The Willamette River Greenway: Cultural and Environmental Interplay

by

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ABSTRACT

The Willamette River Basin, Oregon, viewed in terms of a cultural-ecological system, has been subject to three phases of cultural development: hunting and gathering, agragarian, and industrial-urban. Each population base has employed a technology to exploit the environment to the extent that its patterns of culture would allow. This technology has been oriented towards one relevant resource within the ecological system--the Willamette River.

The environmental quality of the Willamette River began to show signs of impairment with the onset of the industrial-urban development, and the use of a more sophisticated technology. Only through the efforts of a few concerned citizens did the quality of the water begin to improve by the mid-Twentieth Century.

The Willamette River Greenway emerges as a governmental response to renew the relevant resource of the cultural-ecological system. Public attitudes toward the Greenway indicate that basin residents feel industrial-urban technology should be utilized to renew the Willamette River, allowing it to once again become the cultural focal point of the ecological system.

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CHAPTER 1

GENERAL AND HISTORICAL CONSIDERATIONS

People in any environmental circumstance reap the consequence of their numbers and actions upon natural resources. Western history in the United States discloses an interesting situation of people moving into very large and relatively unaltered new zones for habitation. While at first the Euro-American immigrants made adaptations close to those of the native Americans whose lands they settled, their technological progress was soon to alter their choices and goals for comfort and economic security. As population and economic growth were stimulated in the Twentieth Century, they began to seriously affect the carrying capacities of many natural features. What were once regarded as boundless resources have now been shown to exist as a limited good. Previous acts of omission and disregard for a presumably infinitely flexible habitat have now placed severe limits on subsequent growth and development.

The history of human activities in the Willamette River Basin of western Oregon discloses many of the same circumstances. Its nearly 12,000 square miles has a long human history. Though vast in area, the basin has been shown to have limitations in its capacity to sustain human activities, especially thoses which fail to acknowledge its delicate ecological nature.

The central ecological feature of the Willamette Basin and the focus of this report, is the Willamette River. From its source in the southern mountain perimeter of the basin it first moves swiftly, then meanders slowly to its confluence with the great Columbia. The valley of the Willamette now contains about 70% of Oregon's population. From the valley floor to the east one can

see the majestic Cascade Mountains, the eastern boundary. The lower and heavily forested Coast Range forms the western boundary.

From the beginnings of the first European and Euro-American settlements the Willamette River was exposed to different uses by its human populations. The river emerged historically as a cultural focal point--communities built near its banks and competed with one another for trade activities and merchandising--the Willamette River had become an integral part of people's cultural systems. As mechanical technology became more sophisticated, and as the industrial lifestyle became increasingly developed within the valley, the river began to lose much of its previous centrality. The carriers of trade and communication became roads, highways, and railroads. Communities expanded throughout the valley floor, leaving once important waterfronts to become sites for open sewers and other waste discharges. Although individuals objected from time to time, mostly from a health standpoint, little action was taken to restore water quality until the 1940's. By then the Willamette River was in an impaired state.

Through recent legislative action and concern from various interests groups, the Willamette's condition has begun to improve substantially. Primary and secondary sewage treatment facilities have been installed, industrial and municipal discharges are being monitored and communities are now concerning themselves with restoring the Willamette River to an acceptable condition.

The Willamette River is currently being subjected to a redevelopment program designed to offer expanded recreational opportunities to state residents while at the same time affording preservation of the river's natural environment. This project is known as the Willamette River Greenway.

This plan takes under consideration some 286 river miles from Dexter Reservoir near Cottage Grove to the mouth of the

Willamette River's middle fork and adjacent portions of the Columbia River. In essence, the Greenway is dedicated to conservation interests. In theory it will attempt to balance a particular use or activity with the river's capabilities at any given location. The plan incorporates a goal that ultimately a harmonious relationship will emerge between man, land, and water.

Human populations have adapted to conditions of the Willamette River from the time of the aboriginal to the present day. As a resource, the river has limited the extent to which development, either in the long or short run, was possible in the Willamette Valley.

Cultural Systems

A cultural system is difficult to define precisely. In order to have a workable definition one should be able to specify certain attributes and tell exactly where the system's boundaries begin and end. These are usually accomplished by studying the relationships that exist between the individuals and groups who occupy a specified region. The characteristics of the people, along with their values and behaviors, constitute the system. Since these patterns of relationships, or systems, are constantly undergoing change, the development of an intrinsic definition creates vast difficulties and consequences (Beals, 1967:10-13).

Primarily, a cultural system exists as an entity because of the fact that its members interact and have made decisions regarding their actions. The system can therefore be thought of in terms of interaction process and concepts that guide it (Beals, 1967:23-24), i.e., in terms of human actions and ideas. Other characteristics of a cultural system can be specified in terms of their explicit social, economic, political, supernaturalist or aesthetic attributes. One illustration of such components is provided by Hogg (1966) as shown

below:

Cultural Dimensions	Cultural Aspects				
	Economy	Policy	Society	Religion/Magic	Aesthetics
Ideology	Economic Ideology	Political Ideology	Social Ideology	Magico-Religious Ideology	Aesthetic Ideology
Human Organization	Economic Organization	Political Organization	Social Organization	Magico-Religious Organization	Aesthetic Organization
Technology	Economic Technology	Political Technology	Social Technology	Magico-Religious Technology	Aesthetic Technology

Figure 1. Dimensions and Aspects of Culture

These sub-systems can be thought of in terms of linked structures or functions that begin under various conditions and thus establish a continuity of process for a cultural system (Beals, 1967:26).

Boundaries for systems exist not only in space, but also in time. Their patterns are subject to rapid modification or alteration from population pressures or other cultural as well as physical phenomena. Such modification may be relatively permanent or they may be of temporary duration (Beals, 1967:12). The distinquishing features applicable to spatial boundaries of cultural-ecological sytems are certain geographical or physical characteristics which should account for any territorial diversity. Territorial delimitation, the initial description of any cultural system and a logical baseline for any consideration of change, usually precede any discussion of temporal boundaries. The correspondence of physical boundaries to cultural system boundaries is derived from the fundamental requirement that people of a given eco-niche make adaptation of a similar or interdependent nature if they are to persist.

Temporal boundaries of ecological systems such as river basins fluctuate according to a host of natural processes including geological, hydrological, botanical and zoological events. In the case of ecological systems, a temporal boundary of a cultural system will last for indefinite periods of time; it will remain until human extinction, disorganization, disinterest, or departure deem otherwise. Temporal boundary identification for cultural systems is accomplished by observing changing group membership and interaction within a designated spatial system. Persistence of such boundaries means that a cultural system's population is adapting to the environment, aggrandizing their subsistence base, establishing a community organization, maintaining a communication network, and is able to meet demands for change, both large and small, with internal innovations (Smith and Hogg, 1971:659-660). Thus the combination of these relationships, both in spatial and temporal terms, serves to identify boundary configurations, and the full pattern of a cultural system through time.

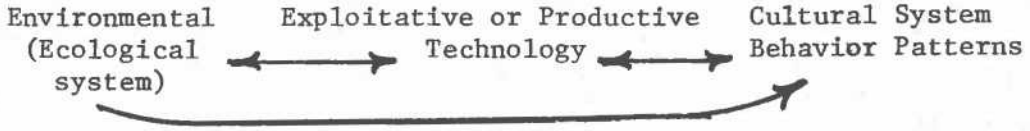
Cultural and Ecological System Interplay

There are two main ways of relating cultural and environmental systems. It is possible first to conceive of a cultural system as a sub-system in a larger system that includes environmental phenomena, or, second, it is possible to conceive of environmental phenomena as being "responsible in some manner for the origin or development of cultural behavior . . . ." (Vayda, 1969:xi). Both conceptions of the relationship are employed in this work. The latter is employed to explain historical relationships, especially the origins and developments of different cultural patterns, in the Willamette River Basin. The former is employed in an examination of the present circumstances of the Willamette Greenway.

It is useful to consider human adaptation and cultural develop-

ment in the Willamette Basin in terms of evolutionary process. The evolutionary model makes explicit the relatedness of cultural and ecological systems, be they part of a greater systemic linkage or linked in a causal or developmental way. Julian Steward's notion of method in cultural ecology takes the interplay into account in terms of three fundamental procedures: (1) analysis of the interrelationship of exploitative or productive technology and environment, (2) analysis of human behavior patterns involved with the exploitation of a given area, and (3) analysis of "the extent to which the behavior patterns entailed in exploiting the environment affect other aspects of culture" (Steward, 1955:40-41).

Implicit in Steward's methodology is the following type of relationship:



The fundamental linkage of the cultural system, according to Steward, is the role of technology. He notes that some features of technology are more important than others so far as cultural adaptation is concerned. Conversely, the "relevant environmental features depend upon the culture", in that more developed cultures are less directly affected by environment than are simple cultures (1955:40). A full grasp of the relationship, argues Steward, can only be attained by a wholistic examination of such factors as demographic and settlement patterns, land use and tenure, and social structures. To consider each separately runs the risk of failing to note critical system linkages (1955:42).

Leslie White, another cultural evolutionist, views the role of environment with respect to particular cultures in similar terms (1959:50-51):

> Every cultural system exists and functions in a natural habitat, a collection of flora, fauna, topography, altitude,

> meteorologic conditions and forces, and so on. And every culture is of course affected by these environmental factors. But the relationship between culture and environment is not a one-to-one correlation by any means. Environment does not "determine" culture in the sense that "given the environment we can predict the culture." Environments vary, and their influence and effect upon cultures vary likewise. Some habitats are suitable for agriculture, a pastoral economy, or fishing, manufacturing, etc.; others are not; they may even render certain types of cultural adjustment to nature impossible.

Like Steward, White views the role of technology as central in the cultural system-ecological system relationship. He sees technology as the means of adjustment to and control of environment, the key to security and survival; to White it is the means by which human beings harness energy (1949:390). Technology is "exercised and expressed in the tools and processes of subsistence" (1959:20).

Both evolutionists acknowledge that cultural systems of different levels of development have substantially different relationships to the environment. The extent to which their technologies are capable of exploitative or productive actions (Steward, 1955) and are capable of providing subsistence, protection from the elements, and defense from enemies (White, 1959), in large measure specifies the extent to which the systems are in interplay. Presumably the greater the degree of the former, the greater the degree of system interdependence.

While Steward and White consider the interplay between environmental (ecological) systems and particular cultural systems in quite similar terms, their views are quite different with respect to the mechanisms for and processes of cultural evolution.

According to White, the components of cultural systems (technological, sociological, ideological, and attitudinal) have different roles in the process of cultural development. White argues

the technology is basic--it determines the form and content of the other components. Social systems are determined by technology through its functions in subsistence, protection from environment and defense from enemies (1959:20). Ideology is determined by technology as it is expressed in the social system; attitudes are determined by the operation of technology as it alters social and political groupings (1959:25-26). White's summary thesis is best expressed in his own words (1959:26).

> In the system that is culture, technology is the independent variable, the other sectors the dependent variables. All human life, and consequently culture itself, depends upon the material, physical, chemical means of adjustment of man as an animal species, as living material systems, to the surface of the earth and to the surrounding cosmos. This fact is so obvious that to emphasize it would be quite superfluous were it not for the prevalence of theories which rest upon other premises. Society, philosophy, and sentiment are, in effect, nontechnological forms of expression of the basic technological process.

Steward expresses a major critique of White's universal evolutionary approach by saying that White's theory "can tell us nothing about the development of the characteristics of individual cultures" (1959:18). He argues that only through tracing the history of a given cultural system can we attempt to understand its specific nature. An empirical rather than deductive method is essential to the historical reconstruction out of which parallels of form, function and sequence might be identified (1955:18-19). To Steward, the determination of parallels in form and function with respect to a cultural system's interrelated behavior patterns, as these relate to environment, is the matter of cultural ecology. He does not posit laws of change; he argues that the manner in which a technology is utilized within a cultural system and the extent to which an environment permits the use of a given technology will vary reciprocally (Steward, 1955:36-39).

Theoretical Applications to the Willamette River Basin

The appropriateness of these considerations to my own work comes in terms of ordering historical and contemporary data on human adaptation to the Willamette River Basin. Essentially three different levels of cultural development have been represented by the inhabitants of the basin. Hunting and foraging cultural development was characteristic of native American inhabitants of the region. Next mechanized agrarian development characterized early Euro-American settlers. Industrial-urban development has characterized populations of the greater part of the Twentieth Century.

These different developments may be viewed in terms of a progressively more elaborate application of technology through time (cf.White, 1949). They may also be viewed as different systems differentially applying exploitative or productive behaviors to the Willamette Valley environment. They thus are comparable in terms of Steward's multilineal methodology.

An attempt is made here to show that progressive cultural evolution in the Willamette Valley, particularly with respect to the Willamette River, its most relevant environmental feature, has led to a more interdependent interplay of ecological and cultural systems. This greater interdependence has yielded a situation in which cultural behaviors must be directed to the protection of relevant environmental features in order that the culture be allowed to persist and continue its development.

The Willamette Greenway is evidence of the cultural-ecological system interdependence in the Willamette River Basin. The program represents a cultural action to renew a relevant resource so that the cultural system might realize its goals. The Greenway is examined in detail to show the sequences of events and cultural actions involved in its emergence.

Additional evidence is presented in terms of present public attitudes toward the Greenway and the Willamette River, showing that people's values are variable with respect to "the need for culture to nurture nature." These attitudes nevertheless reveal a change from those values that previously structured behaviors of forebearers, whose technology had created the detailed and immediate ecological and cultural system interplay.

In view of the foregoing, this report attempts to provide an overview of the ecology of the Willamette Basin and to examine its human history, especially the technological adaptations of different cultures through time. This will be achieved by examining the literature on ecology, historical materials on human population occupancy and field research and survey on the contemporary population. The concluding section offers an evolutionary assessment of historical and contemporary features of the cultural and ecological relationships that have prevailed in the past and are operant on the future.

The Willamette River and Mount Hood
(courtesy of Oregon State Highway Department)

Willamette Falls
(courtesy of Oregon State Highway Department)

CHAPTER 2

THE WILLAMETTE RIVER BASIN AS AN ECOLOGICAL SYSTEM: AN OVERVIEW

Critical to the success of any plan that is designed to enhance the social benefits that can be derived from any inland waterway is the ecological state or condition of the body of water intended for development. Well known to the residents of the valley was the contaminated nature of the Willamette River from the early 1900's until the mid-1960's. Efforts began very late to abate the river's polluted state and attempt to establish programs to insure that such efforts would remain successful. Many now regard the Willamette's condition as acceptable; however, increasing numbers of the valley's population are beginning to see that more and continued improvement is needed.

Water quality is dependent upon many diverse factors. In addition to the amounts and kinds of wastes that are discharged into a river, the temperature of the water and its rate of flow all interact in an exceedingly complicated process to produce certain measurements of dissolved oxygen, biological oxygen demand, coli indices, and other ecological phenomenon which indicate degrees of pollution. An involved discussion of such processes is beyond the scope of this paper. This chapter is intended to simply be an overview of the Willamette River's condition from the early 1900's to the present. For the most part, it is a summary of George Gleeson's work printed in The Return of a River. It is this source I believe to be the most complete and most accurate ever done on the ecology of the Willamette River.

Cultural-Ecological Features of the Willamette River

The Willamette River Basin of Oregon lies between the Coast and Cascade Mountain Ranges in the northeastern section of the state. It is nearly rectangular in shape and in area consists of nearly 12,000 square miles. The basin is divided into three sections: Upper, Middle, and Lower (Fig.2). The Upper Basin is marked on the south by the Calapooyia Mountains. The northern portion of this sub-area is delineated by land that divides the McKenzie River drainage. East and west it is divided by the Calapooyia drainage, Santiam drainage and the Long Tom and Mary Rivers, respectively. The Middle Basin is characterized by the land between the confluence of the Long Tom and Mollala Rivers with the Willamette. The Lower Basin is the remainder of basin drainage to the Columbia River at St. Helens. The valley floor is approximately 30 miles wide and contains nearly 70% of Oregon's population.

In addition, these sub areas contain eleven sub basins which are the (1) Coast Fork, (2) Middle Fork, (3) McKenzie, (4) Long Tom, (5) Santiam, (6) Coast Range, (7) Pudding, (8) Tualatin, (9) Clackamas, (10) Columbia, and (11) Sandy. Those sub basins of the Middle Willamette Basin; that is the Santiam, Coast Range, and Pudding sub basins comprise some 45% of the total basin in area per square mile. The Upper Basin, or Coast Fork, Middle Fork, McKenzie and Long Tom sub basins total some 31% of the area while the Lower Basin, or Tualatin, Clackamas, Columbia, and Sandy represent the remaining 24% (Willamette Basin Task Force 1969 B:I-3).

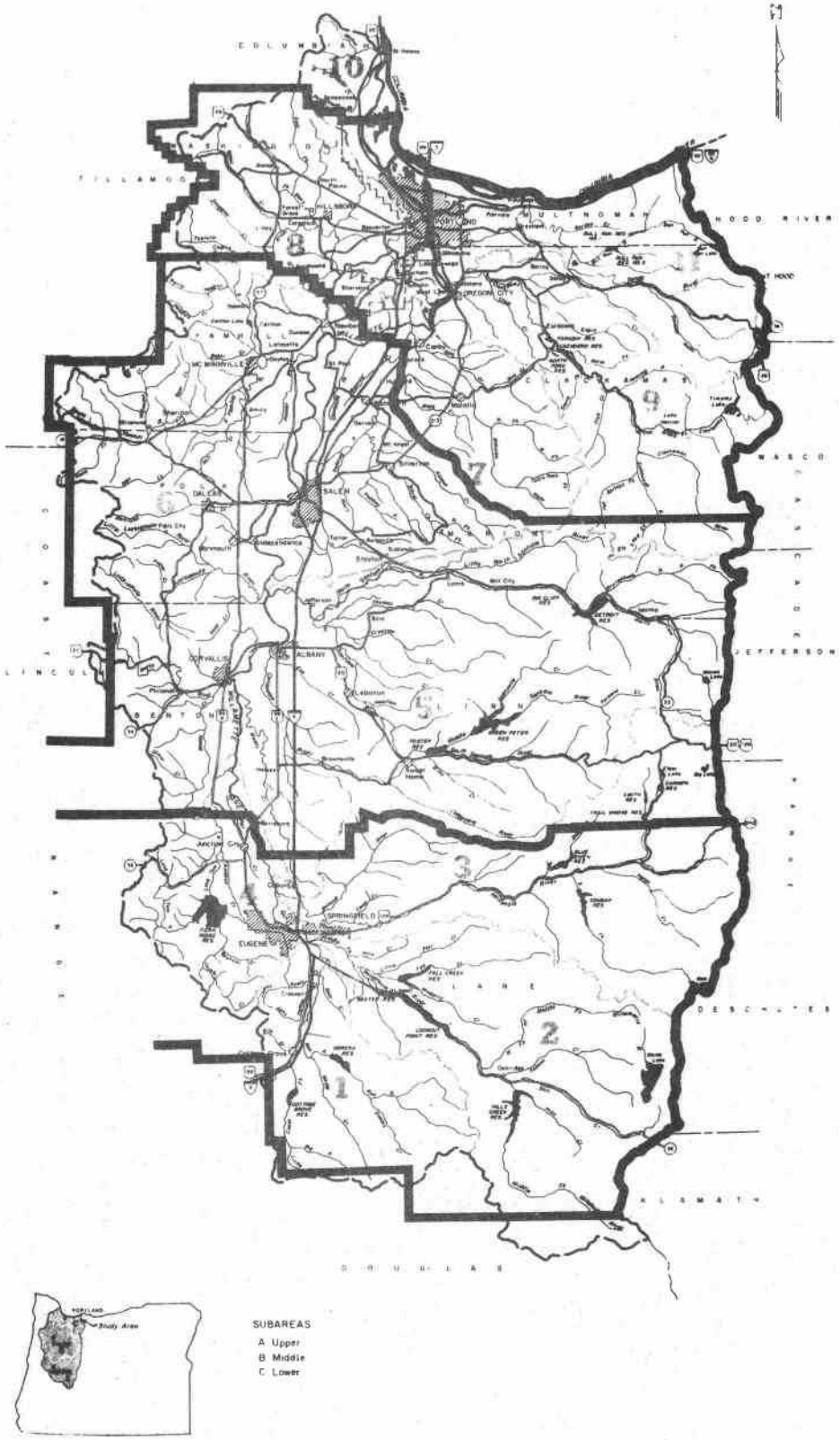


Figure 2. The Willamette River Basin by sub-area (after Willamette Basin Task Force, 1969)

The central ecological feature of the Willamette Basin is the Willamette River which flows in a northerly direction from its origin in the Upper Basin at the confluence of the coast and middle forks. Its total length is nearly 187 river miles from its source to where it merges with the Columbia River system.

Ecologically, the Willamette River Basin consists of a rectangular shaped area which is situated between the Coast and Cascade Mountain Ranges in the northwestern section of the State of Oregon. Basin dimensions are approximately 75 by 150 miles, with the valley floor nearly 30 miles in width. As already mentioned, the total drainage area is nearly 12,045 miles of which 3,500 miles lie below the elevation of 500 feet mean sea level. Lying within the basin, the Willamette River meanders from its tributaries' confluence near Springfield to confluence with the Columbia River. Thus, this serves to delineate the north-south boundary of the system. The topography of the valley floor is characterized by a level flood plain which is intermittently interrupted by gentle rolling hills, and high foothills and buttes to the east and west which comprise 60% of the basin. To the west, paralleling the foothills, the Coast Mountain Range reaches elevations of nearly 4,000 feet. Toward the eastern boundary, the Cascades reach elevations over the 10,000 foot mark. Both of these mountain ranges harbor the major tributaries to the Willamette River (Willamette Basin Task Force, 1969A: II, 1-5) and constitute the east-west boundaries of the system (Fig. 3).

Willamette Hydrology

Prior to any explanation or account of the ecological processes that are peculiar to a river's regime, it would seem pertinent to have some involvement with basic hydrologic principles. In addition, information of a hydrological nature is important to any scenic or recreation oriented river basin development plan.

The main stem of the Willamette River is formed from two

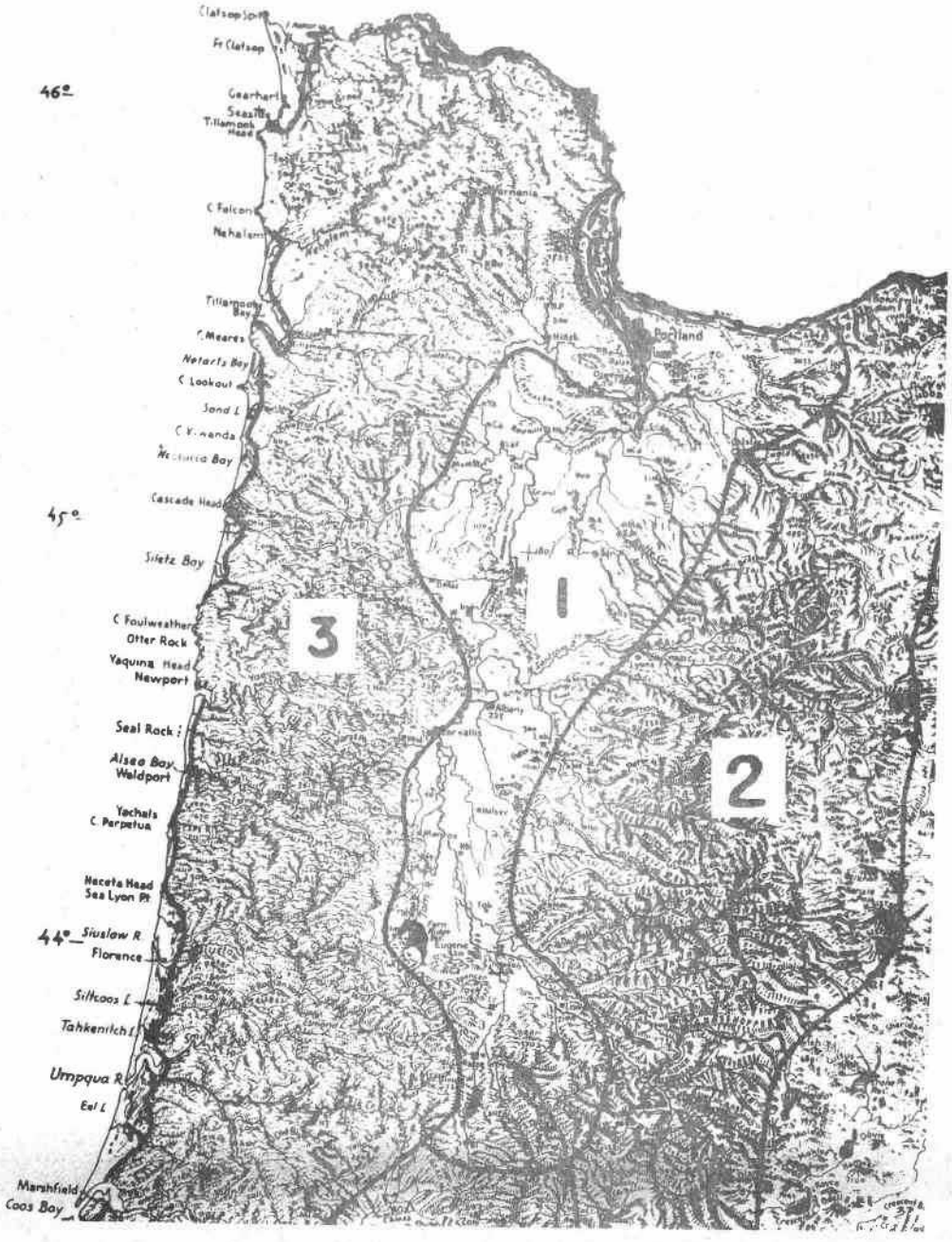


Figure 3. The Willamette Basin in relation to Western Oregon (After Raisz, 1941)

confluent streams--the coast and middle forks. The coast fork generates from the Calapooyia Mountains in the Coast Mountain Range, and the middle fork emerges from the Cascade Mountain Range near Odell Lake. The Willamette River receives its largest runoff from its tributaries in the Cascades, e.g., the McKenzie and Santiam Rivers. The Coast Range supplies the Willamette by means of various smaller tributaries and drainages (Willamette Basin Task Force, 1969B:I 2-3).

Climatically, the Willamette River Basin is described within the modified marine classification that is characterized by moist winter and rather mild summer seasons. Temperature variations to the upper and/or lower extremes are usually non-existent. Aberrations do exist, however, resulting from influences from the Pacific Ocean, the Coast and Cascade Mountain Ranges, and the Columbia Basin. For the most part, annual precipitation rates average about 60 inches per year for the basin although they are significantly higher from the 1,000 to 4,000 foot elevation range in the bordering mountains. This contributes markedly to annual runoff (Willamette Basin Task Force, 1969B: II-1).

Geomorphology, an important consideration in the hydrologic scheme, is characterized by soil permeability, geology, vegetation, and topographical phenomena which exert influences upon water resources spatially as well as temporally. Geomorphologically, the Willamette Basin is divided into three sections: Coast Range, Cascade Range, and the Valley proper (Willamette Basin Task Force, 1969B: III-1).

The Coast Range mainly contains gradients near-precipice in nature. The mountain range is heavily forested and other varieties of dense vegetation cohabit; the foothills support a wide variety of cultigens. Mineral composition at all elevations consists mainly of volcanic and sedimentary formations which are extremely dense and contain many folds and faults. Density, of course, means that

runoff is unusually high, except for the portions of water that are transpired by vegetation. Ground water supplies are insignificant and sedimentary formations contain water with high mineral content. They therefore have poor use potentials (Willamette Basin Task Force, 1969B: III 1-4).

The western Cascades region, termed the principal area of the mountain range, is that area below the 4,000 foot elevation mark. It is characterized by steep ridges and ravines that eventually taper off nearing the foothill elevations. The foothills of the Cascades are primarily composed of volcanic type rock formations, although mixtures do occur. The western Cascades are also volcanic, but of more age than the lower elevation strata. They are somewhat less dense and more permeable--acquifers are more common. Vegetation in the principal Cascades is forest; the foothills exhibit a wide variety of floral species (Willamette Basin Task Force, 1969B: III 4-6).

On the other hand, the valley is best described as an alluvial, pleistocene flood plain. Topographically, it is level to gentle rolling; however, exceptions occur by sub basin. The river flows through this flood plain which is characterized by a loosely defined boundary configuration, i.e., it broadens and narrows at various locations in its south to north course. Through this flood plain the river meanders its course showing a relatively mature stage of river development. The Willamette River's gradient is approximately 6.5 feet per mile at Eugene, levels to nearly 4 feet at Harrisburg, and drops to 1.6 feet at Newberg. Hydrogeologically, the valley is structurally a downwarp, intermittently marked by the presence of alluvial sediments. Since the precise geological structure is intricate, one must bear in mind that the Willamette Valley can be visualized as an extended lowland bordered by igneous and sedimentary rocks (Willamette Basin Task Force, 1969B: III 6-9).

Soil permeability is yet another important aspect in inter-

preting the hydrological peculiarities of the Willamette Basin, especially in reference to rainfall and runoff. Replenishing ground water supplies is also affected by soil types or consistence. For example, the higher the clay content, the less likely water will percolate into the ground. This denotes ramifications for vegetation as well. Soils in the Willamette River Basin are therefore classified by their runoff potential and are termed "hydrologic soil groups" (Willamette Basin Task Force, 1969B: III 9-10).

River Operation and Efficiency

Transport of sediments is an additional hydrologic factor present in effectively determining water quality potentials and various land treatment practices. Data collected on sediment transport will also act as a provisional determiner on the feasibility for river water use in domestic water supplies, fisheries programs, and related recreational suitability (Willamette Basin Task Force, 1969B: IV-33).

In the Willamette Basin, sediment yield is relatively low due to selected meteorological and physiographic factors. Many of the rock types, especially at the base of the Cascades, are practically erosion resistant although the soil layers may be shallow and varieties of vegetation offer additional protection. Of course, the erosion factor can be magnified during intense rainfall in areas that have been clear cut or cultivated, or where vegetation has been denuded (Willamette Basin Task Force, 1969B: IV-33).

As mentioned previously, the concentration of suspended sediment is crucial in the consideration of water supply, and to fish and recreational oriented development programs. Sediment transport on the Willamette River is insignificant in comparison to such rivers as the Colorado or Missouri. Temporally, sediment concentration is influenced by climatic phenomena and the amount of runoff that is likely to occur. Spatially it is related to location;

for example, elevation. Additional causal features are stream size, stream velocity and river bed composition (Willamette Basin Task Force, 1969B: IV 35-38).

Water temperature will also have a meaningful effect upon water resource programs or various water derived services. Temperatures, of course, are prone to rapid fluctuation. In the Willamette River Basin, the months of July and August are critical due to high air temperatures and low water flow. Low flow is somewhat abated, however, by low flow augmentation at Corps of Engineers reservoirs. There is additional effect at tributary confluence from such rivers as the McKenzie and Santiam--both originate in the high Cascades and remain fairly cold due to continuing snow and glacier melt. The rate of flow in a river is also significant. The Willamette River, in the upper basin, runs a faster and more narrow course than does the river at Salem where it is much wider, deeper, and its channel configuration is meandering (Willamette Basin Task Force, 1969B: IV-45).

Many other factors are also operating that have not been mentioned. Probably of primary consideration of hydrologic and ecologic phenomena is any type of modification of the natural environment that might occur through types of water resource development programs, commercial and industrial enterprises.

Human Involvements: Exploitation and Production

The history and impact of white settlement in the Willamette Valley prior to the 1870's will be discussed in the next chapter. Most certainly this activity was the beginning of the ecological problems that the Willamette Basin would experience near the early 1900's. It is most likely that the combination of the white settlement (spatial organization) and the ensuing industrialization of the valley would, as George Gleeson aptly stated, cause the valley residents to begin to "turn their backs to the river" (Gleeson,

1972: 72). In this sense, then, the Willamette River would soon become a carrier for industrial and municipal sewages, and discharges from other quality affecting activities such as poor land use practices.

Prior to 1900, the largest population concentrations were in the lower Willamette Valley, that is from the city of Salem, north, to the mouth of the river. Instead, all portions of the valley were settled quite rapidly, but not at the pace of areas like Oregon City and Portland. At a very early date these two towns showed commercial promise, and in addition, they were well suited geographically; that is to say below the Oregon City falls and in position to monopolize on upper valley and maritime trade. As early as 1870, Clackamas and Multnomah counties contained 17,503 of the Willamette Valley's 51,204 persons--roughly 40% of the population (Bureau of Municipal Research and Service, 1958: 18). From the density of the population and with the onset of many industrial enterprises, it can only be speculated that this section of the river showed the first signs of wear, although this cannot be documented fully from the literature.

Personal communication with George W. Gleeson reveals that any studies focusing on pollution prior to 1900 simply do not exist, not only for Oregon but for the nation as well. As previously indicated, the meaningful approach is to obviously direct attention to those areas which, historically, have shown large population densities, and/or loci for early industrial developments and commercial enterprise. In the case of the Willamette River Basin, those cities and towns in the Lower Basin seem to indicate this trend over others in the basin, especially at the first part of the Twentieth Century.

The Regression of the River

By 1900 the population of the Willamette Valley had increased to 233,633, approximately 62% of the state's total (Bureau of Municipal Research and Service, 1958:18). Nearly two-thirds was at this time agrarian. In the years following the turn of the century, a transformation took place whereby an attraction for the city grew. Shortly after 1900, 50% of the valley's population was living in cities of 2,500 or more. By 1910 the rate of increase of city population was some 130% from 1900 (Clark, 1927:726-728). Although agriculture was still the valley's major industry, this partial shift in social and economic organization would have tremendous impact upon the river's environment. In a 1907 report, the State Board of Health commented on the fact that only a few cities had adequate facilities for the proper disposal of sewage, and the Willamette Valley was no exception. The Board urged for legislative action to force the installation of treatment measures and procedures (State of Oregon, 1907:15). It was noted that the smaller towns were especially negligent.

In 1908 the State Board issued the following:

> The board has endeavored as far as possible to take every means at its disposal to preserve the purity of the water courses of the state. There is probably no other state in the Union so favored naturally with such abundant supply of pure water, and one of the chief efforts of the people of the state should be to preserve this wholesome condition (State of Oregon, 1908:12).

The Board cited further instance that they thought it to be a general consensus of the population that waterways, especially smaller ones, were for the purpose of carrying waste; hence the reason for the increasing, omnipresent, contaminated nature of the state's rivers and streams. The report urged that cities and town should be compelled to install sewage disposal and filter systems in order to alleviate any menacing problem (State of Oregon, 1908:12-13). In 1909 and 1911 similar warnings were issued.

By the early 1920's the Oregon State Board of Health began a series of water quality examinations in the lower basin at Portland harbor. Since various cities and towns, as well as industrial concerns, were discharging raw wastes into tributaries, or directly into the Willamette itself, the tests revealed that the river's condition was serious and represented a potential threat to health (Gleeson, 1972:12). Apparently public interest was generated by the tests and report of the Board. In the year 1926, citizens and concerned groups attempted to get enforcement of a series of anti-pollution laws that were passed in 1919. Later, in the same year, there was an attempt to form an anti-pollution league to make legislative recommendations to instigate a general study of water quality in the Willamette River. A secondary purpose of the group was to make suggestion as to ways to alleviate waste discharges. This, however, all led to a dead-end (Gleeson, 1972: 12).

In the next few years the condition of the valley's waterways was becoming more and more serious. The valley was growing quite rapidly each year. By 1930 there were approximately 600,000 people concentrated in the basin--some 64% of the state's total (Bureau of Municipal Research and Service, 1958:18). Thus the increase in population seemed proportional to the river's degraded state. Municipalities and industry were polluting at rapidly increasing rates. Finally, through the action of concerned citizens and various groups throughout the valley, in 1929 Oregon Agricultural College was commissioned to study the various rivers and streams throughout the state. The study was conducted during low water flow periods; i.e., summer months. From the results, it was concluded that the condition of the river from the area around Salem, north to Portland harbor, was poor-much worse than stations tested in the upper valley (Gleeson, 1972:15).

Corrective Cultural Actions

Concern for the valley's water became apparent in the suc-

ceeding years--in 1933 a local anti-pollution council was organized in an attempt to arrange bonds for facility sewer treatment. The issue was successful, but the bonds were of the utility nature and money was to be collected by way of service charges. Since there were no provisional funds for construction, in the following year the issue was brought to ballot in an attempt to make the bonds obligatory--the measure failed and the city of Portland was denied its much needed treatment system (Gleeson, 1972:16-17).

A Stream Purification Committee was organized in 1935 with the purpose of conducting studies and making recommendations to the forthcoming legislature. The committee made a thorough investigation of existing pollution laws and found that they were too prohibitive. For this reason, they felt, and in conjunction with a general apathy from the public, these laws were not enforced. From this one year study it was soon realized that if pollution statutes were to be efficient, then they must be of a reasonable nature and be enforced by way of a coordinated and flexible agency (Gleeson, 1972:19-21). As a culmination of this request and other previous action, the Water Purification and Prevention of Pollution bill became a reality in 1938. It, in turn, created a coordinating body know as the State Sanitary Authority. This agency had many diversified responsibilities in the area of pollution abatement (Gleeson, 1972:49). It was not untill 1944, however, that a study of water quality in the Willamette River actually began. It was determined, quite succinctly, that the river was in a depleted state.

In the subsequent years, additional water studies were made, but it was determined that they were of little comparative value. In 1950, the National Council for Stream Improvement (an industrial concern) became interested in the industrial waste problem in the Willamette River. In 1950, they commissioned the School of Public Health at the University of Michigan to conduct a study of the river (Gleeson, 1972:24). It was concluded, from previous comparative results, that the river's condition, especially from

Salem north, was not improving. Later the Council arranged for a series of tests at various location on the river. During the 1953-54 interim, it was concluded that the river still showed no significant improvement. This was due, in part, to a wide range in river flow.

It should be noted that by the late 1940's several cities on the river had installed primary sewage treatment facilities and all had begun plans for doing so. By 1957 all cities and towns on the main fork of the Willamette River had installed such facilities. Extensive testing by the authority during a low flow period of the same year, however, revealed that this type of treatment was insufficient and the river had shown no signs of improvement when compared with data gathered prior to facility installation (Gleeson, 1972: 59). Since pulp and paper mills were responsible for approximately 84% of the B.O.D. in the Willamette, in 1950 these plants were instructed to formulate plans for the treatment of the discharge of all sulphite wastes. The same tests in 1957 showed that the directive was not producting the desired results (Gleeson, 1972:59-61).

In 1958, Eugene, Newberg, and Salem were ordered by the State Sanitary Authority to begin construction of secondary treatment facilities. Portland, in turn, was to expedite the construction and installation of interceptor and treatment stations. All pump and paper mills on the Willamette River were to lessen sulphite discharges. Two years later all cities north of Salem were directed to begin the installation of secondary treatments (Gleeson, 1972:61). Apparently these new measures were a partial solution, because by 1959 testing of water quality in the Willamette River revealed that there were signs of improvement--especially in the lower portions of the river. In 1964, the State Sanitary Authority published a water quality summary of the river from 1953 to 1963 which showed evidence that it had somewhat stabilized over the 11-year interim and the overall condition above Salem was adequate, or at least met an acceptable standard (Gleeson, 1972:30-31). About this time there were also several

policy changes instituted by the State Sanitary Authority in order to take additional steps in reducing the pollution load of the river. The new directives were primarily aimed at industrial concerns, although municipalities had received new directives concerning secondary treatment installations. Also under consideration at this time was the prospect that the potential for tertiary treatment might exist in some areas along the river (Britton, 1965:25).

From the mid-1960's to the present, the water quality of the Willamette River has improved markedly, as revealed in Figure 4.

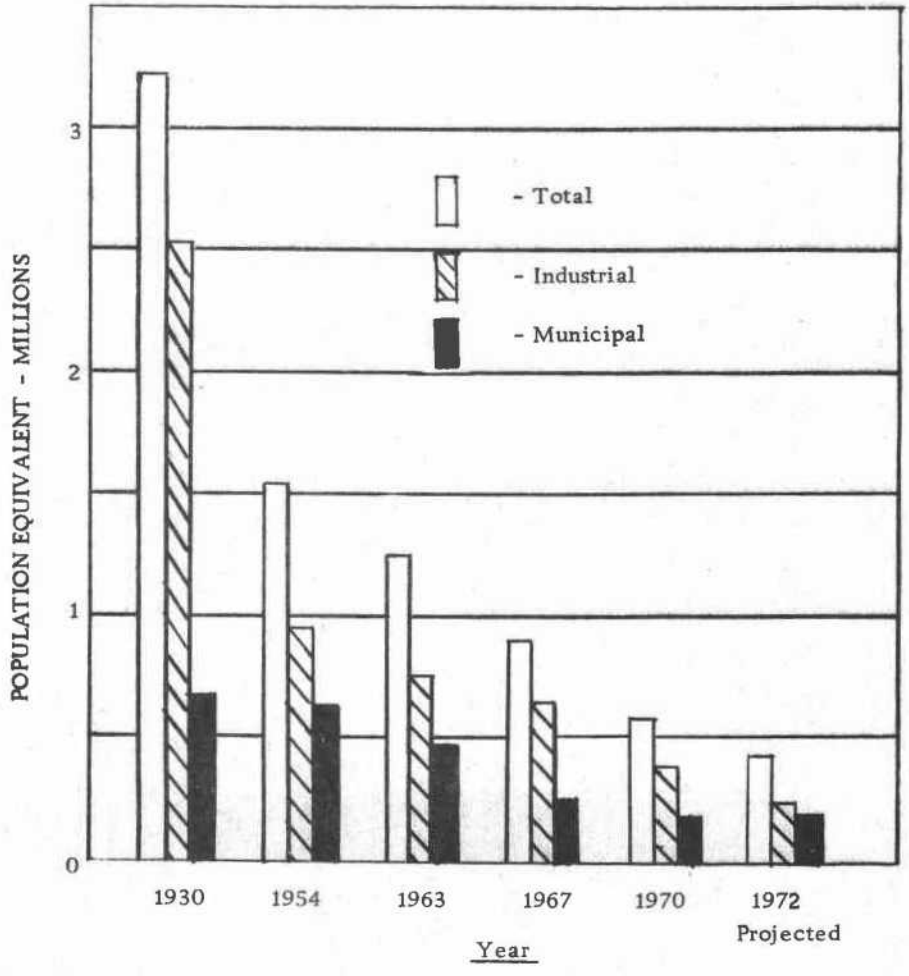


Figure 4. Reduction of wastes to the Willamette River by years (after Gleeson, 1972:70)

There are certain locations on the river, even though monitored daily, which show fluctuations in quality especially during low flow periods. Low flow augmentation serves as only a partial panacea. In recent years, the State Sanitary Authority, now the Department of Environmental Quality, has begun to focus upon preventive measures since there has been more and more reduction of waste discharges. The use of secondary treatment facilities is now considered the minimum and the practice of issuing waste discharge permits has been established. Discharge permits, of course, contain specific definition for use (Gleeson, 1972:62).

Conditions for Future Water Quality

The same phenomena that led to the Willamette River's poor ecological state were involved in a process that eventually led to the river's improvement--actions of the basin's residents. If the quality of water in the river is to be maintained or improved for the future then it would appear that certain control and management procedures must be given adherence. The primary areas of concern will be loci of heavy population concentrations like Eugene-Springfield, Albany-Corvallis, Salem, and Portland. In addition, industry will be required to be cooperative in such efforts. All areas will need constant and continual monitoring.

Summary

In summary, then, it has been noted that many factors and combinations of factors led to the river's regression. All things considered, however, the impacts of white settlement, urbanization, and the industrialization process were most significant. Of critical significance in these actions was the manner in which residents viewed the Willamette River, i. e., their orientation toward it.

Only recently have vigorous efforts been employed to protect and maintain the river's environment. The Willamette River Greenway is one such effort. The extent to which it will be successful depends ultimately on the population's new orientation.

Sculpture of John McLoughlin near Oregon City.
(courtesy of Oregon State Highway Department)

CHAPTER 3

THE WILLAMETTE RIVER BASIN AS A CULTURAL SYSTEM: EARLY HISTORY

The Willamette River has served as a major resource for residents of the valley for hundreds of years. It has successively supported the indigenous native American population, early European trappers, traders, and, later, the more permanent Euro-American settlers. As a major resource, the Willamette River has had a tremendous influence upon the cultural development and activities of the basin's populations. While the river is extremely important to Oregon's history, it is important to discuss it in terms of the Willamette Valley. The activities pertaining to the river must be viewed as a part of the valley as a whole--as a part of a large ecological and cultural system.

The purpose of this chapter is to illustrate how the Willamette River Basin, viewed as a cultural system, has been influenced by one of the most relevant features of the environment--the Willamette River. In conjunction, considerable attention is given to related technological features as determinants for the development of this cultural system. In order to effectively depict the organization of Willamette River Basin as an operating cultural system, comparative data will be abstracted from material on the aboriginal and Euorpean population bases.

Aboriginal Uses of the Willamette River Basin

Only in the past few years have archaeologists begun to focus their attention on the cultural strata of the Willamette Valley. Up until now little investigation has taken place. The arrival time of indigenous Indian populations to the Willamette Valley is mostly a matter of speculation, since many of the valley's archaeological sequences have not been explored.

Archaeologically, several problems arise when attempting to determine the cultural history of the region. First, much of the valley is, and has been historically, a flood plain. Being subject to periodic flooding, many of the archaeological materials have been interrupted from their spatio-temporal sequences. In other words, many of the seasonal habitation sites located adjacent to the river have been disturbed by flood waters. Archaeologists assume that the more permanent settlements are arranged along the higher elevations of the foothills surrounding the basin, from 300-500 feet in elevation. This afforded the occupants protection during rampant flooding.

Another problem is that, quite simply, much of the prehistory of the basin has yet to be studied. Although a few sites have been located by survey, most of the excavation to the present day has been salvage in nature. Salvage archaeology is best described as the immediate response to save cultural material from inundation or other destruction from public works projects, such as dams. Even though some of the cultural material may be lost due to the hurried requirements of such work, it should be noted that strict controls are still applicable to this method of excavation. The knowledge gained from such work is also significant--even though the slower, more systematic, excavation methods usually yield more significant information.

Presently, the earliest evidence for man in the valley was discovered, in part by Luther Cressman, near the city of Lebanon. Cressman located a projectile point, resembling the "Sandia" type, he felt was in probable association with extinct mammoth bones (Cressman, 1947:178). Although there has not been further excavation of this possible Paleo-Indian site, points of this type, and in association with Clovis cultural materials, have been dated elsewhere near 8,000-10,000 B.C. Thomas Newman's excavations at Cascadia Cave, Santiam River Basin, reveal occupation there as early as 6,000 B.C. (Newman, 1966:23). Wilbur Davis has dated habitation of the Little Muddy Creek, a portion of the Willamette

River tributary system, near 700 A.D. (Davis, et al. 1973:36).

Ethnographic materials are by no means free from problems. Much of the data that have been collected tends to be insufficient and of questionable authenticity. Even though the journals of the early Euro-American explorers have offered insight and information to the ethnohistorical background of native Americans, it should be kept in mind that in most cases, descriptions were not gathered by trained or biased-controlling observers. Since many of these are the sole accounts of American Indian cultures, we must wade through some of the bias and ethnocentrism to the heart of the material.

It is not an understatement that the only way to gain further insight to such groups as the Kalapuya is by way of archaeology. There remains a vital need for systematic regional archaeological research in the Willamette Valley in order to supplement, reinforce, or reject the information that has been gathered about the aboriginal pattern of culture from the historical journals or the few early ethnographies. Thus for further or more intensive knowledge of indigenous lifestyles, we are dependent upon the science of archaeology.

Early man's occupation and utilization of the Willamette River Basin is, then, represented as a rather opaque picture. This is due, in part, to a lack of systematic archaeology; consequently, very little is known or understood about the configuration of the pre-contact cultures of the valley. From ongoing archaeology, and from early historical descriptions, some information has been pieced together that illustrates the post-contact phases of the indigenous cultures. However, these illustrations or descriptions are far from complete, and much valuable information lies buried within the Basin.

Aboriginal uses of the Willamette River Basin as a resource base are best revealed by the cultural descriptions on the two largest groups of American Indians to occupy portions of the valley--the

Upper Chinook and the Kalapuya. In later pre-contact times, the most widespread aboriginal group to utilize the Willamette Basin as a resource base were the Kalapuyans. Franchtenburg notes that they possessed most of the land from the east-west limits of the Cascade and Coast Mountain Ranges, to as far north as present day Portland. To the south they extended to the middle course of the Umpqua River (Franchtenburg, 1914:86). Their territory comprised an area of nearly 12,000 square miles. Although forms of wild vegetables were the primary staples of the Kalapuya, the Willamette River and its tributaries also provided a supplemental resource base with fish. In addition to the Camas bulbs, fish and other vegetables, much of the valley also provided habitat for an abundance of fauna, such as deer and elk, which were utilized on a smaller scale (Clark, 1927:51-52).

The Kalapuya, a linguistic stock, contained a number of bands with a wide geographical distribution. They are as follows: (1) Atfaloti, situated on the Tualatin River; (2) Yamhill, occupying the Yamhill Basin; (3) Lakmayuk, on the Lukiamute tributary; (4) the Kalapuya proper, inhabiting the area of Calapooyia and Marys Rivers; (5) Yonkalla, in the southern most reaches of the valley; (6) Ahantsayak, known as Pudding River Indians; and (7) Santiam, of the Santiam River Basin (Franchtenburg, 1914:89). Although all were related linguistically, each band showed a wide lexicographical diversity.

The second most widespread group inhabiting the Willamette Valley were the Upper Chinooks who occupied, in part, the area from the falls near present day Oregon City to the confluence of the Willamette River with the Columbia (Hodge, 1912:274). Unlike the hunting and foraging Kalapuyans, the Upper Chinooks bands subsisted principally upon fish and also gathered vegetables. For example, at the Willamette Falls, they constructed scaffoldings which were used to employ various fishing devices; i.e., scoop nets and poles with lines and hooks. Since the species caught were primarily anadromous, and were not available all year round, a large portion

of the catch was dried and smoked to be consumed during the winter months. The Chinook Indians also hunted the lower valley's fauna, gathered wild fruits, and native vegetables (Clark, 1927:56), but their subsistence emphasis, nevertheless, was on the river.

The importance of the canoe to such riverine peoples as the Upper Chinook and Kalapuya cannot be overestimated. Since slavery and trading were important aspects of the culture of both groups, the canoe was an expeditious means of navigating the numerous river networks throughout the basin as the native peoples sought food and trade items. This aboriginal mode of river transportation took its occupants to as far as the Columbia River in search of slaves, trade, and game.

The Willamette Valley's geographical nature, abundant fauna and flora, and its omnipresent supply of fresh water, substantiate the hypothesis that it supported a large, aboriginal population. With the coming of the white man, however, these aboriginals found themselves in an increasingly imcompatible situation. Not only did many of the whites view the Indians as filthy, ingnorant savages, but also had little regard for their right of aboriginal occupancy. Much of the indigenous population was soon to be decimated by diseases for which they had little resistance. Being eager for the Willamette Valley's resources, the white populations were quick to destroy the harmony that the Indian had created with his land and water. The whites were viewing the valley's resources in a much different perspective. The technology, lifestyle and diseases that they brought would soon cause the decline and virtual extinction of a once highly developed native American culture. Ultimately the presence of whites was to mean incarceration of Indians on diminishing reservations and to literally bring about their cultural and physical extinction in a period of 70 years.

The cultural distinctions of the Willamette River Basin can only be defined by way of rather informal and imprecise features. In other words, in a more generalized or less obvious way than

with the elements of the spatial boundary. Little mention can be made of the time span prior to the native American Kalapuyans who occupied the region at first white contact, since the archaeological and ethnographic data are inadequate or not present. Although the territorial distribution of this aboriginal population was widespread geographically, they nevertheless classify as an operating cultural system rather than a series of subcultures or systems.

First, the Kalapuyan bands showed remarkable and well-suited adaptation to the environment of the Willamette Basin. This uniform adaptation can be best illustrated through their hunting and gathering economy. Although the subsistence duties were divided sexually, the Kalapuya bands were dependent upon the environment for gathering wild vegetables, a primary staple, and, in addition, they hunted various faunal species indigenous to the basin. Salmon and other species of fish were important to their diet (Jacobs, 1945:17-18). Further illustration of this adaptation can be seen through the construction of shelter, canoes and articles that comprised their technological base.

Seasonal migration patterns of the Kalapuya bands seem to be primarily in response to the lack of food resources in certain geographical niches. Since little is known of the periodic movements, this explanation seems to be a logical assumption (Collins, 1951:39). Nevertheless, these bands thus moved on a systematic basis in order to secure subsistence and prevent starvation among their populations. Logically, the use of the canoe, on the Willamette River and its tributaries, provided an adequate means of transporting Kalapuyans to their seasonal encampments. The sophistication of workmanship and the expertise of their occupants were noted by such early explorers to the northwest as Gabriel Franchere (Franchere, 1854:327-329). Thus the canoe played a critical role in the lives of these Kalapuyan bands. They relied upon them not only for procuring subsistence, but also to carry out their communication networks of trade and warfare within the basin as well as to the Columbia River.

The cultural function of innovation is rather difficult to document in the various bands of the Kalapuya. These people were, however, quite innovative in the adaptive adjustments necessary for survival in their environment. For example, the absence of the horse and a limited weapons inventory may have caused them to innovate various ways of killing game for subsistence. Kalapuyans were quite dependent upon the use of snares and pitfalls employed to capture hares and other animals such as elk (Jacobs, 1945:32).

As previously noted, if a cultural system is to survive, it must adjust or innovate to any changes within the environment or its processes will cease to function. With the intrusion of the white Euro-American populations, there was an impact exerted upon the aboriginal population to which they could not adjust. Of primary impact was the spread of disease which reached epidemic proportions among the Kalapuyan bands. An important point to remember is that the Indians used the territory collectively, thus functioning as a cultural system.

The aboriginal cultural patterns of the Willamette River Basin were exemplified by their technological achievements and the intensive use of the river as a resource base. Most of the cultural functions of the Kalapuyan bands were in some way connected to the use of the Willamette River or its tributaries. For example, from their adaptation to the environment, the patterns of subsistence employed, their community organization, and network of communication all reflect a configuration of water-based dependency. Thus the sociological dimension of seasonal migration becomes a technological process as well as a social one. This social process is merely a function of their technology-directly or indirectly. Cultural artifacts, such as the canoe, correlate with a social phenomena that can only be accomplished through a certain level of technological achievement.

The technological impact on the ideological dimension of the aboriginal cultural system is, in one way, illustrated through the supernaturalistic element. Supernaturalistic beliefs, according to White, are most prevalent where man's technological control over his environment is at a minimum (White, 1959:23). An aboriginal culture is, perhaps, best suited for elaboration of this statement. Kalapuyan myths abound with water or river-based characters personifying both good and evil (Collins, 1951:55-57). By this means, then, is employed a justification for a somewhat insufficient technological base. Hence, as cultural development increases with inherent knowledge of the environment, then supernatural means to explain acts or events, become less significant (White, 1956:23). Going one step further, it may well be that the technological influence upon ideological dimension of culture shapes the aboriginal orientation to the river basin. For instance, within the Kalapuya cultural system, the Willamette River was not only a resource base, but also a cultural focal point. Of additional significance were the foothills and montane region of the valley which provided a wholistic view that is expressed in the fact that the territory was used collectively. Thus the ecological relationships have an important impact upon explaining processes occurring in the cultural system (Beals, 1967:33).

Still, the level of native American technological development was such that their collective impact upon the Willamette River Basin ecology was not severe. While related more directly to features of environment than the Euro-Americans who were to follow them temporally, the magnitude of their exploitative and product behaviors was such that they did not create an immediate interdependency with the basin's ecological system.

As the white traders and trappers began to infiltrate the Willamette Basin, we see the transition phase between an eroding or declining native American cultural system and the emergence of a new system whose developments were to become quite dependent upon outside or external influences. The early fur trappers and

traders shared many of the cultural functions of the aboriginal base for they had quite simply adopted many facets of their lifestyle. They were quite dependent upon the Willamette River and its tributaries to function as a communication network. Subsistence-wise they employed many techniques to gather food supplies as the Kalapuyans had done; however, there were many technological improvements. The permanent community structure was well organized, but on a different basis than that of the aboriginal. Usually the white traders and trappers would locate posts adjacent to waterways, but there would be a central location, such as the Hudson Bay Company outpost at Vancouver. This one central outpost would then serve to function as a nucleus for trade, additional subsistence, and innovation.

The significance of the Willamette River in the aboriginal population of the valley is clearly shown through involvement in the transport for trade, subsistence, and of secondary importance, communication. With the arrival of the white man to this frontier region, the Willamette served not only as a route to the interior, but also as a means of transportation, communication, and to some degree subsistence. For the aboriginal and the first white population, the river system was of primary importance and served as a cultural focal point. In other words, this pre-industrial lifestyle was proportionate and thus dependent, upon the river.

Early European Exploration and Settlement

According to James Douglas, the first European to sight a portion of the Willamette River was Lieutenant William R. Broughton, a member of George Vancouver's British Expeditionary Force (Douglas, 1926:402). In 1792, Broughton observed the Willamette's mouth from the Columbia River; however, it is not recorded that he explored the lower Willamette region to any great extent. The party continued some distance upstream on the Columbia and sighted what is now called the Sandy River. Broughton named the portion of the Willamette he saw "Call's River," and

named the Sandy, "Barins River" (Clark, 1927:86).

In 1806, the Lewis and Clark Expedition ascended the Columbia River from what is now the city of Astoria. Although on their journey up the Columbia, they had passed the mouth of the Willamette, they were later informed by a group of Upper Chinooks (Shah-ha-la) that a large river they called the Mult-no-mah discharged into the Columbia several miles downstream from their encampment. The mouth of the river was masked by an island that Lewis and Clark had named the "Image Canoe" (Sauvies) island (DeVoto, 1953:339). Clark hired several Indians to act as guides, and proceeded towards the Willamette. On April 2, 1806, Clark entered the Willamette with his Indian guides in an attempt to measure its depth and determine its course. The record shows that Clark's journey did take him several miles upstream, but he was turned back by fog banks that hindered visibility. His log revealed that he had entered the river at the lower point of Sauvies Island and had gone as far as a point to where the river "was bending to the East and Southeast" (DeVoto, 1953:311). This would have put him approximately eight river miles upstream or where the river bends below Swan Island. Clark's party remained at Sauvies Island to procure provisions for their trip back up the Columbia and on to the next leg, Camp Chopunnish in the heart of Nez Perce country.

Many historians (cf. Lang, 1885) claim that the true Indian name for the Willamette was the Wallamet. It was later corrupted to Willamette by European usage. This, however, is open to debate. I know of no first hand account that documents or supports this usage The term Willamette is probably a corruption, but of some other European word.

Early exploration of the upper river basin was most likely accomplished by traders and trappers who came some years after the Lewis and Clark Corps of Discovery. Donald McKenzie of the Pacific Fur Company, a subsidiary of John Jacob Astor's American Fur Company, located in 1812 one of the three principal tributaries

of the Upper Willamette--the McKenzie River (Ross, 1849:255). He had been exploring, in part, for new fur resources. McKenzie penetrated deep into the valley on many of his journeys, and thereby contributed much to the early cartographical knowledge of the area--knowledge that would be of benefit to later migrants. Still later, in 1812, Robert Stuart, a partner in the Pacific Fur Company, led a small group up the Willamette River. It is not known exactly to what geographical point they reached. It is suggested, however, that William Wallace and J. C. Halsey, clerks for the company, constructed a cabin some 150 river miles upstream--a point somewhere near the Willamette and McKenzie (confluence) (Franchere, 1854:278-279).

The Willamette River was of great importance to early trappers in the valley, Not only did it act as a natural gateway to the hinterland for those in search of new resources, but it also served as a primary means for transportation. The importance of the early fur companies, such as Hudson Bay and others, cannot be underestimated. All made significant contributions to knowledge of the indigenous people, geography, and history, although their accuracy is questioned by some (cf. Allen, 1949). Hence, indirectly, they acted as a stimulus for population growth by the information they made available in regions such as the Willamette Valley. It should be noted also that they were responsible for bringing in people who later became settlers. For example, Champoeg attracted retired Hudson Bay Company French-Canadian trappers who began settlement in the late 1820's (Winther, 1956:168). Robert Clark argues that while fur monopolies dictated many of the conditions under which colonization began in the Willamette Valley, they could not have prevented it since the area was so well suited for population adaptation (Clark, 1927:218). The point is well taken; 13 years after the termination of the British-American Joint Occupation Treaty, Oregon became a state.

A primary motivation that settlement in the lower Willamette Valley was the cultivation of land for such agricultural pursuits as

potato growing, animal husbandry and, later, wheat production. Practically all of the early agricultural activities of the Europeans were sponsored by the fur companies (Scott, 1917:56-57). One such settlement began in 1829 when retired French-Canadian trappers from the Hudson Bay Company established farms on the flood plains above the falls of the Willamette near present day Oregon City (Corning, 1947:13). Most of the farming prior to 1830 was done under the direction and supervision of Dr. John McLoughlin, Chief Factor for the Hudson Bay Company. By 1830, farming began to spread throughout the lower valley and Hudson Bay virtually held an agricultural monopoly. McLoughlin had placed farmers at Champoeg where the climate was more suitable for raising wheat. "French Prairie," as it was called, was solely in the hands of the British except for one American--John Ball (Scott, 1917:58-59). By 1835, Ewing Young, the earliest independent American settler, began growing crops near Newberg. Young later abandoned his pursuits when he was unable to get necessary supplies from Hudson Bay Company (Johansen and Gates, 1857:182). During this same time, Nathaniel Wyeth began a variety of agricultural endeavors on Wapato Island (Sauvies), but he sold out to the Hudson Bay Company in 1837. Wyeth returned east but a few members of his expedition remained in Oregon country and settled in the Willamette Valley where they took up subsistence agriculture on the rich flood plain of the river (Winther, 1956:105).

In the winter of 1830, Hall Jackson Kelley, an Easterner, was propagandizing Oregon country. His object was "to found an American settlement, and assert the rights of the United States Government to the sovereignty of the country" (Bancroft, 1886:89). In 1833, Kelley began an excursion to the Northwest. Although his enterprises and ambitions were generally unrealized, he did serve to instigate and entice others to make the journey to Oregon Country (Powell, 1917:223). In the following years missionaries, such as Jason Lee, made the trip to the Northwest and took up settlement in the Willamette Valley, Lee established a mission near Salem but his agricultural and political endeavors were more suc-

cessful than his religious ones (Scott, 1917:59).

In the next few years migrants started coming cross-country to take up settlement in the valley. In 1842, Elijah White brought in 137 immigrants (Corning, 1947:15). The first townsite to be established south of the Columbia and located in the lower Willamette Valley was Oregon City. John McLoughlin had this site surveyed in 1843, just prior to the Great Immigration of the year. In 1845, Joel Palmer passed through on a tour of the Pacific Northwest and recorded his impressions of this new settlement.

Until 1846, Americans and British had equal rights to the land and resources of the Willamette. In 1843, American settlers formed a Provisional Government which was effective until the formal establishment of the Oregon Territory in 1849. After the treaty with Great Britain in 1846, Americans had jurisdiction over all land north to the present Canadian border (Commanger, 1927: 14-23).

Although white populations were moving into other portions of Oregon territory prior to 1850, settlement of the upper regions of the Willamette Valley, south of present Salem did not begin until about 1850 (Martin, 1939:274).[1] As previously noted, the first whites to penetrate into the upper basin were fur trappers and traders. From the point of view of whites, the upper valley remained a virtual wilderness for some time after the lower valley was settled. After the large migrations in 1843, many of the new arrivals who had hopes of settling in and around Oregon City found much of the choice land already occupied or claimed. Many re-

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[1]Historically, the Willamette River Basin was not divided into lower, middle, and upper regions as today.

mained, however, and spread throughout the valley and into the reaches of the foothills surrounding it, such as the Santiam tributary basin. Others became dissatisfied and traveled up the valley and on to California. Robert Clark notes that many of these annoyed migrants did not contribute directly to the settlement of the upper Willamette, but did so indirectly by establishing well-worn wagon roads leading south--roads that would be used by others who desired settlement in this region (Clark, 1927:358-359). One such individual was Eugene Skinner, who in 1846 built a cabin in the upper valley. By 1850, Skinner's cabin and settlement had expanded into the corporate city of Eugene (Lockley, 1923:52). Another contributing factor that was instigated in order to alleviate the population influx into the lower valley was the discovery of a convenient southern route into Oregon's Umpqua and Rogue River Valleys by 1846 (Winther, 1950:111-112).

Thus the early rapid increase in the population of the upper basin was due to at least two major factors. First, the rapid influx of settlers into the lower valley in 1843-1845 caused agitation for more routes to other locales in the valley in order to catch the overflow. Second, the effect of the development of these new routes of travel are rather easy to ascertain--settlement in the upper Willamette was booming and areas like Skinner's cabin acted as a nucleus to immigrants (Clark, 1927:365-368). The basic premise of these phenomena was most likely rapacity.

Once white settlement became established in the lower and upper Willamette, one of the immediate needs was an adequate means of transportation--transportation that met the needs expeditiously. Naturally, the most obvious means was the Willamette River. Prior to 1854, flatboats and wagons were serving in transporting goods to and from market centers; however, this form of transportation was soon deemed inadequate. Towns were growing and producing goods at a rapid rate. In 1854-1855, a new era in transporatation systems opened up in the Willamette Valley--the steamboat (O'Meara, 1945:140-141). By 1862, the "idea" of

the railroad was also coming to the Willamette Valley. The impact of these new transportational devices was profound.

Steamboat Era

The year 1840-1841 marked the first activity of steamboats in the Willamette Valley. These boats, however, had little to do with basin trafficking per se. They were built more exclusively for transoceanic transportation. Towns located below the Willamette Falls were all anxious to compete for the domination of ocean traffic (Clark, 1927:461-462). One such town was Oregon City which, for a brief period, became a center of maritime activity (Winther, 1950:203). During 1841, Oregon City experienced a great deal of growth due to its enhancement of steamboat commerce. Its business and merchandising efforts centered around this activity.

The first steamboat on the lower Willamette to focus upon valley operations was built in 1850 (Wright. 1961:29). By 1851, the steamboat industry was beginning to prosper and its impact was ramified with the beginnings of rival towns and steamboat companies seeking to dominate valley trade operations. The Willamette River and its tributaries were serving as highways. Goods from other areas, e.g., California, were brought into the Columbia River and on to the Willamette Valley for distribution (Johansen and Gates, 1940:338). At this same time, steamboats began operations to locals above the Willamette Falls to Salem. The omnipresent flatboat was being replaced by a more efficient means of transportation designed primarily to overcome navigating the rapids-- the keel steamer (Winther, 1950:204). By 1855, the expanding and increasing trade stimulated the construction of these boats for operation in the upper basin as well (O'Meara, 1943:141-142).

The city of Eugene witnessed the arrival of the first steamboat in 1856. At this time steamers had journeyed no farther south

than Corvallis; however, since residents of Eugene had promised to buy $5,000 worth of stock in the vessel "Clinton," on March 12, she arrived after a three-day journey (Wright, 1961:59). The significance of this trip to Eugene was later to have a great impact on the Willamette Valley. The owners of the steamship "Clinton" later convinced residents of other towns along the upper Willamette to buy shares of stock in the river boats. The ultimate outcome was the formation of the Peoples Transportation Company, which would monopolize valley trade as early as 1862, and swallow competition, e.g., Willamette Transportation Company (Wright, 1961:108-109). The only real competition that the Peoples Transportation Company would have faced would have been from the Oregon Steam Navigation Company. In 1863, however, a territory agreement was reached where the Oregon Steam Navigation Company would confine its steamers to the Columbia and the Peoples Transportation Company to the Willamette (Johansen, 1940:184).

An obstacle that always posed a prominent threat to navigation on the Willamette River was the falls just above Oregon City. In 1862, a portage railway was built around the falls which had a capacity to transfer 100 tons of goods daily. Since most steamers could carry up to 250 tons of goods at one time, this meant costly delays for customers as well as boat owners. The Peoples Transportation Company, in 1865, financed a project which allowed freight to be transferred by way of an inclined plane which ran from above and below the falls (Clark, 1927:470-477). The most sufficient as well as efficient means of combating the obstacle was not conceived until 1873. At this time the canal and locks at the Willamette Falls were completed. This now afforded the river boats access to all parts of the Willamette River without costly delays in transferring cargo or passengers. Ironically, by the time the locks at the Willamette Falls were completed, the river trade era had practically come to an end. By 1871, water transportation on the upper Willamette had all but been abandoned (Corning, 1947:120). Nevertheless, the steamboats and the river transportation companies had played a significant role in the cul-

tural development of the Willamette Valley.

Railroad Era

Prior to the coming of the railroads in the Willamette Valley, the river had been the chief source of energy, both for native Americans and white settlers. Although there were some overland roads available to Euro-American valley residents, the river and its tributaries served as the primary thoroughfares. Road hauling did not really evolve on an adequate scale until the first State Highway Commission was created in 1913 (Clark, 1927:491).

As an integral part of the environment, the Willamette River had dictated many aspects of cultural activity, especially economic activity. With the decline of river trafficking, many smaller manufacturing towns, like Buena Vista, began to decline (Corning, 1947: 142-144).

The first endeavors in railroad building in the Willamette Valley prior to 1860 were simply in response to a "railroad fever that was sweeping the Pacific Northwest" (Clark, 1927:510). Since many of these early efforts were without adequate finances they were immediate failures.

The first permanent railroad of any salience in the Willamette Valley, other than short portage lines, extended from Portland to Albany in 1870 (Gaston, 1906:117). Later, in 1871, it reached as far south as Roseburg. Throughout the 1870's there were many delays in completing the line through to California. By 1888, under lease to the Southern Pacific Railway Company, the Oregon and California line was finally constructed from Ashland to the California border (Ganoe, 1924:338). Thus by the 1880's, the Willamette Valley had ceased to be an isolated frontier area of the Pacific Northwest. This expedient rail route to outside centers of trade could not help but reshape the economic order of the valley towns

that were adjacent to its line. Those which were not were also changed. Many were destroyed. As Bancroft notes, the multiplication of railroad enterprises had much to do with the unfolding of greater Oregon and of the Willamette Valley (Bancroft, 1888:746). The railroad was a great boost for many Willamette towns--it had an additional impact upon the social and economic development.

Within the Willamette Valley, as previously mentioned, much of the prime agricultural lands had already been claimed (by the early 1840's). During the 1860's, the population of the valley increased by four times the amount present in 1850 (Bureau of Municipal Research Service 1958:993). Naturally, as the population increased, new areas were cleared for agricultural purposes--areas that were located some distances from the Willamette River and its tributaries, or at least in less navigable areas. Since the road systems were not adequately developed, and in some cases, river traffic was not feasible, the railroad offered a suitable alternative. Locally, the railroad was important to valley residents. It not only provided a service that could not be suitably met by river boats, it also allowed the population of the valley to spread out even farther away from the river without fear of total isolation. Johansen and Gates note that railroads served interstate enterprises and, in addition, provided for an integration with national marketing (Johansen and Gates, 1957:373).

Although this new source of harnessed energy brought many expanded possibilities of cultural activity to the valley, it also caused valley residents to begin to "turn their backs to the river." Even though there was still some dependence upon river traffic after the railroad, by 1881 areas like Eugene had completely abandoned any and all forms of river service (Lomax, 1935:235).

At the onset of the period of white settlers in the Willamette Basin, the aboriginal population was under great stress. Dimensions of Kalapuyan culture were only useful for short periods to such

individuals as the earliest of trappers and traders. Since the emerging white cultural system within the Willamette Basin was subject to increases in information and population, that cultural system, in turn, allowed for more diversified and specialized functions to be realized.

Most of the permanent frontier settlements that appeared in the valley were situated near the river. The river provided a practical and expedient mode of travel for both social and political functions, and as a critical link between trade centers (Corning, 1947:13). The lower portion of the valley, along the river, was a key location for the expansion to the upper country. Any settlement adjacent to the river could monopolize the valley trade; however, those of the lower Willamette would especially be in prime location for much of the maritime commerce that traveled in and out of the Columbia River. One such location was Oregon City. It became a principal trading and dispersing center as early as 1840 (Bancroft, 1886:265). In addition to transport, another significant aspect of the river in connection with settlement patterns was its provision to run various types of mill works; e.g., grist mills. Much of the early technology was dependent upon the river as a direct source of power. Thus, to the early settlers in the valley, the Willamette River was a focal point for early technology and settlement.

As further Euro-American technological innovations were introduced to the Willamette Basin, the sociological and ideological dimension of the Euro-American cultural system began to undergo degrees of change. The introduction of the steamboat to the basin provided one such stimulus to cultural change. With this new source of energy, many communities sought to dominate trade operations and thus expand their economic bases. In addition, the boats created a new social class of individuals, the steamboat captains, who were most likely held in the same esteem as many political leaders, if not more.

White population orientation also experienced change with

the onset of the steamboating commerce. While the technological dimension of the cultural system was gaining rapidly, the ideological view of the valley population was becoming more pluralistic insofar as new groups came into the region and did not supplant previous European groups.

The early plurality of the white cultural system was magnified at the onset of the railroad. River trafficking had become totally abandoned on the Willamette River and its tributaries. Prior to this time, the Willamette had dictated many of the aspects of cultural activity, especially economic. The railroad served to create an alternate economic boom to selected towns in the valley. It allowed populations to spread further from the river without fear of isolation.

As Alan Beals notes, from the standpoint of cultural systems, the most important aspect of the environment is that which has the greatest influence on cultural activity within the system (Beals, 1967: 29). The Willamette Valley thus can be considered an operating cultural system when considering the interdependence and interaction of its human elements upon the river. The river was significant at certain levels of cultural achievement. With the completion of the railway which entailed a new energy source, residents of the Willamette Valley began to disregard the river and its importance as a means of human transport and as a single means of transport for goods and wastes. The populace was to become less dependent upon it and the river was to have less influence upon their cultural activity. Thus the valley was to become a more pluralistic system with new but different alternatives for subsequent development.

Summary

I have attempted to show in this chapter how, in one segment of the Willamette Valley's history, the Willamette River greatly

influenced cultural activity in the valley. From the time of the earliest settlement through the time of the early fur trade explorations and settlement, it played a very significant role. With the presence of railroads as a new source of energy, much of the lifestyle of the valley residents was reshaped. Thus as man's technology advanced, he simply let the river slip away. Presently, though, the Willamette River is once again shaping the cultural activity of valley residents. This is occurring through a form of ecological feedback. The river is again becoming a cultural focal point, but now with a different character. The cultural progressions from which people first turned their backs on the river have led to circumstances in the river's quality that have forced limits on subsequent population and economic growth. Thus the river condition is an industrial-urban cultural gauge and demonstrates quite fully the point that the valley and river are integral parts of the same environment in which human beings must adapt or perish.

The Willamette River near Portland.
(courtesy of Oregon State Highway Department)

CHAPTER 4

THE WILLAMETTE RIVER BASIN AS A CULTURAL SYSTEM: THE WILLAMETTE RIVER GREENWAY

Water resource and related land developments in the past few years have been experienceing a shift from the utilitarian to the aesthetic and environmentally sound. Accompanying this change, the socio-cultural uses of water, [2] along with their inherent values, have seemingly experienced a similar change with respect to an increasing environmental concern and from various forms of pressure exerted by the public upon facets of planning. The socio-cultural, not economic, uses of water are occupying an increasingly important role in all land-water related projects developing in the United States. This growing public concern and awareness stems partially from a changing society. Technological innovations, increasing mobility factors, population growth, and other contributing phenomena, have all served to afford individuals the ability to spend additional amounts of time involving recreational and other leisure time activities. Since many of these activities are water-based or water-related, they convey the requirement that many in stream values should be preserved if the current societal trend is to be realized.

One method of protecting or insuring the desired socio-cultural uses and values is the development of plans that are designed to preserve the environment, but also that offer a degree of leisure time activities for public benefit. This type of plan, coupled with sufficient legislation, would enable the maximization of any aesthetic concept. One such plan is the Willamette River Greenway in the State of Oregon.

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[2] By the term socio-cultural I mean a population's value system, political activities, subsistence patterns and base, and social groups and organizations (cf. Hogg, 1968).

Greenway Concept

A greenway concept is, in part, a river front beautification scheme designed for the preservation of the natural environment. At the same time it has an additional purpose of developing river parkways, access points, camp grounds, nature trails, and other recreational as well as scenic facilities for the public's benefit. This scheme is usually accomplished by land acquisition and development by state, county, and/or local governments. Land may be acquired by fee title, easement, condemnation, and in some cases, donation. If necessary, reservoirs may be constructed at certain key locations (usually near headwaters) along a river to aid in the control of subsequent flooding intervals that occur seasonally and provide low flow augmentation. Strict levies are usually placed upon industrial concerns, as well as the public, by these governments to insure that certain abatement standards are practiced. This is done in an attempt to minimize any water, land, and air pollution that might occur now or in the future. In some instances, measures may be taken to prevent or restrict industrial or private enterprises from invading and thus conflicting with many of the socio-cultural uses and values of the river front domain. Many such measures are preventive, many are conforming.

The Willamette River Greenway is an Oregon beautification and recreational plan to be so designed--not only to retain the Willamette River's natural environment and to protect its future but also to offer expanded recreational opportunities from Dexter Reservoir near Cottage Grove, to Portland and portions of the Columbia River.

The Willamette Plan

The original greenway concept for the Willamette River is said to have originated with Karl Onthank, a late University of Oregon professor. He had imagined for Oregon a park system

covering some 510 miles of river front that provided scenic and recreational opportunities for the state's future populations (Willamette Greenway Association, 1970:2).

In 1966, Robert Straub adopted Onthank's greenway concept and applied it as a strategy in the forthcoming gubernatorial election. During his campaign efforts, Straub managed to form a committtee of bipartisans in an attempt to begin early organizations activities. This committee became known as the Willamette Greenway Association (Willamette Greenway Association 1970:3). Although Straub was defeated in the election, Tom McCall, Oregon's new governor, gave his subsequent endorsement to the project. McCall, along with conservation and recreation personnel, was prompt in formulating an avenue of approach. The Oregon State Highway Department (now Department of Transportation) was commissioned to conduct a Greenway feasibility study in an attempt to assess the financial, legal and configurational aspects of this new idea. Relevant data were collected and finalized into a report to be presented by Governor McCall to the forthcoming legislature. McCall introduced his plan in March 1967. It was passed, with some modifications, and enacted into law in June of the same year. (Churchill, 1972: 103-104).

After enactment, Governor McCall designated a committee composed of individuals from state, county, and municipal agencies, as well as others whom he considered qualified, to perform the organizational and administrative duties required by the new law. It was recommended that personnel aquisition and field work activites be designated to the State Parks Division of the Oregon State Highway Department. The State Parks personnel were instrumental in designing and publishing the "Procedural Manual for Oregon's Willamette River Park System" which not only outlined the directives and responsibilities of the system, but also gave explicit instructions to local governments on the correct procedures for submitting applications to obtain park system funds. Local governemnts were expedient, as requests for appropriations were

being received by State Highway personnel by the first of 1968 (Churchill, 1972:104).

The modifications that were made in the original Willamette River Greenway bill, during the time it was receiving legislative recognition, were minor. The legislature did not deem it feasible or practical to attempt to initiate a greenway the entire length of the Willamette River from Cottage Grove to Portland. The ultimate decision was not only a change in procedure but also one in name--hence the Willamette River Greenway was simply absorbed into the Willamette Park System, and in final reality it would take the form of a series of parks, including other forms of recreational and scenic facilities, spaced alternately along the banks of the Willamette rather than being non-interrupted (Churchill, 1972:104).

At this point the Willamette River Park System had evolved into a program to allow local governments, by way of state aid, to secure acreage by direct purchase and/or easement. By 1968, the state had applied for, and received, Federal monies amounting to some $1.6 million. Funds were allocated from the Land and Water Conservation Fund on the Federal and state levels. This money was therefore to be utilized to purchase potential park land along the Willamette River. The cost-sharing formula was now designed so that the Federal government would provide 50% of the costs, while state and local governments would be held responsible for 25% each (Churchill, 1972:105). Although more local governments were now participating in the program, even 25% can be a strenuous factor on many city budgets when one considers all of the local agencies that are competing for local tax revenues.

In 1969, Greenway administrators were authorized to conduct a river resource research project to ascertain the exact potential that existed for park land development.[3] It was determined

[3]The term park land may lead to some confusion. The term is meant to not only include actual parks and facilities, but also game refuges, etc., that are not designed to support intensive human use.

approximately 200 out of 510 river miles were suitable for actual use for the Greenway (Churchill, 1974:60-61). During this same period of time, participation by local governments in the program showed signs of retardation, most likely due to higher priorities on budgeted monies. Thus far, local governments had accounted for a total of eight river miles in the total Greenway development, only 4% of the proposed total. In an attempt to renew interest and local government participation, the State Highway Commission, with condemnation as its chief ploy, began construction of several parks along the Willamette River. Although this program did not meet its intended objective and was considered a partial failure by park officials, it nevertheless had added to the beautification and recreational scheme of the Willamette Greenway for it had obtained an additional 15 miles of river frontage (Churchill, 1974:60-61). Through the procurement of $5.0 million additional Federal funds in 1971, the State of Oregon initiated the State Corridor Program which was primarily designed to commission parcels of land not adjacent to populated lands. Employed with the same tactics as the State Parks Program (Highway Commission), it has been considered the most successful of any program attempted thus far--it accounted for over 46 miles of additional river front lands in a very brief period of time (Churchill, 1974:60-61). This program, however, received a strong amount of resistance and opposition from agriculturalists in the valley--sufficient enough to effectively restrain further operations. Prior to the enactment of new legislation and a revitalized planning process, a total of over 69 miles of park lands had been accumulated for the Greenway under various state and local programs.

The Greenway Plan

Under newly enacted legislation which in part was designed to protect agricultural lands from indiscriminate condemnation, the Willamette Greenway is now principally utilizing the employment of scenic easement rather than fee title to river frontage in order to further reduce operating cost. This recent legislation has brought

forth many changes in lieu of previous materials--there has been, in essence, a "rebirth" of the original legislation of 1967. The Willamette Greenway therefore seems to show vast signs of amelioration from the initial program, which I termed the "Willamette Plan."

Briefly, then, the new statutes (HB2497) have spelled out limitations to be placed on the current plant. First, the Willamette Greenway is emphasizing that most existing uses of land be compatible with their objectives. Thus, under this new plan, allowances are being made for already existing land uses such as agricultural, commercial, and industrial. The Willamette Greenway, however, will now be used as a device to put limitations upon intensifications and changes of now existing, as well as future, land use practices within its jurisdictional boundaries.[4] In addition, by October 5, 1974, the Greenway administration was to present the final draft of its plan to the Land Conservation and Development Commission (LCDC) for approval. Included within the plan must be a rather comprehensive outline pertaining to boundary configurations, land already controlled by the Greenway, potential Greenway lands, and the location of all known sub-surface aggregate mineral deposits, among others. In other words, it will appear as a general development and management plan (ORS 390:310 through ORS 390:222). Also noted is new flexibility that a revision of plans and management may be needed periodically.

Probably of chief interest to valley residents, especially agriculturists and other land owners along the Willamette River, are new guidelines for land acquisition. Of paramount concern has been the prerogative to exercise the right of eminent domain.

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[4]Greenway boundaries are designated as being that portion of land on either side of the Willamette River, and 150 feet back from the ordinary low water mark--not to exceed 320 acres per river mile. Some exceptions will be noted later. For further explanations and definitions see ORS 390:332 through ORS 390:338.

This power has now been subjected to greater limitations. Local governments, with the exception of entities designated as cities, are not authorized to use condemnation to gain control of lands within the Greenway boundaries. State and city governments may employ it, but its use is highly qualified. At no time may either government condemn lands that are being used for any type of agriculture. Only upon change in land use practice may portions within the Greenway boundaries be subject to easement provided that certain conditions are met (State of Oregon, 1974A).

Any land obtained through scenic easement by the Department of Transportation must meet certain specifications: any lands acquired must be maintained to meet the standards prescribed by the Willamette Greenway; that is, natural vegetation and overall scenic qualities must be conserved. On the other hand, the title holder is equally responsible to keep all portions of any easement in harmony with Greenway objectives--the owner may not destroy natural vegetation or construct buildings on the portion of land designated as an easement. At such time when the owner wishes to reinstate suspended agricultural practices, then all restrictions are to be lifted. If, for example, the owner of a farm wished to discontinue agricultural practices on any portion of the easement in order to subdivide for the construction of residential buildings, then permission would have to be obtained from the Department of Transportation (State of Oregon, 1974A).

The overall effects of these revised statutes are viewed and interpreted quite differently, especially by land owners within Greenway boundaries. Greenway administrators are perceiving the law as fair, while many agriculturalists are feeling threatened by the Greenway's existence, under any conditions. Both should admit, however, that it has introduced modifications which have no doubt improved the overall effectiveness of the entire plan. Perhaps the most significant change to take place within the two years is in the area of planning. In October, 1973, the firm of Royston, Honamoto, Beck and Abey was put under state contract and commissioned to

prepare the Willamette Greenway Plan--a plan to meet with the public's acceptance.

Since October, 1973, the Willamette River Greenway can be viewed as leaving an incipient stage of development to a more formalized and disseminated endeavor. As of March, 1974, a series of public participation conferences had been held at Council of Governments areas I-IV, or, in the cities of Portland, Salem, Albany-Corvallis, and Eugene-Springfield. All individuals attending these early meetings were supplied with study guides in order to acquaint themselves with issues, policies and objectives of the Greenway (cf. Willamette River Greenway Policy Conference Study Guide, March, 1974) that were abstracted from forums held the previous month. The primary objective of this first series of meetings was to formulate a preliminary draft and eventually incorproate a full Greenway plan.

By April, the Greenway Commission, along with the aid of consulting representatives, had prepared a preliminary citizens' policy statement in draft form. This preliminary plan focused upon four major categories: (1) environmental protection, (2) land use development, (3) recreation, and (4) plan implementation and management. For the most part, this draft consisted of a composite transcript from various dialogues held at the aforementioned hearings (cf. Preliminary Citizen Policy Statement Willamette River Greenway Plan, April, 1974). Nevertheless, this plan expressed the ideas and concerns of individuals represented at the Council of Governments meeting locations.

From July to September, 1974, the preliminary Willamette River Greenway Plan was beginning to emerge as a viable resource management scheme through a combination of efforts from administrative entities and interested citizens, both as groups and as individuals. At this time planners began to realize that the original concept, developing the river's environment in order to support large concentrations of human activity, was not practical. By way

of soil sampling, geomorphology, hydrologic data, and other investigations, it was finally surmised that the Willamette River and its immediate environment was extremely sensitive to human activity (Royston, et al., 1974C:4). Thus, guidelines would have to be set in order to protect various floral and faunal species as well as to establish other environmental and conservational measures (cf. Goals and Guidelines Willamette Greenway Plan-Preliminary Draft, August 1974). In all, this preliminary guideline focused upon six separate considerations: (1) environmental conservation and resource management, (2) access, (3) recreation, (4) land use and development, (5) management and implementation, and (6) citizen participation. It should be noted that each of these sections contained suggested goal orientations intended to alleviate various problems associated with each category (Royston et al., 1974C:3).

Existing zoning regulations were another factor that consultants scrutinized as having an effect on Greenway development. Adequate zoning regulations are an important consideration if management practices are to be enforced with any degree of efficiency. Probably the most significant findings encountered were that the majority of city and county zoning laws that were reviewed did not incorporate the importance of the protection of the Willamette River, or its immediate environment, into present regulations. In addition, it was found that the zoning device, in general, was not utilized in any degree to afford the Willamette protection from industrial and other uses that may have deleterious and irreversible effects upon the river's environment (Williams and Mocine, 1974: 1-6).

By September, 1974, a Willamette River general management and protection scheme had been tentatively defined.[5] Of

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[5]River Management and Protection Zone includes all portions of lands within the Greenway boundaries and designated as non-critical, environmentally.

primary importance, however, are those areas which have been defined as critical and thus possessing degrees of environmental fragility. Overall, the zone will offer forms of river bank protection from, for example, erosion by means of sustaining varieties of natural floral species. It will also be designed to eliminate or reduce encroachment upon private properties adjacent to Greenway lands (Royston, 1974A:3). Thus, methods of zoning should be designed to preserve or consider the Willamette River and the adjacent environment that falls beyond those already designated for human activity. This particularly applies to parks. More specifically, this scheme included areas designated as critical Greenway importance and critical Greenway concern.[6]

With the enactment of House Bill 2497 (ORS 390:310-368), probably the most significant bill thus far pertaining to the preservation of the Willamette River, reorganization and re-definition of meaning was provided for the Willamette Greenway. This law set forth guidelines for administrators (planners) and state and local governments to pursue land acquisition and other aspects of the Greenway in a logical manner. A brief summary of the prescriptives are as follows:

1. Development of the Willamette River from Cottage Grove, north to the Columbia River for scenic and recreational purposes.

2. Allow for coordinated uses of the river while limiting the intensity of uses in order to preserve any and all natural qualities.

3. Non-restricted agricultural uses along the Willamette River.

4. The State of Oregon Department of Transportation to act as coordinating agency for development and control of the Greenway.

5. Diminish the need for direct purchase of recreational and scenic lands.

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[6]These terms and their applications were slightly modified with the introduction of the Preliminary Willamette River Greenway.

6. Establishment of a Greenway development and management scheme to be coordinated between state government and participating municipalities and counties.

7. Establishment of Greenway configuration and boundaries.

8. Guidelines and restrictions for scenic easements and/or eminent domain.

9. Incorporation of existing state parks into Greenway system.

10. The Land Conservation and Development Commission shall act as reviewing agency for the Greenway plan.[7] (Royston, 1974B:1-2)

By October 4, 1974, the "Preliminary Willamette River Greenway Plan" was released to the public and for review by the Land Conservation and Development Commission. By no means a finalized report, this publication nevertheless represents a culmination of efforts by planners, administrators, and interested members of the public who participated and volunteered information through the periodic meetings that were held throughout the valley. Although quite comprehensive, it must be realized that the plan is only preliminary and will be subject to change and modification by L.C.D.C., if deemed necessary, prior to implementation.

Significant features of this preliminary plan include land use categories by description and intensity to include (a) river, (b) urban, and (c) farm and non-farm (the non-farm section is further sub-categorized by intensity designations of preservation, conservation and recreation) (Royston, 1974B:8).

River. Briefly, this category includes the Willamette River proper from Dexter Reservoir to the Columbia River. Since the river can be considered the locus of the Greenway, it is obviously an important consideration in the overall scheme. In order to

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[7]This ten-point overview simply captures the essence of HB 2497. For a more detailed examination of the law, see ORS 390:310-368.

insure that hydrologic interdependencies are not disrupted, effective management practices and coordination must be initiated so that one user's activities will not be detrimental to other users.

Urban. Designated as approximately 12.5% of all land within the Greenway boundaries, this category would include any parcel in some stage of urban development that parallels the Willamette River. Since the urban network cannot be removed, efforts should be taken to mold the urban environ into compatibility with existing or proposed Greenway landscape. Although urban expansion per se is not advocated within the Greenway boundary, urban renewal and other development schemes oriented towards the river will most likely be encouraged if they are cognizant of a fragile environment. The only exceptions for larger developments would be if they necessitated adjacency to the river; i.e., shipbuilding terminals. It is likely, however, that there would be provisions for zoning this type of endeavor into less environmentally sensitive regions of the river.

Farm. This category is the most omnipresent within the Greenway system and accounts for over 50% of the total land mileage. Currently, farm land is afforded protection from condemnation under HB 2497; however, this category of land will, most likely, be the cause of great consternation to Greenway planners.

Non-Farm. This "catch-all" category comprises some 30% of Greenway lands that are not already indicated in some type of classification; i.e., river, farm or urban. Any concerns that are now occupying portions of lands within this category will be permitted to continue operation; however, they will not be allowed to expand or intensify. New endeavors will only be permitted if they conform to local land-use planning criteria, which, in turn, should correspond to Greenway guidelines.

The entire non-farm entity has been reportedly scrutinized by Greenway consulting teams who determined that it contained the

greatest potential for public usage within its 27,000 acre configuration. This division lies primarily in public ownership, lands in vacancy, land determined to have aesethic value and areas of critical concern that must receive varied degrees of use management or regulation. This latter category, critical concern, consists of nearly 8,500 acres along the Greenway boundary. In addition, this non-farm designator has been sub-categorized on the basis of degrees of potentially detrimental usage that might occur. The following categories, Preservation, Conservation 3, Conservation 2, Conservation 1, and Recreation, comprise non-farm environmental limitations.

Preservation. Consisting of about 2% of all lands in the human use potential, areas designated for preservation would include those areas, for example, that should be set aside for wildlife refuge or for other similar purposes. Many already exist; others are being designed. Management for the majority of these areas will fall under the jurisdiction of the State Wildlife Commission which would also be responsible for placing limitations on the amounts of human activity that would take place in such areas. In most cases, activities would be restricted to those that would be necessary for conducting scientific research or investigation.

Total economic benefits may not diminish, since, in some instances, preservation acreages may be purchased by public agencies or private concerns that are directed toward preservationalist pursuits.

Conservation 3. Containing nearly 36% of all lands designated by the public use potential, this category implies careful management and a very limited amount of allowable activity. These areas are to be primarily set aside for visual experiences while being sustained as the sanctuaries of floral and faunal species. Not designated for development of any economic benefit, Conservation 3 parcels indicate that public education, knowledge, and the creation of buffers must be utilized with lands if this natural area is to endure.

In any case, where this nature of classification juxtaposes a usable or in-use parcel of land, for example agricultural, then a scenic easement device may be employed. Again, it is similar to the Preservation designator in that little or no human activity will be allowed.

Conservation 2. The most abundant land in this category designated with the potential for public usage, Conservation 2 consists of nearly 54% of the total acreage. Its uniqueness lies in the fact that it will only be approachable by the river or by trail due to its location at the borders of the Willamette River's banks. In some cases, access may not be permitted in various areas because of the possible disturbance to vegetation or other factors necessary in order to alleviate erosional cycles or to minimize other serious environmental phenomena.

Conservation 1. The Conservation 1 categories, for the most part, are those that will receive a greater concentration of human activity than the other aforementioned categories. Consisting of about 6% of the remaining lands in the Greenway system, Conservation 1 includes those lands with a rather marginal status--such as those with poor drainage or with relative poor soil conditions. In some instances, areas already developed may be included.

Being more relevant to a recreation oriented base, study has shown that this category may be successfully coupled with various economic enterprises, such as gravel extraction; that is to say, provisions are made or considered that take into account possible disturbances to other users.

Recreation. This last, as well as less sensitive designation, includes about 2% of the remaining land, As its name implies, these areas were selected for intensive recreation sites on the basis of poor soil morphology, ability to withstand erosion, absence or presence of sparse vegetation, non-abundant wildlife or species able

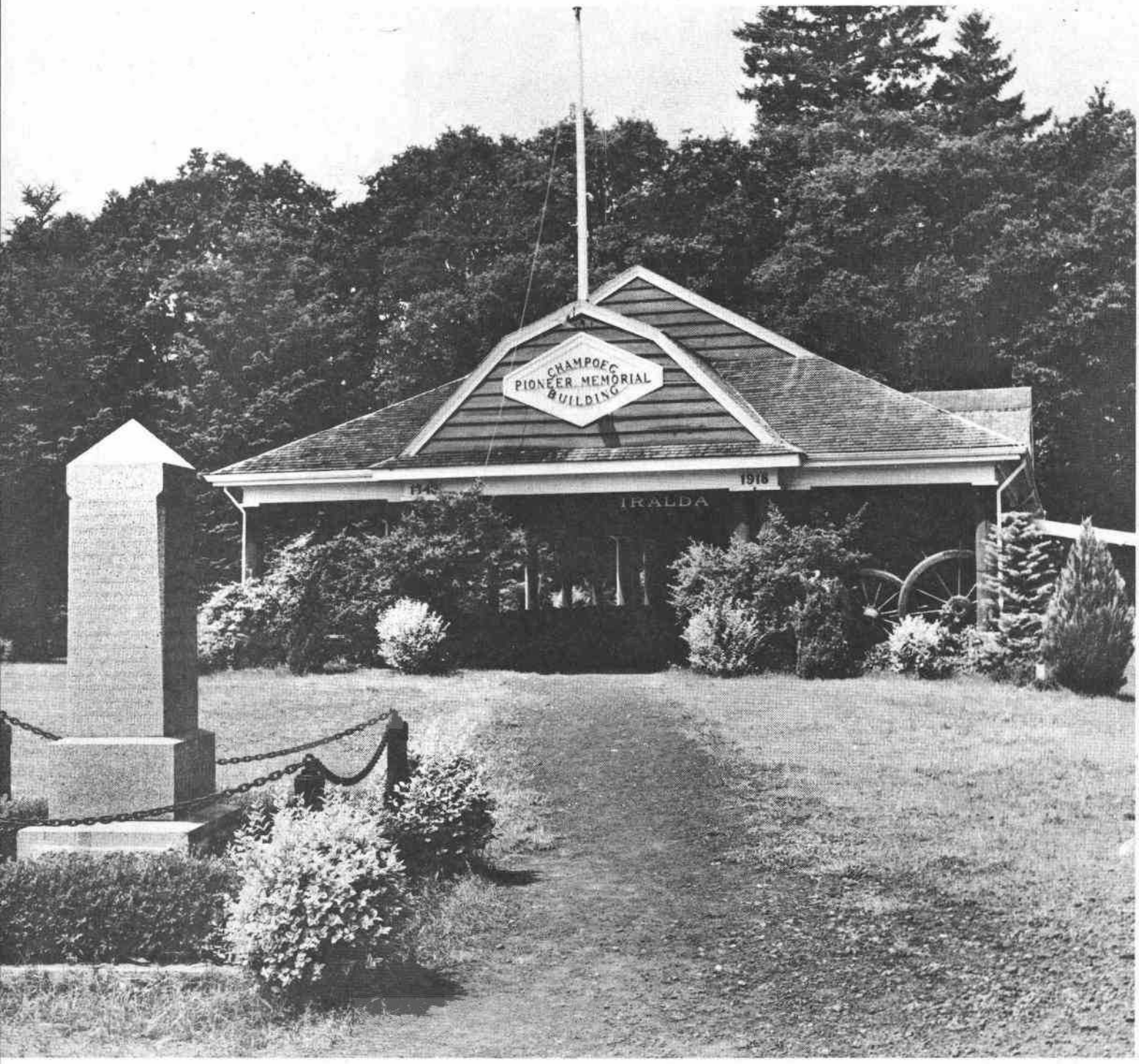
to adopt easily to human population pressures, and, in comparison, are not prone to sever flooding.

Based upon supply and demand, local planners will be the primary determiners of the feasibility of such development as outlined by local comprehensive plans--particularily in urban areas. Designated activities could include water-related recreation, bicycle paths, equestrian pursuits, and a number of other leisure time activities. If circumstances warrant, buffers may be created between recreational areas and more sensitive or industrial areas, thereby taking into consideration prior development. In addition. recreation may be able to compete with economic pursuits, such as gravel extraction. In this case, extraction zones would be rehabilitated and later developed for recreation or another use (Royston, 1974B:8-15).

Other significant aspects as outlined in the Preliminary Willamette River Greenway plan are, for the most part, contained in a section entitled "Goals and Guidelines." These goals and guidelines, or planning recommendations, will be elucidating factors in the alleviation or magnification of the myriad of problems that will confront planners and implementers of the Willamette River Greenway.

Summary

This chapter has been intended as an overview of the development of the Willamette River Greenway. It has taken the plan from its inception to a stage of present realization and has examined the influences that have caused significant change or modification. Thus far the primary stimulus for change in the Greenway has been public reaction, and this will continue to be a primary consideration for any subsequent adoptions. Therefore, it is important to consider their values and orientations from time to time. This should be accomplished not only by way of public hearings and/or commissions, but also from attitudinal surveys.



Champoeg State Park
(courtesy of Oregon State Highway Department)

CHAPTER 5

THE WILLAMETTE RIVER BASIN AS A CULTURAL SYSTEM: CONTEMPORARY PUBLIC ATTITUDES

The Willamette Greenway is more than simply a program to employ technology to renew a relevant resource. The program is itself a configuration of values and priorities for behavior that in turn impact upon all citizens and visitors to the Willamette River Basin. Important to the plan's operational success and ability to be sustained is the attitude of the region's public--the extent to which project priorities and values match with those of the public it serves.

A key to understanding the cultural systems support for its own environmental actions, including those designed to devote the technology to resource renewal and revitalization, comes in terms of analyzing people's attitudes. Understanding these attitudes, which will eventually be the measure of the program's success, is a great deal more than an academic exercise. It is also the cornerstone of program planning in this day of assuring public inputs to social system goals.

Attaining Public Inputs

One of the most omitted features of any land-water development scheme is public participation, even though this neglect may not necessarily be conscious on the part of planners. The public must have significant involvement from the incipient stages of project development and this participation must continue in order to insure success by way of continual evaluation. Public participation and the gathering of attitudes can be accomplished by several methods: public hearings, commissions, review, interviews, and so on. While it is realized that there is no one best method alone, public participation can and should be accomplished by a combination of methods, each employed to obtain the widest possible range of atti-

tudes and information.

One beneficial tool, as an additional effort to reach public attitude, is the questionnaire. Mail distributed questionnaires are usually not considered sufficient when used to gather primary census data, due to usual imbalances of their return. Many critics also object to such questionnaire data receiving complicated statistical work simply because questionnaire distribution "randomness" is not easy to attain. But, as Pelto notes, when gathering information of a general descriptive nature, the questionnaire can be most efficient and succinct (Pelto, 1970:105-106). Even though the return is virtually only a small percentage of those mailed to respondents, it can nevertheless afford some representativeness of public opinion.

Gilbert White notes that state and Federal agencies are currently employing three devices in order to determine public preferences toward water development projects. First is the scheduled public hearing which is held during the initial phases or towards the final phases of completion. As White notes, these meetings of local interest groups or concerned citizens are not extremely beneficial and are usually tightly structured, as if to shape or determine the alternative rather than let issues fall open in other than a predetermined way (White, 1969:79). Most of the participating citizens groups are usually comprised of such groups as the Sierra Club, or other environmentally concerned persons. At the opposite end of the scale are those with the vested interests, for example, agriculturalists, if the proposed project poses a threat to their existence. The tragedy, of course, is that the large percentage of the population does not participate for a variety of reasons; i.e., apathy, lack of time, etc. Only upon completion of the project does this element of the population begin to voice its pleasure or more usually, displeasure. Also representative of these meetings on hearings are the "chronic meeting attenders". Such persons will go and take issue no matter what the subject. All of this is not necessarily bad, as it does aid planners to some degree. It is only unfortunate that most of the users do not attend to voice their opinions.

A second method, according to White, is the testimonial hearing called by Federal or state commissions and/or committees. This method may, at times, be useful in extracting public opinion from selected members of the public many of whom, again, have vested interests. Third, and somewhat more commonplace, is the method by which planners take informal cues from professional associates, opinions from friends and others, or from the rumor mill. Although rarely recorded or documented, planners assure the public that they are expressing what the public really wants in relation to any proposed water-land project (White, 1969:80). The language they use is common to the public and therefore conveys the notion that it is representative of all people.

Public participation in the Willamette River Greenway has been attained primarily by way of hearings situated in the Council of Governments Regional Areas I-IV, or in the centers of Portland, Salem, Eugene, and Corvallis. Additional public meetings have been held throughout the valley at several locations. Such meetings were designed to act as a public involvement and information process and, in addition, to include citizens as well as local governments in the planning process. These constitute an attempt to insure that people would have a say in the general direction the project is to take (Royston, et al., 1974A:1).

Although these meetings are conducted in the manner that White has deemed least desirable, they have nevertheless had considerable impact upon the decision of planners and legislatures alike in the Greenway program's development. Take, for example, those agriculturalists with the vested interest in their land adjacent to Greenway developments. Recent legislation has insured their protection as long as the land remains in some form of farm usage. Still, Greenway planners have made no systematic effort to extract an opinion of the "average" citizen who does not attend such meetings. Even though door-to-door interviews and questionnaires all contain problem areas and bias, they nevertheless remain as useful data collecting tools. It seems Greenway planners will have to find

alternatives or sets of alternatives for existing plans or policies insofar as their public input data are incomplete. Citizen involvement remains biased because of a lack of representative input.

The Preliminary Greenway plan accurately notes that planning is an on-going process and should reflect the contained desires of citizens to insure continued success (Royston et al., 1974A:60). The plan calls for local participating governments to periodically review public satisfaction and dissatisfactions relating to the Greenway which are to be integrated into the comprehensive plan. The local citizen participation conference can be utilized, but should be supplemented with other methods. Simply advertising and contact with an intent group meeting does not get citizens involved to the extent that is needed.

The Research Tool

The research tool utilized for data collection technique on contemporary public attitudes for this research was the mail distributed questionnaire. It is realized that this method is subject to many limitations as well as many criticisms. Pelto notes that questionnaires are open to objection because in any study that involves complex statistical analysis there is the probability of a non-random character of the sample. However, if the researcher is primarily collecting material of a general descriptive nature, and statistical analysis is only secondary, then the questionnaire can be quite useful (Pelto, 1970:105-106) in defining parameters and patterns of public feelings.

Realizing the limitations of the research tool, I selected this method on the rationale that those individuals who are active enough to return the questionnaire are the same individuals who are willing to participate in other forms or methods that could be used in obtaining inputs. Therefore, at least the method would obtain systematic information from public segments already encountered in

structured hearings. The questionnaire was pretested on volunteer members of the Corvallis community. It contained questions designed to elicit limited biographical and residential information on each informant as well as responses to attitudinal stimuli regarding purposes and goals of the Willamette Greenway.

The Sampling Process and Data Interpretation

The sample was derived from a computer print-out of automobile owners in the State of Oregon. This was provided by the Department of Transportation in Salem. The sample was random in the sense that names were dropped from the computer at "skip-intervals" or measured spans between cards. Although the sample was selected from state-wide population, data collection was confined to communities in the valley. Hence, the universe for sampling was defined in terms of a natural ecological feature; i.e., the Willamette Valley. This was decided upon because the population sample would more easily fit with the specific purposes and parameters of the research (cf. Pelto, 1970:162). A total of 500 informants were mailed a questionnaire, and 95 were returned in completed form. These data were collected in the summer of 1974.

Interpretation of the data collected involved the isolation of what the researcher deemed relevant variables. These variables were then run in frequency distribution with one another. Those variables isolated were selected from biographical information provided by the respondent; i.e., age, sex, occupation, education. They were cross-tabulated with attitudinal responses reflected by asking the respondent to rank items that should or should not be given a priority by the Greenway plan. Such items selected were water quality improvements, improvements in land aesthetics, improvements for water-based recreation, improvements for land-based recreation, and improvement for economic opportunities. In addition, they were cross-tabulated with respondent attitudes on whether or not industrial developments should accompany the Greenway. The

material was ordered and tabulated through the Statistical Interaction Program System (SIPS).

Sample Characteristics

In terms of a population profile, the sample was measured with 1970 census data for the Willamette Valley. Biographical information was thus compared in order to determine the extent of bias that existed in the sample. With age of the respondents, the range ran from 19 to 85. The questionnaire categories were collapsed into groups 25 and under, 26 to 30, 31 to 40, 41 to 50, 51 to 60, and age 61 and older. Since these categories did not correspond precisely with those found in the census materials, it was necessary to simply combine the ages from 19 to 61 into one group. There were no respondents under age 19 and only 17 over the age of 61. Therefore, 73.30% of the sample fell into the 19-61 span as compared to 67.74% of Willamette Valley residents.

Data derived on sex will not be discussed at any length, since they were in no way representative of basin census figures. Sex bias did influence factors in other sections, such as occupation. The low female return, 21.11% can most likely explain the small percentage of clerical and sales workers in the return. Male return was 78.88% and perhaps biases occupational responses as well.

Residence was divided into three categories: urban, suburban and rural. On the questionnaire the respondent was asked to mark the category that most appropriately coincided with what they felt described their place of residence. Those indicating urban residence constituted 42.55%, suburban comprised 38.30%, and rural involved 19.15%. When comparing these figures with census data, it was realized that only the urban was operant and it would be necessary to merge the sample suburban percentage figure with the urban figure. This revealed a sample pattern of 80.14% urban and 19.15% rural as compared to the census figures of 70.30% basin urban and 29.70% basin rural.

Basin area classification was not indicated on the questionnaire since it was felt that many respondents might not be aware of this distinction. Basin area classification was merely determined by taking the town in which the respondent lived, and placing it in the appropriate category. By sample, 9.57% were in the upper basin, 40.43% in the middle basin, and 50% from the lower basin. Comparable basin census figures (1964 being the most recent data that could be located) revealed that 14.47% of the population reside in the upper basin, 24.78% in the middle basin, and 60.48% in the lower basin. Even though actual population counts have changed since 1964, percentage figures show very little change.

With respect to amounts of education, sample categories were broken into the following groups: 6 to 8 years, 9 to 10 years, 11 to 12 years, 13 to 14 years, 15 to 16 years, 17 to 18 years, and 19 or more years (see Appendix). When comparing these figures with census materials, only approximate comparisions could be made due to non-compatibility of categories. Census data only accounted for those individuals with five or less years of schooling, four or more years of high school, and those with four or more years of college. By collapsing sample categories 13 to 16, and comparing them with census data on four or more years of college, a rough estimate showed that 49.47% of the sample fit this criterion with respect to 62.42% in the basin census. Again, the sample count is only approximate since those with 11 years of schooling could not be separated from the classification of 11 to 12 years of education. A similar difficulty was experienced with those individuals with four or more years of college. By taking sample categories 17 to 18 years and 19 and more years, an estimate of 14.75% was made in relation to a four or more years of college percentage of 14.42% as shown in the census. Some individuals within group 15 to 16 years of education should apply also, but could not be accurately separated. No corrective formulae were applied.

Questionnaire categories with regard to occupation were the following: uniformed service, professional, student, retired, un-

employed, housewife, skilled, non-skilled, managerial, and clerical or sales personnel (see Appendix). When attempting to compare the sample with census data it was determined that distinctions could only be made in certain categories, such as professional, skilled, non-skilled, managerial, and clerical or sales. These could not be determined with the valley as a whole, so three counties were singled out in an attempt to arrive at some measure of representativeness. Counties used were Benton, Multnomah, and Lane (see Table 1).

As previously noted, the clerical and sales group is below the computed range partially due to low percentage of female returns. In addition, it should be mentioned that the percentage figures are high in relation to others and most likely can be explained in terms that the counties selected are marked by urban concentrations and/or the presence of universities.

Simple income characteristics and census data conformed to one another in closer proportion than did other categories used in the sample (see Table 2). Note that the basin total does not equal 100%. This can be explained in terms of an unemployment factor or a census mathematical error.

Sample Bias

Attitudinal surveys, observations, public hearings, and other research techniques to solicit public opinion often yield diversified results. This diversification can be attributed to a wide range of factors that influence public opinion, such as the type of research technique employed and community organizations that generate influence on decision-making (Smith, 1974:877). Therefore the sample must be composed in terms of census data in order to determine if it is representative. In general terms, bias exists from how the sample was selected, and in terms of who was selected. Additional bias also exists on those who returned the questionnaire.

Table 1. Percent of selected occupations in select basin counties

	Professional	Skilled	Non-skilled	Managerial	Clerical or Sales
Sample	22.59	23.26	7.53	16.13	8.60
Benton	26.97	9.12	17.70	8.27	26.21
Multnomah	14.97	12.54	4.59	8.76	30.21
Lane	15.78	13.79	7.60	9.27	23.97

Table 2. Basin income groups and sample group incomes

	Sample	Willamette Basin
	Percent	Percent
Under $4,999	7.77	16.95
$ 5,000-$ 9,999	23.33	14.42
$10,000-$14,999	27.77	28.00
$15,000-$24,999	33.32	34.27
$25,000 and over	7.77	4.06

Sample bias seems to emerge in the following categories: the most widely represented age group to respond to the questionnaire were those individuals from 41 to 50. This would contain a certain amount of bias from the fact that they may perceive quite differently from younger or older age groups due to differences in education and experience, and station in life.

With residence, bias was towards those responding from an urban environment. This, in part, can be attributed to collapsing the categories to coincide with census data. By basin area, the bias emerges towards middle basin respondents; however, the sample as a whole seems quite representative with respect to basin population configuration.

Since a comparison of education is only approximate, it is difficult to determine the bias that exists. In approximate terms only, bias emerged slightly in those individuals with four or more years of college.

Occupation categories reveal bias in terms of skilled laborers and managers, and the range tends to sway away from clerical or sales as would be expected from the small female return. Professional and non-skilled categories were representative and within an allowable arbitrary range of variation.

Sample bias with respect to income was reflected in a high percentage of persons in the $5,000 to $9,999 category as well as persons in the $25,000 and over category. All other categories were within a reasonable range.

Sample Attitudes

Sample Attitudes as a Whole

A number of attitudes were selected for comparison and simple cross-tabulation in order to determine some of the major patterns of personal characteristics and feelings of the Willamette Valley inhabitants. Those attitudinal variables selected for scrutiny included (1) the extent to which the respondent considered himself aware of the Greenway Program, (2) what Willamette Valley inhabitants considered priority activities or functions of the Greenway program should be, and (3) the feelings of valley inhabitants as to whether or not the Greenway program should incorporate industrial development goals. It was felt that these data would provide a good indication of public sentiments for the employment of technology for either the renewal and preservation of the Willamette River or the continued application of the technology for exploitation or productive involvement with it. The awareness variable simply provided a self-evaluation index of the population's knowledge of the Greenway. Rather than revealing actual awareness, it was thought to represent the extent to which information of sufficient quantity on the Greenway was reaching valley inhabitants and their accordant feeling of being informed.

A suprisingly large number of the total sample indicated that they were aware of the Greenway. Of a total of 95 responses, 80% indicated that they felt aware of the effort and its ramifications. Thus it would appear that information on the program is sufficient for most inhabitants.

Attitudes of the respondents as to what they felt the Greenway should emphasize as a priority function revealed similarly surprising results, particularly in view of many other studies showing that Americans and Oregonians are committed to the values of population and economic growth. Respondents were asked to rank example

functions in terms of their preferences, ranging from one to seven. A one response represented highest priority; a two, second priority and so on. Example functions included improvements in water quality, improvements in land aesthetics, in water-based recreation, in land-based receration, improvement in economic opportunity, improvements in wildlife, and other respondent identified functions. Table 3 shows the highest percentage responses for each example in the appropriate priority assessment. A general whole sample ranking of priorities according to weighted mean percentage responses is contained in Table 4. Respondent attitudes toward whether or not the Greenway should incorporate industrial developments revealed a slightly negative evaluation. Fifty-seven percent said it should not, thus sustaining the low priority assessment for economic opportunity in terms of Greenway functions.

Attitudes and Sample Characteristics

Self-Awareness. With regard to the Greenway self-awareness and sample age categories, in general most groups rated themselves as being aware of the scheme. The exception occurred in the 26-30 age group which indicated low awareness. Those identifying themselves as being most aware were the respondents from 41-50. This is slightly unusual, since one would think most individuals under 60 would consider themselves highly aware of most valley projects (see Fig. 5). Perhaps their assessment is a product of their demands for more detailed information.

Irrespective of the sex bias of the returns, males in the sample also indicated themselves as being more aware than the female respondents. This, of course, was due to an imbalance of returns (Fig. 6) and indicates only that women respondents felt less sufficiently informed than men. Both sexes indicated a mean awareness.

Assessments of awareness were highest among suburban returns, than urban, and then rural; although urban and rural were very close (Fig. 7). By sub-basin, those residing in the upper basin

Table 3. Highest percentage responses in priority sets

Functions	Highest percentage response	Priority set for project functions
Water quality	52.50	1
Wildlife improvement	37.50	3
Land aesthetics	29.33	3
Water recreation	30.14	5
Land recreation	27.40	5
Economic opportunity	37.50	6
Other	Not computed because of low frequency responses	

Table 4. Weighted mean responses in priority assessments

Functions	Weighted mean response[a]	Rank
Improvements in water quality	86.60	1
Improvements in land aesthetics	70.54	2
Improvements in conditions for wildlife	63.81	3
Improvements in land-based recreation	58.36	4
Improvements in water-based recreation	57.53	5
Improvements in economic opportunity	55.34	6
Other	Not computed because of low frequency responses	

[a]Weighted mean responses were computed for each variable from the total percentages of responses in each priority multiplied by a reverse order weight. These were in turn divided by the number of priorities.

Project awareness assessment	Age						
	Under 25	26-30	31-40	41-50	51-60	61+	T-mean
	1.31	1.64	1.15	1.11	1.17	1.12	1.19

Figure 5. Project awareness assessment and age (mean responses in each category)

Project awareness assessment	Sex		
	Male	Female	T-mean
	1.15	1.36	1.25

Figure 6. Project awareness assessment and sex (mean responses in each category)

Project awareness assessment	Residence			
	Urban	Suburban	Rural	T-mean
	1.23	1.13	1.22	1.19

Figure 7. Project awareness assessment and residence (mean responses in each category)

Project awareness assessment	Basin Area			
	Upper	Middle	Lower	T-mean
	1.00	1.23	1.19	1.22

Figure 8. Project awareness assessment and basin area (mean responses in each category)

considered themselves to be more aware than did those persons in the middle or lower basin. Seemingly those persons residing in the middle basin would be most affected by issues of the Willamette Greenway since they are closer to the immediate political arena (Fig. 8).

With respect to educational categories, those people in the 6-8, 9-10, 17-18 and 19 years of schooling categories indicated that they were quite knowledgeable about the Greenway. The highest degree of awareness if reflected by the two lowest and the two highest categories in the educational spectrum of the sample (Fig. 9).

Students and retired individuals emerged as seeing themselves to be more aware than all other occupational categories. The unemployed (one individual) said he was not aware of the project. This is hardly a basis for generalization. The same holds true for the low return of service personnel. Housewives, skilled workers, and clerical-sales workers, while on the mean are "aware" of set categories, were less self-acknowledging than other categories.

Basin residents earning from $15,000-$19,999 annually gave a generally more aware self-assessment than did other income categories. The lower income groups said they were less aware, a fact which might co-relate with amount of education or a general interest in basin planning activities (Fig. 11).

Project Function Priorities and Respondent Characteristics

Assessments of what priorities the Willamette Greenway should embody vary slightly according to age, sex, residence, education, occupation, income, and sub-basin dwelling, characteristics of the sample. Mean priority assessment responses for subcategories of each respondent characteristic were computed with respect to their frequency of occurrence in six major Greenway example functions. The results reveal the following patterns:

Project awareness assessment	Education							
	6-8	9-10	11-12	13-14	15-16	17-18	19+	T-mean
	1.00	1.00	1.24	1.34	1.10	1.00	1.00	1.19

Figure 9. Project awareness assessment and education (mean responses in each category)

Project awareness assessment	Occupation										
	Uniformed service	Profes-sional	Stu-dent	Re-tired	Unem-ployed	House-wife	Skilled	Non-skilled	Mana-gerial	Clerical sales	T-mean
	1.50	1.09	1.00	1.00	1.91	1.33	1.28	1.14	1.07	1.25	1.17

Figure 10. Project awareness assessment and occupation (mean responses in each category)

Project awareness assessment	Income						
	Under $4,999	$5,000-$ 9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000 & over	T-mean
	1.28	1.57	1.20	1.12	1.16	1.16	1.20

Figure 11. Project awareness assessment and income (mean responses in each category)

Priority Assessments With Respect to Age. People under 25 years of age rated water quality improvements highest, wildlife improvements next highest, and land aesthetics improvements in third position. Water and land-based recreational improvements and improved economic opportunity followed in descending order of importance. The greatest range (variability) of this age category's response pattern occurred with respect to improvements in economic opportunity. The range of total responses involving all priority assessments showed this age category to be the least variable. Thus it is possible to say that those under 25 years of age have the least breadth of priority assessment with respect to the example functions.

Patterns for the age category 26-30 show the same order as the under 25 category. The fundamental difference appears with respect to the extent to which this age category ranges in priority assessment. Only the 31-40 category showed a broader spectrum of attitude with respect to the example functions. The greatest variability of this category's response to a single function's priority is disclosed in their attitudes toward improving conditions of wildlife. Least variability, as in the case of 25 and under, is shown with attitudes toward water quality improvement.

The age category 31-40 shows the same general pattern in over-all ranking of functions. The category also discloses the broadest range of attitudes with respect to all variables. Least variation is shown with respect to improvement in water quality; greatest variation in attitude is shown in the functions of land aesthetics improvements, and land and water based recreation improvements.

Respondents in the age category of 41-50 show a departure in the pattern. Their strongest assessment of priority and least degree of variance occurs with respect to improving conditions of wildlife followed in order by water quality improvements and improvements in aesthetics. A slightly different order is observed

in regard to the lower three categories as well. Land-based recreational improvements take priority over water-based recreational improvements. Improvements in economic opportunity are least desired functions for this category whose overall range priority is less broad than those from 26-40 years of age.

Fifty-one to sixty year old respondents disclose a quite different order of preferences. Their mean rankings place priorities in the following descending order: (1) improving conditions for wildlife, (2) improving water quality, (3) improving economic opportunity, (4) improving land aesthetics, (5) improving land-based recreation, and (6) improving water-based recreation. The overall spectrum of priority assessments for this category has precisely the same range as for the 41-50 and 61 and over categories. The category shows quite variable responses within each function category. Least variance is shown with respect to conditions for wildlife improvement. The elevated status of economic opportunity prospects is perhaps related to this age groups' still active, but nearly over, role in productive economics. The Depression experience would not seem to hold since those over 61 devaluate the economic opportunity function. As it will be noted, however, this category shows an ambivalent attitude toward the promotion of industrial developments by the Greenway.

Those persons 61 and over generally duplicate the priority ranking patterns of people 50 years of age and younger. Their preferences show support of river preservation and resource renewal over recreation and economic opportunity. Most important to them is the improvement for the conditions of wildlife (1.30), then water quality (2.15) and improvements in land aesthetics (3.08). Lower level priorities in descending order are land-based recreation (3.58), improvements in economic opportunity (4.00), and water-based recreational improvements (4.16). It appears that while they do not visualize themselves in or on the water for recreation, they do see the Greenway as sponsoring some forms of economic opportunity, including industrial development, as we

shall see in later figures. As previously mentioned, the spectrum of priorities for this age category is average for the whole sample. A totally uniform and invariant response was obtained in terms of this category's priority commitment to improvement of conditions for wildlife. Greatest variability was expressed in relation to land-based recreational improvements and improvements in economic opportunity.

A full expression of means and ranges of responses with respect to age is contained in Table 5.

Priority Assessments With Respect to Sex. Sample returns with regard to sex were not representative of the census material because of the low percentage of female respondents.

Improvements in water quality were rated highest by males. Improvement in land aesthetics was next in their assessment. The remaining example functions were rated substantially lower in terms of mean assessments. Improvements in economic opportunity and water-based recreational improvements appear to be least significant priorities in their minds.

Female respondents also rated water quality improvements as the highest priority; in fact, their ratings were substantially higher than men for this example function. Second for women was improving the condition for wildlife and third priority was given to land aesthetic improvements. The remaining example functions were not differentiated by a quantitatively significant interval.

In terms of variability, male respondents showed a much narrower range of attitudes, while women showed a much broader spectrum. It seems likely that female respondents in this sample held more crystallized attitudes with respect to the variables. Table 6 illustrates the entire expression by sex.

Table 5. Priority assessments and sample age: Mean responses of each category (1=highest priority; 7=lowest priority)

Priority assessments	Age						Total mean	Total range	Aver. range
	Under 25	26-30	31-40	41-50	51-60	61 & over			
Project priority of water quality improvements	2.15	1.30	1.50	2.12	2.23	2.15	1.94	6	3.16
Project priority of land aesthetics improvements	3.92	2.50	3.18	2.75	3.66	3.08	2.96	5	4.33
Project priority of water-based recreation improvements	4.15	4.70	3.45	4.00	4.35	4.16	4.18	6	4.16
Project priority of land-based recreation improvements	4.33	4.71	4.00	3.25	3.92	3.58	3.92	6	4.33
Project priority for improving economic opportunity	4.25	4.12	5.30	4.33	3.00	4.00	4.01	6	4.83
Project priority for improving conditions for wildlife	2.46	1.80	1.75	1.47	1.50	1.30	1.56	6	3.50
Range of means	2.18	3.41	3.80	2.86	2.85	2.86			

Table 6. Priority assessments and sample sex: Mean responses of each category (1=highest priority; 7=lowest priority)

Priority assessments	Male	Female	Total mean	Total range	Average range
Project priority of water quality improvements	2.10	1.44	1.94	6	3.00
Project priority of land aesthetics improvements	2.94	3.70	3.12	5	5.00
Project priority of water-based recreation improvements	4.00	4.70	4.19	6	5.00
Project priority of land-based recreation improvements	3.92	4.00	3.94	6	5.00
Project priority for improving economic opportunity	3.96	4.40	4.05	6	5.50
Project priority for improving conditions for wildlife	3.70	3.05	3.55	6	5.00
Range of mean	1.90	3.26			

Priority Assessments With Respect to Residence. Water quality emerges as an important sample priority for the urban residents in the sample population. A second priority for urbanites is land aesthetics improvements; land-based recreational improvements is the third. Fourth is economic opportunity improvements; fifth and sixth are improving conditions for wildlife and water-based recreation, respectively.

Suburban respondents also rated improvements for water quality highest (1.64). A wide range indicates that the remaining examples are of considerably less importance (3.10-4.59) although they do rate improvements in the land aesthetics as second. Improvements for economic conditions were considered to be of least importance as an example of Greenway objectives.

Although rural responses indicated improvements in water quality in highest (1.93) priority, conditions for the improvement in the conditions for wildlife was a close (2.64) second. The water quality response, however, reveals a much greater variability in responses. The Greenway as a device to enhance economic opportunity was viewed with more favor than water and land-based recreational endeavors by rural respondents.

Priority assessments thus vary between the groups, but water quality emerges as a significant and meaningful example function for each group. The greatest extent of priority support for this function is among suburban responses, then urban, and then rural, as seen in Table 7.

Priority Assessments With Respect to Education. As would seem appropriate, the highest example priority among the lowest level group of the education categories (6-8 years) was found to be improvements for economic conditions. This same group also gave the highest rating to allowance of industrial developments in association with the Greenway. For the 6-8 years of education category, improvements in land aesthetics was rated second, and water and land-based recreation along with conditions for wildlife improvement were tied for third. The lowest priority was assigned water quality so far as mean responses are concerned.

It is important to note that all other educational categories rated water quality as the highest priority for Greenway development.

The next educational category, those with 9-10 years of education, rated water quality higher than all other educational categories. The second priority for this category was land-based recreational improvements, but water-based recreation emerged as their lowest priority. Other examples provided do not descend with any degree of variable difference. It is interesting that this relatively low educated group perceived water quality as an important function of Greenway goals, particularily in view of the 6-8 years category response.

The 13-14 year group indicated their primary concerns were with water quality and land aesthetics improvements. Conditions for wildlife and water-based recreation were ranked next, while land-based recreation and economic opportunities were deemed of lower importance. This age group apparently perceived themselves as water-oriented with wildlife preservation schemes as an important aspect of consideration to the maintenance of high environment standards.

Improvements in water quality once again is ranked of highest importance by those in the 15-16 year grouping, with land aesthetics improvements very close behind. These individuals also seemed to be highly environmentally oriented as improvements in the condition for wildlife comes very close behind in priority objectives. These individuals, as indicated by their responses, tend to rank recreation and economic opportunity as very low Greenway priorities.

Those with 17-18 years of education followed the higher educated with respect to water quality quite closely; however, improvements in economic opportunity emerged as quite high, as a surprising second example priority. The trend toward economic opportunity becomes of a lower priority as amounts of education increase and becomes broken at this point. This most likely can be qualified by the fact that very few individuals in the sample are of this category (6).

Table 7. Priority assessments and sample residence: Mean responses of each category (1=highest priority; 7=lowest priority)

Priority assessments	Residence					
	Urban	Suburban	Rural	Total mean	Total range	Aver. Mean
Project priority of water quality improvements	2.00	1.63	1.93	1.93	6	4.66
Project priority of land aesthetics improvements	2.83	3.10	3.68	3.12	6	5.00
Project priority of water-based recreation improvements	4.42	4.00	4.80	4.09	6	5.00
Project priority of land-based recreation improvements	3.86	3.83	4.33	3.86	6	5.33
Project priority for improving economic opportunity	4.00	4.59	3.53	4.12	6	5.33
Project priority for improving conditions for wildlife	4.10	3.41	2.64	3.53	6	5.00
Range of mean	2.42	2.96	2.87			

They comprise 8.42% of the profile as to education (see Appendix). Even by combining this category with the 19 and more years of education category, the trend shows a low evaluation of economic opportunity by the most highly educated. Table 8 shows this tendency in collapsed categories consisting of 6-12, 13-16, and 17 and more years of education. Still, lowest ratings are assigned by the 13-16 years of education category. This figure tends to make the distinction, then, between those with college education and those without. Those with no college view economic opportunity more favorably.

Table 8. Years of education and economic improvement priority assessment (weighted mean responses)[a]

Years of school	Percent of sample	Weighted mean
6-12	36.32	3.12
13-16	49.47	4.79
17+	14.79	3.78

$$^{a} = \frac{Av^{1} \times N^{1} + Av^{2} \times N^{2}}{N^{1} + N^{2}} = \text{weighted mean.}$$

The group with 19 and more years of education singled out water quality as their highest priority, with land aesthetics improvements emerging second. Wildlife and land-based recreation improvements appear as a third example priority. Water-based recreational improvement is perhaps perceived as a threat to the environmental quality of land and water in regard to its very low rating. Conditions for economic improvement were rated lower by the category than any other educational category. They also rated land aesthetics improvements higher than any other age category (Table 9).

Priority Assessments With Respect to Occupation. In regard to rating occupational categories, it must be mentioned that the category "unemployed" must be dismissed since only one individual in the sample fits this description. Interpretation of the data would be irrelevant.

The uniformed service persons rated land aesthetics improvements highest as compared to all other sample occupational groups. Second in their evaluation was expanded economic opportunities. Water quality was rated third; however, this category rated it the lowest in relation to the responses of the other occupational groups. Land-based recreation, wildlife improvements and water-based recreation received the lowest ratings in descending order.

The professional category rated improvements in water quality high, but in comparison with ratings of most other occupational categories, it was given a lower mean response. These higher educated people seem to lean toward land-related priorities as seen by their responses to recreation, aesthetics and wildlife preservation. They rated improvements to economic opportunity lower than any other responding category.

It was quite clear in the tabulated results that students were in high favor of water quality and wildlife improvements. Their rating of improvements for the condition of wildlife was highest in the entire responding occupational set. Other priorities apparently had less significance to them as they rated them substantially low by mean response. Their low rating of recreation seems to indicate a threat of impairment to the state or condition of water quality.

Those people in the retired category showed mixed attitudes between improving the quality of water (2.00) and economic opportunity (2.00). They rated land aesthetics improvements as equal (3.60). Water-based recreation was clearly not of high interest, since many of these individuals probably consider themseleves beyong the age to enjoy or to participate in this form of recreational activity.

Table 9. Priority assessments and sample education: Mean responses of each category (1=highest; 7=lowest priority)

Priority assessments	Education									
	6-8	9-10	11-12	13-14	15-16	17-18	19 & over	Total mean	Total range	Average range
Project priority of water quality improvements	3.66	1.00	1.36	2.05	1.96	1.33	1.60	1.93	6	3.14
Project priority of land aesthetics improvements	3.25	3.00	2.88	3.29	2.86	3.00	2.20	3.03	5	4.00
Project priority of water-based recreation improvements	3.33	4.00	4.52	3.33	3.88	3.80	4.20	3.21	6	4.57
Project priority of land-based recreation improvements	3.33	2.55	3.55	4.50	3.50	2.66	3.60	3.91	6	4.00
Project priority for improving economic opportunity	2.75	2.66	3.27	4.79	4.80	2.50	5.50	4.16	6	4.28
Project priority for improving conditions for wildlife	3.33	3.66	3.88	3.33	3.27	3.83	3.60	3.55	6	3.85
Range of mean	2.91	3.00	3.16	2.74	2.84	2.50	3.90			

Housewives felt water quality (2.00) and wildlife improvements (2.00) to be of primary concern in the Greenway, while improvements in land aesthetics and water-based recreation emerged as an equal second set (3.50). Of least importance in their responses were land-based recreation (4.50) and prospects for improving economic opportunity (5.50). The spectrum of priorities for housewives was very broad as indicated by the range of their means (3.50).

Those in the skilled category rated water quality improvements highest of their example responses. Again, this category seemed oriented toward environment preservation as indicated by their second priority of land aesthetic improvements and third priority assessments of conditions for wildlife. Economic opportunity was rated fourth, water-based recreation fifth, and land-based recreation given least preference.

Non-skilled individuals show an inverse attitude to the previously mentioned responses of the whole occupational set. Their priorities are quite recreation oriented, with environmental attitudes in second place. Quite interesting is the response to conditions for the improvement for wildlife (4.60), rated lower than any other category by occupation.

Responses from the managerial category showed no strong tendencies in any particular direction. They rated land-based recreation as highest (2.81), followed by water quality improvements (2.90), land aesthetics improvements (3.63), water based recreation (3.80), improving economic conditions (3.90), and, last, concern for wildlife preservation (4.00). Although their tendency was slightly in favor of environmental preservation, it seems they tend to favor the best of two worlds. The spectrum of their response was the narrowest of all occupational categories measured by the range of means (1.10).

The last occupational category, individuals involved in clerical or sales work, showed a wide range of variability between example functions. They rated improvements in water quality highest of all other occupational categories (1.28), while priorities for land-based recreation (4.85)

and economic opportunity (4.71) were rated lower by the category than any other. They seemed quite explicit in their decision for water quality, but showed more variability in other category responses as revealed in Table 10.

Priority Assessments With Respect to Income. In regard to response by income categories, those individuals making $4,999 and less perceived water quality improvements as the most important Greenway objective--highest among all income sets. Improvements for land aesthetics was second with conditions for improvement for wildlife third. Lowest on their priority was water-based recreational improvements. They perhaps saw this as a bigger threat to the impairment of water than economic development opportunities which they rated fifth.

Those earning from $5,000-$9,999 still perceived improvements for water quality as the most important Greenway objective, with wildlife and land aesthetics improvements next. Their orientation, then, is toward environment preservation. The group ranked economic opportunities (4.88) developments lower than any other responding income set.

The $10,000-$14,999, or mid-income group, rated improvements for water quality highest, and land aesthetics improvements second. Of least priority was improvements for water-based recreation (4.50). Their main emphasis seems to be placed upon the Greenway maintaining environmental objectives.

Those responding within the second highest income group ($20,000-$24,999 annual income) still maintained the water quality objective as highest, but land aesthetics improvements dropped to a fifth priority. These individuals did not seem to think that water-based recreational improvements posed any significant threat to water conditions since they rated these second (2.60). Improvement for economic development (3.80) was seen as somewhat important in relation to the Greenway objectives; however, improving conditions for wildlife was not deemed a high priority consideration (5.20).

Table 10. Priority assessments and sample occupation: Mean responses of each category (1=highest priority; 7=lowest priority)

Priority assessments	Occupation												
	Uniformed service	Professional	Student	Retired	Unemployed	Housewife	Skilled	Non-skilled	Managerial	Clerical-sales	Total mean	Total range	Average range
Project priority of water quality improvements	3.50	2.28	1.75	2.00	1.00	2.00	1.90	3.33	2.90	1.28	2.16	6	3.20
Project priority of land aesthetics improvements	2.10	2.32	4.50	3.00	3.00	3.50	2.94	3.60	3.63	3.28	3.09	5	3.60
Project priority of water-based recreation improvements	4.50	4.55	5.00	4.00	1.00	3.50	4.21	3.20	3.80	3.57	3.97	6	3.70
Project priority of land-based recreation improvements	3.50	3.64	4.50	3.60	1.00	4.50	4.57	2.80	2.81	4.85	3.91	6	3.40
Project priority for improving economic opportunity	2.66	5.26	4.25	2.00	1.00	5.50	4.00	3.20	3.90	4.71	3.80	6	3.90
Project priority for improving conditions for wildlife	3.50	3.35	1.75	3.60	2.00	2.00	3.60	4.60	4.00	3.28	3.53	6	2.90
Range of mean	2.40	2.98	3.25	2.00	2.00	3.50	2.67	1.80	1.10	3.57			

The highest income category (over $25,000) revealed a reverse trend in attitude toward example priorities. Although improvements for water quality was rated highest in response means (2.33), their mean response to improving water quality was lowest of all income groups. Their second choice of Greenway example objectives was to improve land-based recreation facilities (2.40) and then have the Greenway focus upon land aesthetics (3.00). Low among their concern was economic development (4.25) since they probably feel less economic pressure in view of their $25,000 and over a year incomes. Least important to high income people was the wildlife improvement function.

Priority Assessment and Sub-basin Occupancy. The category for discussion, sub-basin occupancy will be considered in conclusion since the researcher selected this criteria for a characteristic.

Upper basin attitudes were in favor of the Greenway taking measures to restore and maintain water quality conditions, and, second, to maintain land aesthetics. Least concern was for economic improvements, This category then, did show a slight tendency in favor of the environment in relation to forms of recreation.

Middle basin respondents were quite highly in favor of improvements in water quality. These also showed the strongest category feelings, in reference to all example priorities. Next, they favored land aesthetics aid, then wildlife protection; of least importance to them was economic development.

Lower basin respondents also indicated water quality improvements should be the major concern of the Greenway. As a whole, this group was in favor of environmental endeavors over recreational ones. It is interesting to note that all basin groups rated economic development lowest of all example functions.

Table 11. Priority assessments and sample income: Mean responses of each category (1=highest priority; 7=lowest priority)

Priority assessment	Income						Total mean	Total range	Average range
	Under $4,999	$5,000-$9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$24,999	$25,000 & over			
Project priority of water improvements	1.00	1.95	1.95	1.71	1.80	2.33	1.94	6	3.50
Project priority of land aesthetics improvements	3.33	2.94	2.82	3.15	4.20	3.00	3.08	5	4.33
Project priority of water-based recreation improvements	5.00	4.26	4.50	3.55	2.60	3.20	3.91	6	4.33
Project priority of land-based recreation improvements	3.80	4.42	4.00	3.68	3.83	2.40	3.88	6	4.33
Project priority for improving economic opportunity	4.00	4.88	3.72	4.05	3.80	4.25	4.16	5	4.66
Project priority for improving conditions for wildlife	3.40	2.78	3.44	3.76	5.20	4.66	3.58	6	4.00
Range of mean	4.00	2.93	2.55	2.34	3.40	2.33			

Promotion of Industrial Developments

As an indication of their attitude toward the inclusion of industrial development in the Greenway, respondents were asked to indicate whether they felt that the plan should allow for industrial developments. Only those in age froup 61 and over felt this should be allowed, and this is rather curious since most in this age group are retired individuals (Fig. 12) and persons who placed high values on resource renewal.

Women were more opposed than men in regard to preference for industrial development (Fig. 13) in association with the Greenway.

The mean response for suburbanites slightly favored industrial expansion in association with the Greenway. This response was interesting since the same persons did not want to see economic opportunities expanded (Fig. 14) as a priority Greenway function. Rural area residents were most negative regarding their mean responses to residential developments .

As indicated by Figure 14, individuals responding from the middle sub-basin responded more favorably to industry than those from the upper and lower sub-basins. Middle basin individuals only slightly favored (4), however, and were not in favor of development of economic opportunities as a Greenway function.

Lower educated groups tended to favor industrial expansion. Most likely this was thought to create a greater possibility for more and better jobs in the basin (Fig. 16).

Students were the astonishing category in the industrial development response. Although they rated all priorities rather low with the exception of water quality improvement, they were more in favor of industrial developments than were other occupational categories. This would appear to be a contradiction in terms (Fig. 17) and bears further examination.

Table 12. Priority assessments and sample basin area: Mean responses of each category (1=highest priority; 7=lowest priority)

Priority assessments	Basin area					
	Upper	Middle	Lower	Total mean	Total range	Average range
Project priority of water quality improvements	2.12	1.87	1.94	1.93	6	5.00
Project priority of land aesthetics improvements	2.75	3.03	3.27	3.12	5	4.33
Project priority of water-based recreation improvements	4.12	4.00	3.67	3.98	5	5.00
Project priority of land-based recreation improvements	3.87	3.80	3.55	3.81	6	5.33
Project priority for improving economic opportunity	4.25	4.26	4.48	4.12	6	5.33
Project priority for improving conditions for wildlife	3.87	3.80	3.24	3.30		5.00
Range of means	2.13	2.39	2.54	2.19		

Promotion of industrial developments	Age						
	Under 25	26-30	31-40	41-50	41-60	61+	T-mean
	1.73	1.80	1.75	1.47	1.50	1.30	1.56

Figure 12. Promotion of industrial developments and age (mean response)

Promotion of industrial developments	Sex		
	Male	Female	T-mean
	1.51	1.80	1.57

Figure 13. Promotion of industrial developments and sex (mean response)

Promotion of industrial developments	Residence			
	Urban	Suburban	Rural	T-mean
	1.51	1.48	1.85	1.55

Figure 14. Promotion of industrial developments and residence (mean response)

Promotion of industrial developments	Basin area			
	Upper	Middle	Lower	T-mean
	1.66	1.53	1.57	1.56

Figure 15. Promotion of industrial developments and basin area (mean response)

Promotion of industrial development	Education							
	6-8	9-10	11-12	13-14	15-16	17-18	19+	T-mean
	1.33	1.66	1.47	1.69	1.44	1.50	2.00	1.57

Figure 16. Promotion of industrial developments and education (mean response)

The most positive attitude toward industrial development by income categories was observed in the responses of the $20,000 to $24,999 category. This might be explained in terms that individuals in this high income range depend upon industrial concerns, or at least are positively oriented to them in an economic way (Fig. 18).

Relationships of High and Low Priority Assessments to Other State Problem Assessments

In order to make attitudinal comparisons with respect to water quality and economic opportunity variables, cross-tabulations were made against various problem areas that residents felt the state might be experiencing as a whole. Improvements in water quality and improvements in economic opportunity as Greenway objectives were cross-tabulated with recognition of the state problems of water and air pollution, uncontrolled growth, taxes, unemployment and low wages.

It was first hypothesized that high recognition of air and water pollution problems would relate strongly to high priority of water quality improvement as a Greenway function. Those individuals who felt that air and water pollution were critical state problems also tended to rank improvements in water quality as a high priority.

Economic opportunity improvements were also correlated with the state problems of uncontrolled growth, taxes, and unemployment and wages. As expected, there would appear to be a negative relationship between the two; i. e., persons who see uncontrolled growth as a problem rate improvement in economic opportunity through Greenway as a low priority (Table 14).

With respect to the comparisons of people's recognition of taxes as a state problem, and their corresponding view of economic opportunity as a Greenway function, there appears to be a spurious connection. While over half of the sample viewed taxes as a serious burden, over 75% of the sample viewed the economic function in the lower priorities. A slight bimodality is disclosed with respect to the combination as shown in Table 15.

Promotion of industrial developments	Occupation										
	Uniformed service	Professional	Student	Retired	Unemployed	House-wife	Skilled	Non-skilled	Managerial	Clerical-sales	T-mean
	1.50	1.75	1.00	1.00	2.00	1.57	1.66	1.33	1.53	1.53	1.40

Figure 17. Promotion of industrial developments and occupation (mean response)

Promotion of industrial developments	Income						
	Under $4,999	$5,000-$9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$24,997	$25,000 & over	T-mean
	1.66	1.70	1.50	1.55	1.33	1.66	1.57

Figure 18. Promotion of industrial developments and income (mean response)

A hypothesized positive comparison was expected for high recognition of the state problem of unemployment and wages and a high priority assignment to an economic function for the Greenway. Most people saw unemployment and low wages as a not too serious problem. A high percentage viewed economic opportunities as a low priority (see Table 16). Correspondence between the two was only slight and then in a low problem-low priority connection. Given the present unemployment picture, perhaps the linkages would rise to a higher level.

Thus, what one would consider to be logical value connections, either positively or negatively related, are affected by variations in peoples's attitudes. High recognition of the state problem of air and water pollution does relate to high priority assignment of a water quality function in the Willamette Greenway. People who see uncontrolled growth as a serious state problem similarily devaluate economic opportunity improvements as a function of the Greenway. High recognition of taxes as a state problem does not relate strongly to improvements in economic opportunities as a Greenway function. Variation affects the relationship in a bimodal pattern. Variation, low problem recognition and low priority assignments, made the relationship spurious between recognition of unemployment--low wages as a problem, and high priority for economic opportunity functions of the Greenway. A relationship of the latter two attitudinal factors could be marked by low problem recognition in the former. It is clear that the latter was not highly evaluated as a Greenway function. Variability in attitudes created a bimodality in each variance.

Summary

By way of summary, public input to planning decisions is essential for successful program orientation. Public attitudes can be assessed by several methods that include public hearings, testimonials, commissions, and by additional efforts which involve research tools such as questionnaires. The questionnaire can be a useful technique if the researcher will bear in mind that the information

Table 13. Air and water pollution and water quality improvement (percentile frequency)

STATE PROBLEM: Air and water pollution (percentile frequency)	Project priority: Improvement in water quality (1=highest priority, 7=lowest priority)							Total Percent
	1	2	3	4	5	6	7	
10	1.25							1.25
20	1.25							1.25
30	1.25		1.25					2.50
40		1.25						1.25
50	1.25	1.25						2.50
60	1.25	1.25	2.50	1.25	1.25			7.50
70	2.50	1.25		1.25				5.00
75		1.25						1.25
80	6.25	3.75	2.50	1.25	2.50			16.25
85	5.00	2.50		1.25				8.75
90	13.75	13.75	1.25					28.75
95		2.50						2.50
99	17.50	5.00	3.75	1.25		1.25	1.25	30.00
Total percent	51.25	23.75	11.75	7.50	3.75	1.25	1.25	

Table 14. Uncontrolled growth and economic opportunity (percentile frequency)

STATE PROBLEM: Uncontrolled growth (percentage)	Project priority: Improvement in economic opportunity (1=highest priority, 7=lowest priority)							Total
	1	2	3	4	5	6	7	Percent
10	1.52			1.52	3.03	3.03		9.10
15						1.52		1.52
20	3.03				1.52	1.52		6.01
25	1.52				1.52			3.04
30		1.52	1.52	1.52	1.52			6.08
40						1.52		1.52
50		1.52	1.52			1.52		4.56
60		4.54				4.54		9.08
70	3.03			1.52		1.52		6.01
75				1.52				1.52
80	4.54			3.03	1.52	1.52		10.61
85						1.52		1.52
90		1.52	1.52	1.52	1.52	4.54		10.62
95						1.52		1.52
99		1.52		4.54	3.03	16.66	1.52	27.27
Total percent	13.52	6.08	9.10	12.13	13.66	42.55	1.52	

Table 15. Taxes and improvement of economic opportunity (percentile frequency)

STATE PROBLEM: Taxes (percentage)	Project priority: Improvement in economic opportunity 1=highest priority, 7=lowest priority							Total Percent
	1	2	3	4	5	6	7	
10				1.45				1.45
30					1.45			1.45
40				1.45				
50	4.34			1.45	1.45	4.34		11.58
60		2.90			1.45	1.45	1.45	7.25
65						1.45		1.45
70			1.45	4.34	1.45	7.25		14.49
75						2.90		2.90
80	2.90	1.45		1.45	1.45			7.25
85	1.45					7.25		8.70
90	4.34	1.45				1.45		7.24
95				1.45	4.34	2.90		8.69
99	5.80	1.45	7.25	1.45	1.45	10.15		27.55
Total percent	18.83	7.25	8.70	13.04	13.04	39.14	1.45	

Table 16. Unemployment, low wages and economic opportunity (percentile frequency)

STATE PROBLEM: Unemployed and wages (percentage)	Project priority: Improvement in economic opportunity 1=highest priority, 7=lowest priority							
	1	2	3	4	5	6	7	Percent
10				1.47				1.47
15						1.47		1.47
20	1.47		1.47	1.47	1.47			5.88
30	1.47			1.47	1.47	7.35		11.76
35						1.47		1.47
40	1.47		1.47	1.47	1.47	2.94		8.82
45			1.47					1.47
50	2.94	1.47	1.47	1.47	2.94	5.88		16.17
55					1.47			1.47
60	1.47	2.94		1.47		4.41	1.47	11.76
70	1.47			1.47		7.35		10.29
75	1.47			1.47				2.94
80		1.47			1.47	2.94		5.88
90	1.47	1.47	1.47	1.47		4.41		10.29
95	1.47							1.47
99	4.41		1.47		1.47			7.35
Total percent	19.11	7.35	8.82	13.23	11.76	38.22	1.47	

collected should primarily be used for descriptive purpose since sampling biases are so common.

This research sample was selected from a listing of automobile owners within the state, and mailing of the questionnaires was confined to the Willamette Basin since it was more suitable to the conditions of the research. In the questionnaire, respondents were asked to first assess their own awareness of the Willamette Greenway. They were then asked to rank example Greenway functions such as improvements in water quality, improvements in land aesthetics, improvements in water-based recreation, improvements in land-based recreation, improvements in economic opportunity, and improvements for the conditions of wildlife in order to determine how they perceived Greenway objectives. Third, respondents were asked to indicate how they viewed the promotion of industrial development to accompany the Greenway scheme.

The sample's characteristics were then compared to census material on the Willamette Basin population in order to determine the extent of bias in the return. In terms of sample characteristics, some bias was revealed in aspects of age, sex, residence, basin area, and occupation. With other sample characteristics the amounts of bias were difficult to determine since they did not, for the most part, conform precisely with census profiles.

Attitudes were compared in cross-tabulation by SIPS. Attitudinal variables were: (1) the extent the respondent felt himself aware of the Greenway, (2) what the respondent felt priorities and functions of the program should be, and (3) the respondent's attitude on whether or not industrial developments should be incorporated into the Greenway. A high percentage of the respondents considered themselves aware of the Greenway. With respect to priority assessments of the sample as a whole, water quality emerged as the highest

priority for the project. Then, in descending order, respondents ranked land aesthetics improvements, improvements for the conditions of wildlife, improvement in land-based recreation, and water-based recreation improvements. Last in priority was improvements for economic opportunity. In terms of the response to industrial development, return was slightly toward the negative side. Only 43% felt that the Greenway should incorporate industry into its scheme.

In general, land and water improvements are rated quite high with reqard to other priorities, and respondents feel quite strongly that the Greenway should focus upon environmental improvements to the Willamette River rather that concern itself with recreation or other economic developments. As a whole, the Willamette River Greenway is not viewed by the public as a recreational scheme.

The Willamette River near Champeog State Park
(Courtesy of Oregon State Highway Department)

CHAPTER 6

CONCLUSION

Implications of Methodology

As mentioned in the previous chapter, the selection of the questionnaire was, for the most part, determined so as to illustrate how one research device can be utilized to offer the Greenway additional descriptive material concerning public attitudes. The Greenway has primarily concerned itself with the public hearing method to assess attitudes in the planning process. While this type of procedure can be beneficial, it is only through the combination of research tools that the widest possible range of public responses can be obtained.

The sample size in this study was only a small percentage of the actual Willamette Valley population and further comparisons with actual census data revealed that biases existed within the sample in several directions. The survey data are insufficiently representative to allow for elaborate statistical treatment. Since tabulations and their results were primarily for descriptive purposes, the nature of the information nevertheless can be viewed as valid in a descriptive sense and allow for the derivation of a number of tentative conclusions. These are of particular value in formulating specific hypotheses for further study of public attitudes.

Evolution of Cultural Systems in the Willamette River Basin

Cultural evolution in the Willamette River Basin can be viewed in a progressive sense. The technology base of the various cultures was revealed through their sociological and ideological dimensions as well as through people's attitudes toward the ecological system.

Perceiving the Willamette Basin in terms of an evoloving cultural system, the more efficiently energy was harnessed, the more elaborate and exploitative the cultural system became. As more alternative sources of energy were harnessed, central values changed and orientation toward the Willamette River became quite different, ultimately placing the river in the position of waste discharger.

The history of human activities of the Willamette River Basin has revealed that cultural systems have selected the Willamette River as the relevant ecological feature of their habitat. The three phases of cultural development, or three types of cultures (hunting and gathering, agrarianism, and industrial urbanism) have illustrated a progressive evolution of technology and a correspondingly greater impact of this progress upon the natural environment to include the Willamette River.

The aboriginal or hunting and gathering phase exploited the environment only as their technology would allow, and their cultural patterns were in many ways dependent upon the Willamette River. These groups exerted minimal impact upon the ecological system. Many of the sociological and ideological functions of their culture were derived directly from their technology and thereby were shaped by the activities related to the river.

The orientation of the first Europeans to the Willamette River can be viewed in similar ways to the aboriginal, since they shared many of the cultural functions of the latter. One marked difference appeared in this population's subsistence base, however, and that was the appearance of a more sophisticated technology which set the stage for the next occurring phase of cultural development.

As Julian Steward notes, more advanced stages of technology can occur in an environment only when certain preconditions exist. They are leisure time, stable populations, and some degree of in-

ternal specialization (Steward, 1955:38). With the beginnings of European settlement, aboriginal patterns were employed since they were most immediately efficient. The changing technology had not yet caught up with these vanguards of exploration. The Willamette River was a still relevant and nearly dominant ecological feature in terms of its cultural functions. As Euro-American settlements and technological diffusions began to spread throughout the West, the initial stages for agrarian lifestyle were beginning to be set for the Willamette Basin. The cultural level and the environmental potential now existed for a greater exploitation by the technology base. Although the Willamette River remained as a relevant and central ecological feature, signs of modification would soon appear.

Populations expanded rapidly and migrated throughout the Willamette Basin in search for suitable locations to exploit with the new technology. Even though towns and settlements became widespread, the river was still the primary source of communication and transportation. Eventually, however, expansion was so rapid that the Willamette River was no longer efficient. As new technological ideas began to diffuse to this isolated region of the Northwest, the Willamette River became a less relevant resource.

In the late Nineteenth and early Twentieth Centuries the industrial-urban lifestyle became increasingly apparent. Railways and highways had totally replaced the river for communication and transportation--settlements began to orient themselves away from once important water fornts. The river, a once relevant resource, was beginning to have less and less influence upon cultural activity. The utilization of more intense technologies also began to have significan and deleterious effects upon the basin ecology, especially the river. As the industrial technology base progresses within the new cultural system, environmental interplay became more immediate and critical with the river becoming a dependent environmental feature.

The Willamette River Greenway

The Willamette River Greenway emerged in the late 1960's as a program designed to revitalize the central ecological feature of the Willamette Basin--the Willamette River, as a recreational paradise for its industrial-urban inhabitants. It was soon realized that this sort of scheme was not feasible since its environment is extremely fragile and subject to detriment through over-utilization. The Greenway then became modified to incorporate a balance between the two best possible worlds: the environmental and the recreational. As of this date, seemingly, ecology will necessitate that recreation take the back seat and only be allowed in a very limited and specific sense. The project thus can be viewed as an attempt to renew a relevant environmental resource that had been previously degraded by maladaptation of earlier Twentieth Century cultural activities.

Contemporary Public Attitudes

The attitudinal supports for the Willamette River Greenway reveal that variable public sentiments are in the direction of selecting for the survival of the traditional system. This is explained in terms of the relatively high priority response to environmental improvements that the public perceives as the desirable function and orientation of the Willamette Greenway. In a sense, people want to see the technology that nearly destroyed the Willamette River utilized to restore and reinstate its relevance.

Contemporary public attitudes in this study reveal that the Willamette Greenway should consider improving the quality of water as its primary function. Other priority functions in descending importance include improving land-based aesthetics and conditions for wildlife, land and water-based recreation, and improving

conditions for economic opportunity. It is quite clear then that basin residents perceive the Greenway in terms of environmental improvements rather than in developing a recreational or economic theme.

Recommendations

With this information in mind, state and local planning agencies for the Greenway may very well be able to better assess plan formulation and implementation in terms of success rates. In the past, public attitude surveys have not been given due consideration, and the public hearing usually emerges as an emotionally-fed battleground for those with vested interests. Future planning endeavors must be aware of information such as this and make all possible efforts to obtain public response.

Any project involving socio-cultural aspects of land and water use has potential benefit to all citizens. Most important to insuring realized success are the cooperating and benefactoring public who are willing to express their desires, the establishment of planning procedures to obtain the widest possible range of public attitudes, and the enactment of appropriate legislative measures. The Willamette River Greenway could very well serve as an impetus and model for other such regional or national projects dedicated to the renewal of a culturally relevant resource.

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APPENDICES

APPENDIX I

POPULATION PROFILE OF GENERAL SAMPLE CHARACTERISTICS

Table 17. Population Profile: Age

Age	Number of respondents	Percent of sample
Under 25	13	13.98
26-30	11	11.83
31-40	14	15.05
41-50	20	21.50
51-60	18	19.36
61 and over	17	18.28
Total	N=93	100.00

Table 18. Population Profile: Sex

Sex	Number of respondents	Percent of sample
Male	71	78.88
Female	19	21.11
Total	N=90	100.00

Table 19. Population Profile: Residence

Residence	Number of respondents	Percent of sample
Urban	40	42.55
Suburban	36	38.30
Rural	18	19.15
Total	N=94	100.00

Table 20. Population profile: Basin area

Basin	Number of respondents	Percent of sample
Upper	9	9.57
Middle	38	40.43
Lower	47	50.00
Total	N=94	100.00

Table 21. Population profile: Education

Years	Number of respondents	Percent of sample
6-8	5	5.79
9-10	4	4.21
11-12	25	26.32
13-14	27	28.42
15-16	20	21.05
17-18	8	8.42
19 and over	6	6.32
Total	N=95	100.00

Table 22. Population Profile: Occupation

Occupation	Number of respondents	Percent of sample
Uniformed service	4	4.30
Professional	21	22.59
Student	4	4.30
Retired	8	8.60
Unemployed	1	1.08
Housewife	3	3.22
Skilled	22	23.65
Non-skilled	7	7.53
Managerial	15	16.13
Clerical or sales	8	8.60
Total	N=93	100.00

Table 23. Population profile: Income

Income	Number of respondents	Percent of sample
Under $4, 999	7	7.77
$ 5, 000-$ 9, 999	21	23.33
$10, 000-$14, 999	25	27.77
$15, 000-$19, 999	24	26.66
$20, 000-$24, 999	6	6.66
$25, 000 and over	7	7.77
Total	N=90	100.00

APPENDIX II

SAMPLE ATTITUDES AS A WHOLE BY PERCENTAGE

Table 24. Sample attitudes as a whole (percentages)

1 = Yes 2 = No

		Number of respondents	Percent of sample
Project awareness: Self evaluation	1	76	80.00
	2	18	18.95
	Total	N=95	98.95

Table 25. Sample attitudes as a whole (percentages)
1=Highest priority, 7=lowest priority

Project priority: Improvements in water quality	1	42	52.50
	2	19	23.75
	3	9	11.25
	4	5	6.25
	5	3	3.75
	6	1	1.25
	7	1	1.25
	Total	N=80	100.00

Table 26. Sample attitudes as a whole (percentages)
1=Highest priority, 7=lowest priority

		Number of respondents	Percent of sample
Project priority: Improvements in land asethetics	1	14	18.66
	2	12	16.00
	3	22	29.33
	4	15	20.00
	5	4	5.33
	6	8	10.66
	7	0	-
	Total	N=75	99.98

Table 27. Sample attitudes as a whole (percentages)
1=Highest priority, 7-lowest priority

		Number of respondents	Percent of sample
Project priority: Improvements in water-based recreation	1	5	6.85
	2	12	16.44
	3	7	9.59
	4	16	21.92
	5	22	30.14
	6	10	13.70
	7	1	1.37
	Total	N=73	100.00

Table 28. Sample attitudes as a whole (percentage)
1=Highest priority, 7= lowest priority

Project priority: Improvements in land-based recreation	1	8	10.96
	2	7	9.59
	3	9	12.33
	4	19	26.03
	5	20	27.40
	6	9	12.33
	7	1	1.37
	Total	N=73	100.00

Table 29. Sample attitudes as a whole (percentages)
1=Highest priority, 7=lowest priority

Project priority: Improvements in economic opportunity	Number of respondents	Percent of sample
1	14	19.44
2	5	6.94
3	6	8.33
4	9	12.50
5	10	13.88
6	27	37.50
7	1	1.38
Total	N=72	99.97

Table 30. Sample attitudes as a whole (percentages)
1=Highest priority, 7=lowest priority

Project priority: Improvements for conditions for wildlife	Number of respondents	Percent of sample
1	4	5.20
2	20	25.97
3	22	28.57
4	7	9.09
5	11	14.28
6	12	15.58
7	1	1.30
Total	N=77	99.99

Table 31. Sample attitudes as a whole (percentages)
1 = Yes 2 = No

Allowance for industrial development	Number of respondents	Percent of sample
1	31	42.47
2	42	57.53
Total	N=73	100.00