholder groups without technical experts at a disadvantage in Restudy. (Moller)
	 	Task Force, State and the Tribes vocally sceptical about CROGEE and concerned about it moving from science to policy recommendations. (Best, Ortner)
Output		"CERP provides water for more people, provides water for agriculture, and it provides restoration. If any one of them is ignored or dominates then the other two wind up with a problem." (MacVicar)
	 	The Restudy process "ended up as some 68 different components, some 30 projects out of those components, with some wishful thinking on some technology." (Tepper)
		"We had to balance flood protection, water supply, <i>and</i> environmental needs and restoration things all at the same time." (McLean)

Table 6.1, Part 4: Interviewees' Comments on Scientific Inputs, Processes, Outputs, and Outcomes

Outcomes	☞ ☞	Agreed conceptual CERP and that details would be negotiated during implementation. (Best, Estenoz, Ogden, Teets)
	☞ ☞	Established process of adaptive management. (Best, McLean, Obeysekera, Ogden, Teets)
	☞ ☞☞☞	Created new organizations such as RECOVER for implementation of CERP. (McLean, Obeysekera, Ogden, M. Poole, Rice, Teets)
	☞ ☞	CEMs and PMs will continue to be updated to include new information through RECOVER during implementation. (Gawlik, Ogden, Teets).
	☞	PMs are the tool for making adaptive management adjustments to CERP. (M. Davis)
Actor(s)' Universe		
☞	Science	☞☞ Local Voice
		☞ Policy
Actor(s)' Classification		
	Insider	Super-Agent & Insider
	Outsider	Super-Agent & Outsider
	Insider and Outsider	Super-Agent, Insider & Outsider
		Super-Agent

Towards an understanding of the different roles of science and scientists in the Restudy this chapter frames the subsequent sections by considering the following questions:

- **What were the roles of different types of science in the Restudy?**
- **How did these different sciences meaningfully shape the process?**
- **What and who determine the roles and soundness of science?**
- **To what extent did science, or some types of science have power and primacy in the Restudy?**
- **How were scientific uncertainties recognized and approached?**
- **Was science the main driver or were there other factors that expedited successful completion of the Restudy in authorization of WRDA 2000?**

From the above core questions emerge relevant sub-questions, which will be presented and explored throughout the development of this chapter. At times, analysis refers to the above discussion of the different components of ecosystem restoration science.

6.2 Primacy of Hydrology

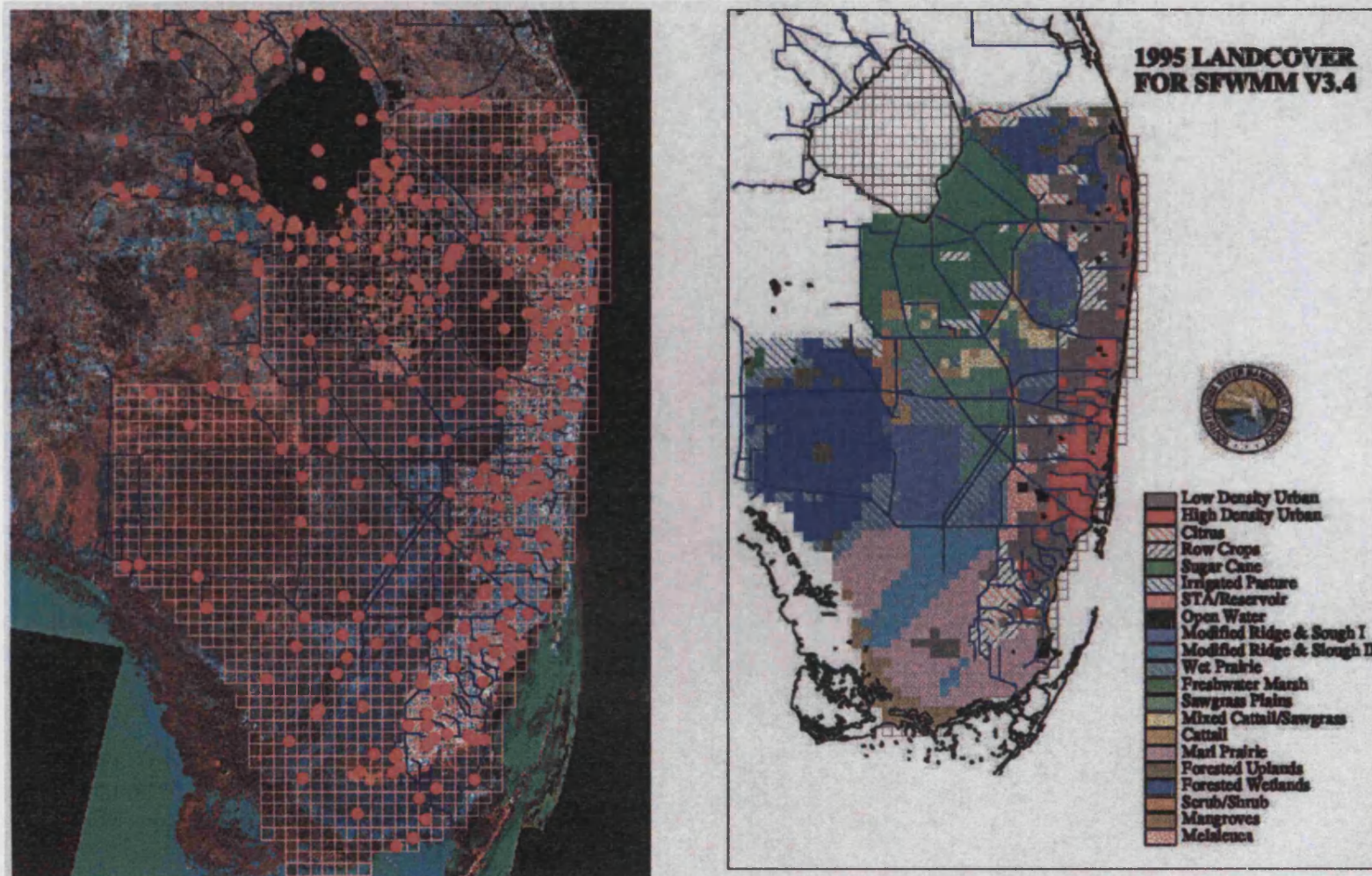
Within Everglades' ecosystem restoration science hydrology was a baseline scientific input and the primary mechanism of analysis. Alterations to the hydrology of the Everglades from the 1880s, such as digging of canals and drainage of wetlands, were the traceable causation of past ecosystem alterations (McCally, 1999; Ogden and Davis, 1994), with symptoms manifesting in ecological indicators such as the loss of wading birds (Bancroft, et al., 1994; Ogden, 1994). Further, the relative ease of obtaining robust hydrological measurements resulted in the perception by many actors of hydrology's greater level of certainty relative to either ecological or social sciences. In consequence, hydrologists were actors that possessed substantial power in the Restudy process. Within the Restudy, the quantity, quality, timing and distribution (Q/Q/T/D) of water were critical factors in the development of CERP. The following sub-sections discuss approaches towards various aspects of hydrology, including the roles of different types of science and key scientists, power to influence the process and the recognition of and approach to addressing uncertainty.

6.2.1 Uncertainty in Hydrology

The Restudy sought to understand the existing hydrological regime and then reallocate the water for improved future water management to equitably meet human water supply as well as environmental needs. The amount of water was easy to quantify, has lower levels of uncertainty, and can be modeled and visualized through technical computer simulation models. At the same time, allocation of water was sharply contested by different stakeholder groups in the ecosystem and therefore a highly political issue. Not surprisingly, water quantity and its equitable allocation was the most discussed attribute of hydrology during the Restudy. The computer simulation models of Everglades' hydrology allowed competing stakeholder groups, even those with minimal knowledge of hydrology, to meaningfully engage in debate about the water allocation to different regions of the natural ecosystem and to human needs. Towards this objective the Restudy used the basic building block of data collected from monitoring stations (Plate 6.1) to construct Everglades' hydrology in simulation models. However, despite the apparent strengths of these models, they had issues of uncertainty.

The modeling data could be influenced by factors such as annual precipitation,


















Plate 6.1: Distribution of Monitoring Stations¹⁴²



¹⁴² Provided by Obeysekera, interviewee.

variable average temperatures influencing evapotranspiration, soil subsidence and loss of spatial area (Thompson, 1999). Further, due to the difficulty of traveling across the Everglades landscape there was less data in the more remote, "natural" areas and the period of measurement began after human alteration to the system (Obeysekera). So, while water quantity may have ostensibly appeared more certain than other types of science, uncertainty remained. However, some interviewees frequently cited hydrological models as absolute proof supporting their preferred position (Table 6.2).

Table 6.2: Interviewees' Comments on Uncertainty

Uncertainty in science	  	Scientists recognize that uncertainty inherent in science. (Aumen, Best, MacVicar, Ogden, Rice)			
	  	Uncertainty about how percent of hydrological restoration correlates to ecological restoration. (Aumen, Best, Gawlik, MacVicar, Ogden, Rice)			
	 	Uncertainty of topography used in NSM and WMM. (MacVicar, McVoy, Moller, Obeysekera)			
		The need for research to continue to improve ongoing ecological restoration is like the continued need for medical research. "A doctor makes decisions every day that's life and death for patients, and doctors do not have 100% certainty." (Aumen)			
Recognition of Uncertainty		Scientists approach to recongizing uncertainty can cause communication problems with managers and public who want <i>enough</i> certainty to make an informed decision. (Aumen)			
	 	ENP established position based on PMs using the NSM, with its acknowledged uncertainty, as a target for hydrological restoration. (Ogden)			
		Good for there to be disagreement and debate in the scientific community. Some areas have very high scientific certainty, although it's never a hundred percent certain, and other areas where we have much less certainty. (Aumen)			
Adaptive Management	 	Addressed uncertainty through the adaptive management process, based in system-wide monitoring and CEMs. (Best, Ogden)			
	 	Those unhappy with adaptive management "feel more certain than I think justified" about links between stressors' results to the ecosystem. (Ogden)			
Actor(s)' Universe					
	Science		Local Voice		Policy
Actor(s)' Classification					
	Insider		Super-Agent & Insider		Super-Agent
	Outsider		Super-Agent & Outsider		
	Insider and Outsider		Super-Agent, Insider & Outsider		

For example, ENP and some environmental organizations attempted to inappropriately use the Natural System Model (NSM) as a performance measure to determine water allocation. As John Ogden points out, unlike CEMs, developed through a scientific peer-reviewed process, the NSM with its known uncertainty was inappropriate to use as a PM. In the case of quantity, uncertainty was often obscured largely because conventional wisdom values quantitative data collected systematically through the scientific method. In fact, *all* ecosystem restoration science has some degree of uncertainty.

As one would expect, scientists were most aware and accepting of uncertainty while non-scientists more often ascribed scientific findings greater authoritative proof than merited. Notably, scientifically trained interviewees emphasized the need to address uncertainty with flexibility during the implementation of CERP. Adaptive management was cited by super-agent John Ogden as the “only sensible approach to dealing with uncertainty.” Scientists Ronnie Best, USGS, and Nick Aumen, ENP, also highlighted the need for new research findings to be integrated during implementation of CERP through: 1) monitoring, 2) a scientific peer-review process like CEMs and, 3) the institution of adaptive management.

6.2.2 Avoidance of Water Quality in the Restudy

Water quality issues, such as the phosphorous level in water, were treated as a peripheral topic in the Restudy, a prioritization widely acknowledged and further accepted by most actors. For example, Malcolm Wade from US Sugar said: “Keep in mind the Restudy doesn’t focus on water quality”. However, some actors are highly critical of the Restudy for not giving quality greater attention. For example, Richard Harvey, EPA, said:

In the formula of quantity, quality, timing and distribution the quality part is the weakest link. With CERP people have heard a lot about getting the water right, but merely getting the quantity, timing, distribution right will not solve the problem. We must also deal with water quality to get the water right.

The Washington Post highlighted this point in its “Swamp Series” articles, noting that CERP “does not assure pristine water quality, even though rehydrating the Everglades with anything less could simply poison it more efficiently” (Grunwald, 2002). The Everglades is a highly sensitive ecosystem where even the elevated presence of natural occurring elements, such as phosphorus, can alter the natural ecology.

If we acknowledge the importance of water quality as an attribute to

restoration, why did it not receive more attention during the Restudy? The answer was not a matter of science, but one of politics and US environmental policy's recourse to the legal process (Jasanoff, 1986). Water quality had been discussed in other forums, including the Everglades Forever Act (EFA) (1994), and was continuing to be negotiated through other processes, namely litigation. A detailed history of water quality litigation is beyond the scope of this thesis. What is relevant, however, is the Miccosukee Tribe's establishment of a maximum phosphorus level of 10 ppb. The EPA determined the 10 ppb standard to be not only scientifically sound, but also necessary for the prevention of damage to the ecosystem (Duncan). Hence, the results of the Tribe's litigation to establish the 10 ppb threshold offered a compelling legal and scientific precedent for setting concordant maximum phosphorus levels throughout the remainder of the ecosystem by December 31, 2003, and then meeting those standards by December 31, 2006, as required by the EFA (1994). Since water quality was being addressed through other simultaneous processes, detailed inclusion of water quality in the Restudy process would have been redundant.

Exclusion of water quality as a core topic of the Restudy was a prudent decision for a number of reasons. First, the Restudy was already a highly complex undertaking within a limited time frame, and higher priority had to be given to devise a tenable solution to hydrological issues not being considered comprehensively elsewhere. As Obeysekera said, "People came together with the understanding that there was an open door in the future to raise water quality issues...there was some emphasis at the time, or at least the perception that we just need to get a Plan and an amount for Congress to approve the funding before the election". Secondly, since water quality was being approached through the quagmire of litigation, its inclusion into the Restudy debate could, and most likely would, have been a "deal breaker", preventing an overall consensus. Alan Farago from the Sierra Club noted, "If we compare water quality versus the water levels and hydroperiods, the whole water quality [issue] was sparked off by the lawsuit, and it spurred a lot of additional lawsuits as well".

The same stakeholder groups, and often the same individuals representing those groups, were actively engaged in litigation about water quality while working in participatory groups towards building consensus about water quantity, timing and distribution. When I inquired about this apparent paradox, Rock Salt commented:

At the same time you have everybody sitting around holding hands at the Governor's Commission trying to work together to find a solution. And...how do you do that? ...I know Pettigrew kind of was amazed,

but there was enough benefit in it for people to stay connected in this process that even as these *huge, huge* ugly battles were happening, that we were still able to keep this effort to restore the Everglades.

Pragmatism clearly guided entrenched stakeholder interests' willingness to explore a negotiation process for water allocation since they previously had taken the route of litigation to decide water quality. The water quality debate had significantly advanced through litigation; a result was the existence of STAs for water quality treatment. As Ronnie Best said, CERP "is comprehensive in scale and in water [quantity], and in quality by inference. Although in a comprehensive plan, water quality isn't assumed...the assumption is that the STAs will work." Bubba Wade also noted the sparse mention of water quality in CERP, stating: "when the Miccosukee and the environmentalists and others state that [CERP] ignores water quality, it literally does. They kind of speak about it and say we've got an STA here and an STA there, and they kind of touch on water quality but it's not a comprehensive plan."

Another reason for the separation of quality from the detail of the Restudy was the strength of scientific research demonstrating causal links between water quality and the health of ecosystem ecology, which offered a diminished scope for negotiation and meaningful compromise amongst groups in conflict (Jasanoff, 1990; Vileisis, 1997). Jack Moller highlighted this point stating, "Water quality is easier to address through litigation because there's specific parameters in the law. There are not really specific parameters to quantity". Stakeholder groups' engagement in a participatory Restudy process appeared to emerge from an unwillingness to repeat the same long, expensive alternative of litigation. As Rock Salt explained:

...there was a sense of, we don't ever want to do *that* again. And so there was a great *resolve* to figure out a way to work together better. There was a huge amount of scar tissue from all the people who had been called liars in court. It's kind of like a divorce – when matters are settled by lawyers, there's a huge psychological impact that scars people. There are still people who carry baggage back from those early days and can't work with someone because, called to testify that person said he doesn't know what he's talking about. His science is wrong. He's in the pocket of this or that. That litigation created all kinds of residue. It was the basis from which the Governor's Commission understood we didn't need to do it again.

Salt described the rationale for movement away from the courts towards decision-making in the "soft infrastructure" (Healey, 1997) of organizations. Participation in such forums was not legally required, but rather was grounded in stakeholder groups not wanting their perspective to be excluded from the decision-making process for

addressing water allocation. Ogden speculated that a consensus approach through soft infrastructure had not been feasible in terms of water quality because “we just hadn’t developed the attitude and the mechanism to work together in a really integrated way. It just hadn’t evolved to that point yet”. The litigation of water quality was part of the learning process for addressing water allocation from a more collaborative approach. Without the antagonistic precursor of water quality, stakeholder groups may have lacked the incentive to engage in collaborative processes towards finding a new way to develop a common solution to equitable allocation of water.

6.2.3 Restudy’s Approach to Equitable Allocation of Water

The components of timing and distribution were addressed in the Restudy in coordination with quantity. They are respectively the *when* and *where* of the underlying matter of *how much* water. Timing and distribution complicate volumetric determinations of how much water should be allocated temporally and spatially. The equitable allocation of water was determined through the use of hydrological simulation modeling tools. As introduced in Chapter 4, the two simulation models are the Water Management Model (WMM) and the Natural System Model (NSM). Firstly, the use of simulation models as tools for decision-making is presented, and then this section turns to consideration of different restoration strategies for equitable allocation of water.

Hydrological Simulation Models in the Restudy

Among different types of science, the simulation models have an undeniable primacy by becoming the foci of decision-making within the Restudy. The WMM calculates both the surface flow and groundwater flow¹⁴³ for the 2 mile x 2 mile¹⁴⁴ grid cells, based on water level and discharge measurements from approximately 600 rain gauges over a 31 year period of record from 1965-1995 (COE, 1999b:7-9 and Appendix B, B-35). The WMM includes water management features of the current system, such as canals, levees and pumps. The WMM’s ability to simulate changes to these features made it an effective planning tool for ecosystem restoration science. The WMM was designed with large temporal and spatial scales, specifically to perform total ecosystem evaluations that estimated hydrological responses to structural and operational modifications to the current water management system.

¹⁴³ Further mention of “flow” refers to surface flow.

¹⁴⁴ 3.22 km x 3.22 km.

The WMM provided a mechanism for comparison of the magnitude and directionality of flow and depth of water among different iterative alternatives and with the status quo of the managed system. Hence, as a tool the WMM provided the “ability to simulate key water shortage policies effecting urban, agricultural, and environmental water demands [that] allows the modeler to investigate trade-offs among different users and sub-regions” (COE, 1999b:B-33).

The NSM represented the hydrology of the pre-drainage Everglades from Lake Okeechobee to Florida Bay, simulating estimated water depths and flows in the historic landscape by modeling the original spatial extent of the ecosystem, removing structural elements from the WMM, and using the same rainfall input as the calibrated WMM. The NSM was originally designed as a “framework for discussion among natural scientists,” and unlike the WMM, cannot be calibrated (MacVicar and Lindahl, 2000:3). The NSM and WMM were similar in that they used the same climatic data, grid size and computational methods. The NSM attempted to recreate pre-drainage morphological features including topography, river locations and vegetation. The NSM was an attempt to derive a conceptual understanding of natural ecosystem dynamics (Plate 6.2) since no data exist from the actual pre-drainage system. The NSM has uncertainty in re-creating the historic system due to factors like soil subsidence, climate change, and the significant reduction of spatial area.

Hence, the NSM “simulates the hydrologic response, not the hydrology, of a pre-drained Everglades system to current climatic input” (COE, 1999b:B-49). Therefore, while it is not possible to simulate the actual pre-drainage dynamics, “the use of recent input data (e.g. rainfall, potential evapotranspiration, tidal and inflow boundaries) allowed for meaningful comparisons between the current managed system and the natural system under identical climatic conditions” (COE, 1999b:B-49, B-50). Hence, the NSM was used as a *conceptual tool* rather than a template for ecosystem restoration. See Attachment 2 for a sample animation that the Modelling Team presented to policy-makers which compares the current managed system, *Alternative D-13R* and the NSM. Since the NSM could not be used as the definitive template to measure the success of restoration alternatives, the Restudy Team required a more robust mechanism to identify strengths and weaknesses of the different alternatives. Using the results of the Applied Science Strategy – CEMs¹⁴⁵ – the Restudy Team identified performance measures (PMs) to determine the strengths and weaknesses of different alternatives.

¹⁴⁵ See section 4.5.1

The brief, one page description of the WMM in CERP and ten pages in Appendix B do not adequately convey the significance of the simulation models and power ascribed to them within the Restudy. In fact, the hydrological simulation models – both the WMM and the NSM – were key actors with powerful agency in the Restudy and shaping the output, CERP. Modeling consultant Tom MacVicar and SFWMD planner Tom Teets emphasized the centrality of simulation models, calling them the “unifying focus” of the Restudy process. Obeysekera, leader of the Modeling Team (MT), further highlighted the importance of the simulation models noting the WMM was “not just a tool for decision-making, but also a tool for gaining consensus.” Interviewees also identified some limitations of the simulation models (Table 6.3). For example, MacVicar expressed concern that the NSM was being used inappropriately to measure the success of alternatives and stressed that the “NSM is more of a compass than a blueprint.” Mary Ann Poole noted that the 2x2 mile grid limited the ability to attempt higher precision for restoration within the remnant natural areas.

The models’ power as actors emerged from the centrality of the WMM and NSM in the decision-making process to select an alternative plan. An elite group of technologists from the District understood the full operation of the models; for other actors the models were effectively “black-boxes” into which water gauge data was input and analyzed. For the alternative iterations, WMM output was *the* result of the alternative. Complexity of model inputs and calculations to obtain output, made it effectively impossible for most actors to challenge the outputs of the model because its technical aspects were not well understood. Hence, while the results of a given model iteration could be improved through alteration of the inputs in future iterations, it was infeasible for human actors to determine the level of uncertainty of the black-box calculations or to question how the input data was analyzed. In response to the black-box identity of the models, non-technical human actors widely accepted the models as highly certain. In this case, lack of understanding and inability to effectively question the model ironically led to ascendancy in power of the models and the perception by non-technical actors that the models’ output offered the closest approximation to an “ultimate truth”. Interviewee MacVicar commented:

People always have a tendency to misuse models. It’s generally the policy people that need to make a decision and they kind of use models as a crutch, but sometimes as an aid. They don’t always understand the shortcomings of the model the way modelers do, so [policymakers] try and take it a little further than it really can go.

Table 6.3: Interviewees' Comments on Hydrological Simulation Models

NSM	☞ ☐	ENP established position based on PMs using the NSM, with its acknowledged uncertainty, as a target for hydrological restoration. (Ogden)	
		"NSM more of a compass than a blueprint." (MacVicar)	
Collaboration Tools	☞	Models tools for communication with stakeholder groups. (Obeysekera, Rist, Teets)	
	☞	"WMM not just a tool for decision-making, but also a tool for gaining consensus." (Obeysekera)	
		"People do not always understand the shortcomings of the model the way the modellers do" and may try and push the model a little further than it can really go. (MacVicar)	
Models in Plan Formulation	☞ ☐	Very labor intensive, especially during modelling when different disciplines pooled their knowledge. "Turned out to be the most fruitful work that occurred." (M. Poole)	
		Some environmental groups wanted to remove control structures, "in my opinion they did not understand the model runs." (Rist)	
	☞ ☐	Models have dispersion around the edges and the Seminole Tribe is located where the model starts to fade. (Tepper)	
		"Really taken on faith in the Restudy is that the public's goals can be met through just changing the water and the NSM is the way to change the water." Concern that NSM was mis-used in the process. (MacVicar)	
	☞	"The AET-ADT process was a very important way to get through a lot of work in a fairly short period of time." (Appelbaum)	
	☞	Models became unifying focus of Restudy. (MacVicar, Teets)	
Model Refinements	☞	Models will continue to be refined as part of adaptive management. (McLean)	
		If starting Restudy right now, "I would have a very hard time if they didn't make use of my information," but from information available at beginning of Restudy, the simulation models as good can expect. Hope new findings incorporated into models. (McVoy)	
	☞ ☐	WMM's 2x2 mile grid is kind of like a sledgehammer. To have attempted higher precision was not possible due to the scale of the simulation model. (M. Poole)	
Actor(s) Universe			
☞	Science	☞ Local Voice	☐ Policy
Actor(s) Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

The WMM was further empowered during the Restudy as a result of the potent visual image of the pre-drainage system offered by the NSM. The Restudy appeared to be understood by non-technical actors widely, though mistakenly, as trying to find a WMM alternative that moves the hydrology of the present day closer to the NSM.

While broadly true, understanding the objective of the Restudy as moving the behavior of the WMM to more closely mimic the NSM was a gross oversimplification of the how alternatives were developed and evaluated. Non-technical individuals had dubious, or non-existent, understanding of the role of PMs as the mechanism to compare different alternatives. Use of the NSM as a measure of success also may have raised false expectations about the extent of restoration that could potentially be achieved in the much-diminished remnant natural ecosystem. Nevertheless, the visual output made the models' results seemingly accessible to stakeholders and provided a common point for debate. Obeysekera identified the simulation models as "a great medium for us to communicate". The wide acceptance of WMM as *the* focus of discussion and mechanism for determining future water management made the WMM a powerful actor. An example of primacy ascribed to the simulation models is apparent in Restudy documentation which stated, "Given the complexity of the Everglades system, computer simulation is perhaps the only way to devise long-range water management plans" (COE, 1999b:Appendix B, B-33).

Strategy for Equitable Allocation of Water in the Restudy

The WMM in cooperation with PMs were the tools used to select an alternative plan. Use of these tools required a *strategy* for how to make equitable allocation decisions. The Restudy Team labeled two fundamentally different approaches: "cookie cutter" and "Xerox reduction". "Cookie cutter" described the exact recreation of pre-drainage characteristics in the remnant natural system. In contrast, the "Xerox reduction" approach accommodated for the loss of spatial area by reconstructing the ecosystem mosaic of the pre-drainage landscape in the remaining area of the natural system. Both were "ideal type" strategies and the agreed plan formulation strategy was a hybrid solution. The underlying tenet of the strategy was "that a successful Everglades restoration program will be one that recovers those ecological characteristics that defined the original system to a sufficient degree so that a 'new' Everglades-type ecosystem is created" (COE, 1999b:7-13; Davis and Ogden, 1994a). Varied stakeholder interests had different ideas about what constituted an effective restoration strategy (Table 6.4).

Table 6.4, Part 1: Interviewees' Comments on Restoration Strategies

Concept of Restoration		"Everglades so manmade and constricted by the cities and farming, it's going to need the help of engineering just to <i>mimic</i> being more natural." (Lorian)
	☞ ☞	Some interests want to lock in restoration plan now rather than have flexibility of adaptive management. Desire for fixed plan seems linked to concern about change in government policy towards restoration. Philosophical approach has to do with faith or lack of faith in future. (Ogden)
	☞	Modelers focused on hydrological boundaries and ignored political boundaries. (Obeysekera)
	☞	Until GCSSF, many interests saw models pervasive view that EAA had to give up land for a flow-way. WMM challenged that idea. (Wade)
		"Pollyanna view" that restoration means tearing out all structures "to make Everglades natural again." (Lorian)
	☞ ☞	Managing wetlands about more than turning on the water and letting it flow. (Best)
Scale of Restoration	☞	Large spatial scale requires inclusion of different interests; one perspective alone could not solve problems. (McLean)
	☞ ☞	"Even if we did nothing else but communicate amongst the federal family we could connect Keys NMS, to ENP to Big Cypress and the Wildlife Refuges." (Causey)
	☞ ☞	Restudy still compartmentalized ecosystem; need better linkage of upstream/downstream PMs. (Johnson)
	☞ ☞	Done work all over the world and people couldn't believe what South Florida had in place as framework for ecosystem scale focus. (Causey, Estenoz)
	☞ ☞	Need to look more at big picture of ecosystem yet also retain local perspectives. (Tepper)
	☞	"Everything's interrelated, so a decision made in one location has knock-on effects in other locations." (Moller)
	☞	Modelers' work guided by hydrological boundaries and did not consider political boundaries. (Obeysekera)
	☞ ☞	Need to create new organizations to infuse science into water management at the watershed scale. (Ogden)
	☞	I think some have a cultural bias of their own that <i>only</i> ENP is important. (Moller)
Actor(s)' Universe		
☞	Science	☞ Local Voice
		☞ Policy
Actor(s)' Classification		
☞	Insider	Super-Agent & Insider
	Outsider	Super-Agent & Outsider
	Insider and Outsider	Super-Agent, Insider & Outsider
		Super-Agent

Table 6.4, Part 2: Interviewees' Comments on Restoration Strategies

Approach to Restoration	GR PB	<i>Theory</i> of restoration to move modern hydro-patterns as close as possible to pre-drainage hydropatterns is widely agreed. Different stakeholder groups advocate varied <i>strategies</i> . (Ogden)	
	GR	Two potential approaches: 1) make decision on final plan now; 2) establish procedures to allow flexible implementation. Second option preferred as way to incorporate additional scientific findings. (Gawlik)	
	GR	Iterative alternative development and evaluation not only driven by restoration but also by need to balance water supply and flood protection. (Aumen, McLean, Teets)	
	PB	Need to act now but recognize may have to make adjustments along the way. Foolish to think we have all the answers as for complex ecosystem never will. Need to make decision based on best available information. (M. Davis)	
	GR PB	ENP established position based on PMs using the NSM, with its acknowledged uncertainty, as a target for hydrological restoration. (Ogden)	
		NSM can point to the right direction but "you can't build the Plan to it because it's not precise enough and you may build the wrong thing." Concern when NSM is mis-used as a blueprint to reconstitute exact water levels or exact water flows. (MacVicar)	
	GR	CERP should be ecologically and economically feasible and socially acceptable. (Mazzotti)	
		Stakeholder groups have a range of concepts of "restoration" and no singular definition of term appears in writing. (Ploos)	
Actor(s) Universe			
GR	Science	PB Local Voice	
Actor(s) Classification			
	Insider	Super-Agent & Insider	Super-Agent
	Outsider	Super-Agent & Outsider	
	Insider and Outsider	Super-Agent, Insider & Outsider	

Some interests sought to solidify a detailed restoration plan through the Restudy process and were skeptical of the strategy to develop a conceptual plan with details to be decided during implementation through adaptive management. In contrast, most scientists and key policy negotiator Michael Davis strongly advocated adaptive management for responsive adjustments during implementation for the best possible management of a complex ecosystem. Interviewees Ronnie Best and Joette Lorian emphasized that restoration was an extremely difficult objective to achieve and

that due to existing alterations from the pre-drainage system engineering solutions ironically were required to begin to mimic a “natural” ecosystem. A substantial area of differentiation amongst competing interests was their support for either achieving moderate restoration across the entire ecosystem, or focusing on maximum restoration within selected political boundaries.

Sportsman Jack Moller advocated a total ecosystem approach, but noted that the powerful interest of the Department of Interior did not share this perspective: “[ENP Superintendent] Ring and [Secretary of Interior] Babbitt say, ‘yes, we want to restore it,’ but when you get down to ask them what restoration means and biological and hydrological definitions, they want to restore it to benefit their properties and purposes.” However, ENP hydrologist Bob Johnson saw the situation as more nuanced than either selective or total ecosystem restoration. Johnson explained: “As soon as you start having to make decisions about how to manage the *whole*, you start having to make decisions that affect individual constituencies, and that’s the politically difficult part.” Craig Tepper, Water Management Director from the Seminole Tribe of Florida, concurred explaining that what was required was consideration of the big picture of restoration while also integrating and retaining the local perspectives within the different political boundaries. SFWMD Director of Modelling, Jayantha Obeysekera stated that the hydrological simulation modeling ignored political boundaries. The simulation models were politically neutral in that they did not explicitly seek to maximize the benefit to one natural area at the expense of other natural areas; however, subsequent discussion (Section 6.5.4) raises questions about the political drivers behind model parameters that made assumptions about specific conditions in some developed areas.

The WMM calculated the available quantity of water in the pre-Restudy scenario, identified the core issue of large water volume flowing into the ocean from canals, and then resolved this issue by dramatically reducing the water sent to the ocean. The large volume of water sent to the ocean in the pre-Restudy water management regime was an inexpensive solution designed to provide flood protection at a time when water supply shortages were not a consideration. The changing priority to find more water for allocation to users, inclusive of the environment, yielded the primary solution of the Restudy process to recapture the majority of the average “1.7 billion gallons of *excess* water a day that is *wastefully* discharged to the

Ocean”¹⁴⁶ (COE, 1998a). Much more difficult was how to equitably allocate this “new” water to the three primary users: urban, agriculture and environment. While total annual water quantity might be adequate to meet these different users’ needs, seasonal variations in rainfall create management difficulties of water surplus or deficit. Some stakeholders were dissatisfied with the distribution of the “new” water in CERP, because these interests saw priority being given to human uses over restoration. For example, Alan Farago of the Sierra Club noted, “it’s the cities, it’s sugar and agriculture and it’s the environment. It’s the three legs of this supposed stool, and the leg on the environment is very short right now”.

The challenge to equitable allocation was how to meet the needs of the three different primary users, including which user has responsibility to store the water in times of surplus and priority for allocation in times of shortage. For example, ENP hydrologist Johnson said:

It would have been nice if in this process we could have found enough water for everybody, but there isn't a footprint physically on the ground to store all that water. So the trade-offs are inevitable...and I hate to say it, the tradeoffs are really between different environmental areas. And less between the environment and urban and agricultural water supply users because there's more of just a view that water supply to urban agricultural areas is a constraint, it's something we have to do.

In response, SFWMD planner Agnes McLean noted that the Florida legislature passed a law that mandated the District “to adopt as a planning goal, a one in ten level of service, which means that what we have to plan for is to have no more restrictions than a one in every ten year frequency”. Further, McLean summarized that the authorizing language in WRDA 1992 instructed the Corps: “to look at the water management system with an eye towards enhancement of ecosystem restoration, while still providing for the other water related needs of the region”.

As a result, McLean stated: “We had a real balancing act to do. We had to balance flood protection, water supply *and* environmental needs and restoration all at the same time.” From a planning context McLean noted:

...there’s a PM that includes the population of Florida 50 years from now... Today approximately 6 million people live in South Florida and we projected that by the year 2050 there would be between 12 and 15 million people... So that’s what we were *planning for*, a 12 to

¹⁴⁶ My emphasis. This statement highlights the presentation of the water management solution to the public towards making the recapture of water lost to tide be non-controversial. Who can argue with use of “excess” water? However, this statement masks the challenges of developing a water management plan to meet the various user needs in the confines of seasonal and annual fluctuations of rainfall.

15 million population and not today's population.

Hence, by law planners were required to incorporate an estimated future population with only one year in ten experiencing water shortages in the development of the plans for the equitable allocation of the additional water recovered from altering the management of the ecosystem. With regards to these planning constraints McLean emphasized, "we did get and we continue to get severely criticized for planning for future population growth. Some folks, especially in the environmental community, say that through this planning process we're *encouraging* that kind of growth". For example, Johnson criticized the Restudy's planning approach saying:

CERP was designed to be able to meet the water supply needs of a population through 2050. Basically nobody said, okay let's figure out how much water we need for restoration and then *after* we're done figuring out how much water we need for restoration, then we'll see if there's water left over to meet these other needs. It wasn't designed that way at all. It was designed just the opposite. Here's the amount of water that's needed for future population growth, here's the areas that have to be provided a certain level of flood protection. Those constraints were put on in the beginning and then we looked at restoration after those constraints were imposed.

In response, McLean indicated that to have ignored growth projections would have been "simply *irresponsible*" because:

The practicality of it *is* that if we *didn't* plan for that type of population and in thirty years if a crunch time occurs, the environment is going to lose. The people are not going to lose. There is an old saying: "People vote, bunnies don't." And so I firmly believe that it would be the environment that would lose, and not the people.

The above debate evidences that the primary concern was not inadequacy of available water for distribution *now*, as the needs of the present population and environment could be met by the additional quantity of water that the Restudy makes available. The core controversy was how to equitably allocate water in the future within a context where the foundational issue of sustainable development was not on the table for discussion; and, in fact, the culture of continued unsustainable population expansion in South Florida was protected through laws developed by Florida's state legislature.

6.2.4 Sustainability: As Ostensible Guiding Principle and in Practice

The above discussion leads to the question of why was the legal requirement of “one in ten years for human water supply shortfall” established in advance of the Restudy process? In Florida, with existing water constraints, the parameters of water management law continue to promote unsustainable growth and provide clear prioritization to human needs over the environment. The legal requirement was to meet the “one in ten years” water supply needs of a projected 2050 population of 12 – 15 million. The law became a decisive and divisive parameter that emphasized the role of politics in the attempt to negotiate equitable water allocation in the Restudy process. The pre-emptive movement by the State legislature to establish this standard in advance of the Restudy process meant that questions examining the future growth of South Florida could be avoided.

For example, a fundamental question that could have examined water management from a sustainable development perspective was: *How much water should be equitably allocated to meet the basic needs of the present and estimated future population of South Florida?* This elementary question was unfortunately not asked as part of the Restudy process for political reasons. Water utilities were threatened by the potential limitation of water available to them for resale at low cost to the public and similarly the EAA did not want diminished access to inexpensive water for agriculture. ENP hydrologist Bob Johnson’s approach could have been better incorporated if water conservation measures had been considered and integrated into CERP to increase available water supply. Not only would this perhaps have allowed for planning first for environmental needs and then allocating additional water to human users, it also potentially benefited human users by making more water available at low cost, rather than relying on expensive and highly technical solutions, such as ASRs and wastewater reuse.

The lack of genuine consideration given to water conservation in the Restudy was a clear concern for some participants in the Restudy process as well as members of the wider public. For example, at a public meeting in Homestead a citizen questioned why water conservation measures had not been incorporated into the Restudy before turning to more expensive wastewater reuse. The behavioral change strategy of conservation could have been a less costly alternative to technical solutions such as wastewater treatment and could have been encouraged through public education and outreach. So, despite the pivotal role of the Governor’s Commission

for a *Sustainable* South Florida, during the Restudy process meaningful debate about a movement towards more sustainable use of water resources was avoided. Although sustainability was not meaningfully debated in practice, sustainable development was a term bantered about by the range of competing interests (Table 6.5).

Table 6.5 Part 1: Interviewees' Comments on Sustainability

Link Between Restoration and Sustainability	OR	Basic conflict in mandates and objectives between restoration and sustainable development. (Ortner)
	OR, H, P	GCSSF more extensive purview than other organizations as it took considered sustainable development, not just Everglades restoration. (Rice)
		"Ecosystem bounded by a very diverse urban population, so all of the issues of sustainability are in play here, not to mention the issues of race, poverty, and who has power and who doesn't." (Peterman)
	OR	District focused on water management and not addressing sustainable growth. (Ortner)
	OR, H, P	"I'm absolutely convinced that the only way Everglades restoration was going to happen was if we were all on the train when it left the station, and everybody went along. That's been called by some of the more radical environmentalist a sell out, but I don't think it is. I think it's a recognition of the fact that we're all here." (Collins)
Connection Between Nature and Humans		Environmentalists have to realize that humans are also part of the environment. (Lorian)
	H	Restudy sometimes produced unlikely alliances. Developers sided with environmentalists to protect Keys because they enjoyed fishing. (Parrish)
	OR, H, P	Always been a tension between environmentalists and development. (Salt)
		Water conservation should be included more strongly in CERP. (Homestead residents)
		"We have to continue to build a constituency in South Florida that cares about sustainability of the ecosystems, and what's the quality of life going to be like in ten, twenty and fifty years." (Aumen)
		"Education is necessary for the future to be sustainable." (Peterman)
		More wildlife in the EAA than natural areas. (Scheuneman)
	OR, H, P	Approach issues to "blend environmental concerns with economic needs in a more coherent way." (Salt)
		"If you completely forget about the ecology, if ENP wasn't there, we'd die from lack of water." (Moehling)

Table 6.5, Part 2: Interviewees' Comments on Sustainability

Planning for Growth		"It's like the immune system that would defend society from deprivations of the environment and public policy has been compromised by both politics, land use practices, and really conditions that are quite unsustainable in the long run for humans." (Farago)
	∞	Because Dade, unlike other counties, has areas that remain open and undeveloped, asked to accept unfair burden of infrastructure. (Alspach)
		"If sugar farmers pushed on the issue of sustainability, are they willing to commit to doing agriculture in the EAA indefinitely?" (McVoy)
		Less clear ten years ago than it is today that the cities play a huge role in the problem. Because cities are controlled by local legislators, who are largely elected through campaign contributions by development interest, really do view the Everglades not as an asset, in and of themselves, but as an obstacle to cheap growth." (Farago)
	∞ P	Sierra Club argued we should not anticipate population growth as it encourages growth. (Salt)
	∞ P	In South Florida, given that the environment has already been effected by development, "there are not a lot of choices." (Johnson)
	✎	Advocates protecting environment and development. "I like good, clean industries and bigger developments, and I think a sane community offers a balance of everything." (Parrish)
		"Farming is a <i>lot</i> less painful a neighbor than development." (Moehling)
	✎	The big fear is that the EAA would ultimately become development. Commission decided best scenario for EAA was continued agriculture with actions to increase compatability of farming with water supply and quality issues. (Wade)
		Every time you drive along Alligator Alley (I-75) there is more development. Before I-75 built it was promised that area would not be developed. (Wickman)
	∞	Water management linked to sustainable development. Dade County believes in the "Eastward Ho concept, the idea of going along the coastal regions instead of sprawling out to west." (Alspach)
Actor(s)' Universe		
∞	Science	✎ Local Voice
		P Policy
Actor(s)' Classification		
	Insider	Super-Agent & Insider
	Outsider	Super-Agent & Outsider
	Insider and Outsider	Super-Agent, Insider & Outsider
		Super-Agent

As pointed to in the literature, sustainability has a range of meanings from the perspective of varied interests and is popular partly as a result of its malleability. Jack Moller summarized the role of sustainable development in the Restudy process when he noted, “sustainable has become a glitzy word”. The call for sustainability by some interests also entailed not practicing what they preached. For example, small farmer and lifelong resident Robert Moehling noted: “The same people complaining about the destruction of the Everglades are living in beautiful homes in what used to be the Everglades.” Alan Farago, Sierra Club, noted that for political reasons the role of urban areas in the creation of existing water issues in the remnant natural system was often overlooked in the simplified assignment of responsibility to the EAA. Broward County Commissioner Lori Parrish, identifying herself as both pro-development and pro-environment, emphasized that the Restudy process also featured some unlikely alliances. Parrish cited the example of developers mobilizing to protect certain natural areas that offered popular fishing areas. Outsiders offered some of the most optimistic comments about sustainability. Activist Audrey Peterman, who had the primary concern of social justice for minority communities, stated: “By restoring water for nature, we also can make our lives better in the future.” William Kramer, Vice-President of the Sugarcane Growers Cooperative, notably a company criticized by environmental organizations, stated: “I think we can find solutions that reach a balance between the needs of agriculture, the needs of the environment and the needs of urban areas.”

Despite the frequent use of the word sustainability by interviewees, actual debate about sustainability in South Florida’s water use and serious consideration of sustainable approaches to water management, such as promotion of water conservation, did not occur. At best, the Restudy reflected a weak sustainability position that did not require modification of the current or future human use of the limited resource by urban, commercial or agricultural interests. Water level consumption rates as a predetermined parameter perpetuated what was effectively unrestricted water access at extremely low rates and prevented meaningful consideration of appropriate levels of human water consumption. Florida presently has among the most inexpensive water in the United States, and more broadly in the world to serve human water supply. A report on sustainability acknowledged:

The average Florida resident uses 170 gallons of fresh water per day, *over 50% more than the average for the United States*. Further, use is highest where population is the greatest. In South Florida, where fresh water resources are already under severe pressure, use averages 210

gallons per person per day (Jones, 2002, my emphasis).

Furthermore, potential debate about appropriate levels of human water consumption was eliminated as a relevant point of discussion by the exclusion in simulation modeling of variable levels of consumption in the Restudy. Level of water consumption is a central socio-political issue that should have been debated within the realm of the Restudy. Identifying “reasonable demand” is a meaningful step towards determination of the equitable water allocation for different users.

A process truly driven by the objective of sustainability would have asked more pointed questions about existing water management practices and pursued strategies for reducing urban, commercial and agricultural demand. Of course, the stakeholders of water utilities and agriculture would not want to debate these questions as it would potentially reduce the amount of inexpensive water available for water supply and force them to reevaluate their present practice of distributing large amounts of water at low cost. Various interviewees made clear, in no uncertain terms, that no South Florida politicians would accept an increase in water utility costs as a component of CERP. It is unfortunate that the opportunity to debate the core question of sustainability at the heart of equitable water allocation was squandered because political considerations towards building consensus precluded serious discussion about this critical aspect of water allocation. Avoidance of the core issue at the early stages of the Restudy may well lead to explosive conflict in future implementation.

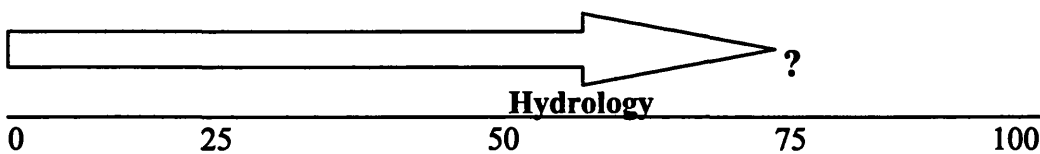
6.3 Linkage Between Hydrology and Ecology

The determination of the equitable allocation of water was directly linked to the ecology of the Everglades in terms of the suitability of the ecosystem as habitat for wildlife. Numerous scientific studies have identified linkages between ecology and hydrology (Bancroft, et al., 1994; Bennetts, et al., 1994; DeAngelis and White, 1994; Frederick and Spalding, 1994; Hoffman, et al., 1994; Loftus and Eklund, 1994; Ogden, 1994). For example, Mazzotti and Brandt’s research demonstrated alligators “are dependent on spatial and temporal patterns of water fluctuations” (1994:485). Another example was the presentation of Lorenz’s research findings on the roseate spoonbill to CROGEE (February 1, 2001), which identified the importance of seasonal periodicities of freshwater flow for wildlife and ecology. The scientific findings that link hydrology and ecology raise the foundational challenge of

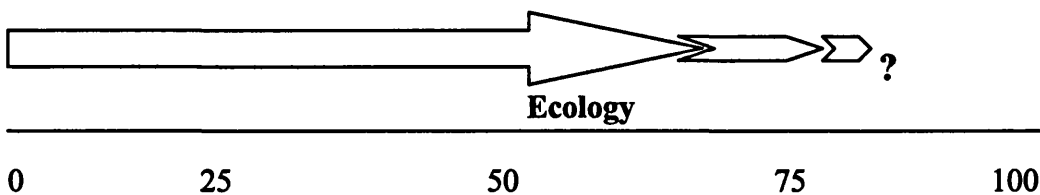
ecosystem restoration: *How to distribute and time water releases to different regions of the ecosystem to maximize the functional restoration for survivability of the ecosystem?*

The Restudy deployed a methodology that considered the linkages between hydrology and ecology. Scientists developed CEMs to determine PMs, which allowed for the comparison of the progressive plan iterations in the WMM. PMs were the primary mechanism for linking hydrology with ecology. For example, one PM was establishment of maximum water levels in natural areas to avoid pooling of water destructive to the ecology. Nevertheless, determination of the water management scenario that maximizes ecological function was uncertain because of the incomplete understanding of the complex Everglades ecosystem. What was certain was that the hydrology needed to be changed. What was uncertain was the degree to which correcting hydrological performance would lead to ecological revitalization. Figure 6.1 shows the uncertain relationship between hydrology and ecology.

Figure 6.1: Linkage Between Hydrological and Ecological Restoration



While scientists accept the linkage, the percentage of hydrological restoration needed to attain a desired level ecological restoration is unknown.



Ogden explained the point:

The theory everybody seems to sign-off on is that the whole idea of restoration is to move the hydro-pattern that we have today towards the pattern that existed a hundred years ago. We know we cannot go all the way, because we don't have the spatial area and a host of other reasons. We do know that as we go towards the historic hydro-pattern, the ecology is going to start to shift towards the pre-drainage natural system ecologically, but...we don't know exactly what any particular hydrological pattern is going to give us ecologically. So

that's the big uncertainty.

Ogden further identified the varied comfort levels of different scientists with uncertainty as the basis of various proposed approaches towards restoration. He explained: "A lot depends on the scale at which people's minds work. Some people are micro-thinkers...and others are big picture thinkers, [with differences in how they] are trained to think as scientists". Part of the benefit of the Restudy process was inclusion of multiple scientific perspectives in the development of CEMs.

An example that highlights the debate about the extent of linkage between hydrology and ecology was controversy about how to alter the Tamiami Trail. The Tamiami Trail, a major highway connecting the east and west coasts through remnant Everglades, is a barrier to sheet flow. Map 6.1 depicts how the Tamiami Trail transects Big Cypress National Preserve and, extending eastwards, also delineates parts of the northern boundary of ENP.

Map 6.1: Part of the Tamiami Trail¹⁴⁷



¹⁴⁷ Available: <http://www.byways.org/browse/byways/12130/travel.html?map=234> [March 15, 2004].

Debates about how to restore sheet flow included the question of whether a series of bridges were adequate or if the highway should be replaced with eleven miles of elevated causeway. Ronnie Best, USGS, advocated the elevated causeway noting:

The road is still going to be a major impediment to flow. And we should not only be concerned only with the flow of water [but also wildlife]. And that gets back to the simplistic engineering design – well, gee if the water is flowing right on both sides of the bridge what difference does it make? It's the impediment to the flow of species. You see [the benefit of a causeway] all the time in Louisiana where the birds fly back and forth under the elevated causeway. Whereas here, if we have those bridges, then the only way that a blue heron can go from one side of a segment to the other side of a road, is to fly over it. A fish species has a hell of a time flying over it. So, I tend to argue that if we're going to spend this much money in restoring the system, we just ought to build the road, right, now, correctly.

Here Best stressed that reconnection of sheet flow is about more than water and his insights demonstrate the importance of the participation of multi-disciplinary scientists in the Restudy process. Hydrologists alone most likely would not consider the related ecological implications of the water management decision between culverts and an elevated causeway.

Plate 6.2: Alligator in a Road Culvert



In the absence of an elevated causeway, occasional culverts are the mechanism that allows for movement of wildlife across some managed system barriers, like roads.
(Photograph by author).

Best's comments further highlighted that through adaptive management decisions can be made over time. Insiders to the Restudy seemed to have developed a recognition and acceptance that CERP would continue to be improved through adaptive management by integrating future scientific understandings of causal linkages between hydrology and ecology. Retired COE Colonel Terry Rice elucidated the need to approach specific restoration issues at appropriate times. The existing mandate for modifications to the Tamiami Trail was to build a series of bridges through the prior legislation of Mod Waters.¹⁴⁸

Rice discussed use of adaptive management to *later* integrate a causeway when additional authority and funding is granted through CERP:













At some point in time exists the probability of building a causeway, whereas in Mod Waters we have the authorization for an intermediary step. So how does that work with adaptive management? Well, it's really simple. You figure out what you would do and rather than do it all now - which is not in your authorization, and it's going to cause you all kinds of problems if you try to do it, plus you don't even have the water that it's going to be able to accept for many years in the future - why not go and figure out the concept of what you would do and just make Mod Waters a small part of that. If you're going to build causeways across the whole thing, make the design such that it would be the same as you move on to CERP.

Therefore, adaptive management encourages application of logic in actions so that preliminary restoration efforts could later be more easily enhanced. In the case of the Tamiami Trail, Rice advocated fulfilling the mandate of Mod Waters with engineering conducive to integrating modifications at a later stage of implementation. As Best argued, if greater scientific evidence emerges that demonstrates the importance of not only hydrological, but also ecological linkages this information can be appropriately integrated in at an appropriate time.

There was general acceptance among the key actors and interests about the benefits of adaptive management, as the comments in Table 6.6 indicate. Nevertheless, it is worth noting the ironic tone of some interviewees' comments about adaptive management. As Karsten Rist, President of the Tropical Audubon Society commented: "If you don't like the COE you say it's 'trial and error', and if you like the COE you say it's adaptive management." Similarly, Germaine Ploos, ENP social scientist, pondered: "How much of adaptive management is really just waiting for people to retire?"

¹⁴⁸ Notably, Congress indicated additional modifications to the Tamiami Trail under CERP's authority cannot occur until the Mod Water construction is completed.

Table 6.6, Part 1: Interviewees' Comments About Adaptive Management

Practical Application	 	Continue to improve CERP through adaptive management that includes improved scientific findings. (Best, Ogden)
		"Adaptive management needs to be tested and practiced instead of theory." (Farago)
		"Have budgeted a lot of time in the next fiscal year to do additional modeling for adaptive management." (Obeysekera)
	 	Adaptive management feasible if modifications fall within a reasonable range of cost and continue to meet three goals of restoration, water supply and flood protection. (Best)
		"As adaptive management goes forward obviously will be many changes in political leadership and scientists." (Aumen)
		"Likely that USGS research will be incorporated into the continued monitoring that's going to be done for adaptive management." (Mooney)
		ENP attained 90% of water levels and through adaptive management hope to further improve percentage. (McLean)
		"The adaptive management acknowledges we don't have all the answers, but will continue to get more answers as we go along." (Teets)
	 	Way to deal with uncertainty is through adaptive management. (Ogden)
		"Ecologists were very, very insistent, and rightly so, that adaptive assessment was key." (Appelbaum)
		"After you put in your first couple of reservoirs, and your 50 ASR wells and your headed in the wrong direction, then you need to use adaptive management to head back towards the vision." (Estenoz)
		
Concerns		"Before we spend the money we need to make sure we're doing it the right way because if the program is too far along then adaptive management will never bring it back." (Moller)
		"The problem that worries me about the adaptive management in the Restudy, if you look at scheduling there's no time window for any adaptive management. Everything is fund and build, within 20 years." (MacVicar)




Actor(s)' Universe			
 Science	 Local Voice	 Policy	
Actor(s)' Classification			
Insider	Super-Agent & Insider	Super-Agent	
Outsider	Super-Agent & Outsider		
Insider and Outsider	Super-Agent, Insider & Outsider		

Table 6.6, Part 2: Interviewees' Comments About Adaptive Management

Actors' Perceptions		"Adaptive management is great idea that says be open, keep your eyes open, have a course but change course if you get new information." (McVoy)
	✎	"When we explained adaptive management, the [Japanese] reporter started laughing as they called it a fancy name for trial and error." (Moller)
	⌘	"One of the concepts embraced by the authorizing legislation is the principle of adaptive management." (M. Davis)
	☞✎⌘	Very supportive of principle of adaptive management. (Aumen, Best, Gawlik, McLean, McVoy, Obeysekera, Ogden, M. Poole, Rice, Rist, Salt, Teets)
		"From an environmental perspective you really need an adaptive management approach, because it will always be bounded by bigger issues." (MacVicar)
		"People can think adaptive management is a cop-out or an easy escape." (Ferro)
	☞ ⌘	Adaptive management will allow new research to be included in CERP. (Childers, Gawlik, McVoy, M. Poole)
Actor(s)' Universe		
☞	Science	✎ Local Voice
		⌘ Policy
Actor(s)' Classification		
	Insider	Super-Agent & Insider
	Outsider	Super-Agent & Outsider
	Insider and Outsider	Super-Agent, Insider & Outsider
		Super-Agent

Also notable was that the underlying concerns with adaptive management widely expressed by varied interests were with the political rather than how new scientific information would be integrated. As Ogden expressed: "It seems the concern with adaptive management is more based on politics than about what science is ultimately going to find." For example, environmental interests were particularly concerned that assurances to restore the ecosystem could be eroded through the use of adaptive management in a future federal political climate where environmental issues lacked the priority they were given by the Clinton-Gore administration. Jack Moller questioned: "Will adaptive management be favored to the natural system or skewed to the people who push the hardest?"

Some concerns about the practical application of adaptive management did exist. For example, hydrological historian Christopher McVoy noted that it is "also unrealistic to assume that if you have a conceptual plan with some strength or orientation to it that you can integrate *any* new information easily." McVoy's

comment raises the question of who decides how adaptive management influences practical implementation. Immediately following authorization of CERP interviewees could not clearly answer *how* the adaptive management process would occur throughout implementation. Even John Ogden, leader of the RECOVER Team, at the time, lacked a clear understanding of how RECOVER's findings would be integrated by the COE to determination implementation of CERP. The lack of certainty in January 2001 about how RECOVER would be integrated was indicative that the larger process of water management in the greater Everglades ecosystem would continue to evolve after the conclusion of the Restudy process.

RECOVER, notably mirroring the organizational structure of the Restudy Team, demonstrated a willingness to include participatory forums for continued scientific review. Although it was not known how the information would be integrated prior to the completion of the Restudy process, super-agents sought to establish conditions that would feature adaptive management based on their shared understanding of the importance of flexible implementation. For example, Ogden emphasized adaptive management as a way to address uncertainty through integration of new, peer-reviewed information. Stuart Appelbaum, COE, noted: "It's almost arrogant to think that we've got all the answers up front, that we are going to build CERP exactly the way we think it is today." Terry Rice agreed, summarizing the adaptive management as "just common sense." The flexibility for evolution of CERP through adaptive management was ultimately about the need for continued learning about the complex ecosystem and institutionalizing the capacity for responsive change during implementation.

6.4 Flow in the Restudy Process

The linkage of hydrological attributes and ecological function are the crux of a core contested scientific question: importance of flow. Recall that the historical ecosystem consisted of heterogeneous landscape types, linked across the watershed through sheet flow. A number of questions about flow manifested throughout the Restudy process:

- While sheet flow is recognized as the historical delivery system, to what extent is flow necessary for the ecosystem function?
- In terms of specifics, is a flow-way from Lake Okeechobee to existing

natural areas a viable solution to restoration?

- A corollary question includes, does Q/Q/T/D necessitate re-creation of sheet flow or is point delivery throughout the system adequate?
- Finally, if flow is identified as an important hydrological attribute towards restoration of ecological function, are there practical limitations to reintroducing flow through the Everglades?

These questions are explored throughout the following sub-sections.

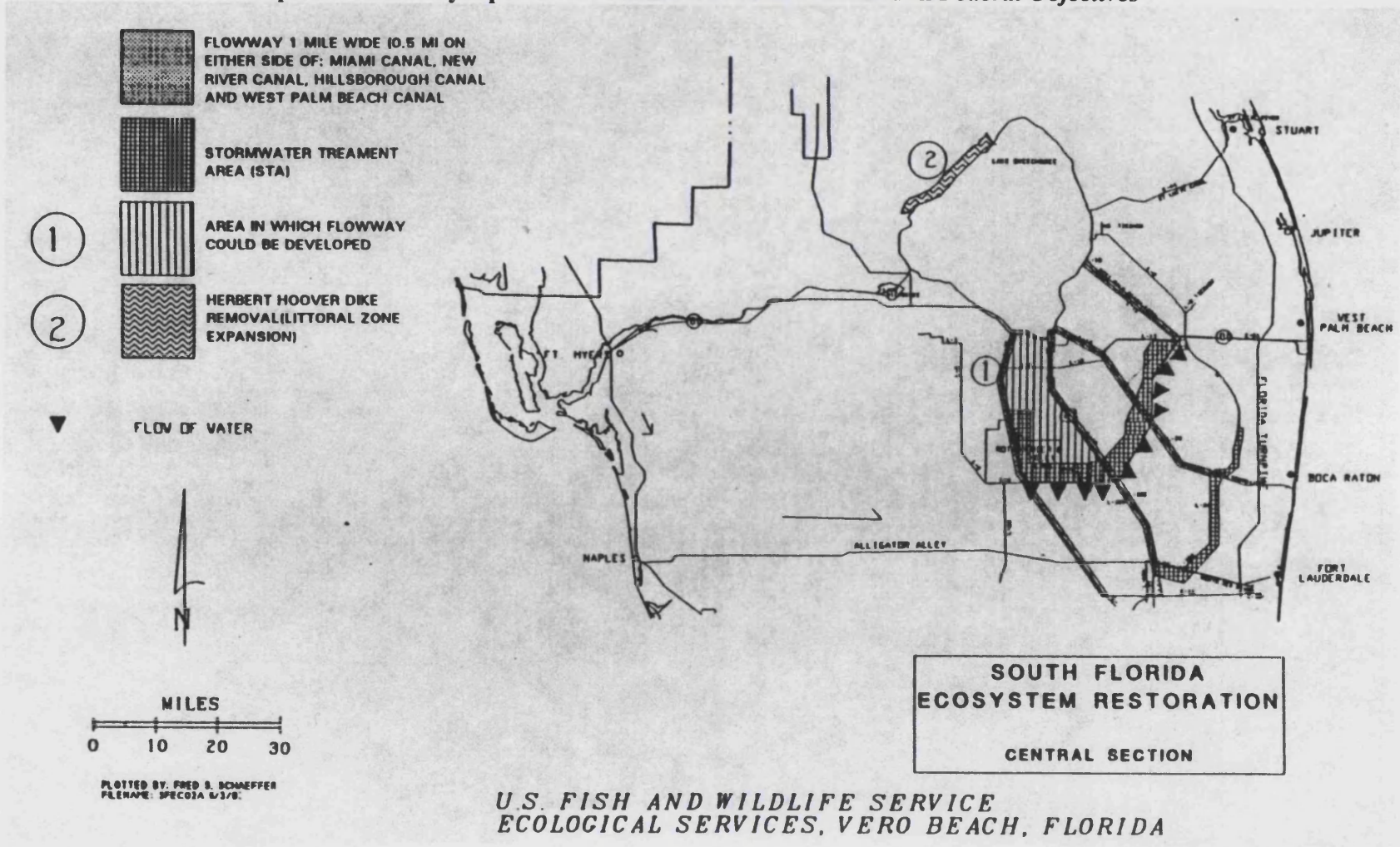
6.4.1 Should Restoration Include a Flow-way?

The most comprehensive, and also most controversial, attempt at inclusion of flow in the Restudy process was a flow-way through the EAA to reconnect Lake Okeechobee to remnant natural areas. The initial advocates of a flow-way were federal inter-agency scientists who were part of the Science Sub-Group. Recall that the Science Sub-Group's 1993 report, *Federal Objectives*, stated: "A flow-way from Lake Okeechobee to the WCAs has been identified as an option of the *minimum plan*" (my emphasis). The flow-way envisaged (Map 6.2) was highly controversial politically because it removed a large swathe of land from the EAA.¹⁴⁹ Billy Causey identified *Federal Objectives* as "probably one of the most provocative documents ever produced in South Florida". Peter Ortner, member of the Science Sub-Group, said, "the Science Sub-Group produced, from a purely technical sense, no political considerations whatsoever, what would constitute a restored sustainable system". Rock Salt recalled *Federal Objectives*: "Scientists first had their chance to say what had been pent up over *all* these decades". So, at the earliest stage of the Restudy, federal inter-agency scientists advocated the re-creation of a flow-way as a minimal component in restoration to "create sufficient conveyance and transient storage within the EAA to allow the natural volumes and timings of flows through STAs into the Everglades wetlands to the south" (1993a:2, section "Sub-region 4").

Yet, this concept was not emphasized in the Restudy, nor contained within the output, CERP. The ultimate exclusion of a flow-way was strongly criticized by some interests and attributed to political causes. Not only does it affect Big Sugar, but also people who live in the EAA. As Malcolm Wade noted, "You've got US 27 and the railroads along the Lake. I mean you literally would have to disrupt the cities around

¹⁴⁹ So political in fact that while it is possible to access the 1993 Science Sub-Group Report on the web: www.sfrestore.org/sct/docs/subgroup rpt [March 15, 2004] the controversial maps are unavailable and are further unavailable by request from the Task Force archives. I finally managed to obtain the maps from local sources whom still had copies of the original document.

Map 6.2: Flow-way Option for Minimum Plan as Presented in *Federal Objectives*¹⁵⁰



¹⁵⁰ Figure 7, from *Federal Objectives* (Science Subgroup, 1993).

the Lake and move them". Alan Farago said the Sierra Club "thinks that because of the political, or the way that the political equation is measured that there is *not* support for adding lands for storage that would do the natural flow-way...and we disagree with that". Clearly, a flow-way across a portion of the EAA was political.

So, was the exclusion of a flow-way entirely political, or did scientifically compelling reasons also exist? One scientific reason for rejecting a flow-way was the limitation imposed by extensive soil subsidence in the EAA. Obeysekera noted that "because of agriculture, the land has subsided – some places up to 10 or 11 feet." The subsidence becomes a limitation for a number of reasons. The ground elevation is higher in the EAA than the southern natural areas, which would preclude a simple re-creation of natural sheet-flow across the ecosystem. However, some environmentalists discount the importance of subsidence. Environmentalist Susan Wilson argued that a flow-way could work:

...with a *little* pumping - and we've been pumping against gradients for years for the wrong reasons. Now we could do bit of pumping for the right reasons. The arguments the Corps uses are that there has been subsidence in the soil, which of course there has, ponding, and the difficulty to re-establish the ecosystem. But once you set the conditions for a natural system, it starts to heal itself.

However, even if this elevation limitation could be mitigated through engineering a secondary, more difficult issue to resolve, becomes having adequate water to keep the flow-way wet (Plate 6.3).

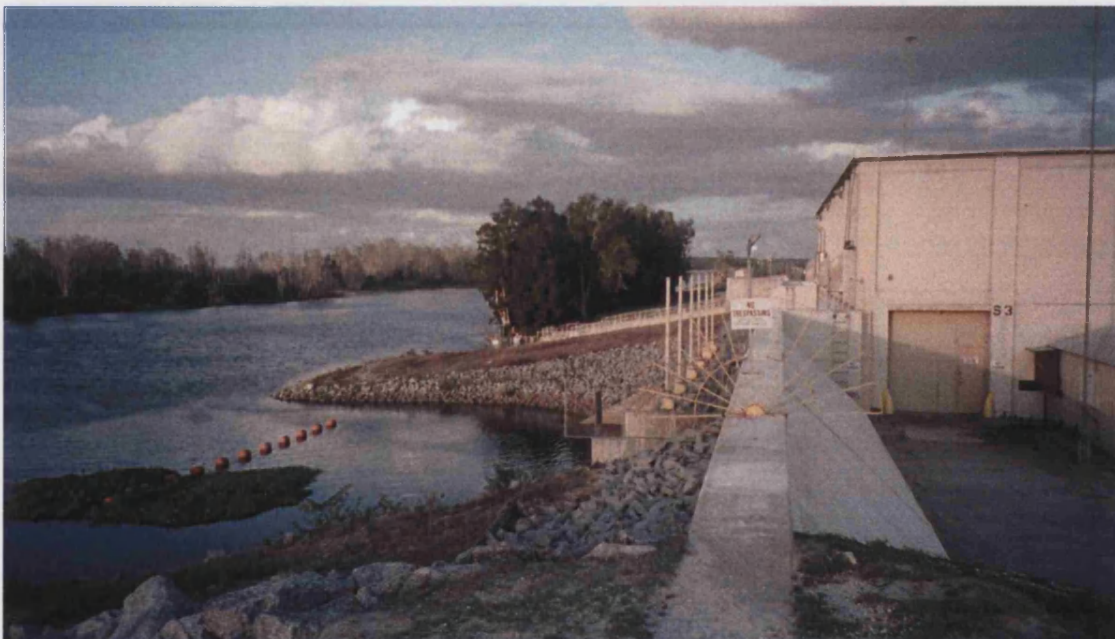
Obeysekera indicated that in preliminary model runs where flow-ways were considered, not enough water was available for the ecosystem during average and dry times because of the large amounts of water needed to keep the flow-way wet, coupled with loss from evapotranspiration and groundwater seepage. Further, in the wet season the volume of water that would be necessary to maintain the flow-way into average rainfall periods caused flooding in parts of the natural system. The flooding of the biodiversity rich tree islands was particularly a problem. Hydrological historian Christopher McVoy highlighted the interconnectivity of these issues stating:

Flattening of the landscape imposes a constraint. If you do eventually get to a point where you decide flowing water versus impoundments through the system is important, flowing water means more water. So that's a challenge to restoration. Tree island flattening means you're constrained by how much you can just let a big pulse of water go through, particularly at the end of the wet season when [water is] already up high...But unfortunately the time when other folks have spare water is then. So what that suggests is that the need for storage might be even bigger than what you would estimate from simply

restoring pre-drainage flow patterns.

Yet, as presented by Obeyesekera, the possibility of above ground water storage is not a feasible solution in the context of variable annual rainfall because of the high rate of evapotranspiration. Finally, quality of the water that would flow through the system was a concern. As McVoy explained, “the bigger concern is what is sitting in that peat soil remaining from agriculture”. Karsten Rist expressed the conventional wisdom of insiders about a flow-way: “While I have an emotional sympathy for the [flow-way] argument, I see no practical way of making a flow-way work. Therefore, I don't believe it's worth spending time on it.” Hence, while a flow-way through the EAA was presented as an initial conceptual approach towards restoration by federal inter-agency scientists and received continued endorsement from some environmental groups and scientists, it was commonly agreed to be scientifically infeasible, as well as politically untenable.

Plate 6.3: S-3 Water Control Structure Along South of Lake Okeechobee



The S-3 is one of a series of water control structures along the southern edge of Lake Okeechobee. The pre-drainage system included natural sheet flow from the Lake.
(Photograph by author).

The inclusion of a flow-way through the EAA was eliminated during the Component Screening phase of the Restudy, in advance of alternatives development through model iterations. Hence, neither CERP nor description of iterative processes towards the generation of CERP contained notable mention the flow-way. One person who remained an advocate of the flow-way through the EAA was John

Marshall. However, other actors cited weaknesses in Marshall's argument. For example, Karsten Rist said:

Marshall, I don't think, understands the hydrology enough...and I've talked with John at length. He does not have a plan that would make [an EAA flow-way] work... You would have to create levees and pumps and somehow move water in and then move it back out [of the flow-way]. You'd have to deal with nutrients and in my opinion you would end up with a dramatically managed system again. And John does not have an answer to that. He can't tell you how he would do it - he just feels that it should be done.

As discussed in Chapter 5, Marshall did not have a seat at the table of any decision-making organizations with central roles in the Restudy; Rist's description reaffirmed Marshall's identity as an outsider. To support the status quo of not including a flow-way Rist discounted Marshall's perspective as intuitive, rather than based in science. Interestingly, Rist did not mention the political impediments to a flow-way and focused only on scientific rationales when presenting his argument. In contrast, Marshall was highly critical of the lack of consideration of a flow-way in the Restudy process from a political perspective; Marshall saw science as a tool used to obscure a highly political debate. Of his experiences he said:

Some government scientists actually came to me during the Restudy and said, "You've got to keep pushing the flow concept and connectivity, because they're just not listening to us and it's not politically correct for us to keep pushing it." The managers did not want to hear about a flow-way because of agricultural politics and urban politics. Well, I kept pushing it and nobody was listening. Then I took this situation to SFMWD's ombudsman, who hears public input. He convened a meeting of about 16 people, mostly scientists at the District, and they concurred that the flow concept had been under-considered throughout the Restudy's two year history...out of the ombudsman meeting came a recommendation from the District scientists that we have a flow-way workshop. The Governing Board, which is mostly political appointees of Governor Bush...had *promised*, in public and private, a workshop to re-consider the flow concept. When we tried to set a date for the workshop, two of the scientists involved were clearly against the flow-way...so the Governing Board said no we're not going to have a workshop - now we've got other alternatives. So we got the big kabosh even as we presented the majority opinion of District scientists.

Marshall's experiences as an advocate for the flow-way demonstrate a number of socio-political dynamics.

On the surface, his experiences are a demonstration of the COE's poor communication of scientific evidence that prompted the elimination of a flow-way prior to the iterative alternatives. Marshall's vehemence that flow-way solutions were

overlooked for political expediency was in contrast to the general, though perhaps reluctant, acceptance of the scientific, as well as the political, rationales for the elimination of a flow-way as a viable solution by those who had a seat at the table of the Restudy Team, GCSSF or Working Group. While Marshall exemplifies the different understandings by insiders and outsiders of the Restudy, his experiences as a flow-way advocate further demonstrate the *importance* of outsiders to the process. The obvious way that outsiders play a key role is as 'watch-dogs'. Marshall did this, but also much more subtly and perhaps even without his own realization, he furthered the consensus building of insiders at the tables of the Restudy's decision-making organizations.

Having Marshall, an outsider, advocate a socio-politically radical solution to restoration provided environmental insiders sitting around the tables of organizations with greater negotiating power by positioning them as more moderate actors willing to find solutions that were reasonable compromises. In effect, Marshall becomes a veiled threat to urban and agricultural interests, pressuring them to stay engaged in the decision-making organizations of the Restudy to avoid potentially having to seriously address proposed solutions that fall outside of the boundaries of the range of socio-political acceptability, agreed by those insiders with a seat at the table. Hence, in this case John Marshall or the Sierra Club's advocacy of more extreme solutions gives environmental actors sitting around the table, like Audubon or WWF, greater ability to pressure urban or agricultural actors to reach an agreement favorable to the environment.

In this case, without agreement amongst insiders that a flow-way fell outside of the range of socio-political acceptability, CERP may not have been successfully authorized. Agreement that the flow-way fell outside the range of socio-political acceptability was, hence, pragmatic on the part of insider environmental interests, with the rationale that it was better for the ecosystem for them to reach agreement on some degree of restoration rather than none. Interestingly, science was used as the predominant justification for the elimination of a flow-way from consideration, and the compelling socio-political reasons are largely unmentioned by insiders.¹⁵¹

Reflecting on the initial call for a flow-way Science Sub-Group member Peter Ortnier highlighted science, not the powerful political reasons, as rationale for elimination of a flow-way from consideration as a viable solution. He said:

...there have been subsequent issues. *Federal Objectives* was a first

¹⁵¹ For example, this point is evidenced by Rist's previous statement.

rush at that point without consideration of *changes*, physical changes in the system, and it looks like a wonderfully simple, elegant solution. I've been told by various engineers – and not all ones with a vested interest – that it's not so obvious any more, given the changes in the levee structure around the Lake and subsidence in the EAA.

This critique does not mean that compelling scientific reasons did not exist. What is of interest here is that Ortner *only* cited scientific reasons rather than mentioning them in tandem with the obvious socio-political limitations.

Moreover, as an evolution of the Science Sub-Group's initial advocacy of a flow-way through the EAA, Ortner suggested considering flow from a broader perspective. Simply, Ortner stressed that if flow is an important aspect of the system then the EAA was not essential to the re-creation of a flow-way:

If one only cared about south of the EAA...and were willing to spend big bucks for more substantial STAs...and massive decompartmentalization – things like no lateral road that weren't really causeway bridges, rather than just occasional culverts – one could start that flow-way anywhere you wanted. It's only a question of how much you're willing to spend.

Hence, Marshall's insistence about the importance of a flow-way, while not included in the context Marshall intended, promoted flow as a primary issue of interest for further study.¹⁵²

In addition to providing an example of the necessity of communication and the relationship between insiders and outsiders, Marshall's continued advocacy of a flow-way demonstrates that ecosystem restoration science can have inherently different prerequisite definitions by various interests. Marshall told me, "we would just like a little flow-way...if we don't have that we'll never have restoration." In contrast, the majority of actors, particularly insiders actively engaged in the Restudy's decision-making organizations, view restoration more as revitalization.¹⁵³ Nevertheless, the inclusion of adaptive management as a strategy of CERP leaves open the potential that if the scientific and political limitations change in the future that a flow-way may be considered. Ronnie Best highlighted this point stating:

We're not going to get a flow-way back in nature's near life-time. Would I like to see an expanded fluctuating zone of the Lake? The answer there is yes. Do we have an opportunity to do that in adaptive implementation? Yes, if the need and the opportunity arise. The need may arise because the ASRs may not work as well as we would

¹² For example, the SCT selected flow as one of its five priority areas and began its focus on flow with a December 2000 workshop and produced *Role of Flow in the Everglades Ridge and Slough Landscape* (SCT, 2003).

¹³ See the introduction of this chapter for a further discussion of the distinction.

like. The opportunity may arise because economic conditions may change and agriculture may not be as feasible. The opportunity to buy those lands for natural systems rather than for development may occur, but would have to take place within the next twenty years. A lot of things can change in that time.

Hence, the question of a flow-way across the EAA to reconnect Lake Okeechobee with the WCAs was considered, but then abandoned as infeasible within the context of the Restudy both in terms of the political and the scientific limitations. The adaptive management strategy did leave open the potential outcome of reconsideration of a modified flow-way if conditions change in the future. Following this detailed discussion of the specific flow-way proposal, the next section turns to a more general consideration of the importance of flow to the Everglades.

6.4.2 Importance of Flow

Above Peter Ortner commented that even without a flow-way across the EAA, the flow of water throughout the system can, and should, be integrated into restoration at whatever starting point demarcates the northern boundary of the remnant natural system. Building from Ortner's point, this section considers the importance of flow to the ecosystem. Flow is a phenomenon expressive of the interrelationships amongst Q/Q/T/D and ecology for a given landscape's morphology. Intuitively, flow is a critical functional attribute within the Everglades historically linked through hydrological sheet-flow. Further, strong evidence exists that flow is an important feature to the ecosystem. As ENP hydrologist Tom Van Lent summarized, "The scientific evidence [about the importance of flow] is clear, hydrologically". ENP hydrologist Bob Johnson also highlighted the importance of flow to restoration stating: "Put the right volume of water and let it flow through the system as uniformly as possible. If potentially we don't get enough water to the downstream end [in ENP], we reconnected the system and we'll live with the outcome." Johnson's statement was particularly poignant in the socio-political context where the ENP sought to claim first priority to the water available to allocate for restoration, based on the ENP's national and international recognitions. Johnson's statement further indirectly acknowledged the challenges of determining the appropriate water allocation for any given political unit of the natural system.

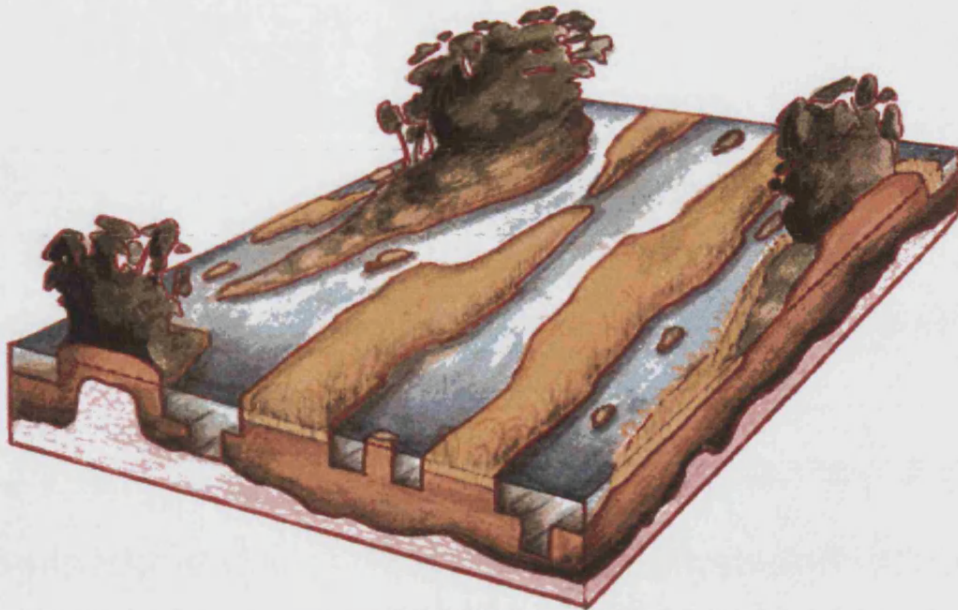
Determination of flow levels is fraught with difficulty in the greatly altered ecosystem and during the Restudy this question was further complicated because flow was approached peripherally from discussions of Q/Q/T/D. The SCT noted, "much

less attention has been paid to the importance of the actual movement of water [than Q/Q/T/D], the physical and ecological roles that movement of this water plays, and how management activities have altered that flow” (SCT, 2003:1). The indirect approach to flow was partly reflective of the greater scientific uncertainty to determine flow needs compared to quantity allocation. In addition, with a flow-way across the EAA a politically volatile subject, discussion of flow could have been limited to avoid the (inappropriate) definition of functional flow as dependent on the creation of a flow-way. However, following authorization of CERP the scientific community sought to engage in this more complicated question of flow as an initial step of adaptive assessment. The SCT hosted a flow workshop in December 2000, and subsequently identified flow as a priority for future research (SCT, 2003).

Environmental historian Christopher McVoy emphasized flow as integral to management noting, “one of the management challenges is how do you get water to move through the system, if you decide that flow’s important, without going up so high in the water level that you are drowning tree islands” (Plate 6.4). Beyond resolving the conflicting interests of needs for the different landscape types in the remnant natural system, flow also presents conflicts between the natural system and human needs. Ecologist Nick Aumen noted, “There are all sorts of competing interests...water flow through eastern ENP is going to affect your ability to provide flood protection to people that live on the west side of the protective levee”.

Flow is a challenge to manage both temporally and spatially. As discussed in the example of a flow-way the seasonal periodicity coupled with evapotranspiration complicates the ability to store adequate water for release in dry periods. In the rainy season, too much water can further destroy the natural system through flooding. While the difficulty of water storage in dry periods was mitigated in the modeling iterations by reducing surface water storage, and hence evapotranspiration, the management of water during high rainfall events remains within the remnant natural environment. As McVoy explained, “by definition, taking flow from a cross-section and squeezing it into half the cross-section...[the result] has got to be deeper [water]”.

Plate 6.4: Model of Ridge and Slough Landscape¹⁵⁴



The example of tree islands illustrates the challenge of managing flows and levels of water in tandem (Plate 6.5). Too much water can flood tree islands and destroy these havens of biodiversity. Sportsman Jack Moller recalled, “Within a few years from the time that water started flowing into the WCAs [drowning tree islands] we noticed a remarkable decline in all wildlife”. Too little water flowing through the system, either as a result of volume available or barriers to flow, can also be detrimental, prompting the change from ridge and slough landscape to dense stretches of sawgrass (Plate 6.6). Such increased landscape homogeneity in turn has a negative effect on animal diversity and numbers. For example, in a study of bird foraging researchers did not attempt to include dense sawgrass in their sample because of the overall lack of birds in this homogenous habitat (SCT, 2003:26). Flow is determinant of landscape and concomitantly, ecology. As Kushlan noted, “Whatever determines vegetation patterns will also, to a large degree, determine bird use of wetlands” (1989, as quoted in SCT, 2003:2).

¹⁵⁴ Provided by McVoy, interviewee.

Plate 6.5: Tree Island within a Slough¹⁵⁵



Plate 6.6: Sawgrass Landscape¹⁵⁶



¹⁵⁵ Available: <http://sofia.usgs.gov/publications/ofr/03-26/> [March 15, 2004].

¹⁵⁶ Available: <http://sofia.usgs.gov/sfrsf/rooms/historical/future/> [March 15, 2004].

Christopher McVoy's research has indicated that flow is an important formative process in the Everglades' ecosystem determining the directionality of tree islands in the ridge and slough system. Plate 6.7 depicts the directionality of the ridge and slough landscape in a remnant natural area, which McVoy attributes to water flow. Plate 6.8 depicts a remnant ridge and slough system in WCA 3A, considered to be in a well-preserved condition, while Plate 6.9 shows a degraded ridge and slough system.

Plate 6.7: Directionality of Ridge and Slough in Remnant Natural Area¹⁵⁷

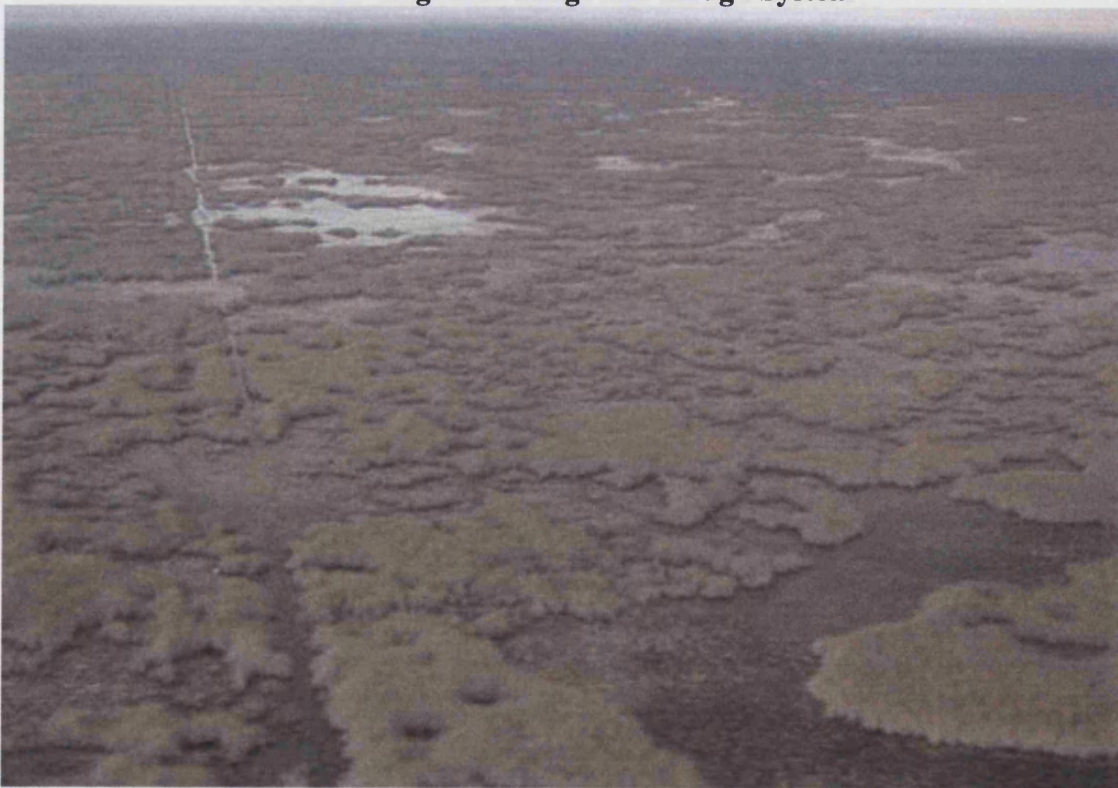


¹⁵⁷ Provided by McVoy, interviewee.

Plate 6.8: Well-preserved Ridge and Slough System¹⁵⁸



Plate 6.9: Degraded Ridge and Slough System¹⁵⁹

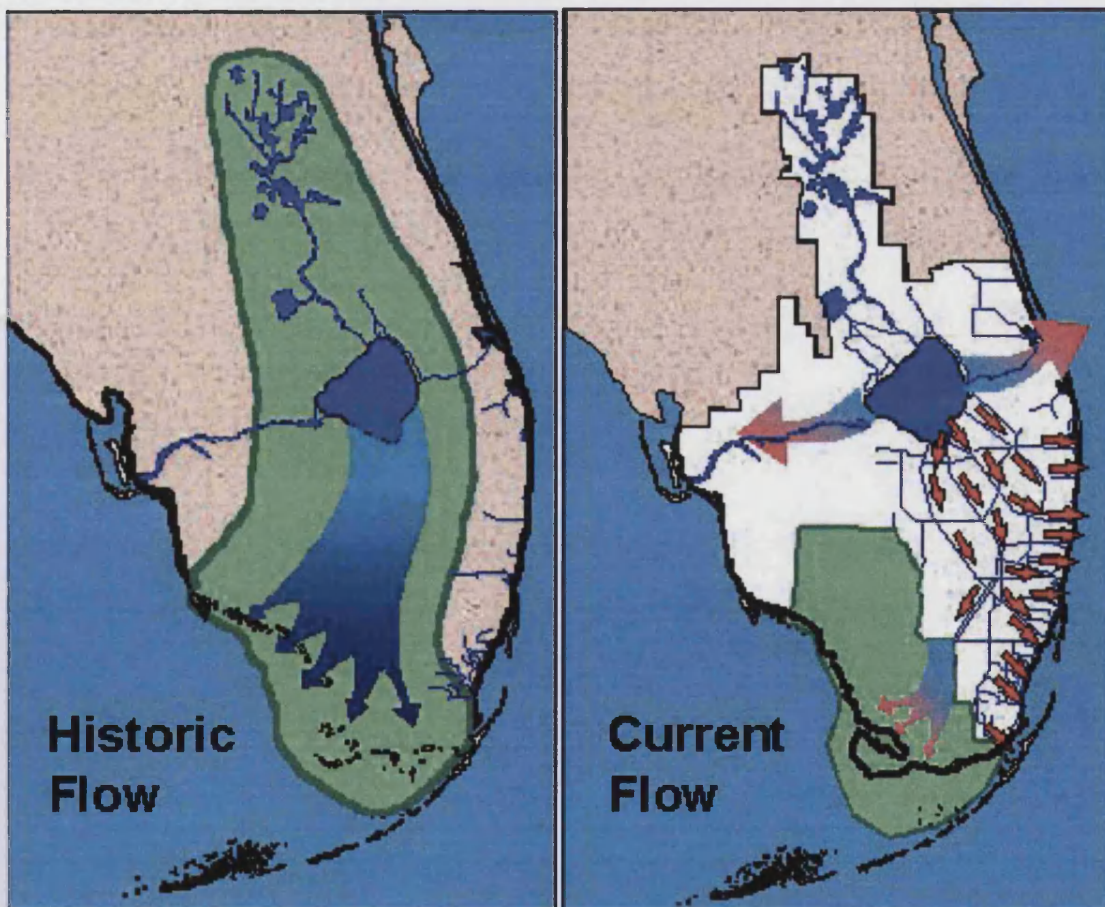


¹⁵⁸ Available: http://sofia.usgs.gov/publications/papers/sct_flows/evidence.html [March 15, 2004].

¹⁵⁹ Available: http://sofia.usgs.gov/publications/papers/sct_flows/evidence.html [March 15, 2004].

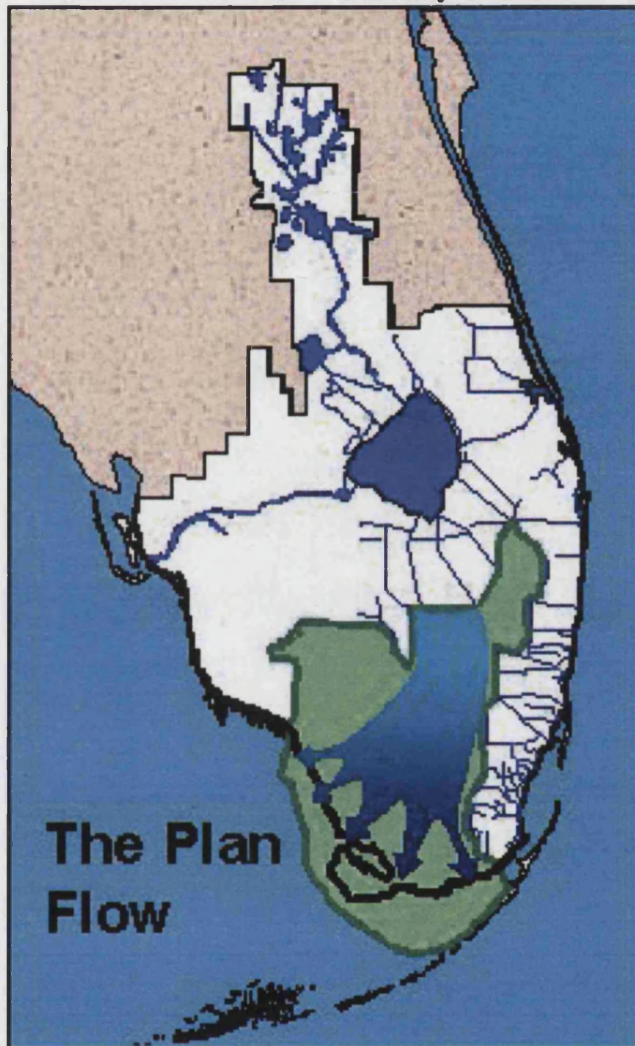
Commenting on the diagrams McVoy stated, “based on looking at the pattern of the original [ridge and slough] landscape, [tree islands had] very oriented long thin pattern with a strong spatial correlation as to flow”. McVoy’s research was undertaken as a validation exercise of the NSM through collection of historical data. As measuring gauges and aerial photographs were not available for the unmodified watershed McVoy used historical sources such as explorers’ descriptions, early land surveys and photographs. Rather than verifying the NSM, McVoy’s findings indicate a variant to the flow pattern depicted in the NSM with a greater level of flow across transverse glades into Biscayne Bay rather than as depicted in the NSM models where the water is channeled through Shark River and Taylor Sloughs. Plates 6.10 and 6.11 depict the estimated flows used in the NSM, WMM and resultant CERP, while Plate 6.12 shows McVoy’s findings of flow directionality based on his historical research.

Plate 6.10: Flow Directionality of the NSM and WMM Used in the Restudy¹⁶⁰



⁶⁰ Available: http://www.evergladesplan.org/facts_info/maps.cfm [March 15, 2004].

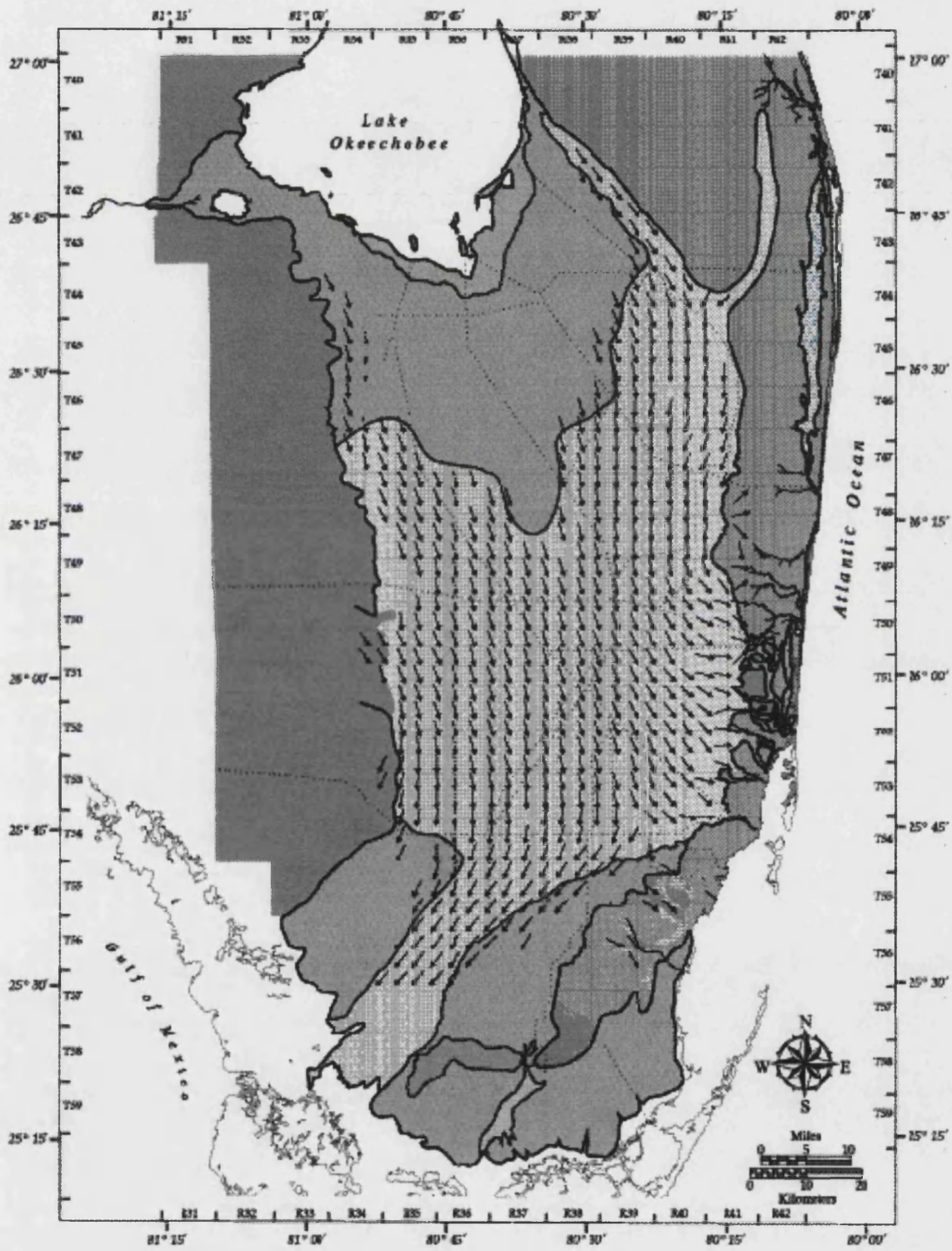
Plate 6.11: Flow Directionality in CERP¹⁶¹



Flow is a formative process, but also potentially destructive to the ecosystem if either too much or not enough water flows through the system. Therefore, the manner in which water flows through the ecosystem is important, and also incredibly complex. Scientific findings about the relevance of water flows through the ecosystem raise questions about how flow was addressed in the iterative modeling of alternatives, the level of certainty of the simulation models and further, what additional science verified the simulation models?

¹⁶¹ Available: http://www.evergladesplan.org/facts_info/maps.cfm [March 15, 2004].

Plate 6.12: Historic Flow Directionality Determined by McVoy's Investigations¹⁶²



¹⁶² Provided by McVoy, interviewee.

6.5 Models in the Restudy

Recall that during the Restudy a number of different models were used: hydrologic simulation models, WMM and NSM; ecologic models, Everglades Landscape Model (ELM) and Across Trophic Levels System Simulation (ATLSS); and the relational CEMs. A summary of the types of models appears in Table 6.7. Flow appeared in the Restudy as a stressor in the CEMs and an attribute simulated in the WMM and NSM.

Table 6.7: Summation of Types of Models in the Restudy

Types of Models	Examples
Hydrologic Simulation	WMM, NSM
Ecologic	ELM, ATLSS
Relational	CEMs

This section investigates issues of power and uncertainty in simulation models, specifically focusing on why uncertainty of the NSM was problematic and an inappropriate benchmark for restoration success. In contrast, explained is why PMs offered a suitable method for developing restoration objectives and measuring the performance of different alternatives. Next, the technological parameters integrated into the simulation models are investigated, identifying the problematic, socially constructed assumptions of some parameters. Finally, this section considers the technical solutions integral to the Restudy's output and resultant outcomes.

6.5.1 Uncertainty in Hydrological Simulation Models

The model developers and the scientists on the Modeling Team were among the strongest advocates for acknowledging uncertainty inherent in the simulation models. However, some actors seem to have ascribed both the WMM and particularly the NSM a much higher level of certainty than justified. A basic problem with the interpretation by these actors of the WMM results was the degree of certainty assumed for the model simulation with how the ecosystem would respond to actual changes to the water management regime. As discussed earlier, this was problematic because it is uncertain what degree of water restoration is needed to obtain a given percentage of ecological restoration. The WMM can be calibrated, so has a higher degree of certainty than the NSM. However, measurement gauges, the source of data

input, were situated less frequently in the more remote remnant natural areas (Obeysekera). Larger distances between input data meant greater interpolation by the WMM at some of the more "natural" grid cells. Similarly, Craig Tepper identified edge effects as source of uncertainty, noting: "Models are no good at the borders. It's like looking at a photo with dispersion around the edges and really good clarity in the middle."

Secondly, subsidence and change in vegetation can affect hydrology. Jack Moller expressed specific concerns about the input data used in the simulation models:

I had all these questions about modeling...because there were things I was seeing on their little squares that didn't make sense. So, I'm talking to a sportsmen's club, two guys raise their hand and one of them says, "Well Jack, my company surveyed ENP and we did it right, for topo[graphy]. The guy [who did the work for the District] worked for a company from Louisiana and they didn't do it right. They're off by more than six inches." That's a big amount [in the Everglades]. So at the next [GCSSF] meeting I asked somebody in the Corps, "Who did your work north of the [Tamiami] Trail?" "Why?" I said, "I have some information and I want to check my source." So they got me the information and I said, "Now I'll tell you why. That company did it wrong." All of a sudden everybody in the world was there. Aaron Higer was there. USGS was there. People I'd never seen before were there. The bottom line is: they did it wrong. So ask this, "What are the baseline assumptions? Show me the formulas that direct your computer to function under NSM or any system you want. Show me the formulas that direct your computer to make all these little squares red or green or whatever color they are." Follow me? And what is the base assumption, the foundation for those formulas to work properly? It's got to come down to topo[graphy]. And they don't have good topo[graphy] work, and they don't even have good hydrology work. So how are you going to build an 8 billion dollar project without topo[graphy]?

Moller's information about topography was relevant in an ecosystem where a few inches constitute the downward slope that allows for water to flow, albeit slowly, rather than collect in pools. While the topographical measurement used may be adequate as a planning tool, failure to recognize topographical uncertainty can lead to inappropriately establishing the model output as the absolute blueprint for restoration. Moller's experiences present valid concerns about how science was used to determine the WMM input data and the black-box processes that calculated model simulations.

Thirdly, the "model assumes homogeneity in physical as well as hydrologic characteristics within each grid cell" (COE, 1999b:Appendix B, B-34). The assumption of homogeneity fails to reflect the topographical variation within a ridge

and slough landscape in the assignment of water levels to a given cell (Plate 6.13).

While Lal has identified the 2 mile grid as, “sufficiently fine to describe the solution to overland and groundwater flow equations” (1998:604), it is nevertheless relevant to note cell homogeneity in the context where non-technical actors were ascribing high certainty to the WMM output as a proscriptive formula for restoration. Hence, the hydrologic simulation models used do have uncertainty, which is often inadequately recognized by non-technical actors. Now discussion turns to consider the use of the models to establish restoration objectives and measure restoration success.

6.5.2 Use of Models to Establish Restoration Objectives and Measure Success

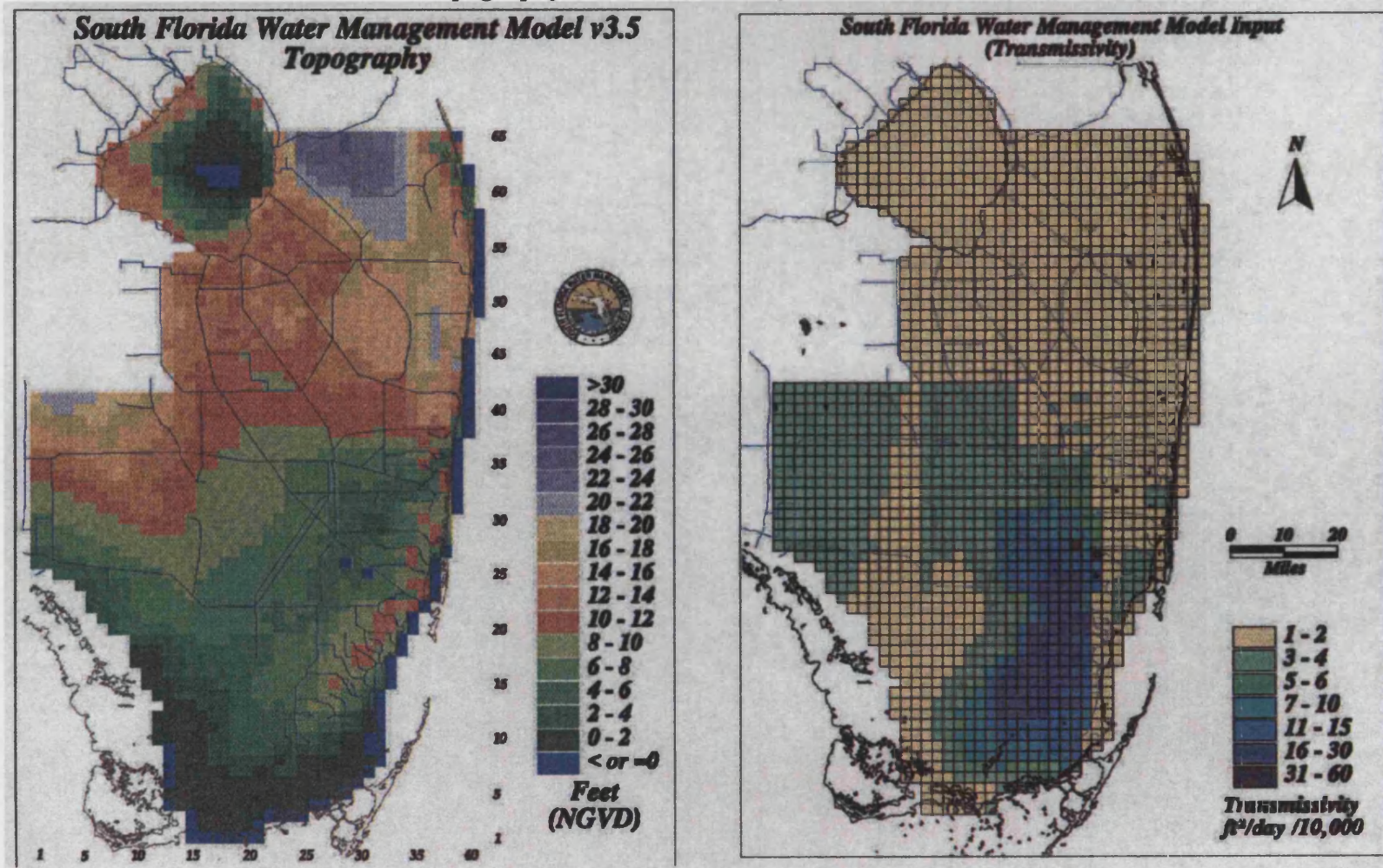
The question of how restoration objectives were established and how success was measured is a litmus test towards understanding the powerful role of simulation models in the Restudy. Restoration objectives were identified through another type of modeling exercise, relational models known in the Restudy as CEMs, which were developed from inter-disciplinary communications amongst scientists. From causal linkages identified in CEMs, PMs were developed as indicators to evaluate progress towards ecological goals.

SFWMD bird specialist Dale Gawlik, a participant in CEMs development, summarized the relevance of CEMS to the Restudy stating: “The conceptual models were, I think, the backbone of the planning process”. The method used to develop CEMs was through interactive peer review towards developing consensus on causal relationships in ecosystem restoration science. John Ogden described the CEMs development process:

We would get twenty-five of the right people that had been working on a given part of the system and we would spend two or three days in a workshop. We would make lists of what we thought the major stressors were on the system, what the best indicators were and the major ecological linkages. Then somebody would go off...package it up in one of those conceptual models and then you'd come back and have another workshop. [CEMS] was a wonderful way of stimulating conversation and discussion and it was an evolutionary process in terms of getting scientists to think. They'd have something to look at as they thought, and out of that would come, “well, this is the most important.” Something gradually would come out of this [process], something constructive, like what was important, what were really the major ecological features of the Everglades, where were the ones that were less important and where do we put our focus.

Ogden and SFWMD scientist Steven Davis designed and coordinated the CEMs development process towards finding an effective way to incorporate and integrate

Plate 6.13: Topography and Transmissivity as Modeled in the WMM¹⁶³



¹⁶³ Provided by Obeysekera, interviewee.

known scientific knowledge about the Everglades. In addition to identifying what was known, the robust process also identified gaps in knowledge to prioritize future research.

In the large, complex ecosystem that amalgamated traditionally separate ecoregions a clear benefit of CEMs was to foster interaction amongst scientists from different interests, regions and disciplines. As Ogden noted, “one of the real values of CEMs was that they were a catalyst for discussion”. Scientists who participated in CEMs development spoke favorably about the process. For example, Gawlik said:

Everybody I was aware of doing science in the Everglades was involved at some point...over that two year period the goal was to bring as many people as possible into workshops to capture the crux of what's going on. We had very spirited discussions on some issues, and there was a lot of exchange. We eventually ended up with consensus on the main important links between stressors and attributes, and then eventually, PMs.

Hence, development of CEMs was robust, scientific peer-review that yielded PMs during the Restudy process.¹⁶⁴ While the majority of PMs fittingly emerged from CEMs, some PMs were inappropriately based on comparisons with the NSM, which cannot be calibrated or verified. “Traditional calibration/verification methods can not be applied to the NSM” (COE, 1999b:Appendix B, B-50), because the model attempts to express the hydrology of the ecosystem before any data had been collected.

Application of calibrated WMM parameters to the NSM was a mechanism used to reduce uncertainty of the NSM. However, from a human interpretive perspective this was problematic because the appropriate use of the NSM by many actors was poorly understood. Some non-technical actors saw the NSM as *the* objective to recreate during the Restudy because the NSM and WMM were more comparable through the mutual use of WMM parameters. For example, CERP notes, “the use of recent input data [into the NSM] allows for meaningful comparison between the current managed system and the natural system under identical climatic conditions” (COE, 1999b:Appendix B, B-50). While the NSM can be a helpful guideline, it was highly problematic when the NSM moved beyond a planning tool to become the benchmark of restoration success. Nevertheless, CERP misleadingly portrayed the NSM not only as appropriate, but also as *the* primary basis for PMs:

Many of the PMs used to measure progress toward ecological objectives were based on hydrologic patterns revealed by the NSM...The topography of subsided areas are adjusted in the NSM to

¹⁶⁴ CEMs are also relevant in CERP output, monitoring and adaptive management.

estimated pre-drainage levels. The output from the NSM represents the best available approximation of the pre-drainage condition and is the basis for many of the restoration targets (COE, 1999b:7-10).

This statement is revealing in a number of contexts. First, it identified PMs as linked to NSM, rather than relying on the more complex and scientifically robust CEMs. In fact, oddly, CERP's sections discussing PMs made no mention of CEMs. Secondly, this statement discounted the relevance and uncertainty of subsidence in the determination of restoration objectives. In addition, the inclusion of "estimated pre-drainage" soil levels as a parameter of the NSM further reduced the meaningfulness of comparison between NSM and WMM. In a landscape with greatly reduced spatial area, use of NSM as basis for restoration targets was inappropriate. Most strikingly, this statement in CERP incorrectly conveys to the reader that the NSM was the basis for restoration targets and measuring restoration success. The Restudy's focus on the NSM coupled with the failure to acknowledge CEMs as the basis for the creation of PMs¹⁶⁵ is a revealing point about communication of science to public.

Understanding CEMs, both how they developed and their integral role in the Restudy is much more complex than acceptance of the visual representation offered by the NSM. For a non-technical actor it was more comprehensible to compare results of one simulation model with another, in contrast to understanding the difference between predictive and simulation models and further why predictive models are more robust for the development of objectives. Moreover, attempts by technically savvy actors to explain the appropriate context for the use of the NSM could have widely discredited the NSM, which in many ways had an iconic status as the ideal of restoration and could have undermined the ability of non-technical actors to reach agreement on a conceptual approach.

During the Restudy there were effectively multiple levels of understanding and engagement with the process. There are broadly two scientific levels: technical understandings of the simulation models, and understanding of CEMs. The non-technical actor level consisted of actors engaged in less detail and who appear to conceptually have understood the Restudy as working towards making the WMM more closely resemble the NSM. These non-technical actors, for the most part, did not understand the black-box of the simulation models nor the process of developing PMs from CEMs. While simulation models proved beneficial as a way to communicate across the technical and non-technical levels of engagement,

¹⁶⁵ CEMs are mentioned in CERP (1999:5-34 – 5-35) but there is a complete disconnect between discussion of CEMs and their use in development of PMs.

simplifying the objectives and measures of success to the simulation models also presented problems. For example, MacVicar stated:

One of the dangers is if you show simulations to a policymaker and say the NSM is good, even the name implies that it's good, they buy-in to the 'model'. But you've got to be careful what the public's goals are for the Everglades. That's the step that you really take on faith in the Restudy: that the public's goals can be met through just changing the water and the NSM is the way you change the water.

Use of the NSM allowed for a clear visual objective that interests could rally around for restoration. NSM effectively assumed an iconic status by depicting a restored ecosystem. The clear, but misguided premise of the iconography was that the closer a WMM alternative mimicked the NSM the better the result. Actors then could fixate on recreating the NSM and became divorced from the uncertainty and limitations of the application to the existing remnant natural ecosystem. Examples include John Marshall's devotion to a flow-way and some environmental groups' insistence that the ENP receive priority for water allocation based on the NSM.

Technical actors identified three widely unacknowledged points necessary for appropriate use of the NSM:

- Results should be interpreted regionally rather than for discrete cells.
- NSM water levels should be interpreted with +/- *one foot* uncertainty.
- While useful for water depth, within the +/- one foot, NSM should not be used to simulate discharges (MacVicar and Lindahl, 2000:6).

Restudy documentation concurred with these points, though with a different uncertainty range, noting that while the NSM "represents the best available approximation of the pre-drainage condition and is the basis for many of the restoration targets...it would not be appropriate for depth targets at scales plus/minus 0.5 feet, *or to be used for estimates of flow volume*" (COE, 1999b:7-10). These findings question the legitimacy of using the NSM as a restoration target. Ignorance by non-technical actors of the water depth uncertainty range obscured a significant shortcoming of the NSM in a system where the difference of inches can mean flooding high ground. MacVicar and Lindahl highlighted this point writing, "planners consistently ignored the range of uncertainty that limits water depth estimates...the most basic model output used to evaluate the plan's performance" (2000:i).

The explanation for why the NSM was used and continued to be widely understood by non-technical actors as the restoration objective and mechanism to measure a given alternative's success was socio-political expediency. It was simply

easier to channel a group of diverse interests towards a common visual goal rather than attempt to engage planners and public interests in the scientific debate that surrounded the development of CEMs and resultant PMs. Hence, from a socio-political context planners and technical actors possessed different concepts of the ecosystem restoration objective.

The occurrence of different details and language amongst sets of actors was not necessarily problematic, and in some instances was simply pragmatic; moreover, was appropriate towards fostering communications within and among sets of actors. For example, Obeysekera provided me with animated output of the simulation model that visually summarized differences between the current managed system, *Alternative D-13R* and the NSM (Attachment 2). The animation showed how CERP moves the current hydrology towards the NSM. Obeysekera identified the animation as a mechanism for effectively communicating the technical, complex plan to policy-makers, stakeholder interests and politicians saying, “this was for a different audience, like Tallahassee or Washington. Our Governing Board likes to see things like this, without the technical details”. While undeniably highly beneficial as a communication tool in the context Obeysekera described, such simplified portrayal of the processes underlying the Restudy was problematic and inadequate within the more detailed Restudy documentation where the role of CEMs should have been better explained.

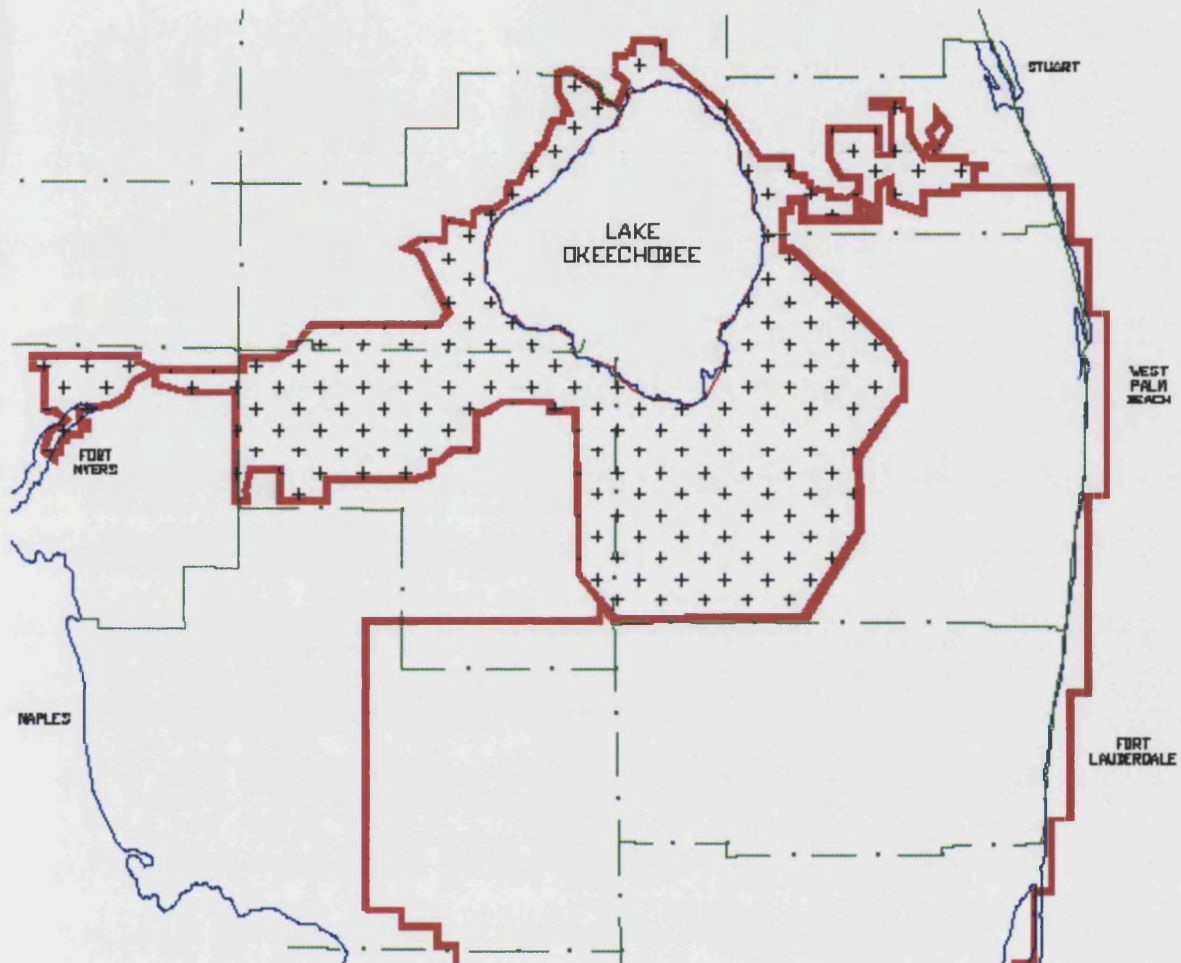
6.5.3 Socio-political Construction of WMM Parameters

The WMM included some parameters that precluded debate of politically contentious questions. For example, while the WMM 2 mile x 2 mile grid appeared across the entire watershed, within the fine print a grid overlay followed specific, pre-determined parameters within the EAA (Plate 6.14). The EAA parameters stated:

The entire area of the EAA in production was assumed to have a uniform depth to water table equal to 1.5 feet below land surface. This is consistent with the level at which the water table is maintained in the EAA during seepage irrigation, the type of irrigation used for the predominant crop type in the area, sugar cane. Within this narrow band of soil...a desired range of moisture contents is maintained...Therefore, the EAA is simulated in the model such that the natural fluctuation of total soil moisture is within [the desired range of]...the water table is maintained at 1.5 feet below land surface (SFWMD, 1997a:88).¹⁶⁶

¹⁶⁶ Available: http://www.sfwmd.gov/org/pld/hsm/models/sfwmm/v3.5/maintext/chap3_3.pdf [June 20, 2003].

Plate 6.14: Separate WMM Parameter Boundaries for EAA¹⁶⁷



¹⁶⁷(Hydrological Systems Modeling Division, 1999:6). Available:
http://www.sfwmd.gov/org/pld/hsm/models/sfwmm/v3.5/maintext/chap1_3.pdf [March 21, 2004].

Hence, the EAA was modeled specifically to favor the current agricultural production. While it was clearly beneficial to be able to accurately model the EAA with the status quo of land use within the WMM, assumption that this was the *only* manner in which the EAA could function in a “restored” ecosystem is problematic. A much better way forward within the iterative modeling of alternatives would have been to include other potential water management patterns in the EAA. The predetermination by the WMM that the EAA could have no other hydrological function effectively eliminated the ability to meaningfully debate appropriate future land use in the EAA. In the context of greater ecosystem restoration this limitation was extremely troublesome because core sustainability issues of development and land use patterns were ignored.

In fact, in this instance the WMM’s technical parameters created a scenario whereby apparently “neutral science” was applied in a manner that obscured relevant socio-political questions. Questions left unasked as a result of the assumptions made by model parameters included:

- Should sugar cane production be the EAA land use in 2050?
- Will it be possible to continue to grow sugar cane on land where subsidence is expected to deplete soil beyond the necessary threshold for sugar cane by 2020?
- If sugar can no longer be grown in the EAA what will grow there, different crops or housing developments?
- How does ignoring the EAA as part of the spatial area of the ecosystem limit potential restoration in other parts of the ecosystem?
- Is it possible to include some type of flow-way from Lake Okeechobee to the WCAs as part of restoration to enhance the connectivity of the ecosystem?
- What is the best future land use within the EAA in the context of greater ecosystem restoration?

Hence, the presumption that current water management practices within the EAA would continue indefinitely within a restored ecosystem stifled meaningful and relevant debate about sustainability.

A counter argument to this critique is that the EAA was constructed for the specific purpose of promoting agriculture by the federal government and as a result the status quo was not the fault of farmers, nor should they be penalized for changes in public opinion. The creation of the EAA was linked to the social values at a time

when wetlands were seen as a social anathema and conversion to agricultural land was favorable. Agriculture's existence in the EAA today is a product of those past societal values. Nevertheless, society progressed and social needs and values change. It is incongruous for agriculture to argue that practices potentially detrimental to the common good, in this case inflexibility with water management, should not even be considered within the context of revised social values. CERP did include the component of 360,000 acre/feet of above ground storage within the EAA. 120,000 acre/feet was designed to meet EAA water supply requirements and the remaining 240,000 acre/feet was intended for environmental uses. However, the model parameters that precluded debate about how to best restore the ecosystem for the long term environmental and human benefit was a serious shortcoming of the use of the WMM in the Restudy process.

Perhaps it would have been the case that through a modified process inclusive of modeling various water management alternatives in the EAA, the preservation of the status quo in the EAA would be decided as the preferred option. However, the WMM's assumption of parameters that presumed maintaining status quo in the EAA was severely flawed because it prevented opportunity for meaningful debate. "Neutral science" does not appear as neutral when analyzed within the context of the WMM assumptions for the EAA. In effect, the WMM parameters established the framework for debate about how to restore the ecosystem. As a result, the above socio-political questions fell outside of the realm of debate and lacked a valid mechanism for incorporation into a process whereby modeling was the tool used to negotiate a solution for future water management.

In fact, the EAA became effectively untouchable within the context of altering water management. Priority given to the EAA was demonstrated in a flow-chart summarizing the functional steps of the WMM where one of the early steps computes needs of EAA prior to consideration of remnant natural system's needs (SFWMD, 1997a:8).¹⁶⁸ Prioritization of the EAA's hydrological management within the WMM parameters raised the question: *is the potential extent of restoration in the remnant natural system negatively influenced by the continued priority given to the water management of the EAA?* This and other questions were silenced as a result of the parameters imposed on the WMM. The example of the EAA also proves to be an enlightening instance of how too much precision in science can limit the range of

¹⁶⁸ Available: http://www.sfwmd.gov/org/pld/hsm/models/sfwmm/v3.5/maintext/chap1_3.pdf [March 15, 2004].

ultimate outcomes. The objective within ecosystem restoration science should be “good enough science for better than average management.” In this instance, better than average science limited the potential for developing a management solution by presupposing a solution within limited conditional parameters.

In addition to the conditions for EAA, other parameters assumed in the WMM similarly limit the framing of solutions to future water management. The Lower East Coast (LEC) model parameters included water supply for a projected doubling of current population to reflect potential growth by 2050. The rationale behind modeling water supply for future rather than current population, as previously discussed, was based on the legal requirement that water supply for future population be planned so that shortages only occurred in a one in ten year frequency. Beyond legal requirements, planner Agnes McLean argued that it was prudent to anticipate future human needs to assure adequate provision for the environment in future scenarios of water stress. While this argument is logical, a serious problem with accommodating the water supply needs of 2050 population was that no conservation measures were considered as a potential factor in the WMM modeling exercise.

As in the case of the EAA, the parameter for the level of future water supply was predetermined as a fixed amount of water for the increased population. While documentation indicates that the model can accommodate “short-term water restrictions on various users within the LEC” (SFWMD, 1997a:141), these restrictions were incorporated as temporary measures during dry periods to prevent saltwater intrusion into aquifers by maintaining groundwater levels of sufficient head. *No systematic long-term reductions in per capita human water demand were considered in model iterations and hence as a central component of the Restudy.* Failure of the WMM to incorporate planned conservation measures, whereby the average daily use per person decreases from present level, was a serious shortcoming of the WMM. From a socio-political perspective conservation offered a crucial aspect of water management that was for all intents and purposes ignored in the Restudy.

In both the case of agriculture and utilities, these powerful political interests manifested in assumptions made within the technical parameters of the WMM. Model parameters perpetuated the status quo in both cases: continuation of the water management regime within the EAA and assumption of consumption at the currently high levels (at low cost to the consumer) for double the population in the future. In both instances the ability to truly work towards sustainable, equitable allocation of water amongst the three primary categories of users, agriculture, urban and

environment, were silenced as a topic of debate by assumptions made in the WMM's technical parameters. Use of technology to establish parameters that predetermined the range of options on the table for consideration was the greatest weakness of the Restudy because this stifled sincere debate about core socio-political issues of sustainability integral to the question of water management. Exclusion of these debates through the inclusion of technical parameters was most unfortunate as the opportunity towards devising innovative, proactive solutions was squandered during a time when the actors and institutions were mobilized.

The above examples of the existence of parameters for the EAA and human water demands demonstrate the potential weaknesses of environmental governance based on hard sciences without appropriate inclusion of social sciences. The WMM was a powerful technical agent seen as promoting sound science. The near absolute power ascribed to the model to identify solutions created a situation whereby the WMM became deterministic through inappropriately limiting potential debate on relevant socio-political questions. From a socio-political perspective the Restudy failed to address foundational issues of sustainable governance of water resources in South Florida. While successfully authorized, CERP featured the painless solution of recapturing water presently "lost" to tide coupled with technical strategies. Although the avoidance of core socio-political issues perhaps ensured the authorization by Congress, these issues remained and their ultimate resolution will not likely become easier in the future. In fact, the avoidance of these core socio-political debates as part of the Restudy process offers explosive potential for future problems during the implementation of CERP.

6.5.4 Model Outputs and Outcomes

The output of the simulation modeling included highly technical solutions to water management as part of CERP such as ASRs, STAs, seepage barriers and wastewater treatment plants. While it is beyond the scope of this thesis to evaluate these individual technologies, from a social scientific analytical perspective it is important to recognize the substantial reliance on technological solutions of modeling output and resultant outcomes. Some stakeholders were critical of the extensive reliance on technology in CERP because they viewed technical solutions as counter-intuitive to the objective of restoring the natural form and function of the ecosystem. Activist Joette Lorian commented that from an environmentalists' point of view:

Everglades' restoration is supposed to be about breaking levees down

and making things more natural. And I can almost understand that because I used to have the same image of the Everglades restoration - a Pollyanna view of I want to make it all natural again and I want to rip everything out and let's tear out Tamiami Trail and let's get rid of the EAA. And then you realize it's never really going to be like what it was - in fact, it's almost like what you realize is that because it's so manmade and constricted by the cities and the farm areas, it's going to need the help of engineering just to even *mimic* it being more natural.

Hence, Lorian expressed acceptance of the reality that a restored Everglades had direct reliance on water management technology. However, a concern amongst some scientists was the extent to which new technologies are required in CERP to meet the water supply needs of the competing users. These scientists emphasized that difficulties may arise if the technologies fail to perform as anticipated.

Therefore, an outcome of the Restudy was the risk that some of the technical solutions proposed may not work as planned during implementation, which will raise the challenge of finding other viable solutions to meet demand for water. Peter Ortnier summarized this perspective stating, "Another problem is that CERP involves a great leap of faith to solve all kinds of technical issues. The way a reasonably equitable distribution was reached was by including in the picture, 'yes, it formally works on paper, but there are large technological things to overcome, like ASRs'". Therefore, an outcome of the Restudy was that equitable water allocation became inextricably tied to reliance on technology. Which raises the question: *If technology fails to work as planned and other feasible and cost-effective solutions cannot be agreed which users will have allocation priority for limited water?* The relationship between equitable allocation to multi-purpose users and technology is illuminated in such 'what if' scenarios. As previously discussed, one low cost mechanism for creation of more available water not included in CERP was conservation. Nevertheless, the technological output of model iterations had the outcome of further demonstrating the relationship between social science and technical science in water management policy.

6.6 Linkages Between the Restudy and Implementation of CERP

Sound science binds together the Restudy and CERP's implementation processes. This chapter has considered what constitutes sound science and also the shortcomings of science's use in the Restudy. A key attribute to soundness of science

in the Restudy was how planning was meaningfully linked to implementation through science. This section provides a brief overview of the linkages between planning and implementation through CEMs, PMs, adaptive management and peer review.

6.6.1 CEMs as the Foundation of Sound Science

Dale Gawlik identified CEMs as the “backbone” of the Restudy; CEMs similarly are the scientific basis of adaptive management in CERP’s implementation. Hence, CEMs are the primary scientific framework cohesively linking the Restudy process with implementation. The relevance of CEMs to the Restudy was to offer a scientifically sound approach towards identification of “PMs and restoration targets...[and to] lay the foundation for the design of [a] regionally comprehensive monitoring program and for the institution of an adaptive assessment strategy for reaching long-term restoration goals” (Ogden, 1999:i). Like Obeysekera’s observations about the use of the simulation models to enhance communication, Ogden emphasized a benefit of CEMs was improved communications within the wider scientific community that was studying the Everglades. While it was important for CEMs to identify causal relationships between stressors and attributes towards agreement of PMs, CEMs also importantly provided a scientifically robust mechanism for integration of new scientific findings into CERP. The fact that the process of refining CEMs continues beyond the authorization of CERP established a consistent and rigorous procedure for integration of peer-reviewed science.

6.6.2 Peer Review by Organizational Outsiders

By bringing together multi-disciplinary and multi-agency scientists, CEMs was an integral mechanism of peer review during the Restudy. However, if peer review was integrated into these processes, was it really peer review since the “peers” were actually actors belonging to stakeholder groups? To obtain outside peer review a National Academy of Sciences review panel, the Committee on Restoration of the Greater Everglades Ecosystem (CROGEE), was established. However, establishment of CROGEE occurred only after “there was a kind of a little scuffle in the press...Stuart Pimm had wrote a letter to Secretary of the Interior, Bruce Babbitt, and then got some prominent ecologists to sign on and say it needed to be reviewed - so there was a little antagonism” (Ortner). With the motto of sound science as a driving principle of CERP, outside peer review by CROGEE should have been universally

accepted as beneficial. As Dale Gawlik said, "I know that CROGEE, or a body like it was always supposed to be part of the process". To the contrary, CROGEE's existence was highly controversial as some interests were concerned about the extent to which CROGEE's scientific peer review can then determine policy. As Ortner explained: "The truth of the matter is much of the Task Force, the State and the Tribes, very loudly, are very skeptical about CROGEE. They are nervous about it moving beyond technical issues into policy recommendations".

Insiders' fears about the ability of CROGEE to affect policy through scientific review reflected the tenuous balance of sound science within the range of socio-political acceptability negotiated by local interests. As Peter Ortner commented, the logic behind objections to CROGEE were entirely political:

In my own view it's [been] made quite clear from Dexter [Lehtinen of the Miccosuke Tribe and] Mike Collins from the District. The real issue is they want to make sure they have Tribal and State veto power over anything to do with restoration. Now on the other side of the table, the Department of Interior, the pure resources agencies like natural resource system type agencies like NOAA, like parts of the Department of Interior, are 180 degrees opposite. They feel that their mandate is on the ecosystem restoration side of life here, and anything to do with the growth or sustainable growth of South Florida is not their problem, and not even their issue. They feel the only way those issues won't be sacrificed is by a very strong, completely independent academy or something like a panel, and federal dominance of that Task Force. And somewhere in the middle, walking back and forth, edgily, is Michael Davis and the COE.

Hence, the insiders' objections to CROGEE were based on political concerns about the potential for erosion of the tenuous balance struck by competing interests to develop CERP.

Interestingly, one pervasive objection by insiders about CROGEE was inclusion of social scientists on the review panel. At a CROGEE meeting following authorization of CERP, a prominent social scientist asked to be removed from the review panel if his ability to participate meaningfully in CROGEE continued to be stymied (observation, February 1, 2001). Since the Restudy relied on stakeholder involvement as well as quantitative science such attempts to block social science review by CROGEE was not only counterintuitive, but also counterproductive towards effective implementation. Attempts by insider actors to block inclusion of social scientists was highly ironic because without social science the range of socio-political acceptability falls out of the Restudy process equation and decision-making is left to the realm of quantitative science. Elimination of the social science aspect of

the Restudy would have failed to produce a tenable water management plan and hence social science peer review should be an integral topic for CROGEE. However, as Ogden noted, planners like to be able to support their position with scientific findings: “the managers really want this to be a science based plan. Politically, that’s a very popular thing to be able to say and people that are paying the funding also want to be sure that it works. So everybody’s comfortable with this concept of a science based plan”. Therefore, the desire to obscure the role of social science appeared to emerge from the fear that acknowledgement of its relevance would be a diversion from sound science. However, social science is in fact part of the total package of sound science. Moreover, avoidance of social sciences undermines recognition of the necessity of integrating different scientific approaches towards successful policy development and implementation.

For political motivations, some interests also had objections about CROGEE’s review of quantitative aspects of the Restudy process such as monitoring, simulation models and ASRs. In contrast to many actors’ fears about CROGEE influencing policy Ronnie Best highlighted the benefits of CROGEE and clarified the organization’s role:

CROGEE are looking at it from a completely different level. And they do have the opportunity to step back and say, “well, we have nothing to do with you folks down in South Florida and so therefore we can make recommendations or give our viewpoint or assess the science from a different perspective.” There are some people who do not like that. In fact, there's one particular group of people who are raising all kinds of cain and saying well, why should anyone like the National Academy of Sciences have anything to do with policy. Well, National Academy of Sciences says, “hang on, we'll tell you what the science is. If it has policy implications, then that's up to you to decide whether or not [CERP] should be implemented in a new way”.

Best’s explanation provides logical rationales for the inclusion of an outside scientific body for peer review: greater objectivity and an ability to divorce the science, both quantitative and social, from the political. Ultimately, the question of how new scientific findings should be integrated during implementation will be resolved by the COE, SFWMD and RECOVER. Notably, the institutions that governed the Restudy Team and will govern RECOVER during implementation rely on inclusion of social sciences as well as the quantitative findings from hydrology, ecology and modeling.

Summary

This chapter has investigated the roles of different types of science in the Restudy process. Issues of power and uncertainty were considered as well as detailed discussion of specific types of sciences. Identification of the centrality of social sciences, as well as the controversy in its application, was a theme emergent from this chapter. As a discursive strand science, both quantitative and social, linked together the Restudy process, its output and future implementation. A crucial finding from this chapter was the extremely political nature of science in the context of highly contested water management in South Florida. Science was indeed a powerful type of knowledge for both framing problems and delineating potential solution sets. This chapter concludes the three empirical chapters and has brought us to a point where we have explored the roles of institutions, actors and the role of different types of knowledges in the Restudy process. The next chapter concludes this thesis by discussing the theoretical, empirical and methodological lessons learned through investigating the Restudy process.

Chapter 7: Conclusion

*“That we must act now is clear. The question which we face is how.”
-Barry Commoner (1971:300).*

Introduction

This thesis is interested in evaluating how a policy-making process for a multi-purpose water management plan unfolded in a highly conflicted watershed with many competing stakeholder groups. At its core, this investigation of the Restudy process is concerned with collaborative management as a strategy of governance for sustainable and equitable water management. This chapter discusses the key findings and original contributions to knowledge of this thesis. The chapter begins by moving away from the focused analysis of the specific themes featured in Chapters 4 (institutions), Chapter 5 (actors' agency), and Chapter 6 (role of science) to consider the wider socio-political context in which the Restudy process unfolded. Acknowledgement of this context is important because the Restudy was inherently a political process with power relations being negotiated amongst actors in the social settings of different knowledge worlds. From this wider context, the next section considers the key findings to the research questions about the roles of institutions, actors and different types of knowledge. The implications of key findings are explored from their theoretical, methodological and practical policy contributions. Finally, the thesis concludes by considering to what extent collaborative management offers a strategy for genuine consensus-building or is rather pragmatic negotiated compromise.

7.1 Socio-political Context (1992-2000)

The Restudy process occurred from 1992-2000 when the Democratic Party held the US executive branch of federal government, led by President Bill Clinton and Vice President Al Gore. The Clinton administration followed twelve years of Republican leadership first under Ronald Reagan and then George H.W. Bush. Since the environmental movement of 1960s and 1970s a distinguishing quality of the two

US political parties has been that Democrats are generally pro-environmental protection, while Republicans are widely attributed with favoring economic development at the expense of environment (Doyle and McEachern, 2001). Following the Regan-Bush era of the 1980s where environmental protection was a low priority, the Clinton administration made significant efforts to institute environmental protection policies. The League of Conservation Voters went as far as saying, "Bill Clinton's environmental record in office is one the best of any president."¹⁶⁹ The Clinton administration had a number of individuals with a stated commitment to environmental protection in key leadership positions. For example, Al Gore authored Earth in the Balance: Forging a New Common Purpose (1992) about the importance of environmental governance and Secretary of Interior Bruce Babbitt advocated environmental protection in principle and practice as the primary mission of the DOI.

A number of initiatives, one of which was the Restudy process, were widely cited as evidence of the Clinton administration's commitment to environmental protection. For example, Clinton proposed the largest budgetary allocation to date for the DOI to use towards National Parks System habitat management and wildlife protection. Clinton also designated over 3 million acres of federal land as National Monuments under the National Parks System, which protected the land from development and resource extraction. Through his executive power he also increased protection of more than 58 million acres of National Forest land in 39 states and prevented logging, energy resources exploration, and road-building in existing National Forest land that had not already been developed. As a result of these actions, Clinton designated more lands for environmental protection than any past president, including President Theodore Roosevelt who first established the National Parks system of federal land protection (Wapner, 2001). Clinton's actions at the end of the twentieth century are particularly notable considering that during Roosevelt's era large tracts of the American West were unclaimed so a greater pool of land would have been available to designate.

The Restudy process, marketed as Everglades' restoration, also featured prominently as an environmental protection achievement of the Clinton administration. Rather than strictly Everglades' *restoration*, this thesis has shown that the Restudy process yielded a multi-purpose water management project. As Ronnie

¹⁶⁹ See the League of Conservation Voters environmental scorecards: <http://www.lcv.org/scorecard/scorecardmain.cfm> [January 28, 2004].

Best summarized: “We have to recognize that to restore the Everglades we have to do two other things: water supply and flood control.” In fact, the Restudy’s notable achievement was improved watershed based management through a collaborative management process for governance that integrated ecosystem revitalization with the human needs of water supply and flood protection. The Clinton-Gore marketing of the Restudy process as focused on Everglades’ restoration, rather than more accurately presenting the achievement of better *governance* for the watershed, was a politically motivated public relations strategy to appeal to environmental interests. However, the administration’s message equating the Restudy with the singular focus of restoration largely failed as a communication strategy. Rather than appealing to environmentalists, it provoked resentment from some environmental interests who thought that the message of restoration was being used to obscure the Restudy’s true purpose: creating a water management plan to accommodate unsustainable population growth in South Florida. In this instance, attempts to simplify the policy action of environmental governance into a marketable message to the wider public failed to convey the notable achievement of developing a scientifically based and socio-politically acceptable multi-purpose water management plan that included restoration in a region with a tradition of intense conflict amongst competing interests.

Unfortunately for Gore, this failed communication had repercussions in his 2000 Presidential campaign. In the 2000 Presidential elections, Gore was the Democratic candidate and George W. Bush was the Republican candidate. Gore believed in and advocated environmental governance. For example, Gore writes, “we do not have to face harsh choices between economic growth and saving the environment. We ought to seek, and we can find, sustainable growth that doesn’t undermine human health or the natural ecosystems that support life on this planet” (1992:xiii). However, his failure to coherently express the concept of environmental governance to the wider public resulted in accusations from environmentalists that he failed to stand by his stated pro-environment position. Some environmentalists felt that Gore’s actions towards environmental policy were too weak compared to his stated pro-environment stance and, to send a message of political protest to Gore, voted instead for Independent candidate Ralph Nader. Nader achieved 97,421 votes in Florida; Gore lost Florida to Bush by 537¹⁷⁰ votes and, as a result, the Presidency.

As a politician Gore recognized environmental governance requires negotiated

¹⁷⁰ For further details and data about the 2000 Presidential Election see: http://en.wikipedia.org/wiki/U.S._presidential_election,_2000#Florida_election_results [January 31, 2004].

compromise. He was pro-environment, but accepted the pragmatic reality that to create environmental policies authorized by the legislature required a win for the environment to be linked to provision for competing interests. In practice, Gore sought to forge “a new common purpose” (1992) through environmental governance with the rationale that it is better to achieve weak sustainability than no concessions for the environment. As this thesis’ analysis of the Restudy process demonstrated such strategic compromise yielded a weak sustainability result in the Everglades’ watershed.

7.2 Restudy: A Political Process

From the above consideration of the wider relevance of the Everglades’ Restudy in US politics this section discusses how understanding the Restudy as an inherently political process with power relations being negotiated between actors in different social settings contextualizes key findings about the roles of institutions, actors and different types of knowledge. Through this focused case study emerged the components, as well as the subtleties of their interaction, that constituted a successful process for the development of environmental governance policy. This thesis makes specific theoretical, methodological and practical policy application contributions to understandings of environmental governance.

7.2.1 Theoretical Contributions

This analysis of the Restudy process has contributed to theoretical understandings of environmental governance. The literature points to understanding environmental governance processes as socially constructed (Brulle, 2000, Demeritt, 1998, Fischer, 2000). Analysis in this thesis has supported the socially constructed qualities of both the problem identification and the delineation of potential solution sets to water management in the Everglades. Exploration of the Restudy also supports principles of sound environmental governance: unification of social, economic and environment; inclusion of multiple stakeholder perspectives; and procedural and distributive justice. The thesis contributes to building the governance literature through the use of structuration theory (Giddens, 1984) for conceptually understanding environmental governance and the use of a “shared-power world” (Bryson and Crosby, 1993) approach to investigate a governance process.

The role of institutions is extensively discussed in environmental governance literature and this thesis further supports the integral role of building appropriate institutions in a policy-making process. However, the findings from this thesis indicate that not only institutions, but also actors' agency are of crucial importance in governance. The critical role of actor's agency is largely overlooked in the literature and this thesis makes a theoretical contribution in demonstrating the power of influential actors in shaping a governance process. Events in a shared-power world occur in organizations, which are distinctive sets of institutions and the actors that inhabit them. This thesis has identified that the organizations of the Restudy process had different communicative foci and demonstrated the varied and complementary roles of these multiple organizations to together constitute a governance process.

One of the most interesting theoretical implications of a shared-power world is the power dependency of competing stakeholder groups in decision-making (Stoker, 1998). In a governance perspective the realm of policy decisions moves beyond that of strictly government towards one where the plurality of interests with a stake in the issue play a critical role. Rather than a monolithic public interest, this thesis has identified the importance of recognizing the plurality of perspectives that constitute the public interest and the importance of building appropriate institutions to integrate the competing perspectives into a collective action position. This thesis also points to the necessity of these institutions being inhabited by "authentic" (Salt) representatives that have the recognized legitimacy to make decisions on behalf of their respective constituent stakeholder groups in an empowered collective action forum. Effective collaborative forums, like the GCSSF, include representatives from all of the powerful individual stakeholder groups that could individually thwart the decision-making process through litigation. Rather than collaborative forums providing "public interest", this thesis has asserted that such stakeholder group empowerment forums delineate the "range socio-political of acceptability" that a plan must be within in order to be accepted as policy.

The literature points to the acceptance of collaborative management as a strategy for governance adopted by competing stakeholder groups when other more opportunistic individual strategies would be less effective (Baughman, 1995; Ostrom, 1990; Susskind and Cruikshank, 1987). This thesis' analysis of the Restudy process has supported that highly pragmatic explanation of the motivation for competing interests to engage in collective action forums. During the Restudy, interests that had engaged in collective action also made individual attempts to circumvent collaborative

agreements. In the instances when this occurred, those interests found diminished returns and instead retreated to the collective action position. The collaborative management result was a weak sustainability position, which resulted from negotiated compromise where each competing interest achieved as much as possible while conceding as little as possible.

7.2.2 Methodological Contributions

This thesis makes contributions to qualitative methodologies through approaches deployed to identify and analyze interviewees from stakeholder groups. The Restudy presented three specific methodological challenges: large spatial scale, complexity and range of stakeholder groups, and access to actors. To address these challenges I developed a conceptual stakeholder selection map. The map first identified broad categories of interest, then specific stakeholder groups within these categories. Representational actors involved in the Restudy were then identified from the stakeholder groups. Semi-structured interviews were used as part of a triangulated methodology towards collecting data on the informal communications that were part of the Restudy's governance. As a result, I sought a balance of individuals both core and peripheral to the process to collect data about their differential experiences.

To identify and communicate with interviewees I used an application of grounded theory I called 'follow-the-actor' methodology. This included identifying initial contacts through archival research and then following leads to additional contacts suggested by an interviewee. Follow-the-actor methodology also included networking at conferences and organizational meetings as well as communicating with individuals that made comments on an Everglades listserv. Networking at conferences and organizational meetings proved particularly effective for gaining access to core actors, while the listserv provided access to peripheral interests that would have been otherwise difficult to locate and include. A specific benefit of the US cultural context was the highly transparent quality of the data. Interviewees agreed to be recorded and attributed by name in the thesis. The conceptual stakeholder selection map was further refined during subsequent stages of fieldwork to seek a balance of involvement in the Restudy as well as among stakeholder groups through plotting interviewees' organizational memberships. The selected interviewees included individuals identified as 'insiders' and 'outsiders' based on their organizational membership.

The use of the classification of organizational insiders and outsiders became

an important analytical tool that allowed for a comparison of their experiences during the Restudy process. Insiders were further classified as belonging to one of three primary 'universes': science, policy and local voice. The term universe served as a conceptual metaphor to express the organizational focus on specific types of knowledge. Analysis identified those actors with membership in organizations within all three universes as 'super-agents'. Analysis of the unprompted mention of other actors by interviewees demonstrated the use of not only different knowledge foci within the universes, but also the existence of specific knowledge strands as the basis of social networks amongst actors. Interestingly, interviewees within different universes applied varied communicative rationalities (Rydin, 2003) to express their perspectives. Analysis identified the powerful roles of super-agents who participated in organizations within multiple universes and communicated using multiple rationalities.

7.2.3 Policy Implications

In terms of policy implications, this analysis of the Restudy has offered practical insights towards improved understandings of the recursive transformations between actors and institutions and the role of formal and informal communications in a complex governance process. Analysis has identified the crucial role of building appropriate institutions that are inhabited by legitimate actors. Evaluation of the Restudy identified existing government institutions as inadequate and new organizations had to be created to undertake governance in a shared-power world. The flexibility to create responsive organizations was not the exception, but rather a necessity for effective environmental governance. In the Restudy process the policy, science and local voice universes each saw the creation of new organizations that were designed to mobilize actors and institutions. Hence, the example of the Restudy indicates that a singular new institution will likely be inadequate for effective governance. This thesis has identified the crucial role of separate, complementary new organizations in the governance of the Restudy process.

Furthermore, the act of building organizations is not a discrete task but rather a fluid, continually evolving process. Initially organizations within the three universes had limited memberships. These memberships were expanded to be more inclusive of wider ranging interests to increase their legitimacy and effectiveness in decision-making. Additionally, during the course of the Restudy organizations formed and then dissolved as their specific function was accomplished. For example, when CERP

was sent to Congress the Restudy Team dissolved because the purpose that it was designed for was achieved. As the policy-making process progressed the need for a scientific team to address implementation was recognized. The dissolution of the Restudy Team coincided with the formation of RECOVER. The creation and evolution of organizations during the process was largely as a result of the initiatives of key actors. These individuals, often super-agents, were in positions of power where they could establish and then integrate organizations into the decision-making process. Such individuals used their agency to empower other actors. Interestingly, through empowering other actors their individual power further increased in the policy-making process.

In terms of practical policy implications the Restudy process has demonstrated the crucial importance of local involvement forums for collaborative management in a US context. A key feature of GCSSF was that members belonged to powerful competing stakeholder groups that could have individually undermined the authorization of CERP through litigation or individual lobby. Firstly, the GCSSF demonstrated that it is possible to create an effective organization with competing interests in a highly conflicted watershed. Secondly, the Commission offers the example of key features that enabled its success in the Restudy: the talented leadership of Dick Pettigrew, inclusion of representatives from all the powerful individual interests, and institutions that empowered collective action and integration of the Commission's input meaningfully into the decision-making process.

Inclusion of competing interests was crucial because if any interests that had the power to obstruct the Restudy were excluded, those interests strategically had great incentive to undertake individual action. Instead, the inclusion in the GCSSF of all the powerful competing stakeholder groups allowed for the creation of consensus rules and provided significant incentive for the interests to engage in collaboration. Thirdly, the Commission showed that through empowerment these competing interests were able to achieve a collective action position. The statements of the Commission were powerful because the inclusive membership and consensus rules crucially offered a range of socio-political acceptability that a plan would have to fall within to be collectively accepted by the competing interests that could individually hinder the authorization of the plan. Finally, key actors from other universes welcomed the Commission's collective action results and effectively integrated them into the Restudy process. Hence, delineation of the range of socio-political acceptability by the local voice universe played a crucial role in shaping CERP.

The Restudy has been endorsed as a scientifically driven and scientifically sound process with a commitment to public involvement. The above discussion indicates that while sciences featured as powerful types of knowledge and are essential for both the problem identification and delineation of potential solution sets, at its core the Restudy was a highly political process. Nevertheless, science and technology were knowledge types with powerful roles in decision-making. Science and technology were a source of legitimacy in the Restudy and competing interests sought to mobilize their arguments around a scientific evidence base. Chapter 6 discussed how multiple interpretations of scientific “facts” as well as inherent uncertainty in science offered opportunities for competing interests to shape their arguments. Science was indeed a powerful knowledge type in determination of sound environmental governance, but notably subordinate to addressing political and economic interests in the greater Everglades’ watershed. As Jack Moller said, “politics controls science and politics evaluates science.” The Restudy process’ integration of scientific knowledge had to fall within a range of socio-political acceptability to produce a multi-purpose water management plan that ultimately would be authorized. For example, Stuart Appelbaum from the COE calls the Restudy a “marriage of technical feasibility with political acceptability. Where the two overlap is the zone you want to be in.”

Numerous interviewees emphasized the shared desire amongst competing interests to have CERP be a science-based plan. However, interviewees’ also acknowledged that a scientifically sound plan was insufficient. Christopher McVoy calls this reality the “undeniable political element”. The political element is clear in the examples of individual interests attempting to leverage scientific information to support their political position. For example, Peter Ortner mentioned the threat posed by individual species management, such as the Cape Sable seaside sparrow, conflicting with and super-ceding coordinated watershed management. Another example was the ENP and some environmental groups use of simulation modeling and ecology to argue for the prioritization of water management within the ENP boundaries. John Ogden’s comment that identified *Alternative D-13R4* as a “quick and dirty modeling exercise because ENP was not happy with *Alternative D-13R*” reveals how political motivations were cloaked in scientific and technical rationales by stakeholder groups.

In terms of procedural justice, despite some specific criticisms, interviewees, particularly insiders, largely found the collaborative management undertaken during

the Restudy to be an equitable approach to environmental governance. While Chapter 5 demonstrated that outsiders had higher levels of dissatisfaction, those engaged to some degree in the process, even individuals whom identified specific shortcomings, emphasized that though the Restudy was not perfect it was the best procedural solution. For example, Dale Gawlik said, "I definitely support the process. I've seen the weaknesses of it, I've seen the strengths of it and I can't come up with another better process." Jayantha Obeysekera commented: "In the end people realized that in order to meet all their demands they just had to have some compromises." This observation supports Ostrom's (1990) theories about CPR management and further explains why collaborative management can offer an effective strategy for environmental governance: inclusion of competing interests throughout the process allows those interests that could derail the policy-making result to achieve a mutually acceptable compromise within "win-win" decision-making forums and arenas rather than the "win-lose" social setting of courts. As Ronnie Best summarized: "Since nobody is perfectly happy, then CERP is probably a pretty good compromise." The next section considers to what extent collaborative management is consensus-building or pragmatic, negotiated compromise.

7.3 Collaborative Management for Governance

Existence of collaboration during the Restudy process was evidenced by the achievement of CERP despite the different goals for the Restudy cited by interviewees from varied stakeholder groups. Some interviewees presented the goals of a governance perspective: integrating restoration, water supply and flood protection. Other interviewees, while acknowledging the multi-purpose goals, were highly critical of the governance perspective because they thought not enough restoration was achieved. For example, Alan Farago, Sierra Club said, "I believe the EAA should be bought out. That may be politically impossible, but people need to say it." Audrey Peterman concurred: "The highest goal of the restoration should have been purchase of agricultural land and return to its natural state." As discussed in Chapter 5 these outsiders had an unrealistic goal for the Restudy, while insiders recognized the strategic solution of sharing benefit and adversity to achieve a plan that would be authorized. Nevertheless, insiders from different interests have varied statements about the goals of CERP. For example, planner Agnes McLean and Dade County

employees were the only interviewees who identified the goal of meeting the one in ten years water shortage standard for water supply.

The different interests also had varied concerns about CERP. Richard Harvey, EPA, emphasized the need for better integration of water quality; other interviewees largely accepted that the Restudy focused on equitable allocation while quality was being approached in other social settings. The level of hydrological connectivity was a point of concern cited by hydrologists. Mary Ann Poole and Ronnie Best were also concerned about connectivity, but from an ecological perspective of habitat for wildlife. Interviewees also cited concern about CERP's reliance on a range of technical issues, such as ASRs and wastewater reuse. Peter Ortner said that CERP contained a "great leap of faith" that various technical issues could be solved. Jack Moller was concerned about the baseline data used in the hydrological simulation modeling to develop alternatives. A third type of concern about CERP was the socio-economic. The largest socio-economic issue was the lack of addressing sustainability in future development in terms of land use (Marshall), population growth (Aumen), and water use (Alspach).

The range of different goals and concerns about CERP identified by interviewees from competing interests highlight the complexity of environmental governance. As discussed in Chapter 5, the Restudy process resulted in governance from a weak sustainability position. Environmental governance has the clear challenge of negotiating a tenable solution amongst competing interests. A collaborative management approach to governance has a primary objective of fostering communication to reach improved understandings of different points of view so that a tenable compromise can be reached amongst competing interests. The literature focuses on communication as a tool for consensus. However, *consensus* is a generous and overly optimistic interpretation for improved communication channels. This thesis has demonstrated that rather than consensus-building, communication through the social settings of a collaborative management process can yield improved understandings to achieve *pragmatic compromise*. Competing interests participate and agree to collaborative management processes with the incentive to protect and advance their specific interests. As evidenced in attempts by various interests to divert from the process, interests moved away from collaborative management if other strategies provided them with greater benefit and less adversity. These opportunistic interests returned to the agreed plan from the collaborative management process once they realized that their attempts to deploy alternative strategies had failed.

Through participation in the social settings of collaborative management competing interests could ensure they *shared* in a resulting win-win solution. Interests positioned outside of the social settings for decision-making lacked a voice and power in the negotiations and as a result were excluded in the result. In practice, buy-in to the Restudy process meant buy-in to CERP; exclusion from the social settings of the Restudy process yielded dissatisfaction with CERP. This largely reflects the effectiveness of collaborative management to produce collective choice results. Recall that collective choice theory hypothesizes that competing interests agree to work together because they realize they can achieve a better individual result through cooperative, coordinated action rather than individual action. The Restudy process supports this understanding of collective choice theory because CERP would not have been authorized without support from the range of competing interests. The need for competing interests to work together to achieve environmental governance resulted in a paradigm of weak sustainability.

When competing interests advance and defend their position through processes of collaborative management the result is the least common denominator of weak sustainability because no interest is willing to lose more than is strategically required. This case study analysis has demonstrated that rather than idealized consensus-building based on enlightened understandings amongst competing interests, collaborative management is an approach that works through 'win-win' arenas and forums, rather than the 'win-lose' social settings of courts, to develop pragmatic solutions through negotiated compromise. Without strategic compromise a socio-politically acceptable result would not have been achieved in the greater Everglades' watershed. Is governance within a weak sustainability paradigm better than continued water management that lacks integration of restoration? While not ideal, governance for weak sustainability is preferable to the status quo of water management before the Restudy process and ultimately reflects the collaborative management process used to develop CERP.

John Ogden asserted that varied outlooks for the future implementation of CERP were linked to different individual's level of trust in the institutions and actors governing the implementation process. Like the variation in their concerns about CERP, interviewees' have different metrics of success for the Restudy process. Some interviewees' provide very specific measures. For example, Bob Johnson, ENP, defined success as rewetting of the ENP marsh during dry years and environmentalist Shannon Estenoz defined success as achieving restoration goals before meeting water

supply goals. Others had more general criteria, like Audrey Peterman who referred to the Bruntland Commission and stressed that for environmental initiatives to be successful the perspectives of the poorest people should be included. From a scientific perspective, Peter Ortner emphasized that there are “no clear ecological definitions in CERP of what constitutes restoration success.” However, like many other scientists Ortner agreed that success should be measured through PMs developed through the peer-reviewed CEMs.

Some key insiders highlighted that the Restudy process was merely the first stage in the long process of governance of water resources in the Everglades’ watershed. For example, John Ogden emphasized that the measure of the success of the Restudy process is tied to how implementation of CERP unfolds in the decades ahead. Recognition of the Restudy as a discrete segment of the water management history in South Florida is important towards understanding its role as a radical shift towards governance for decision-making rather than the past tradition of sole reliance on the COE and SFWMD. The success of the Restudy has been defined in this thesis as the collaborative management process yielding a multi-purpose water management plan that was authorized by Congress. However, Ogden is correct in the assertion that society’s ultimate measure of the Restudy’s success will be tied to the future unfolding of the implementation process of CERP because the Restudy is the foundation for the collaborative management of water resources in South Florida. Chapters 5 and 6 discussed how some crucial questions of sustainability, like water conservation, were avoided in order to attain a negotiated compromise. Avoidance of these critical issues during the Restudy process may well become highly problematic during implementation.

While this thesis focuses on the Restudy process, it is worthwhile to mention a few key points about the transition to implementation of CERP following authorization in WRDA 2000. Super-agents and other key actors appear to be working towards applying the principles of successful collaborative management learned during the Restudy. Coinciding with the dissolution of the Restudy Team the COE and SFWMD agreed that scientific implementation should continue to feature multi-disciplinary and multi-agency teams and created the RECOVER Team. Led by John Ogden and Agnes McLean, RECOVER consists of multi-agency and multi-disciplinary scientists in collaborative sub-teams to address questions of implementation. Within the policy universe the Task Force and Working Group continue to fulfill the functional role of coordinating policy and promoting inter-

agency coordination. The SCT has sought to address some of the key areas of scientific uncertainty raised during the Restudy, such as the importance of flow to the ecosystem. Unlike the science universe, the function of the organizations within the policy universe remains consistent to its role during the Restudy process and hence the organizations of the policy universe did not dissolve and then re-organize to fulfill a new function.

Interestingly, the local voice universe has demonstrated the greatest transformation since the conclusion of the Restudy process. Following the dissolution of the GCSSF, the GCE was formed by the new Governor, Jeb Bush, in an attempt to mimic the successful organizational structure of the GCSSF. The GCE proved largely ineffective as an organization because it had a less diverse membership and lacked both the representational quality and the clear functional role of the GCSSF. Once CERP was authorized the value of a stakeholder group body that reported to the Governor was limited because the Governor had a negligible role in implementation. Actors involved in the Restudy recognized the importance of an empowerment organization for stakeholder groups and key actors discussed the creation of an organization to fill the void left in the local voice universe. Interestingly, in April 2001 Mike Collins, the fishing guide who became Chair of the Governing Board for the SFWMD, created a stakeholder group forum to report to the Governing Board.¹⁷¹ Called the Water Resources Advisory Commission, the organization's objective is "working to build consensus within the public and private sectors regarding water resources activities...including the further development and implementation of CERP."¹⁷² The lesson from the Restudy about the importance of a local voice organization prompted the building of the Water Resources Advisory Commission in a way that could be meaningfully integrated into the institutions that governed CERP's implementation so that the local voice organization would have a mechanism for effectively communicating their collective action perspectives on implementation.

This thesis has focused on providing an exhaustive review of the Restudy process. While the Restudy has successfully concluded, the story of multi-purpose water management in South Florida continues to unfold through the implementation of CERP. One question that merits further empirical research is if achieving agreement to a weak sustainability position in the Restudy process established a foundation from which stronger sustainability can eventually be achieved in

¹⁷¹ Notably, Collins is also Chair of the 47 member WRAC.

¹⁷² Available: <http://www.sfwmd.gov/gover/wrac/main.html> [March 23, 2004].

subsequent collaborative management processes to implement CERP? Or, will subsequent iterations lead to further weakening of the initial position? Is collaborative management through the Restudy process the first step towards a more sustainable future for balanced multi-purpose uses of water resources in the greater Everglades' watershed or is sustainability merely a "glitzy word" (Moller) with little substance in practice? How the future implementation of CERP unfolds will be the ultimate measure of the success of collaborative management as a strategy for the governance of multi-purpose water management in a highly contested watershed.



American alligator in slough. (Photograph by author).

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Appendix 1: Complete Wording of Message to Everglades Commons Listserv

Relevant Excerpt from the EAC Minutes:

“--- John Marshall <JamInfo@AOL.COM> wrote:
ENVIRONMENTAL ADVISORY COMMITTEE
Fostering communications & partnerships with government!

EAC DRAFT REPORT OF MEETING
May 5, 2000, 10:30 a.m.
Conference Room 3B, District Headquarters

Visitor Introduced

John Marshall introduced Mary Dengler who is working on her Ph.D on the environment from the University of London. Mary distributed cards advertising the USGS website, sofia.usgs.gov, and a South Florida website, www.evergladesvillage.net.”

Posted on COMMONS-EVERGLADES@LISTS.SIERRACLUB.ORG, by John Marshall.

Mary's complete response:

“Dear John and all on the Commons,

I wanted to correct two statements made in the EAC minutes.

First, I wanted to make the important correction about the scope of my research. My PhD investigates society and environment interactions. I am in the Department of Geography at University of London, England.

The title of my thesis is: The Relationship Among Government Policies, Scientific Research and Local Knowledge in Determining the Hydrological Management of the Everglades

I also wanted to correct the statement that I distributed info. cards for [sofia](http://sofia.usgs.gov) and evergladesvillage.net websites. As I indicated at the meeting, the info. cards were provided by Bob Mooney (who I interviewed directly before the meeting) and I just carried the cards over for him to save him the trip of walking over to the other SFWMD building. Though this is a small point I think it is important to clarify so that it could not be wrongly interpreted that I was endorsing these sites in the context of my PhD.

In the highly charged climate of South Florida I want to be sure that my research focus is correctly represented and that there is no question as to my much treasured objectivity and neutrality.

Thank you for your attention and understanding.

Best wishes,
Mary Dengler”

CORRECTION: re EAC May Meeting Report, posted on COMMONS-EVERGLADES@LISTS.SIERRACLUB.ORG, by Mary Dengler, May 18, 2000.

Appendix 2: Complete Listing of Open Codes¹⁷³

*WRDA	*consensus	*policy-most broadly	*science-most broadly
*CERP	*Restudy	*representative	*education
*policy	*science-specific word	*local outreach	*local involvement
*trust	*Governor's Commission	*talk	*storage
*parallel	*plan formulation	*economic	*moral
*media	*lobby/ists	*fundamental	*fair
*faith	*EAA	*sustainab/le/ility	*central
*important	*flood protection	*flooding	*utilities
*water supply	*restoration	*justice	*Chief's Report
*time	*temporal	*realize/ation	*bias/es
*balance/ing	*systems	*monitor/ing	*found/ation
*discuss/ion	*success	*insight	*really
*hope/fully	*future	*advisory	*input
*state	*federal	*paradigm	*criteria
*sound science	*measures	*link/age/s	*baseline
*factors	*components	*solutions	*unprecedented
*detrimental	*beneficial	*perspective	*problem
*balance	*agriculture	*farming	*levels
*pollution	*east coast	*development	*vision
*priority	*Lake Okeechobee	*cattails	*sawgrass
*artificial	*managed	*natural	*coral reefs
*Florida Bay	*endangered species	*Florida Keys	*ridge and slough
*wetlands	*coastal	*marine	*SFWMD
*COE	*BNP	*ENP	*Everglades
*ecology	*hydrology	*ecosystem	*connecti/on/ivity
*questions	*option	*engage	*management
*legitimacy	*Governor	*President	*manage*
*draft	*funding	*authorization	*conceptual
*conceptual plan	*plan	*contribute	*decisions
*state legislature	*Congress	*perceived	*real
*measure	*agency	*government	*entity
*business	*legal	*scale	*spatial
*goals	*objectives	*authority	*social science
*minority	*presidential election	*feedback	*compromise
*unanimous	*challenges	*shortcomings	*Water Advisory Commission
*strategy	*GC for Everglades	*exclusive	*inclusive
*focus groups	*shared adversity	*range of acceptability	*outreach
*public outreach	*public involvement	*local	*public
*opportunity	*participa/tion/tory/nts	*multi-agency	*groups
*stakeholders	*environment	*tool	*universes
*Task Force	*Working Group	*Science Sub-Group	*networks
*politics	*power	*distribution	*timing
*quantity	*catalyst	*SFWMM	*Restudy Team
*NSM	*CROGEE	*uncertainty	*conceptual ecologic models
*flow-way	*adaptive implementation	*adaptive assessment	*adaptive management
*RECOVER	*wastewater treatment	*adversity	*peer review
*water quality	*ADT	*AET	*D13R4
*D13R	*resources	*rules	*role
*STA	*ASR	*internet	*communication
*technology	*process	*institutions	

¹⁷³ * delineates autocodes for reference as some words/phrases were both open codes and subsequently thematically hand-coded.

Appendix 3: Complete Listing of Hand-codes

Communication

stkhlder.ntwks.: knowledge of Restudy/CERP
stkhldr.ntwks: role of State government
actor network: key actors mention of other actors
How do ASPECTS link USERS to meet GOALS?
GOALS: restoration/water supply/flood protection
USERS of water: enviro/urban/ag
ASPECTS of Process: science/local knowledge/policy
ntwks.linkages: HOW are actors selected for inst. in/exclusion?
ntwks.linkages: MONITORING: of inst./grps/actors
ntwks.linkages: EVOLUTION of restoration strategy
ntwks.linkages: how does in/exclusion in Process relate to satisf.w/CERP?
ntwks.linkages: KEY DOCUMENTS
ntwks.linkages: HOW do dif. ntwks. intersect/relate
actor.ntwks: VISION: of restored everglades
actor.ntwks: ROLES of key actors
actor.ntwks: OUTSIDERS
actor.ntwks: INSIDERS
actor.ntwks: individuals w/agency in Process
key actor networks
stkhlder.ntwks: role of international interests
stkhldr.ntwks: role of Congress
stkhlder.ntwks: role of local government
stkhlder.ntwks: dif. grps satisfaction w/CERP
stkhlder.ntwks: sense of inclusion/exclusion in Process
stkhlder.ntwks: POSITIONALITY: agency mandates
stkhlder.ntwks: POSITIONALITY: dif. enviro groups
stkhlder.ntwks: COM: grps w/dissimilar interest
stkhlder.ntwks: COM: grps w/like interests
stkhlder.ntwks: ROLE: defining other groups
stkhlder.ntwks: ROLE: self-defined
stkhldr.ntwks: ID: groups involved
stakeholder group networks
inst.ntwks: COM: local to local
inst.ntwks: COM: local to science
inst.ntwks: COM: local to policy
inst.ntwks: COM: science to local
inst.ntwks: COM: science to science
inst.ntwks: COM: science to policy
inst.ntwks: COM: policy to local
inst.ntwks: COM: policy to science
inst.networks: COM: policy to policy
inst.networks: linkages among inst. networks
inst.networks: does participation in new inst. by groups/key actors mean buy-in and remove agency veto power
inst.networks:evolution: indep.sci.review bodies
inst.networks:evolution: TF/WG
inst.networks:evolution: RECOVER Team
inst.networks:evolution: Restudy Team
inst.networks:evolution: WRAC to fill gap
inst.networks:evolution: GCSSF vs. GCE
inst.networks:evolution: of GCSSF
inst.ntwks: EVOLUTION of new institutions
inst.networks: ROLE of new institutions
institutional networks
mary's id
Chap 6 quotes
Chap7quotes - science in process

quotes used chapter 5
chap1 quotes
chapter 4 quotes
trade-offs of water
faith in the process
making everglades more real to people
networks need time to evolve
Top-down vs. bottom up governance
Shared adversity
Restudy Process
Role of technology
Role of NSM in Restudy Process
Role of key individuals
Role of local knowledge
Role of institutions
Fund now, details later

Appendix 4: Development Details of Alternatives

To better understand the location of technical features discussed please refer to the SFWMD Facility and Infrastructure Map (Attachment 1).

Iterations of *Alternatives 1- 6*

Alternatives 1-6 (see Figure 4.7, phases 1-5) were formulated with the theme of overcoming water storage shortfalls in the *Starting Point Alternative* (COE, 1999b:7-15). *Alternative 1* doubled the storage in Everglades' headwaters north of Lake Okeechobee and storage in the C-43 basin and reduced aggressive seepage management of L-31N, which would have caused salt-water intrusion into well fields. *Alternative 2* further expanded storage and improved seepage management and also demonstrated that additional surface water storage was going to be more expensive than non-traditional storage methods, namely Aquifer Storage and Recovery wells (ASRs). *Alternative 3* incorporated ASRs for water storage and the AET identified that the next alternative needed to improve timing and distribution of water deliveries and attempt to reestablish greater ecosystem connectivity.

Prior to *Alternative 4* at a December 15, 1997 meeting the entire Restudy Team debated various approaches to decompartmentalization. Three scenarios that progressively removed more barriers to flow were evaluated by the AET. The evaluations showed that while the removal of the L-29 levee improved north to south flows to Shark River Slough and reduced high water in southern WCA-3A, negative effects occurred in other portions and were further exacerbated as levee and canal removal increased. Negative effects included severe high water in WCA-3B and dry conditions in WCA-1, WCA-2A and northeast Shark River Slough, which resulted in placing too much of the water supply burden on Lake Okeechobee (COE, 1999b:7-16). These scenarios demonstrated both the interconnectivity of the hydrology of the greater ecosystem, and that restoration could not simply be removal of existing water control structures. As a result, *Alternative 4* and subsequent iterations maintained canals and levees in the northern part of the system, specifically between WCA-1 and WCA-2A as well as WCA-2A and WCA-2B. To attain some of the desired benefits of decompartmentalization, *Alternative 4* did remove levees and canals within WCA-3 and eliminated barriers between WCA-3 and ENP. However, even this action resulted in negative effects to portions of WCAs, Lake Okeechobee and water supply.

Alternative 5 sought to mitigate the failure to meet PM targets in these areas.

As the Restudy Team noted, “Many areas were substantially improved, but at this point it was clear that it would not be possible to precisely meet all targets. In addition, the timing and distribution of water in WCAs remained problematic” (COE, 1999b:7-17). As was the intention of the iterative plan formulation strategy, *Alternative 6* incorporated the additional technical feature of wastewater reuse. Upon completion of *Alternative 6* the Restudy Team recognized that “an unintended consequence of these [iterative] modifications and improvements was that the alternatives could not fairly be compared to each other” (COE, 1999b:7-17). The inability to compare *Alternative 6* to earlier alternatives can be interpreted as demonstration of positive benefits of the iterative process because it meant that the Restudy Team learned significant information about how different components work together in terms of the total ecosystem’s hydrological function. As a result, in the next stage the alternative plans were further refined “to place them on an equal footing for comparison”(COE, 1999b:7-17).

Iterations of Alternatives A-D

Alternatives 3, 4, 5, and 6 (see Figure 4.7, phases 1-6) were modified respectively into *Alternatives A, B, C, and D* to reflect knowledge gained in initial iterations to improve each alternative’s performance. Because the *Starting Point Alternative* and *Alternative 1* would clearly not achieve the PM targets at a level that would meet restoration objectives these two alternatives were eliminated from further refinement. The terminology was changed from numbers to letters to reflect the transition to the development of a set of comparable alternatives, and to clearly differentiate the first and second phases of the modeling iterations.

Modifications included operational changes, changes to WMM input, alternations to structural design, exclusion of consistently poor performing components, and inclusion or exclusion of components to reflect changes in base conditions (COE, 1999b:7-19). From a technical perspective, *Alternatives A-D* were modeled on an improved NSM model [v4.5], which only became available in December 1997. As a result of reformulation, *Alternative A-D* had a number of common components, which underwent a more rigorous evaluation process utilizing the following analytical tools:

- River of Grass Evaluation Methodology
- Summary Evaluation Criteria
- Keystone and Endangered Species

- Water Quality Analysis

The River of Grass Evaluation Methodology was a subset of PMs selected to compare habitat quality of different alternatives by sub-region through assigning numeric scores. Summary Evaluation Criteria were used by the AET to make final comparisons by means of alternative plan ranking, grade and color by converting the numeric results from the River of Grass methodology into qualitative expressions of the different alternative plans' performance. The Keystone and Endangered Species method evaluated alternative plan performance by using Across Trophic Levels System Simulation to identify the expected biological responses of key species such as wading birds, deer and fish, as well as endangered species: crocodile, Snail Kite, Wood Stork, Cape Sable seaside sparrow, and panther. Furthermore, other species' specific performance measures such as Wood Stork nesting patterns were included, as well as continued consultation with research biologists. A Water Quality Team addressed alternatives' performance regarding water quality via quantitative and qualitative assessments.

The result of these analyses identified *Alternative D* as the best alternative for achieving ecological, water supply, water quality and endangered species PMs. Despite being the best among existing alternatives, *Alternative D* was only moderately adequate at meeting PM targets in the Florida Bay, St. Lucie estuary, Lake Fort Worth lagoon and South Dade agricultural area. Critically, *Alternative D* failed to meet the targets for portions of WCA-2 and WCA-3 as well as Shark River Slough (COE, 1999b:7-33, 7-34). Since these areas are large portions of the remnant natural system *Alternative D* clearly was still inadequate as a final restoration plan. Choosing the best *available* option, the AET "selected *Alternative D*, with the provision that steps be taken to correct specific weaknesses in the alternative" (COE, 1999b:7-33). At a June 1998 meeting the Restudy Team agreed with the AET and selected *Alternative D*, with the recommendation that it should be further refined in order to more closely meet PM targets in the key areas of the natural system.

Choosing an Alternative for the *Initial Draft Plan*

To further refine *Alternative D*, throughout June 1998 an intensive iterative process was undertaken (Figure 4.7, phases 1-7). The first seven iterations attempted to improve performance via operational changes, but these alone proved insufficient. The six subsequent iterations also included structural changes. The thirteenth iteration included component modifications that "rectified performance inadequacies in portions of the Water Conservation Area, Everglades National Park, Florida Bay, and

the St. Lucie Estuary” (COE, 1999b:7-35). This Alternative was named *D-13R* by the Restudy Team and was then compared again to *Alternative D*. The components of *Alternative D-13R* included highly technical solutions such as ASRs and wastewater treatment plants. The Restudy Team recognized the greater uncertainty through inclusion of these highly technical and costly components. Towards addressing uncertainty, the Restudy Team “identified contingency plans to address potential performance deficiencies or cost-effectiveness problems related to these uncertain components” (COE, 1999b:7-40).

Alternative D-13R improved PMs in the problematic portions of the natural system without undue negative consequences for other parts of the ecosystem. Improvements included additional water to the WCAs and ENP without compromising urban water supply or Lake Okeechobee water levels and mitigating adverse high and low water conditions in the WCAs (COE, 1999b:7-36). Improved performance was a result of the removal of additional levees and canals between WCA-3A, ENP and Big Cypress Preserve. However, L-67 was retained as a barrier, though modified in structure to a “conveyance canal and series of passive weirs to promote high flows” (COE, 1999b:7-35), between WCA-3A and WCA-3B to mitigate negative effects in upstream portions due to increased flow and seepage.

Appendix 5: Identification of Actors Discussed Throughout Chapter 5

The analysis contained within Chapter 5 focuses on investigating the roles of different actors' agency in the Restudy as well as the different experiences of insiders and outsiders. As a result, the chapter contains reference to many different individuals. Actors, their affiliations and titles are presented to assist the reader. The majority of people discussed in Chapter 5 were interviewees, but the table also includes other actors mentioned in the chapter.

Key: ~ contacted, but not interviewed
 + not contacted, but mentioned in text
bold interviewee

Name	Affiliation	Title
Aguilera, Ibel	8.5 Square Mile Residents	Homeowner
Alspach, Sue	Miami-Dade County, Dept. of Env. Resources Mgt. (DERM)	Special Projects Administrator
Appelbaum, Stuart	COE	Chief, Ecosystem Restoration Section
Aumen, Nick	ENP	Ecologist, RECOVER Team
Babbitt, Bruce+	Department of Interior (DOI)	Secretary of Interior
Barley, George+	Developer/ Save Our Everglades	Founder
Barnett, Ernie~	Florida Department of Environmental Protection (DEP)	Director of Ecosystem Projects
Bass, Sonny	ENP	Ecologist, Restudy Team
Best, Ronnie	USGS, Restoration Ecology	Branch Chief & Supervisory Ecologist
Browder, Joan+	SE Fisheries Science Center, Natl. Marine Fisheries Service/NOAA	South Florida Ecosystem Restoration Team Leader & Research Ecologist
Brown, Brad+	SE Fisheries Science Center, Natl. Marine Fisheries Service	Director
Bush, George H.W.+	Federal Govt., Executive Branch	41st President USA
Bush, George W.+	Federal Govt., Executive Branch	43rd President USA
Bush, Jeb+	State of Florida, Executive Branch	Governor (Began 1999)
Causey, Billy	Keys National Marine Sanctuary	Director
Chiles, Lawton+	State of Florida, Executive Branch	Governor (1991 - 1998)

Clinton, Bill+	Federal Govt., Executive Branch	42nd President USA
Collins, Mike	SFWMD Governing Board	Chairman
Cypress, Billy	Miccosuke Tribe	Chairman
Davis, Michael	Dept. of the Army for Civil Works	Deputy Assistant Secretary
Davis, Steven+	SFWMD	Scientist
Dobson, Bill	Miami-Dade County	Water Utilities Official
Douglas, Marjory Stoneman+	Historic Advocate for Protecting the Everglades	Activist
Doyle, Mary+	Department of Interior (DOI)	Counselor to Sec. of Interior
Duncan, Gene	Miccosuke Tribe	Water Resources Director
Estenoz, Shannon	Everglades Coalition/WWF	Co-Chair/Regional Director
Fascell, Dante+	State of FL, Legislative Branch	State Congressman
Fanjul, "Pepe" and "Alfie"+	EAA Sugar Industry	Owners of Flo-Sun Sugar
Farago, Alan	Sierra Club	Miami Grp. Conservation Chair
Ferro, Karyn	ENP	Ecosystem Planning and Compliance
Finch, Frank	SFWMD	Executive Director
Finnerty, Maureen+	ENP	Superintendent (replaced Ring 2000)
Frampton, George+	Department of Interior (DOI)	Asst. Sec. of Interior (93-97)
Gawlik, Dale	SFWMD, Everglades Division	Sr. Environmental Scientist
Gore, Al+	Federal Govt., Executive Branch	42nd Vice-President USA, 2000 Presidential Election Candidate
Graham, Bob+	Federal Govt., Legislative Branch	Senator
Harvey, Richard	EPA	South Florida Officer
Heisler, Lorraine+	FL Fish and Wildlife Conservation Commission	Biologist
Johnson, Bob	ENP	Chief Hydrologist
Jones, Johnny+	Florida Wildlife Federation	President
Jones, Ron~	Southeast Environmental Research Center (SERC)	Director
Kramer, William	Sugar Cane Growers Cooperative of Florida	Senior VP - General Manager
Kranzer, Bonnie	GCSSF	Executive Director
Lee, Charles+	Audubon of Florida	Senior Vice President
Lehtinen, Dexter+	Miccosuke Tribe	Attorney
Lorian, Joette	Miccosuke Tribe/ Local Residents	Local Activist
MacKay, Buddy+	State of Florida, Executive Branch	Lt. Governor for Lawton Chiles (Governor in December 1998 upon Chiles death)
McLean, Agnes	SFWMD	Planner

MacVicar, Tom	MacVicar, Frederico, and Lamb Consulting	Water Management Consultant
Marshall, Arthur+	Historic Advocate for Restoring the Everglades	Ecologist and Activist
Marshall, John	Arthur R. Marshall Foundation	President
May, James+	COE	Colonel (replaced Miller, Aug. 2000)
Mazzotti, Frank+	U. of Florida	Associate Professor (biologist)
McVoy, Christopher	SFWMD	Senior Environmental Scientist
Meeks, Carrie+	Federal Govt., Legislative	Congresswoman
Miller, Joe+	COE Colonel	Colonel (replaced Rice, Oct.1997)
Moehling, Robert	Local Farmer	
Moller, Jack	Florida Wildlife Federation & Everglades Coordinating Council	Sportsmen (hunters and fishermen)
Mooney, Bob	USGS/ Evergladesvillage.net	Research Scientist/ Webmaster
Munson, Mary	National Parks Conservation Association (NPCA)	S. Florida Field Representative
Nott, Philip	Institute for Bird Populations	Research Scientist
Obeysekera, Jayantha	SFWMD modeling	Director, Hydrologic Systems Modeling
Ogden, John	SFWMD	Lead Scientist
Ortner, Peter	Natl. Oceanographic and Atmospheric Assoc. (NOAA)	Director, Ocean Chemistry Division
Parrish, Lori Nance	Broward County	Commissioner
Perry, Sue+	ENP	Scientist
Peterman, Audrey	African-American Community	Writer and Activist
Pettigrew, Richard "Dick"~	GCCSF	Chairman
Pimm, Stuart+	Duke University	Conservation Ecologist
Pomar, Armando	League of United Latin American Citizens (LULAC)	Florida State Director
Poole, Mary Ann	FL Fish and Wildlife Conservation Commission	Administrator, Everglades Protection and Restoration
Poole, Sam+	SFWMD	Executive Director (until March 11, 1999; replaced by Finch)
Rapach, Fred~	Palm Beach County	Water Utilities Official
Reed, Russ+	COE	Restudy Team and RECOVER
Rice, Terry	Army Corps of Engineers/ FIU	Retired Colonel/ Researcher
Richardson, Mike	Homestead Residents	Local Businessman
Ring, Richard "Dick"+	ENP	Superintendent (resigned June 2000; replaced by Finnerty)
Rist, Karsten	Tropical Audubon Society	President

Roosevelt, Teddy+	Historic Advocate for Preservation	26th President USA
Salt, Terrance "Rock"	COE/ Task Force	Colonel/ Executive Director
Schueneman, Tom	U. of FL Extension, Institute of Food and Ag. Sciences	Extension Agent IV
Simmons, Glen	Lifelong Resident	
Sklar, Fred+	SFWMD	Scientist
Smith, Bob~	Environment & Public Works Senate Committee	Committee Chair, NH State Senator
Smith, Rick	Governor's Office	Office of Environmental Affairs
Strahl, Stuart+	Audubon of Florida	President
Teets, Tom	SFWMD	Head Planner
Tepper, Craig	Seminole Tribe of Florida	Water Resources Mgt. Director
Tipton, Ron+	National Parks Conservation Association (NPCA)	Director Everglades Campaign (1994-1999)
Van Lent, Tom	ENP	Hydrologist, Restudy Team
Wade, Malcom "Bubba"	U.S. Sugar Corporation	Senior Vice President
Wilson, Susan	Arthur R. Marshall Foundation	Member

Key: ~ contacted, but not interviewed
+ not contacted, but mentioned in text
bold interviewee