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"If You Can't Beat 'Em, Eat 'Em:" Legal Methods To Control Aquatic Nuisance Species In The Gulf Of Mexico

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"IF YOU CAN'T BEAT 'EM, EAT 'EM:" LEGAL METHODS TO CONTROL AQUATIC NUISANCE SPECIES IN THE GULF OF MEXICO

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I. INTRODUCTION

The emergence of aquatic nuisance species in the Gulf of Mexico has created repercussions not only on the environment and economies of the Gulf states, but has crept into the Southern culture, as well. The nutria is a rodent that was introduced into the United States from Argentina in 1937, an addition to the collection of the Avery Island nature preserve on the southern fringes of Louisiana. A hurricane resulted in the release of the animals into the surrounding marshes, and the nutria became widespread across south Louisiana in only five years. It eventually spread across the State, causing the rapid decline of the native muskrat. The Louisiana Nature Center earned international headlines with its 1993 and 1994 Nutria Festival, which featured this theme: "If you can't beat 'em, eat 'em." Local chefs presented innovative recipes for preparing the critter. One member of New Orleans society probably not in attendance was Boudreaux the Nutria, the furry life-sized mascot for the minor league baseball team, the New Orleans Zephyrs.

Though the citizens of the Gulf states may face aquatic nuisance species (ANS) like the nutria tongue-in-cheek, developing and implementing plans for their control is an immense task. In March of 1998, the Aquatic Nuisance Species Task Force, the national entity directed to assist in developing and implementing state plans to control exotic or nuisance species, released its draft Guidance for State and Interstate Management

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Plans. The draft Guidance noted that one of the goals of a state management plan for aquatic nuisance species (ANS) is to "paint a picture of NIS problems and concerns."[1] This is a daunting task for state legislatures and marine resource managers across the United States.

In many cases, the current "picture" is composed of a patchwork of statutes and regulations prescribing a permitting scheme for possession, sale, transport or release of a species that is found on the state's "dirty list," that list of species known to be harmful to the state's waters or ecosystems.[2] When Congress passed the Nonindigenous Aquatic Nuisance Species Prevention and Control Act in 1990 and called for states to assess the risk of ANS, as well as the methods to curtail and prevent the introduction and spread, most states were aware of the high risk species in their waters—those that threaten economies and ecosystems such as the sea lamprey or zebra mussel in the Great Lakes states. These high risk species are easier to target, however, after they have made true nuisances of themselves. The statute itself was the result of zebra mussel infestation across the lower Great Lakes and the emerging day-to-day crisis propelled the bill forward: "[M]ussel encrustation of intake pipes shut down the Monroe, Michigan water supply for two days, bringing the impact of the zebra mussel directly to the homes of basin residents."[3]

As states and regions throughout the United States took notice of the economic and ecosystem devastation resulting from the introduction of one species, they began to reevaluate their own methods of aquatic nuisance management. State legislatures and marine resource departments had to assess the state interests and resources that are at risk. Once a state legislature determines that the people of the state have a primary interest in regulating the placement and planting of any nonindigenous live fish, fresh or saltwater animal, or aquatic plant in the waters of the state, it must then determine how to prevent further introduction, halt the spread of aquatic nuisance species already present, and eradicate or reduce such populations to acceptable levels.

The Gulf of Mexico is an area with numerous ports, important commercial and recreational fish and shellfish species, and estuarine and wetland resources valuable to the Gulf ecosystem. While aquatic nuisance species are present in the Gulf waters,[4] the Gulf states have been slow to

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1. AQUATIC NUISANCE SPECIES TASK FORCE, DRAFT GUIDANCE FOR STATE AND INTERSTATE MANAGEMENT PLANS 6 (1998) [hereinafter Task Force Draft Guidance].

2. *See infra* notes 65–67 and accompanying text.

3. Sharonne E. O'Shea & Allegra Cangelosi, *Trojan Horses in Our Harbors: Biological Contamination from Ballast Water Discharge*, 27 U. TOL. L. REV. 381, 382 (1996).

4. Indeed, Florida is a popular home for exotic species, housing more than any other southern state. *See* U.S. Congress, Office of Technology Assessment, Harmful Non-Indigenous Species in the United States, OTA-F-565, 45 (Washington, DC: U.S. Gov't

implement protections for a variety of reasons: lack of funding, lack of research on preventative measures, and lack of an "exotics crisis" with a widespread economic magnitude similar to the zebra mussel crisis in the Great Lakes. Without an immediate call for help, state resource departments find it difficult to convince their legislatures of the need for resources to develop management plans. In addition, how does a resource department create a preventative plan for threats which may or may not exist?

This article will give the background of aquatic nuisance species in the Gulf states and legal methods used to control the spread of such species. Part I provides background about ANS in both a national and international context and presents the federal response to the transport and introduction of these species. Part II provides background of state management plans. Part III introduces the legal methods to control ANS in the Gulf of Mexico, including the state laws and their effectiveness and suggestions for creating state management plans and a Gulf-wide management plan that can address the problems of current aquatic nuisance species and present preventative measures for possible future invasions. Part IV analyzes the challenges facing state management plans. Part V concludes with the future of ANS control in the Gulf.

II. AQUATIC EXOTICS AND THE FEDERAL RESPONSE

Exotic species are those organisms that have been transported by human activity, intentionally or accidentally, into regions where they have not historically occurred.[5] Exotics may displace native species, degrade native habitats, spread disease, and disrupt human social and economic activities dependant on water resources. Often, the new habitats do not contain the same predators and natural competitors which kept these species in check in their native environments. Introductions can result from activities such as shipping, commercial or recreational fisheries, mariculture, the aquarium trade, scientific research, and engineering projects like canals that link previously unconnected water bodies.[6]

Printing Office, Sept. 1993) [hereinafter OTA Report]. The report notes that the state of Florida is well recognized as providing the largest sanctuary for NIS and that the problems caused by NIS in Florida are among the most severe in the United States. Several factors are at the root of the NIS problem in Florida, including "the subtropical climate, major ports of entry, burgeoning pet, aquarium and ornamental plant industries; high rates of human immigration, increasing urbanization, and extensive environmental manipulation." *Id.* at 255.

5. *See* ELLIOT A. NORSE (ED.), GLOBAL MARINE BIOLOGICAL DIVERSITY 130 (1993). Exotic species are also referred to as biological invasions, invasive species, biological pollution, aquatic nuisance species (ANS), nonindigenous species, or introduced species.

6. *See id.*

Even though biological invasions have been a part of the earth's natural history, those organisms transferred by human activity, either intentionally or accidentally, differ in kind and scale.

Intentional introductions, especially those for agricultural purposes, have created international emergencies. The intentional introduction of the Nile perch and exotic tilapia species as commercial species into Lake Victoria, the second largest lake in the world bordered by Uganda, Kenya, and Tanzania brought about "the greatest single paroxysm of extinction ever recorded" —the rapid disappearance of over 200 native lake species.[7] The water hyacinth, one of the world's fastest-growing plants and possibly the "world's worst tropical aquatic weed," has also taken hold in Lake Victoria, as in waters of the United States.[8]

Unintentional introductions have posed a risk as well.[9] The United States Coast Guard recognized that "ballast water from ships is one of the largest pathways for the intercontinental introduction and spread of [aquatic nuisance species]."[10] While ballast water, the water carried by ships to assist in balance and stability, has been used in the maritime industry since the 1880s, the number of ballast-mediated invasions appears to have grown dramatically in recent decades due to the larger size of the ships, the more ballast water that is moved, and faster transference, which allows more organisms to survive.[11] The introduction of the American comb jelly, brought in with the tanker ballast waters in the Sea of Asov, the Black Sea, and the Mediterranean Sea, caused radical changes in the feeding base of commercial fish.[12] Engineering feats thought to merely create a detour for ships also created pathways for organisms such as the sea lamprey, which probably found its way from Lake Ontario, the easternmost of the Great Lakes, to the remaining lakes through the Welland Canal, a shipping detour

7. CHRIS BRIGHT, LIFE OUT OF BOUNDS 88 (1998).

8. *Id.* at 89.

9. Mechanisms for unintentional introductions include the water garden and aquarium trade which pose great risks as exotic species are sold without identification or warning as to their rapid spread or predatious tendencies. *See* Marilyn Barrett-O'Leary, Presentation at the 10th International Aquatic Nuisance Species and Zebra Mussel Conference (February 14, 2000).

10. Implementation of the National Invasive Species Act of 1996, 64 Fed. Reg. 26,672 (1999) (codified at 33 C.F.R., pt. 151) (interim rule with request for comments). Coast Guard regulations define ballast water as "any water and suspended matter taken on board a vessel to control or maintain, trim, draught, stability, or stresses of the vessel, regardless of how it is carried." *Id.* pt. 151.1504.

11. *See* NORSE, *supra* note 5, at 131–32.

12. *See* STANISLAV PATIN, ENVIRONMENTAL IMPACT OF THE OFFSHORE OIL AND GAS INDUSTRY 58 (1999).

around Niagra Falls.[13] The Welland Canal was opened in 1921 and all of the Great Lakes were colonized by 1946.[14]

Several water-related industries have assisted in moving the zebra mussel, the small, fingernail-sized, freshwater mollusks that were accidentally introduced to North America via ballast water from a transoceanic vessel.[15] Since their introduction in the mid 1980s, they have spread rapidly to all of the Great Lakes and an increasing number of inland waterways in the United States and Canada. Zebra mussels colonize on surfaces, such as docks, boat hulls, commercial fishing nets, water intake pipes and valves, native mollusks and other zebra mussels. Their only known predators, some diving ducks, freshwater drum, carp, and sturgeon, are not numerous enough to have a significant effect on them. Zebra mussels have greatly impacted the Great Lakes ecosystem and economy and are moving rapidly through nearby waterways.[16]

The rapid spread of the zebra mussel inspired the United States Congress to pass the first direct legislation to control and prevent the further introductions of non-native species.[17] The Nonindigenous Aquatic Nuisance Species Prevention and Control Act[18] (NANPCA) was passed in 1990 as a direct response to the zebra mussel infestation of the Great Lakes. The statute noted that:

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13. *See* BRIGHT, *supra* note 7, at 94.

14. *See id.*

15. *See* O'Shea and Cangelosi, *supra* note 3, at 383–84.

16. For confirmed sightings and established settlements of zebra mussels, *see North American Range of the Zebra Mussel*, 10:1 DREISSENA! THE DIGEST OF NATIONAL AQUATIC NUISANCE SPECIES CLEARINGHOUSE 8 (July/Aug. 1999).

17. For legislation prior to 1990 that indirectly addressed exotic species, *see generally* the Lacey Act, 16 U.S.C.A. §§ 3371–3378 (West 1985 & Supp. 1999); the Plant Pest Act, 7 U.S.C.A. §§ 147a, 149, 150aa–150jj (West 1999); the Plant Quarantine Act, 7 U.S.C.A. §§ 151–167 (West 1999); the Federal Noxious Weed Act of 1974, 7 U.S.C.A. §§ 2801–2814 (West 1999); the Federal Seed Act, 7 U.S.C.A. §§ 1551–1610 (West 1999); the Endangered Species Act, 16 U.S.C.A. §§ 1531–1544 (West 1985 & Supp. 1999); Executive Order No. 11987, 42 Fed. Reg. 26,949 (1977). For a review of legislation prior to 1990 that indirectly addressed exotic species, *see generally* Eric Biber, *Exploring Regulatory Options for Controlling the Introduction of Non-Indigenous Species to the United States*, 18 VA. ENVTL. L.J. 375, 390–95 (1999); John A. Ruiter, *Combating the Non-Native Species Invasion of the United States*, 2 DRAKE J. AGRIC. L. 259, 264–67 (1997); and David P. Eldridge, *Leviathan Lurks: Might the National Invasive Species Act of 1996 Actually Authorize Invasion by Proscribed Species?*, 6 S.C. ENVTL. L.J. 47, 50–53 (1997). For aquatic nuisance species legislation critiques, *see generally* David J. Bederman, *International Control of Marine "Pollution" by Exotic Species*, 18 ECOLOGY L.Q. 677 (1991); and Steven A. Wade, *Stemming the Tide: A Plea for New Exotic Species Legislation*, 10 J. LAND USE & ENVTL. L. 343, 353 (1995).

18. *See generally* 16 U.S.C.A. §§ 4701–4741 (West Supp. 1999).

> [T]he potential economic disruption to communities affected by the zebra mussel due to its colonization of water pipes, boat hulls and other hard surfaces has been estimated at $5,000,000,000 by the year 2000, and the potential disruption to the diversity and abundance of native fish and other species by the zebra mussel and ruffe, round goby, and other nonindigenous species could be severe.[19]

The direct influence of the zebra mussel crisis framed the requirements of the Act. It called for a mandatory ballast exchange program only in the Great Lakes applying to "all vessels equipped with ballast water tanks that enter a United States port on the Great Lakes after operating on the waters beyond the exclusive economic zone."[20] This restricted scope has generated numerous critiques for limiting the potential regulation of ballast water for all U.S. ports.[21] In addition, critics questioned the plausibility of an effective mandatory ballast exchange program when "no proven viable 'procedures or technology exists to manage residual ballast on board vessels entering U.S. ports fully laden with cargo except to retain the ballast on board.'"[22] Indeed, one of the great challenges for species managers is the development of adequate science and technology in order to put the regulations in practice.

But, the Senate Report notes that NANPCA "also was drafted to accommodate the national need for a coherent program to address unintentional introductions of nonindigenous aquatic species."[23] The components of this coherent program were prevention, research, monitoring, and control of aquatic infestations. The law also created a standing

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19. *Id.* § 4701(a)(4).

20. *Id.* § 4711(b)(2)(A).

21. *See* Viki Nadol, *Aquatic Invasive Species in the Coastal West: An Analysis of State Regulation within a Federal Framework*, 29 ENVTL. L. 339, 358 (1999); Ruiter, *supra* note 17, at 268; David P. Eldridge, *supra* note 17, at 55.

22. Ruiter, *supra* note 17, at 268 (citing *Reauthorization of the 1990 Nonindigenous Aquatic Nuisance Prevention and Control Act: Hearings on S. 1660 Before the Subcomm. On Drinking Water, Fisheries and Wildlife of the Senate Comm. on the Environment*, 104th Cong., 2d Sess. (1996) (testimony of Rowan W. Gould, Deputy Assistant Director of Fisheries, U.S. Fish and Wildlife Service, Department of Interior)).

23. S. REP. NO. 101-523, at 3 (1990), *reprinted in* 1990 U.S.C.C.A.N. 6455, 6457. It is interesting to note, however, that the House Report on NISA refers to the ballast water provisions of NANPCA as paramount by stating:

> Perhaps most importantly, NANPCA directed the Coast Guard to issue voluntary guidelines for the Great Lakes and, after two years, promulgate regulations (applicable to the Great Lakes) to help reduce the probability of new introductions of nonindigenous species by commercial vessels, whose ballast water is a leading pathway for nonindigenous aquatic species into U.S. waters.

H.R. REP. NO. 104-815, pt. 1 (1996).

multi-agency task force, the Aquatic Nuisance Species Task Force ("Task Force"), to establish and implement measures to minimize the risk of introduction of aquatic nuisance species to U.S. waters.[24]

Finally, NANPCA authorized and provided general guidance for the development of state aquatic nuisance species management plans. A state that submitted a comprehensive management plan could receive federal aid for technical, financial or enforcement support necessary to eliminate or reduce the environmental, public health and safety risks associated with aquatic nuisance species, "particularly the zebra mussel."[25]

NANPCA was reauthorized by the National Invasive Species Act (NISA) in 1996.[26] The Senate Report noted that "[s]ix years after its passage, there is need to reauthorize and reform NANPCA to address waters beyond the Great Lakes and threats of additional exotic species through nationwide preventive management measures."[27] NISA did expand the state management plan provision to authorize interstate plans.[28] The Act maintained the requirement that ships in the Great Lakes exchange ballast water prior to putting into port or to use "an environmentally sound alternative."[29] However, NISA added a safety exemption, permitting a vessel to discharge in a harbor if a ballast water exchange on the high seas would compromise ship safety.[30] It also directed the Secretary of Transportation to establish voluntary national guidelines to prevent the introduction and spread of invasive species as a result of ballast water discharge.[31] The guidelines require operators of vessels entering waters of the U.S. from beyond the EEZ to submit a ballast water management report and provide voluntary ballast water management guidelines for such operators as well as promote ballast water management for operators of all vessels in U.S. waters.[32]

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24. *See* 16 U.S.C.A. § 4722(c)(1) (West Supp. 1999). The Task Force was directed to: (1) identify the pathways by which aquatic organisms are introduced; (2) assess the risk by which aquatic organisms may become an aquatic nuisance species; and (3) evaluate whether measures to prevent introductions of aquatic nuisance species are effective and environmentally sound. *Id.*

25. *Id.* § 4724(a)(1)(A). *See infra* Part II for full discussion of State Management Plans.

26. National Invasive Species Act of 1996, PUB. L. NO. 104-332, 110 Stat. 4073.

27. H.R. REP. NO.104-815, pt. 1 (1996).

28. *See* 16 U.S.C.A. § 4724(a)(1) (West Supp. 1999).

29. *Id.* § 4711(b)(2)(B)(iii).

30. *See id.* § 4711(k)(1).

31. The Coast Guard, acting on behalf of the Secretary, proposed the national voluntary guidelines on April 10, 1998. *See* Notice of Proposed Rulemaking, 63 Fed. Reg. 17,782, 33 C.F.R. § 151 (1998). The interim rule was released on May 17, 1999. *See* Interim Rule with Request for Comments, 64 Fed. Reg. 26,672, 33 C.F.R. § 151 (1999) (hereinafter Coast Guard Interim Rule).

32. *See id.* at 26,673.

NISA and NANPCA have been subjected to similar critiques, namely that the scope of the mandatory regulations is limited to the Great Lakes region and that the statute lacks a viable enforcement mechanism.[33] The House Report from the Committee on Transportation and Infrastructure foresaw these critiques and noted that:

> Compliance by the Great Lakes shipping industry with NANPCA has been high. At the March 22, 1996, National Forum on Nonindigenous Species Invasions in U.S. and Marine Fresh Waters sponsored by the Northeast-Midwest Institute, the United States Coast Guard reported that there were only 4 known cases of noncompliance in 1995, all due to a misunderstanding of the regulations. Based on this positive record of compliance, NISA takes the approach of first relying on a voluntary program of ballast water exchange and management practices to reduce the probability of the introduction of nonindigenous species from ships operating in waters of the United States. Under NISA, the voluntary program does not become mandatory unless the Secretary of Transportation determines that the rate of voluntary compliance with the guidelines is not adequate or if the Secretary is unable to adequately assess compliance due to inadequacies in voluntary reporting.[34]

In addition, the House Report responded to the criticism that the only ANS introduction vector subject to regulation under the Act is ballast water by noting that in order to "address other vectors for introduction and spread, the bill authorizes funding for research and demonstration projects in these areas."[35]

President William Clinton supplemented the network created by NANPCA and NISA with Executive Order 13,112.[36] The Order directed each Federal agency whose actions may affect the status of invasive species to:

> (1) identify such actions;
> (2) subject to the availability of appropriations, and within administration budgetary limits, use relevant programs and authorities to:
> (i) prevent the introduction of invasive species;
> (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;

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33. *See* Viki Nadol, *supra* note 21, at 359; *see also* Eldridge, *supra* note 17, at 57.
34. H.R. REP. NO. 104-815, pt. 1 (1996).
35. *Id.*
36. Exec. Order No. 13,112, 64 Fed. Reg. 6183 (1999).

(iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
(v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and
(vi) promote public education on invasive species and the means to address them; and
(3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.[37]

The Order established an Invasive Species Council with members representing the Departments of Commerce, Interior, Agriculture, Defense, State, Treasury, and Transportation. The Council will take the lead in overseeing implementation of the order and "seeing that the Federal agency activities concerning invasive species are coordinated, complementary, cost-efficient, and effective. . . ."[38] The Council must also develop guidance for the prevention and control of invasive species and the establishment of an internet-based information sharing system to disseminate invasive characteristics, economic, environmental, and human health impacts, and management, research and public education techniques. In the Summer of 2000, the Council is directed to issue the National Invasive Species Management Plan to recommend goals and specific measures for federal agency efforts concerning invasive species.

The Executive Order officially revoked President Carter's Executive Order 11,987 of 1977, which represented the earliest executive call for federal agencies to restrict the importation of exotic animals into the United States and to restrict their introduction into natural ecosystems on lands and waters possessed, leased, or held for purposes of administration.[39] The President appeared to recognize not only the environmental and economic concerns that exotics carry but also the problems associated with the multi-jurisdictional authority over their regulation and thus directed federal

37. *Id.* § 2(a).
38. *Id.* § 4(a).
39. Exec. Order No. 11,987, 3 C.F.R. pt. 116 (1977), *reprinted in* 42 U.S.C.A. § 4321 (West 1994).

agencies to encourage states, local governments, and private citizens to prevent the introduction of such species.[40] The recognition that the federal framework has its limitations has led state legislatures and environmental managers to heed the call for state and regional management plans.

III. MOVING BEYOND BALLAST: STATE MANAGEMENT PLANS

The Task Force, co-chaired by the Fish and Wildlife Service and National Oceanic and Atmospheric Administration, was established to coordinate governmental efforts related to nonindigenous aquatic species in the United States with those of the private sector and other North American interests. It has led efforts in researching prevention, control and elimination techniques. It has conducted ecological surveys, established the National Nonindigenous Aquatic Species Information Center, and implemented a protocol to ensure research carried out under authority of the Act does not result in the introduction of ANS.[41] The Task Force consists of seven federal agency representatives and ten ex officio members. The other federal agencies are the Environmental Protection Agency, the Coast Guard, the Assistant Secretary of the Army for Civil Works, the Department of Agriculture, and the Department of State.

These agencies, as part of the Task Force, are directed to assist in the creation and review of comprehensive state management plans. The Task Force approves a proposed state management plan if it meets the requirements of the statute.[42] NANPCA called for each plan to:

> (1) identify state and local programs for prevention and control of target aquatic nuisance species;
> (2) identify those Federal activities necessary and how they would be coordinate with state and local efforts;
> (3) identify any authority that the state does *not* have at the time of the development of the plan that may be necessary to acquire; and

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40. *See* John L. Dentler, *Noah's Farce: The Regulation and Control of Exotic Fish and Wildlife*, 17 PUGET SOUND L. REV. 191, 215 (1993).

41. *See* ANS Task Force, *Protocol for Evaluating Research Proposals Concerning Nonindigenous Aquatic Species* (visited Feb. 20, 2000) <http://ansTaskForce.gov/resprot.htm>. National policy direction has been a result of efforts of the ANS Task Force working committees including Research Protocol/Coordination Committee, Intentional Introduction Policy Review Committee, Great Lakes Panel on Aquatic Nuisance Species, Ruffe Control Committee, Risk Assessment and Management Committee, Detection and Monitoring Committee, Zebra Mussel Coordination Committee, and the Brown Tree Snake Control Committee. *See also* Availability of Proposed Protocol for Evaluating Research Proposals Concerning Nonindigenous Aquatic Species, 57 Fed. Reg. 44,207 (1992).

42. *See* 16 U.S.C.A. § 4724(a)(2) (West Supp. 1999).

(4) establish a schedule for implementation of the plan, annual objectives, and enabling legislation, if necessary.[43]

The Task Force has approved state management plans for New York, Ohio, Michigan, Washington, Iowa, Illinois, and the St. Croix National Scenic Waterways,[44] and provided funding for implementation of those plans.[45] NISA authorizes interstate, as well as state, plans.[46] Work is underway for drafting other State and Interstate Management Plans.[47]

Moreover, the Task Force has created Regional Panels for the Great Lakes and the West to highlight problems and coordinate aquatic nuisance species activities in those regions, as well as to establish regional priorities. The Great Lakes Panel on Nonindigenous Species, established in 1990, developed a Model Comprehensive State Management Plan for the Prevention and Control of Aquatic Nuisance Species.[48] Moreover, the Gulf of Mexico Regional Panel was created in 1999 and will focus efforts on management needs for the Gulf states.[49]

The overriding focus of the federal statutes has been on ballast water. In contrast, the focus of the approved state management plans tends to be public education and outreach. The Michigan Plan recognizes that "[o]f primary importance is federal action in limiting introductions through transoceanic shipping ballast water. At this time, Michigan lacks the ability resources, and authority to require ballast water exchange before a vessel enters United States or Michigan waters."[50] While the plan notes that "it is appropriate to evaluate this potential authority if federal restrictions prove insufficient,"[51] its future policy and regulatory focuses include limiting boating access or establishing mandatory boat inspection programs to

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43. *Id.* § 4724(a)(2)(A)–(D).

44. Sharon Gross, Executive Secretary of the ANS Task Force, U.S. Fish and Wildlife Service, Presentation at the Tenth International Aquatic Nuisance Species and Zebra Mussel Conference (Feb. 14, 2000).

45. The New York Comprehensive Plan was approved on March 1, 1994; the Michigan Comprehensive Plan was approved on May 30, 1996; and, the Ohio Comprehensive Plan was approved on January 28, 1997. ANS Task Force Internet site, *Activities and Accomplishments* (visited May 2, 2000) <http://ansTaskForce.gov/accomp.htm>.

46. *See* 16 U.S.C.A. § 4724(a) (West Supp. 1999).

47. *See* ANS Task Force Internet site, *Activities and Accomplishments* (visited Feb. 17, 2000) <http://ansTaskForce.gov/accomp.htm>.

48. *See* KATHERINE GLASSNER-SHWAYDER, GREAT LAKES COMMISSION, A MODEL COMPREHENSIVE STATE MANAGEMENT PLAN FOR THE PREVENTION AND CONTROL OF NONINDIGENOUS AQUATIC NUISANCE SPECIES (1996) [hereinafter Great Lakes Model Plan].

49. *See* Gross, *supra* note 44.

50. Michigan Department of Environmental Quality, *Nonindigenous Aquatic Nuisance Species State Management Plan* (visited Apr. 3, 2000) <http://www.deq.state.mi.us/ogl/plan.html> [hereinafter Michigan Plan].

51. *Id.*

protect ecologically sensitive waters, a review of private hatchery operations and the aquatic pet trade, and considerations on the use of pesticides to control exotic species.[52]

This focus on more readily accessible—and easily regulated—pathways for aquatic nuisance species has been contemplated by the U.S. Coast Guard due to the daunting nature of regulating and enforcing ballast discharges. The Coast Guard Interim Rule explains that:

> It has long been the Coast Guard's position that consistent standards of universal application, coupled with Federal initiatives to address unique regional concerns, are the best means of meeting local and national environmental goals with the least disruption to international maritime commerce. To avoid potential conflicts and duplication, we request that any political subdivision of the United States contemplating any laws, regulations, or requirements regarding the discharge of ballast water, consider this regulation prior to taking action.[53]

In addition, states recognize that the "absence of interjurisdictional authority is problematic in regulating the transoceanic vectors transporting ANS to the Great Lakes."[54]

Rather than tackle the largest problems, the content of each state plan is to identify ANS problems and to focus on feasible, cost-effective management practices and measures that states can use to prevent and control aquatic nuisance specie infestations in an environmentally sound manner.[55] But, many tensions exist in attempting to reach these goals. How much detail does a "comprehensive" plan require? Even with significant research, there will be species or introduction vectors that a state agency cannot be aware of. This lack of knowledge can lend to ad hoc decisions regarding nuisance species management. The Task Force advises that "[p]lans can be comprehensive if they identify all likely nonindigenous aquatic species problems, issues, and concerns. This should include instances where, at the moment, there may not be a full consensus that a problem or concern exists."[56]

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52. *Id.*

53. Implementation of the National Invasive Species Act of 1986, 64 Fed. Reg. 26,672 (1999) (codified at 33 C.F.R. pt. 151).

54. OHIO DEPARTMENT OF NATURAL RESOURCES, DIVISION OF WILDLIFE, OHIO COMPREHENSIVE MANAGEMENT PLAN 11–12 (1996) [hereinafter Ohio Plan].

55. *See* 16 U.S.C.A. § 4724 (West Supp. 1999); Great Lakes Model Plan, *supra* note 48, at 2.

56. Task Force Draft Guidance, *supra* note 1, at 3.

Moreover, as required under NANPCA, state and interstate plans are to be comprehensive but, in order to effectively prevent new introductions and control existing infestations, the plans must be implemented as soon as possible. The ANS Task Force Draft Guidance acknowledges that these two goals may be in conflict "because development of a comprehensive plan requires substantial time and study."[57] In order to enable prompt submission of plans, "addressing just the most immediate and pressing problems and concerns that can be effectively tackled in the first iteration of the Plan is acceptable."[58] This requires subsequent iterations and the rationale for selecting a subset of the problems to address initially and a plan for addressing problems as they emerge.

Both the Task Force Draft Guidance for states and the Great Lakes Model Plan recommend that the plan's contents should contain the following: an Executive Summary, Introduction, Problem Definition and Ranking, Goals, Existing Authorities and Programs, Objectives, Strategies, Actions & Cost Estimates, Priorities for Action, Implementation Table, Program Monitoring and Evaluation, Glossary; and Appendices.[59] An executive summary reviews each section of the management plan to explain the purpose of the plan, background on ANS problems, and the existing authorities and current programs. The Introduction explains the purpose of the plan in detail, including its value in highlighting ANS problems in the geographic area covered and identifying effective management tools. A section devoted to Problem Definition and Ranking which "paints a picture" of NIS problems and concerns, summarizing the history of invasions, pathways of introduction, and ecological or economic effects of specific species. The Goals section lays out what the developing entity wants to accomplish with time-lines clearly defined.

The next section outlines the existing authorities and programs in order to meet the statutory requirement of summarizing relevant federal, state, tribal, and regional authorities and activities that can be used in ANS management. The Objectives, Strategies, Actions and Cost Estimates section describes the efforts the state will take to achieve the goals along with the estimated contribution of the organizations or agencies involved and cost estimates. The section entitled Priorities for Action assigns priorities to particular problems according to its severity. The Implementation Table will then show the agreement between agencies to apportion

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57. *Id.*

58. *Id.* The Task Force Draft Guidance continues that the "rationale for not addressing a problem or concern might include lack of viable, effective actions that can be taken, actions are too costly, authority to undertake the action does not exist, incomplete information . . . and apparent lack of significant impact." *Id.*

59. *See id.* at 5–12; Great Lakes Model Plan, *supra* note 48, at 2.

activities and work collaboratively. The Program Monitoring and Evaluation section discusses the performance measures used to assess the effectiveness of the management actions taken. Finally, the state agency should include an appendix with relevant documentation such as agencies memorandum of agreements, legislation, proposed legislation and regulations.

IV. LEGAL METHODS TO CONTROL ANS IN THE GULF STATES

A. Analysis of State Provisions

According to the National Oceanic and Atmospheric Administration, the Gulf of Mexico is home to three of the nation's top five exporting ports: Southern Louisiana, Houston, and New Orleans. It is also home to three of the nation's top five importing ports: Houston, Corpus Christi, and Southern Louisiana.[60] The Gulf of Mexico's fisheries are worth millions annually, both in the commercial and recreational sectors.[61] The numerous ports and fisheries offer many open pathways for the transfer and introduction of nonindigenous species. Moreover, the coastal economies of the Gulf states are dependent upon fisheries and tourism. Salvinia, hydrilla, water hyacinth, zebra mussels and nutria threaten the Gulf of Mexico with millions of dollars in lost revenue through operational interruptions and control efforts. An influx of an invasive species with the magnitude for environmental and socio-economic impact such as the zebra mussel could devastate coastal economies.

As a result, the Gulf States Marine Fisheries Commission (GSMFC), an organization representing the interests of the five states of the Gulf of Mexico to promote the better utilization, promotion, and protection of the Gulf fisheries,[62] sent letters to each of the Gulf states governors formally recommending that each state develop a state management plan for aquatic nuisance species.[63] The GSMFC had addressed aquatic nuisance species at

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60. *See* NOAA, *Turning the Tide Interactive CD-Rom* (1995) (available from NOAA). Southern Louisiana exports 67 million tons annually and Houston imports 46 million tons annually. *See id.*

61. According to the Gulf States Marine Fisheries Commission, the 1998 commercial fishery landed 1,536,583,000 total pounds with a value of $718,925,000. *See* Telephone Interview with Ron Lukens, Assistant Director/Sport Fish Restoration Administrative Program Coordinator, Gulf States Marine Fisheries Commission (Feb. 11, 2000) (on file with author).

62. *See* Act of May 19, 1949, PUB. L. NO. 81-66, 63 Stat. 70. (Congressional authorization following the individual acts of the state legislatures).

63. *See* Letter from Larry B. Simpson, Executive Director, Gulf States Marine Fisheries Commission, to The Honorable George W. Bush, Governor, state of Texas (Dec. 8, 1999) (on file with the author) (identical letters were sent to Alabama Governor Don Seigelman,

its fiftieth anniversary meeting in Biloxi, Mississippi in October of 1999 and determined that the development of state plans for prevention and control were "of paramount importance."[64]

It is generally agreed upon that controlling the pathways of nonindigenous species is the best way to avoid their introduction and state management plans provide an excellent avenue for pursuing consistent regulation and control over these pathways. State statutes can offer some control, as well. Often, statutes will set out specific requirements such as a permit or prohibitions against certain introductions. The basic legal approaches include the "clean list" approach which prohibits all nonindigenous introductions except those that are individually evaluated and listed as "allowed."[65] The "dirty list" approach which lists certain nonindigenous species that are prohibited from importation and/or release because of their economic, ecological, or health effects.[66] Other states do not have clean or dirty lists but require formal agency permission.[67]

None of the five Gulf states have established comprehensive management plans at the state or regional level. Texas and Florida are pursuing such efforts at the state level and Texas has invested in creating a Gulf-wide management plan. While no management plans exist, each of the Gulf states have statutory provisions aimed at nonindigenous species. All of the states have specific provisions aimed at nonindigenous aquatic species, although in some cases the prohibitions apply to either plants or fish, and have a patchwork of other provisions that indirectly regulate aquatic nuisance species and other exotics. An analysis of these provisions is necessary prior to the proposal of a state management plan to determine ancillary statutory needs and the holes that a state management plan must fill.

1. Florida

Florida has two primary statutes that work together to create its invasive species management regime.[68] First, the Florida Aquatic Weed Control Act

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Louisiana Governor Mike Foster, Mississippi Governor Kirk Fordice, and Florida Governor Jeb Bush).

64. *Id.*

65. OTA Report, *supra* note 4, at 210. According to the report, Hawaii is the only state with laws that require this for both importation and release of all major fish and wildlife groups, though a few other states have adopted clean lists for particular fish releases. *See id.*

66. *See id.*

67. *See id.* at 211.

68. In addition to the Aquatic Weed Control Act and Nonindigenous Aquatic Plant Control Act (discussed below), Florida indirectly addresses nonindigenous species in the following statutes: FLA. STAT. ANN. § 373.185 (West 1997) (directing water management

authorizes the Department of Environmental Protection (DEP) to "direct the control, eradication, and regulation of noxious aquatic weeds and direct the research and planning" related to the weeds to protect human health and prevent injury to plant and animal life and property.[69] Similar to the federal structure, the DEP may disperse funds to a special district or local authority that is charged with controlling or eradicating aquatic plants upon review and approval that the local program is in conformance with the state program.[70] The DEP also grants permits to control, eradicate, remove or alter aquatic weeds in Florida state waters.[71]

Second, the Florida Nonindigenous Aquatic Plant Control Act also grants authority to the DEP[72] to carry out the general supervision for the control of nonindigenous aquatic plants. An aquatic plant means "any plant, including a floating, immersed, submersed, or ditch bank species, growing in, or closely associated with, an aquatic environment and includes any part or seed of such plant."[73] The statute requires a permit to import, transport, cultivate, collect, sell or possess any aquatic plant listed on the prohibited aquatic plant list, established by the DEP.[74]

While the DEP and the State are responsible for the control of plants in all *intercounty* waters, the act provides that "control of such plants in *intracounty* waters be the designated responsibility of the appropriate unit of local or county government, special district, [or] authority."[75] The DEP must review all actions of agencies engaged in the control of nonindigenous aquatic plants when state funds are used or when state waters are at risk[76] and submit an annual report which analyzes the degree of maintenance control, effectiveness of the program, and estimate of the costs involved.[77] Finally, the DEP can issue permits to control, eradicate, remove of alter any nonindigenous aquatic plants in Florida state waters.[78] Florida provides for

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districts to require identification of prohibited and controlled invasive species before qualifying the local government for an incentive program); FLA. STAT. ANN. § 373.4136 (West 1997) (requiring review of the removal or control of exotic species at a mitigation bank site to determine the number of credits or schedule for release of credits); and at the local level, FLA. STAT. ANN. § 373.465 (West 1999) (authorizing the Lake Panasoffkee Restoration Council to review exotic species management to carry out its purposes).

69. FLA. STAT. ANN. § 369.20(2) (West 1997 & Supp. 2000).

70. *See id.* § 369.20(5)(c).

71. *See id.* § 369.20(7).

72. Both statutes allow the DEP to delegate some responsibility to the Fish and Wildlife Conservation Commission. *See id.* §§ 369.20(3), 369.22(9).

73. *Id.* § 369.25(1)(a) (West Supp. 2000).

74. *See id.* § 369.25(2).

75. *Id.* § 369.22(3).

76. *See id.* § 369.22(5).

77. *See id.* § 369.22(7).

78. *See id.* § 369.22(11).

exotic plant control on public lands, as well as in state waters. Again, the DEP is directed to establish a program for the eradication or maintenance control of invasive exotic plants "when the scientific data indicate that they are detrimental to the state's natural environment or when the Commissioner of Agriculture finds that such plants or specific populations thereof are a threat to the agricultural productivity of the state."[79]

The Florida statutes are unique as they directly address the potential for lack of resources. The Invasive Plant Control Trust Fund was created to provide resources to carry out control and maintenance activities on public lands and in state waters[80] and the legislature enabled local governments to establish a mechanism to provide funding dedicated to the proper management of greenspace areas for the limitation and control of nonindigenous plants.[81]

Florida addresses fish species through several provisions. First, through its Freshwater Fish Dealer's License provision, a person is prohibited from importing any exotic or nonindigenous fish without a fish sale license and fee payment.[82] Second, a person may not import or possess any marine plant or animal not indigenous to the state which may "endanger or infect" the marine resources of the state or pose a human heath hazard.[83]

2. Alabama

Alabama has adopted the Alabama Nonindigenous Aquatic Plant Control Act as its primary exotics statute.[84] The statute names the Alabama Department of Conservation and Natural Resources (ADCNR) as the lead agency to carry out its provisions and establish standards for its enforcement.[85] The Act prohibits a person from introducing or placing or causing the introduction or placement of any nonindigenous aquatic plant into Alabama public waters unless that introduction is a result of the unintentional adherence to a boat or boat trailer in the course of common and ordinary boating activities.[86] However, the statute specifically exempts the possession of a nonindigenous aquatic plant if the "possession poses neither danger or intent to further disperse" the plant.[87]

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79. *Id.* § 369.252(1).
80. *See id.* § 369.252(4).
81. *See id.* § 369.255(1).
82. *See id.* § 372.65(1).
83. *See id.* § 370.081(1). The section also provides a list of animals that may not be imported including sea snakes, weeverfishes, and stonefishes. *See id.* § 370.081(2).
84. *See* ALA. CODE § 9-20-1–7 (1975 & Supp. 1999).
85. *See id.* § 9-20-2, 5.
86. *See id.* § 9-20-3.
87. *Id.* § 9-20-4.

Alabama uses the "dirty list" method and directs the ADCNR to establish a list of all nonindigenous aquatic plants which are prohibited from being introduced into public waters.[88] The authority of the Commissioner of Conservation and Natural Resources is supplemented by the power to prohibit the importation of "any bird, animal, reptile, amphibian or fish when the importation of such animal, bird, reptile, amphibian or fish would not be in the best interest of the state."[89]

3. Mississippi

Mississippi passed its nonindigenous species provisions in 1998 as part of Title 49 Conservation and Ecology. The provisions name the Department of Wildlife, Fisheries and Parks as the lead agency to establish and maintain a list of approved, restricted and prohibited species and to establish rules governing their importation, possession, sale and escape.[90] The statute also requires a person to first obtain a permit from Wildlife, Fisheries, and Parks before stocking, placing, or releasing any aquatic species into Mississippi public waters. [91] It also prohibits the release of "any animal not indigenous to Mississippi" without a permit.[92] The Department must first complete a study of the species, aquatic or otherwise, "to determine any detrimental effect the species might have on the environment."[93]

The Department of Agriculture and Commerce also maintains permitting requirements under the aquaculture provisions which state that "[a]n aquaculturist shall obtain a cultivation and marketing permit for cultured aquatic products produced from the following aquatic plants and animals: (a) All nonnative aquatic plants and animals, including those that are well established in limited or extensive areas of natural lakes, rivers and streams in this state."[94]

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88. *See id.* § 9-20-5.
89. *Id.* § 9-2-13(a).
90. *See* MISS. CODE ANN. § 49-7-80 (1972 & Supp. 1999).
91. *See id.*
92. *Id.*
93. *Id.*
94. *Id.* § 79-22-9(1)(a). *See also* Mississippi Bird Dealers Licensing Act, MISS. CODE ANN. §§ 75-40-101 to 117 (1972 & Supp. 1999) (Department of Agriculture and Commerce grants licenses for dealers in exotic and nonexotic birds).

4. Texas

Texas defines exotic species as "a nonindigenous plant or animal not normally found in the public waters of this state" in its Aquaculture Code.[95] The Texas aquaculture provisions assign regulation and of the importation, possession, propagation and sale of harmful or potentially harmful exotic species *by an aquaculturist* to the Parks and Wildlife Commission.[96] The statute directs the Commission to establish and enforce its dirty list of harmful or potentially harmful exotic species that an aquaculturist may not import, possess, or sell as part of that person's aquaculture trade.[97]

The more extensive nuisance species prohibition is found in Texas' Parks and Wildlife Code which prohibits *any person* from importing, possessing, selling, or introducing a species on the Commission's list of harmful exotics.[98] Under the Parks & Wildlife Code, the Commission must establish a list of exotic fish, shellfish and aquatic plants for which a permit is necessary. Finally, the statute specifically addresses the spread of disease in shellfish by prohibiting a fish farmer from importing, possessing, propagating, or transporting exotic shellfish unless the fish farmer "furnishes evidence required by the department showing that the shellfish are free of disease."[99]

In addition, in 1999, Texas adopted a statute directing the Texas Parks and Wildlife Department, in coordination with the Natural Resource Conservation Commission, the Department of Agriculture, and water districts, to develop and adopt a Statewide Vegetation Management Plan.[100] The Plan is to apply statewide unless a governmental entity has adopted an approved local plan.[101] It shall set guidelines for the use and application of aquatic herbicides in public waters and provide for an Aquatic Vegetation Control Fund for research, outreach and education that relates to vegetation control and for grants to political subdivisions to develop local aquatic vegetation management plans.[102] Development of the plan is underway.[103]

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95. TEX. AGRIC. CODE ANN. § 134.001(2) (West Supp. 2000).

96. *See id.* § 134.020 (emphasis added).

97. *See id.* § 134.020(b).

98. *See* Tex. PARKS & WILD. CODE ANN. § 66.007(a) (West 1999) (emphasis added). The Parks and Wildlife Code defines exotic fish, shellfish or aquatic plan as "a nonindigenous fish, shellfish, or aquatic plant that is not normally found in the public waters of the state." *Id.* § 66.007(e).

99. *Id.* § 66.007(f).

100. Act of June 19, 1999, ch. 1461, 1999 Tex. Sess. Law Serv. 12 (West 1999).

101. *See id.* § 11.082.

102. *See id.* § 15.853.

103. *See* Telephone Interview with Bill Harvey, Resource Protection Division, Texas Parks and Wildlife (February 28, 2000). *See also* Joyce Johnson, Texas Parks and Wildlife, *Controlling Nuisance Aquatic Plants in Private Ponds* (visited Feb. 17, 2000)

5. Louisiana

In its general provisions for wildlife and fisheries, Louisiana establishes its "dirty list," prohibiting the possession, sale or transport into the state specific species without a permit from the Department of Wildlife and Fisheries.[104] Permits are granted for one year.[105] Other provisions offer authority over more than those fish species listed in section 56:319. The Department of Wildlife and Fisheries has the authority to regulate or prohibit the possession, sale or transportation of any fish into Louisiana,[106] and any pen-raised or wild animal, fowl or fish for restocking purposes.[107]

B. The Potential for State Management Plans

Florida's two primary statutes and its noxious weed management program, as well as Texas's Statewide Vegetation Management Plan offer excellent models for a state management plan as they provide a lead agency for executing the ANS program, a directive for research efforts, prohibitions on introductions, and grants to local agencies. The statutes do not, however, have comprehensive provisions regarding freshwater or saltwater animals. While aquatic plants may be recognized as species deserving of the highest priority for control and eradication, legislation to amend the primary statutes to include animals would likely be necessary.

Alabama's plan suffers from a limited scope similar to Florida as its Nonindigenous Aquatic Plant Control Act addresses only plant species. The statute will likely need to be amended to expand its breadth. In addition, like Mississippi and Louisiana, Alabama does not offer an extensive research or grant program to advance local efforts to study potential ANS problems or develop education or preventive measures. In addition, Louisiana's and Texas's restrictions are a patchwork of aquaculture or wildlife provisions which do not lend themselves to construction of comprehensive management. Moreover, each state uses the "dirty list" rather than a "clean list" approach.[108] The more restrictive—and most

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<http://www.tpwd.state.tx.us/fish/infish/forms/nuisance.htm> (for the Department's guidance on controlling nuisance aquatic plants in private ponds).

104. *See* LA. REV. STAT. ANN. § 56:319 (West 2000). The species are: "carnero catfish, all of the family clariidae, freshwater electric eel, carp (except those taken in state waters, provided such fish shall be dead when in a person's possession), common carp, goldfish, rudd, and all species of tilapia." *Id.* § 56:319(A). The statute also prohibits the possession of piranha or Rio Grande Tetra except for display at the Aquarium of the Americas. *Id.* § 56:319(D).

105. *See id.* § 56:319(B).

106. *See id.* § 56:319.1.

107. *See id.* § 56:20.

108. *See supra* notes 65–67 and accompanying text.

preventive—approach is to prohibit all nonindigenous species except those that are individually evaluated and listed as allowed.

Finally, the statutes fail to provide two necessary elements that should be incorporated into both individual state management plans and a Gulf-wide management plan. The statutes do not include provisions to offer notice of identifications, introductions or infestations to neighboring states.[109] This can cause significant conflict when the introduction is intentional and controversial. States lack the authority to stop the release in a neighboring state of an nonindigenous species that is potentially invasive, making notice even more crucial to management.[110] The second element is the requirement for mitigation once a species has been introduced. This often depends upon the existence of mitigation methods but statutes may also include liability for property damage as a penalty for introduction.[111]

V. CHALLENGES FOR STATE MANAGEMENT PLANS

Because Congress first established a framework for researching, preventing, and controlling ANS in the Great Lakes region, other regions in the United States can use this base information as a model. In fact, the Model Comprehensive State Management Plan for the Prevention and Control of Nonindigenous Aquatic Nuisance Species written for the Great Lakes states can be used as a pattern for both state management plans and a regional management plan for the Gulf of Mexico.

The plans must overcome a number of challenges, however, before management plans can be effective tools for preventing and controlling aquatic nuisance species. As one regulator noted, "[m]anagement and control efforts are fragmented, piecemeal and underfunded."[112]

A. Research

Research regarding zebra mussels is widely available—including their methods of travel from waterway to waterway, their filtering capabilities,

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109. One commentator recommends that the current federal scheme be amended to impose necessary conditions on grant recipients including the requirement to notify neighboring states of ANS problems. *See* Nadol, *supra* note 21, at 374.

110. The experimental release of the European zander as a new sport fish by North Dakota against the objections of Minnesota demonstrated this tension as did the conflict between Virginia and Maryland over the proposed introduction of the Pacific oyster to the Chesapeake Bay. *See* OTA Report, *supra* note 4, at 207.

111. *See* CAL. FISH & GAME CODE § 12023 (West 1999).

112. Randy Westbrook, U.S. Department of the Interior, Presentation at the 10th International Aquatic Nuisance Species and Zebra Mussel Conference (Feb. 14, 2000).

and impacts on freshwater ecosystems—yet there is still much to learn especially the manner in which zebra mussel infestations can be halted once they have begun.[113] Generally, the larger the economic impact, the more congressional support an issue will have and the more appropriations will be made available to conduct scientific research.[114] Unfortunately, as a result, research tends to be reactionary rather than precautionary and it cannot effectively focus on preventative measures for newly discovered species or species in the "lag time" between introduction and infestation of an ecosystem.

In addition to being reactionary, research must keep up with the changes in technology in the shipping, fishery, agriculture and aquaculture and other industries. New species may be introduced not by lack of regulations or enforcement, but *by new methods*. It has been questioned whether Congress or executive agencies can "keep up with the spread of the zebra mussel and provide preventative measures, (for example, in California's water canal systems) if they cannot even keep up with the risks involved in new industry developments."[115]

B. Risk Assessment

Assessing the risk for colonization is the first step in developing a plan of action for ANS. Risk assessment is useful to water-dependent industries and regulatory agencies in making monitoring and control planning decisions. Once colonization is determined likely, it can be used to predict population abundance, the species' ability to survive the environmental conditions of an area and then, ways they may be introduced. Regardless of how certain species travel to a new location, they will not successfully colonize if the environment is unsuitable.

While risk assessment depends upon surveying an area for environmental conditions specific to a particular species, this can be useful for

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113. Among other publications, *see generally 10:1 Dreissena! The Digest of the National Aquatic Nuisance Species Clearinghouse* (July/Aug. 1999) published by the National Aquatic Nuisance Species Clearinghouse, New York Sea Grant; *ANS Digest*, published by the Freshwater Foundation, Minnesota Sea Grant; *Ballast Exchange*, published by the Ballast Outreach Project, California Sea Grant (on file with author or available through Sea Grant Programs).

114. For instance, the National Sea Grant College Program "expects to make available about $2,300,000 [in fiscal years 1999 and 2000] to support projects to prevent and/or control nonindigenous species invasions in all U.S. marine waters, the Great Lakes, and Lake Champlain." NOAA, *Aquatic Nuisance Species Research and Outreach and Improved Methods for Ballast Water Treatment and Management: Requests for Proposals for FY 1999*, 64 Fed. Reg. 10,623 (1999).

115. Ruiter, *supra* note 17, at 272. *See also* Adam Babich, *Understanding the New Era in Environmental Law*, 41 S.C. LAW REV. 733, 761–62.

preventing against known invasive species even though it is not particularly useful in preventing unknown species.

C. *Statutory and Regulatory Deficiencies*

As shown above, the Gulf states will need to address weak links in their statutory frameworks, primarily the patchwork structures that do not lend themselves to comprehensive management, the lack of substantial research and grant programs, and the absence of notice provisions for effective management across political borders. States will also have to improve the collaboration between the relevant state agencies and consider creating a state Invasive Species Council as a guiding body, similar to that created by President Clinton's Executive Order. An example of such a body is the Aquaculture Advisory Committee created in Illinois which makes recommendations regarding the importation and possession of nonindigenous species for aquaculture providing for participation by experts from universities, government, and private industry.[116]

D. *Time Delay*

The delay involved in researching and developing a state management plan can result from the need to establish state or local programs to address ANS, the need for new enabling legislation, or the need for scientific research in order to prioritize risks and goals. Federal aid, of course, is available only when the state management plan is complete and approved and preventative measures will be put into place only when the plan is distributed to the relevant agencies and user groups.

The time delay will have a greater impact on Alabama, Mississippi and Louisiana as these states have a longer road ahead to develop a state management plan but may benefit from the process of creating a Gulf-wide plan that will prepare management techniques using resources from all five states.

E. *No Problem and No Resources*

While the lack of adequate funding plagues many prevention, education, and control efforts, it becomes particularly threatening when paired with the perception that there is no immediate, or otherwise, ANS threat. Although the zebra mussel panic has aroused most legislatures and fish and wildlife agencies into action, they may still linger, especially around appropriations time, if it is perceived that there is not a problem crucial

116. *See* Ill. ADMIN. CODE, tit. 17, § 870.10(e) (1999).

enough to divert financial resources away from other more pressing state or regional issues. In some cases, this is accurate. The Sea Grant National Aquatic Nuisance Species Clearinghouse provides a series of maps, beginning in 1988 through 1999, showing the unexpected and hurried spread of the zebra mussel across the Great Lakes. [117] If a legislator with limited financial resources is faced with an infestation of a few miles, few would act, not expecting the swift dispersal of the voracious mussels.

The zebra mussel is somewhat of a lesson for the nation. While Louisiana bemoans the accidental release of the nutria that hungrily makes its way through productive wetland marshes, and Florida fights off the hydrilla that eradicates more biological diversity in waterbodies every day, the sight of the zebra mussel causes reaction. This lesson may be to prepare for the "next zebra mussel"—that species that can spread a thousand miles in a short period and wreak havoc environmentally and socio-economically. Of course, if we prevent this new species from taking hold, we may never know.[118]

The perception that there is "no problem" will remain a challenge for the Gulf states. Texas and Florida, the two Gulf states closest to establishing a state management plan, have recognized the importance of ANS management primarily as a result of their own ANS crises.[119] Alabama, Mississippi and Louisiana may lag behind until a "problem" arises.

VI. CONCLUSION: THE FUTURE OF ANS MANAGEMENT IN THE GULF

In the development of state management plans, the Gulf states have many assets upon which to rely. There are currently eleven approved state management plans across the nation and two model guidance documents upon which to draw. Because of the economic emergency of the zebra mussel and other introduced species that have wreaked havoc in the Great Lakes, there is an increasing effort by Congress and state legislatures to fund research and control activities. Each Gulf state has a Sea Grant program that is available for scientific research and partnerships, policy analysis, and assistance in developing plans and models. Also, the Gulf

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117. *See Sea Grant National Aquatic Nuisance Species Clearinghouse* (visited February 20, 2000) <http://www.entryway.com/seagrant/maps.cfm>.

118. *See* Gross, *supra* note 44 (lamenting the quiet reward inherent in "if you don't hear about it, that means we did our job.").

119. For the last several years, Texas researchers have been concerned about the possible impacts of viruses spread from shrimp farms to wild shrimp in Texas coastal waters. *See* Jerald Horst, *Shrimp Virus Threat is Topic at Seminar*, THE TIMES-PICAYUNE, July 17, 1997, at 2F. The Florida DEP estimates almost $ 100 million will be spent primarily to control hydrilla and water hyacinths. *See* Jan Hollingsworth, *Strange Invaders*, THE TAMPA TRIB., August 12, 1998, at 1.

states can take advantage of the efforts of organizations, such as the Gulf States Marine Fisheries Commission, which have economic interests in preventing and controlling the introduction and spread of nonindigenous species and are willing to lobby for the creation of management plans at both the state and regional level. Finally, with the creation of the Gulf of Mexico ANS Panel, the Gulf states have an opportunity to collaborate on comparable ANS concerns and problems.

Although there is much work to be done and the emergence of state management plans may be years away, these assets and the annual reminder of nonindigenous species like Boudreaux the Nutria may propel the Gulf states to great efforts in ANS management.