TEXAS STATE COMPREHENSIVE MANAGEMENT PLAN FOR AQUATIC NUISANCE SPECIES

Water hyacinth (*Eichhornia crassipes*) on B.A. Steinhagen Reservoir

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EXECUTIVE SUMMARY

The Texas State Comprehensive Management Plan for Aquatic Nuisance Species (ANS) approaches the subject of aquatic nuisance species from the natural resources management perspective. This plan primarily addresses the control and management of aquatic nuisance species introduced into Texas' water unintentionally, without permitted approval, and/or illegally. Non-indigenous species are plants and animals found beyond their natural ranges. Many are highly beneficial. Most U.S. crops and domesticated animals, many sport fish and aquaculture species, numerous horticultural plants and most biological control organisms have origins outside Texas. In this plan, we focus on nuisance aquatic species, and therefore do not address beneficial or terrestrial species. The geographic scope of the plan is that of the State of Texas and the boundary waters under its jurisdiction, including parts of the Red River, the Sabine River, the Rio Grande and coastal waters.

Aquatic nuisance species are a very serious problem in Texas with increasingly negative impacts. This document is an important step in providing guidance on management actions to address the prevention, control and impacts of aquatic nuisance species that have invaded or may invade the state. The development of a state plan is called for in Section 1204 (A) of the **Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646)** (**NANPCA**). **NANPCA** was re-authorized and amended by the **National Invasive Species Act of 1996 (NISA) (P.L. 104-332)**. These laws provide an opportunity for federal cost-share support for implementation of the plan. Approval of the management plan by the national Aquatic Nuisance Species Task Force is also required for a state to be eligible for federal cost-share support, and these costs that can be significant in many cases.

Implementation of this plan will require a commitment of both staff and financial resources; however, when considering these costs it is important to understand the costs of non-implementation. For example, at one point over $1 million worth of water was being lost per month during the peak irrigation season in the Rio Grande Valley as a result of overabundant hydrilla in the Rio Grande downstream of International Falcon Dam. This lost water would have been used to support the billion-dollar Texas agricultural industry in that region. A program for prevention, early detection, and control, even if the cost was in the millions, could ultimately save Texas many millions or billions of dollars in direct cost and indirect economic benefit.

There are currently 33 states with approved management plans. The Texas plan was patterned after a model developed by the Great Lakes Fisheries Commission and approved by the Great Lakes Panel, as well as other state management plans such as Alaska, Illinois, Louisiana, Michigan, New York, and Ohio. Section 1204 requires that the management plan identify those areas or activities within the state, other than those related to public facilities, for which technical and financial assistance is needed to eliminate or reduce the environmental, as well as public health and safety risks associated with aquatic nuisance species.

The six goals on which this plan is based are as follows:

Goal 1: Coordinate all Aquatic Nuisance Species Management Activities within Texas and collaborate with regional, national and international programs.

Goal 2: Prevent the introduction of new ANS into Texas waters.

Goal 3: Detect, monitor, contain, reduce or eradicate populations of ANS as quickly as possible with a minimum of environmental impact.

Goal 4: Educate the public and appropriate resource user groups about the importance of preventing ANS introductions, and how the harmful impacts of ANS can be reduced.

Goal 5: Identify relevant problems, develop and conduct research, and disseminate research results dealing with ANS that are identified as species of concern in Texas.

Goal 6: Take appropriate steps to insure that federal and state rules and regulations sufficiently promote the prevention and control of ANS.

These goals will be accomplished by increased effort by the Texas Parks and Wildlife Department (the state agency most responsible for the regulation of ANS), cooperation by federal, state, and local governmental entities as well as stakeholder groups, and by the solicitation and utilization of federal, state, and local funding sources, including stakeholder organizations.

INTRODUCTION

Aquatic nuisance species (ANS) are a significant threat to the integrity of marine and freshwater ecosystems of the United States and around the world. Typically these exotic species disrupt the flora and fauna of native aquatic communities by destabilizing food webs, nutrient dynamics, and biodiversity. Because of the magnitude of the threat posed by ANS, the Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA) was passed by the U.S. Congress in 1990. This act was reauthorized and updated as the National Invasive Species Act in 1996. Among the provisions of these acts is the opportunity for federal cost-share support for implementation of an ANS state plan. A thorough examination of this legislation will provide a good start in understanding the impetus behind this management plan.

NANPCA calls upon each state to develop and implement a comprehensive state management plan for the prevention and control of aquatic nuisance species. The Act was established to provide for the prevention and control of unintentional introductions of nuisance non-indigenous aquatic species, and is based on the following five objectives as listed in section 1002 of NANPCA:

> To prevent further unintentional introductions of nuisance, non-indigenous aquatic species;
>
> To coordinate federally funded research, control efforts and information dissemination;
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> To develop and carry out environmentally sound control methods to prevent, monitor and control unintentional introductions;
>
> To understand and minimize economic and ecological damage caused by ANS organisms; and
>
> To establish a program of research and technology development to assist state governments.

NANPCA was created principally in response to the ecological and socioeconomic impacts of the zebra mussel (*Dreissena polymorpha*) invasion of the Great Lakes. Although the zebra mussel invasion may have prompted its passage, NANPCA is designed to prevent new ANS introductions and to limit the dispersal of aquatic nuisance species already in U.S. waters.

The national ANS Task Force established under Section 1201 of NANPCA is co-chaired by the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration. The function of the ANS Task Force is to coordinate governmental efforts related to ANS in the United States with the private sector and other North American interests, and to facilitate national policy direction in support of NANPCA. The Task Force currently consists of 12 Federal agencies and 13 *ex officio* members. The

Aquatic Nuisance Species Program under Section 1202 of the act has been adopted and recommends prevention, detection, monitoring, and control be the essential elements in an ANS management plan.

This document is the ANS plan for the State of Texas. It is designed to address the prevention, control, and impacts of ANS through management, research and public education. It focuses primarily on unintentional, unsanctioned introductions of aquatic nuisance species into Texas waters. It is not intended to address beneficial non-indigenous species such as those used in aquaculture, horticulture, or as biological control agents. Also, this plan does not address those species that are terrestrial. However, it does encompass certain semi-aquatic and/or riparian species that heavily impact aquatic resources such as giant cane (*Arundo donax*) and salt cedar (*Tamarisk* spp.). The geographic scope of the plan is that of the State of Texas and the boundary waters under its jurisdiction, including parts of the Rio Grande, the Red River, the Sabine River and all coastal waters. (See Appendix A, Texas and Its Waterways.)

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DEFINITION OF THE PROBLEM

The introduction of aquatic nuisance species, many of which are exotic/non-indigenous, has been a recognized problem as early as the 1800's. There have been well founded concerns about both plant and animal invaders and their effects on outdoor recreation, water availability, hydropower production, human disease and agriculture for decades. Many of these concerns have been borne out. For example, in recent years unchecked growth of hydrilla (*Hydrilla verticillata*) and water hyacinth (*Eichhornia crassipes*) in the Rio Grande have been implicated in the loss of millions of dollars of irrigation water in the Rio Grande Valley, drinking water in Matamoras, Mexico, and freshwater inflows into the Gulf of Mexico. Similarly, unchecked hydrilla growth in the Colorado River near Austin, Texas was implicated in increased flooding during a 2002 high water event. Excessive hydrilla growth has also been the cause of lost hydropower production at Lake Austin and Lake Bastrop due to clogged water intakes. Water hyacinth impedes boat traffic and causes water losses through evapotranspiration up to 13 times that of open water evaporative loss. Concern about increased mosquito production and the possibility of disease transmittal as a result have been expressed in relation to a new invader in Texas, giant salvinia (*Salvinia molesta*), a problem already associated with noxious growths of water hyacinth.

There are also many concerns about exotic invasive animals. For example, the channeled apple snail (*Pomacea canaliculata*) that has devastated rice production in some areas of the Indo-Pacific is often viewed as a threat to Texas multi-million dollar rice industry. The Asian snakehead (*Channa micropeltes*) is considered a threat to the balance of fish communities in freshwater ecosystems, as are a number of Asian carp, including grass carp (*Ctenopharyngodon idella*), silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Hypophthalmichthys (Aristichthys) nobilis*), and black carp (*Mylopharyngodon piceus*). In the marine environment, the Asian tiger prawn (*Penaeus monodon*) is beginning to appear consistently off the East Coast and in the Gulf of Mexico off shore of Alabama and Louisiana. This shrimp poses a significant threat to native shrimp and crabs; it is an active and voracious predator preferring to feed on other penaeid shrimp, crabs, and bivalves including oysters. It also carries diseases not native to Texas that could infect and devastate both shrimp and blue crab (*Callinectes sapidus*) populations. This would have a significant negative affect on commercial and bait fisheries, and the loss of significant product value. The Australian jellyfish (*Phyllorhiza punctata*) had a significant presence in the Gulf of Mexico by 2000. Ecologically, this species subsists on larval fishes and invertebrates and in sufficient numbers can negatively impact recruitment of fish such as red drum (*Sciaenops ocellatus*) or spotted seatrout (*Cynoscion nebulosus*) and can clog nets resulting in decreased catch in the shrimp industry. Over 100 exotic species of fishes, crustaceans, and mollusks have already been documented in Texas waters.

As a result of such concerns, the Texas Legislature passed the Texas Fish Farming Act of 1989 to expand instructions given in 1967 to regulate harmful and potentially harmful fishes. This act gave the Texas Parks and Wildlife Department (TPWD) the authority to promulgate regulations concerning harmful or potentially harmful aquatic fishes,

shellfishes, and aquatic plants. It also prohibited the release of any fish, shellfish, or aquatic plant into Texas waters, except for native baitfish, without authorization from TPWD.

TPWD harmful or potentially harmful species regulations went into effect January 1, 1990. These regulations have been subsequently revised on a number of occasions. The general rules are found in the Texas Administrative Code under Title 31, Part 2, Chapter 57, Subchapter A, RULE §57.112. All harmful or potentially harmful exotic fish, shellfish, and aquatic plants regulations are found in Appendix B.

Although not a comprehensive list, the following provides information about some of Texas' most problematic ANS as well as some that are a serious concern as of August 20, 2011.

Algae

Caulerpa (*Caulerpa taxifolia*) – *C. taxifolia* is a green marine alga that is native to the Caribbean and other tropical areas including Australia, Brazil, Ceylon, Indonesia, Philippines, Tanzania, and Vietnam where it usually grows in isolated stands (Meinesz and Hesse 1991). Sometime in the early 1980's it was introduced, either by accident or as an aquarium release, into the Mediterranean Sea where it forms meadows from the surface to more than 30 m deep (Boudouresque et al. 1995). The plant produces substances that are toxic to two primary macro-herbivores, sea urchins (Lemee et al. 1993), and Salema (*Sarpa salpa)*.

The Mediterranean strain of *C. taxifolia* is much more aggressive than the *C. taxifolia* native to the Caribbean Sea. Similarly, it is more aggressive than the two species native to Texas waters, *C. mexicana* and *C. prolifera*. In the Mediterranean, *C. taxifolia* invasions have precipitated huge declines in native sea grass beds. Associated with sea grass declines there have also been declines in native mollusks, crustaceans, and annelids (Bellan-Santini et al. 1996).

To date there have been no confirmed sightings of the Mediterranean strain of *C. taxifolia* in Texas waters.

Fish

Armored catfish – The family Loricariidae contains almost 700 species and new species are still being found. They originate from freshwater habitats in Costa Rica, Panama, and South America (Burgess 1989). They are known for the bony plates that cover their bodies. The "sucker fish" or "plecos" commonly sold in the aquarium trade to help keep aquaria free of algae are loricariids. One major problem associated with established populations of commonly released loricariids is their propensity to burrow into the banks of rivers and streams, leading to vast erosion problems. Depending on the species, these burrows can be almost a meter deep and 12 centimeters wide. In areas where loricariids are numerous, entire banks can collapse resulting in the reduction of waterfront property

by several feet overnight. These species are hardy and can endure up to 30 hours out of water allowing them to survive in extreme conditions. Additionally, loricariids can displace native species through competition for resources and space. The catfish can quickly alter the aquatic food chain, eating organic material that would otherwise be available to native herbivorous fish, aquatic insects, and other life. Their bottom feeding actions also uproot aquatic plants, further disrupting the system.

Armored catfish have become established in a number of areas; most notable are populations in the Houston Ship Channel and surrounding bayous, San Antonio River, San Felipe Springs, and the San Marcos River.

Asian carp – (*Ctenopharyngodon idella* (unless permitted), silver carp *Hypophthalmichthys molitrix*, bighead carp *H. nobilis*, and black carp *Mylopharyngodon piceus*) – The family Cyprinidae (carps and minnows) includes species native to every continent except South America and Australia (Schofield et al. 2005). Grass carp are among the largest members of the minnow family (Cyprinidae). Black carp, which feed primarily on benthic invertebrates, may attain weights in excess of 150 pounds. (Nico et al. 2005). Black carp have been used extensively for snail control in aquaculture ponds outside of Texas. Grass carp are very similar to black carp in size and shape, and may grow up to 100 lbs. or more (Etnier and Starnes 1993; Lopinot 1972; Robison and Buchanan 1988). Grass carp are used primarily for vegetation control in the United States mostly because of their ability to eat prodigious amounts of plant material. For example, Jensen (1986) measured consumption rates up to 300% of their body weight per day, but Opuszynski (1972) found maximum daily consumption to be only 100-120% body weight, and Wiley and Wike (1986) reported daily consumption rates not exceeding 50% of body weight. In Texas, grass carp are used for vegetation management by permit only, and only sterile triploid fish are legal. Silver carp can grow in excess of 75 pounds (Li and Mathias 1994; Xie Ping 2003). They have become famous in the Midwest for their habit of jumping out of the water when disturbed. Bighead carp reaching nearly 90 pounds have been reported (Baltagi 1979 *in* Jennings 1988). Both silver carp and bighead carp are filter feeders.

To date, the only Asian carp species established in Texas is the grass carp. It is thought this is due to a very few, but very large, stockings of non-sterile diploid fish for vegetation control in the 1980's before the technology to create triploid fish became available.

Lionfish (*Pterois* spp.) – Lionfish are members of the Scorpaenidae family and are native to warm waters of the South Pacific and Indian Oceans. Specimens have been reported by divers along the Atlantic coast of the U.S. for almost two decades, but final confirmation came in early 2002 when a commercial fisherman landed a 6.75-inch specimen off the Florida coast near St. Augustine. Since then, lionfish have expanded their range along the east coast from Long Island, New York through the Florida Keys and the Caribbean and through the Gulf of Mexico.

Lionfish are voracious eaters, exhibit binge-feeding behaviors, have no known predators, and are venomous. Given these traits, there are concerns they may compete with other important reef fish such as groupers and snappers. Though not considered life-

threatening, human exposure to lionfish venom has been compared to that of a severe wasp sting.

Lionfish have been collected throughout the Caribbean, off the Yucatan, and off Louisiana, 155 miles from the Galveston jetties. In early summer 2011, several specimens were documented at the Flower Gardens Bank National Marine Sanctuary located approximately 100 miles southeast of Galveston.

Snakehead Family Channidae – Although all species within the Family Channidae are prohibited in Texas, northern snakeheads (*Channa argus*) in particular have received a great deal of media, public, and political attention in recent years, even at the national level. This has probably been due at least in part to the establishment of the species in the Potomac River. Because snakeheads are voracious predators, there is concern that they could have a significant impact on native fish communities. They are known to feed on banded killifish (comprise 66% of identifiable food items in northern snakehead guts from the Potomac River), bluegill, pumpkinseed, and white perch (personal communication, October 2007, John Odenkirk, Virginia Department of Game and Inland Fisheries).

Although they have become established in Arkansas, to date snakeheads have not become established in Texas waters.

Invertebrates

Apple snails and ramshorn snails of the family Ampullariidae except *Pomacea bridgesii* – Apple snails are freshwater snails equipped with an operculum. They are larger than most other freshwater snails and possess oval shells that are different from other freshwater species. The umbilicus of the shell is either perforated or open (Stange 2004).

In the 1980's, *Pomacea canaliculata* was introduced into Taiwan, Japan, Thailand, and the Philippines in order to start an escargot industry. As late as 1989 they were introduced to Hawaii for the same reason. However, the snails did not catch on. Instead, they escaped into the wild and threatened commercial rice (Litsinger and Estano 1993; Halwart 1994; Albrecht et al. 1996) and taro production as well as native plant communities. Soon it also became apparent they were able to transfer the rat lungworm (*Angiostrongylus cantonensis*), a parasite capable of infecting humans when snails are undercooked, causing eosinophilic meningoencephalitis. The snails also spread to Indonesia, Cambodia, Hong Kong, Southern China and Australia. Despite these significant problems, apple snails are still considered a delicacy by many and are often found in Oriental food markets.

Pomacea and *Marisa* species have been introduced in Africa and Asia to help control other snails that serve as intermediate hosts for trematodes that cause swimmers itch and schistosomiasis. Unfortunately, although these trematodes do not complete their life cycle in apple snails, apple snails can still carry them. One of the species that was introduced as biological control agent was the giant ramshorn snail (*Marisa cornuarietis*).

In Texas, *M. cornuarietis* is found in the Comal and San Marcos springs. *P. insularum*, a species sometimes confused with *P. canaliculata*, has been found in East Texas, including some rice fields. Recent reports indicate these species have also expanded into new areas throughout East Texas and along the coast to the south.

Australian spotted jellyfish (*Phyllorhiza punctata*) – *Phyllorhiza punctata* is a large jellyfish native to coastal and estuarine waters of Australia and the Indo-Pacific including the Philippine archipelago. The first reported occurrence in the Gulf of Mexico was in 1993 off the coast of Louisiana. During the summer of 2000 thousands of jellyfish were reported off the coasts of Alabama, Mississippi, and Louisiana. A single specimen was collected off Sabine Pass, Texas in July 2001 and a small specimen (25-50mm) was collected from West Galveston Bay in June 2006. The introduction into the Gulf of Mexico of this species has been attributed to a break off of the Loop Current circulating through the Gulf (Martin 2000), but *P. punctata* introductions have also been attributed to ship fouling (scyphistomae) and ballast water (ephyrae) (Larson and Arneson 1990; Perry 2005). Specimens that appeared in the Gulf of Mexico reach a larger size (65 cm) than those found in Indo-Pacific (35-40cm) waters (Graham et al. 2001).

These jellyfish are known to prey upon planktonic crustaceans, bivalve larvae, fish eggs and larvae within their native range. Graham et al. (2003) reported circumstantial evidence that the 2000 occurrence in the northern Gulf of Mexico reduced the white shrimp (*Litopenaeus setiferus*) harvest in Mobile Bay, Alabama and Mississippi Sound by 26.7% (clogging of shrimp nets, damage to boat intakes and fishing gear, and area closures).

In Texas, there was one confirmed report from Galveston Bay in 2006. However, no new sightings have been noted in Texas waters since.

Brown mussel (*Perna perna*) – The brown mussel is native to tropical and subtropical regions of the Atlantic and is usually associated with rocky/cobble substrates. The first reported sighting in Texas was at the Port Aransas Jetties in 1990 and has since been reported as far south as Port Mansfield Pass and northward to the Matagorda Peninsula. *P. perna* is thought to have been introduced into Texas waters through the ballast water of ships originating from Venezuela.

The mussel has colonized hard substrates along the coast including navigation buoys, petroleum platforms and jetties. Due to its rapid growth (60-80 mm in 6 to 7 months), navigation buoys may sink creating navigational hazards (Hicks and Tunnell 1993, 1995). The brown mussel has been commercially harvested in Africa and South America.

Small concentrations are found from time to time, but it is believed they are being harvested recreationally.

Green mussel (*Perna viridis*) – The green mussel is widely distributed throughout its native range in the Indo-Pacific, from the Persian Gulf to Japan and New Guinea. *Perna viridis* has a wide temperature tolerance (10-35°C) but prefers higher salinities (24-80 ppt). Shafee (1979) reports that *P. viridis* has the greatest growth rate of the mussels studied. Due to its fast growth rate and wide temperature tolerance, the mussel has caused problems in power plants that use seawater cooling systems. Clogging of intakes and condenser tubes has resulted in mechanical damage to these systems (Neitzel et al. 1984; Henager et al. 1985).

To date there have been no confirmed sightings of the green mussel in Texas waters.

Mitten crab (*Eriocheir sinensis*) – The mitten crab, native to China, is capable of tolerating a wide range of environmental conditions and has shown a propensity to thrive in highly modified aquatic habitats, including polluted waters (Rudnick et al. 2003). It is primarily a freshwater crab but spawns in brackish estuarine waters.

Mitten crabs are thought to have been accidentally introduced into North America where they are sold as a food item in Asian-American markets (Horwarth 1988, 1989). Where mitten crabs have become established they have adversely impacted local biodiversity through direct competition with native crustacean species. Juvenile crabs in tidal reaches of streams create burrows along banks, which accelerate erosion. Dense populations of crabs have blocked water intakes and holding tanks that are used to prevent fish from entering turbines (Siegfried 1999). Mitten crabs also pose a risk to humans as they are the second intermediate host of the Oriental lung fluke in their native range.

Though mitten crabs have been documented near the mouth of the Mississippi River, none have been found in Texas to date.

New Zealand mudsnail (*Potamopyrgus antipodarum*) – A native to New Zealand, *P. antipodarum* can occupy a wide variety of ecosystems including rivers, lakes, and estuaries. Introductions of this snail into the Great Lakes most likely occurred through ships traveling from Europe (Zaranko et al. 1997). *P. antipodarum* was possibly introduced to western state waters through contaminated shipments and stocking of live game fish. Because of their rapid growth and reproductive rates, *P. antipodarum* quickly out-competes native species with some documented cases comprising over 95% of the invertebrate biomass in a river (Richards et al. 2002). Densities have been reported as high as 500,000/m^2 with the New Zealand mudsnail's invasive characteristics being compared to the zebra mussel. Snails are capable of withstanding desiccation and because of their small size may be transported to new water bodies inadvertently on shoes and clothing (Global Invasive Species Database 2005).

To date there have been no confirmed sightings of the New Zealand mudsnail in Texas waters.

Oyster Family – Ostreidae, except for the eastern oyster (*Crassostrea virginica*) and crested oyster (*Ostrea equistris*) – In 1992, TPWD added Pacific giant oyster (*C. gigas*)

to its list of harmful or potentially harmful fishes, shellfishes, and aquatic plants that are prohibited in Texas. This was done in response to documented problems such as competition with native species and introduction of a non-indigenous disease that are associated with the introduction of this species into waters of the Chesapeake Bay (Burreson et al. 2000). More recently, other exotic oysters being cultured in the Pacific Northwest, the northeastern U.S., and elsewhere in the world began to appear in Texas markets and restaurants. Because of their value and importance as seafood, different oyster species have been released at locations outside their native ranges (Carlton 1992 Chapman et al. 2003). In other cases, introductions of exotic oysters have been accidental (FAO 2005). In addition to situations where exotic oysters directly displaced valuable native oysters, introduced oysters have also been linked to foreign parasites, diseases, predators, and other associated non-native organisms.

Because of the increasing local trade in exotic oysters and concerns over releases in Texas waters, in 2005 TPWD moved to prohibit all edible oysters of the family Ostreidae, except the two native species: Eastern oyster (*C. virginica*) and crested oyster (*O. equistris*).

Penaeid shrimp family – Penaeidae including *Farfantepenaeus* spp., *Fenneropenaeus* spp., *Litopenaeus* spp., *Marsupenaeus* spp., *Melicertus* spp., and *Penaeus* spp. except *F. aztecus*, *F. duorarum*, and *L. setiferus* – All species of these genera are prohibited in Texas and require an Exotic Species Permit for commercial aquaculture operations in the state. Approval is made on a case by case basis and requires that shrimp be certified as disease-free by an approved shellfish disease specialist. Currently, *F. vannamei* is being cultured in shrimp farms near Harlingen, Texas and *L. stylirostris* in a facility in west Texas, outside the Exotic Species Exclusion Zone. Random tests for disease have been conducted since the early 1990's with no major diseases of concern identified.

Many species of this family have been shown to be carriers of a variety of viruses and diseases and therefore could pose a serious risk to native shrimp stocks, the commercial shrimp industry, and other species that prey upon native Penaeid species.

In 1991, several hundred pounds of *F. vannamei* were reported to have escaped from an aquaculture facility in Harlingen, Texas. Six *F. vannamei* have been collected during routine fishery independent monitoring by TPWD in Lower Laguna Madre between November 1992 and October 2003. Specimens ranged in size from 117-152mm. A few *F. vannamei* were reported being captured by commercial shrimp fishermen in Matagorda Bay in 1997. In 1998, a report was also received that an unspecified number of *F. vannamei* escaped from an aquaculture facility into Matagorda Bay.

P. monodon, a predatory exotic shrimp, has been collected in coastal waters of seven states from North Carolina south through Louisiana. There have been unconfirmed reports of *P. monodon* from around the Yucatan Peninsula. This shrimp is edible and may have led to under reporting or lack of reporting in neighboring regions. A specimen was collected during the summer of 2010 off Louisiana, approximately 160 miles from

the Galveston jetties which suggests the great likelihood that *P. monodon* may soon expand their range into Texas waters.

Sea squirt (*Didemnum* spp.) – Several species of the colonial tunicate genus *Didemnum* exhibit invasive characteristics that pose significant threats to coastal and marine ecosystems. These species grow rapidly and will overgrow native species, killing them and preventing recruitment of native encrusting species. Fouling of boat hulls, water intakes, and other man-made structures have also been documented. *Didemnum* species are very resilient and have been found at water depths from intertidal to the continental shelf (65m).

Didemnum spp. are believed to have been introduced into waters of the United States by ballast water in ships returning from Southeast Asia, hull-fouling and possibly hitch-hiking on oysters or other shell stock species.

To date there have been no confirmed sightings of this colonial tunicate species in Texas waters; however, 10kg of *Didemnum* spp. were listed on a shipping invoice from a Korean shipper to a Houston, Texas seafood dealer in February 2007 (TPWD unpublished data).

Veined rapa whelk (*Rapana venosa*) – Veined rapa whelks are large carnivorous marine snails named for their distinctive shell markings. The whelk is native to marine and estuarine waters of the western Pacific (Sea of Japan, Yellow Sea, East China Sea, and the Bohai). The veined rapa whelk was introduced into the Black Sea in the 1940's and by the early 1970's had extended its range along the coasts of Romania, Bulgaria, and Turkey (Richerson 2011). The whelk is considered a major marine pest in the Black Sea and has caused significant changes in the community ecology of demersal organisms. Veined rapa whelks were first reported in the United States from the Chesapeake Bay (Hampton Roads, Virginia) during the summer of 1998 and is thought to have been a possible ballast water introduction. Since their introduction, adult specimens and egg cases have been reported throughout the lower Chesapeake Bay.

Environmental conditions in *R. venosa*'s native range are comparable to those in Texas and include wide fluctuations in temperature and salinity. As a known predator of bivalves, this species could potentially cause serious damage to oyster reefs in Texas. To date there have been no confirmed sightings of the veined rapa whelk in Texas estuarine waters.

Zebra mussel (*Dreissena polymorpha*) and **quagga mussel** (*Dreissena rostriformis bugensis*) - Zebra mussels were accidentally introduced into the Great Lakes through ballast water releases from Trans-Atlantic vessels and have quickly spread throughout North American waters. Established zebra mussel populations have caused significant economic and ecological damage. Zebra mussels reproduce rapidly and filter large quantities of microscopic aquatic plant and animal life from the water column. Additionally, their ability to quickly form massive colonies on hard surfaces, which can clog water intakes and conduits, is well documented. In many cases, established zebra

mussel populations have caused massive, and often irreversible, modifications of aquatic ecosystems and extirpation of native species (Ricciardi et al. 1998). In 2009, the first report of zebra mussels in Texas was confirmed in Lake Texoma. The potential damage to Texas fisheries and human infrastructure from established zebra mussel populations could be profound. According to a recent economic impact study, zebra mussels have cost water users in the northern U.S. $120 million between 1989 and 1995. Commercial and recreational vessels and beach areas are also vulnerable to the negative impacts of the zebra mussel (Hushak et al. 1995). In 1999, a boat transported from Lake Michigan that was covered with zebra mussels was nearly launched at Lake Grapevine (Howells 2001). If not for an observant marina operator who stopped the launch and contacted TPWD, these mussels might have been introduced into waters upstream of the Dallas-Fort Worth metroplex.

To date zebra mussels have become established only in Lake Texoma and in Sister Grove Creek upstream of Lake Lavon. Since that time, more have been found in the creek, but none, so far, in Lake Lavon.

Vascular Plants

Alligatorweed (*Alternanthera philoxeroides*) – Alligatorweed is native to South America (Maddox 1968; Vogt et al. 1979), and has been introduced to North America, Asia, and Australia (Julien et al. 1995). This plant has been described as amphibious because of its ability to grow in a wide range of habitat types, both terrestrial and aquatic (Vogt et al. 1979). Alligatorweed can be found as a floating or rooted plant, has hollow stems in its aquatic form, and upright flowering stems. Leaves are usually elliptic and may be up to 4 inches long, and flowers bloom from April through October if conditions are favorable.

Alligatorweed may out-compete native vegetation, and excessive population growth can clog waterways, impede swimming and limit access for boating, fishing, and hunting. Water bodies that have extensive coverage of Alligatorweed may also have problems associated with low dissolved oxygen levels.

Alligatorweed in widespread, particularly in East Texas, but it is seldom as problematic as water hyacinth or giant salvinia.

Eurasian watermilfoil (*Myriophyllum spicatum*) – Eurasian watermilfoil is native to Europe and Asia. It was first introduced into North America in the late 19th century (Reed 1977). Since its introduction, *M. spicatum* has gained a reputation as a nuisance plant species in North America (Nichols and Shaw 1986). Although *M. spicatum* is quite similar to the North American native watermilfoil (*M. exalbescens*) the two species are typically distinguishable on the basis of leaf morphology. In general, *M. spicatum* produces 5-24 pairs of leaflets per leaf, whereas *M. exalbescens* produces 4-14 (Aiken and McNeill 1980). About 70% accuracy can be obtained by characterizing everything with 14 or more pairs of leaflets as *M. spicatum* (Nichols 1975).

Eurasian watermilfoil flowers in mid-June through late summer, and may reproduce by seed production, vegetative buds, or fragmentation (Nichols 1975). Plants typically

survive the winter as an intact plant mass, a root mass, or by producing turions or winter buds (Stuckey et al. 1978; Titus and Adams 1979).

Eurasian watermilfoil is capable of displacing native submerged plant species, thereby reducing both habitat diversity and plant species diversity. Overabundant populations of Eurasian watermilfoil can create problems similar to those associated with hydrilla infestations, including reduced boating access, reduced recreational opportunities such as swimming and skiing, and low dissolved oxygen levels.

Eurasian watermilfoil is found in a variety of water bodies from East Texas to the Rio Grande, but is seldom as problematic as hydrilla.

Giant reed (*Arundo donax*) – *Arundo donax* is one of the largest grasses in the world, growing to a height of 8 m (Bell 1997). There is some confusion about its origins. *A. donax* is thought to be native to eastern Asia (Polunin and Huxley 1987) as the plant has been cultivated throughout Asia, southern Europe, North Africa, and the Middle East for thousands of years. Others propose *A. donax* is actually native to the area around the Mediterranean Sea (Hickman 1993). During the 1820's it was introduced into California for erosion-control in drainage canals, and was also used for thatching (Hoshovsky 1987). *A. donax* is also used in the production of reeds for a number of musical instruments.

Giant reed frequently grows along waterways and around lakes but is also capable of growing in dry, terrestrial environments. The plant may use large amounts of water; some researchers have reported as much as 20,000,000 L/hectare (Perdue 1958; Iverson 1994). Under optimal conditions *A. donax* can grow over 5 cm per day and produce more than 20 tons per hectare of above-ground dry mass (Perdue 1958). There may be as much as 20,000 to 30,000 acres growing in dense stands along the Texas bank of the Rio Grande alone; a significant drain on the water supply in that region.

There is little evidence that *A. donax* provides food or habitat for native animals (Bell 1997). It competes with a number of native plant species including willows and cottonwoods which provide nesting habitat for federally threatened or endangered bird species such as the least Bell's vireo (*Vireo bellii pusillus*) (Hendricks and Rieger 1989; Franzreb 1989).

Giant salvinia (*Salvinia molesta*) and **common salvinia** (*Salvinia minima*) - Two species of introduced aquatic fern, genus *Salvinia*, have been identified in Texas. Common salvinia was first identified in Jefferson County (Port Arthur area) in 1992 while the more ecologically threatening giant salvinia was first identified in the Houston area in spring 1998. Giant salvinia, also known as Kariba weed, has spread from its native habitat in southern Brazil to many other countries around the world including Australia, New Guinea, New Zealand, Zambia, Zimbabwe, and now to the United States (Mitchell 1976). Since it was first discovered in Texas giant salvinia has been identified in 17 public reservoirs.

Common and giant salvinia are floating plants with oval shaped leaves (fronds). The two species can be distinguished from one another by the pattern of tiny hairs on the upper

surface of the leaves. In common salvinia these hairs are split four ways, whereas in giant salvinia the hairs split and then join again in an egg-beater shape. Mature leaves of giant salvina can reach the size of a half dollar; however, mature common salvinia leaves might only reach half this size. Giant salvinia can grow very quickly, with laboratory observations showing a two-fold increase in mass over a two-day period. Under field conditions giant salvinia can undergo a two-fold increase in approximately a week with infestations often expanding rapidly.

Since 1994, giant salvinia has been ranked second behind water hyacinth on the list of international nuisance aquatic weeds (Barrett 1989). Giant salvinia damages aquatic ecosystems by outgrowing and replacing native plants that provide food and habitat for native animals and waterfowl. Additionally, excessive salvinia growth blocks out sunlight and decreases the dissolved oxygen concentration in water to the detriment of fish and other aquatic species. Giant salvinia masses block waterways and impede boat traffic and other recreational activities. When giant salvinia masses die, decomposition of the plants can further decrease dissolved oxygen levels. All salvinia species are on the state's "Harmful or Potentially Harmful Exotic Fish, Shellfish, and Aquatic Plants" list, and are prohibited in Texas.

Hydrilla (*Hydrilla verticillata*) – *Hydrilla verticillata* was first introduced into North America in the 1950's and is considered to be one of Texas' most problematic aquatic plant species. Hydrilla was first recorded in the U.S. in Florida in the early 1950's (Florida Department of Environmental Protection 2004), and was initially marketed under the common name Indian star-vine (Schmitz 1990). Since its introduction hydrilla has become established throughout the eastern seaboard states as well as California and Washington (Netherland 1997).

One problematic characteristic most commonly associated with hydrilla includes rapid growth under a wide range of environmental conditions. Hydrilla can grow up to one inch per day until nearing the surface of the water. Once near the water surface, hydrilla will form a thick mat of branches and leaves that intercept sunlight and prevent native plants underneath from growing. Bowes et al. (1979) reported that dense surface mats of hydrilla cause wide fluctuations in dissolved oxygen levels, pH, and temperature. Although hydrilla prefers a pH of 6-8 (Langeland 1990) it can grow under a wide range of pH conditions. Overabundant stands of hydrilla may also reduce plant and animal diversity (Barnett and Schneider 1974), as well as stunt sport-fish populations (Colle and Shireman 1980). Flow rates in canals and rivers can be restricted from these mats (TPWD staff observations), and access may become limited, precluding water recreation, as well as the economic benefits of recreational activities (Colle et al. 1987).

Hydrilla commonly occurs in reservoirs ranging from oligotrophic (low in nutrients) to eutrophic (high in nutrients) conditions. Hydrilla is capable of tolerating high salinity water and growing and photosynthesizing in less than 1% of full sunlight (Haller 1978). The ability to grow and photosynthesize at light levels below those required for native submersed plants allows hydrilla to colonize deeper water, frequently growing in water 10 feet deep with instances of establishment in very clear water up to 45 feet deep.

Another problematic characteristic most commonly associated with hydrilla is its ability to reproduce in a variety of ways including fragmentation, root tubers, turions (resting buds), and seeds (Langeland 1990). Although hydrilla can reproduce sexually by flower pollination and seed development, seed viability is low and the overall importance of seed production is unknown. Only unisex (dioecious) female plants have been found in Texas. The ability to reproduce asexually from plant fragments aids in the rapid spread of hydrilla within water bodies and from one water body to another. Nearly 50% of fragments with a single leaf whorl can sprout a new plant (and subsequently a new population). Fragments with three or more leaf whorls have a success rate grater than 50%.

Another method of hydrilla reproduction is by tuber production. Hydrilla tubers are subterranean (underground) turions. These tubers can remain dry for several days, or be buried in undisturbed wet sediment for as long as 10 years and still retain viability. Hydrilla tubers also survive herbicide treatment and ingestion and regurgitation by waterfowl. The resilient nature of the tubers to survive herbicide treatment often allows hydrilla to remain established even during an aggressive treatment program. Tuber densities up to approximately 6,000 per square meter have been reported (Sutton et al. 1992).

Water hyacinth (*Eichhornia crassipes*) - *Eichhornia crassipes* is a large floating plant, native to South America, which has been called the world's worst aquatic weed (Cook 1990). It is believed to have been introduced into the United States at the World's Industrial and Cotton Centennial Exposition of 1884-1885 in New Orleans, Louisiana, but may have been cultivated in the U.S. as early as the 1860's (Tabita and Woods 1962). By the late 1890's, water hyacinth had become such a problem for navigation that Congress was prompted to pass The Rivers and Harbors Act of 1899 that authorized the U.S. Army Corps of Engineers (ACOE) to begin major aquatic plant control programs (North American Lake Management Society and Aquatic Plant Management Society 1997).

Water hyacinth reproduces asexually through budding daughter plants and sexually by producing seeds. A mass of water hyacinth is capable of doubling in size every 6-18 days (Mitchell 1976). Due in part to this rapid growth rate, initial efforts by the ACOE failed to control the spread of water hyacinth, and populations expanded to over 125,000 acres in Florida by the late 1950's (United States Congress 1965).

Light and oxygen diffusion (Gopal 1987) as well as water movement (Bogart 1949) can be severely reduced by abundant growth of water hyacinth. Beds of submersed vegetation can be smothered under floating water hyacinth mats thus eliminating plants that are important to waterfowl (Tabita and Woods 1962; Chesnut and Barman 1974). Similarly, low dissolved oxygen concentrations underneath water hyacinth mats can cause fish kills (Timmer and Weldon 1967). Water hyacinth related fish kills have completely eliminated resident fish populations in some small Louisiana lakes (Gowanloch 1945). Water

hyacinth's large leaves and hanging roots can produce evapotranspiration rates many times that associated with normal evaporation rate for a given area. Water loss associated with introduced water hyacinth can be significant, especially in West Texas water supply systems where drought conditions often occur. Water hyacinth infestations are often associated with reduced boating, fishing, hunting, and swimming access.

Waterlettuce (*Pistia stratiodes*) - Water lettuce (*Pistia stratiotes*) was documented in the U.S. as early as 1765 (Bartram 1942), but was possibly brought to the U.S. by early Spanish settlers who established the city of St. Augustine in 1565 (Stuckey and Les 1984). Thought to be native to South America (Cordo et al. 1981), water lettuce is recognized as a weed in at least 40 countries including the U.S. (Holm et al. 1979). Although it is generally seen as a floating plant, it is capable of rooting in wet soil for prolonged periods of time. It is easily recognizable by its lettuce-like leaves, which are broadly rounded at the upper end and covered by tiny hairs. This plant is capable of forming dense mats which disrupt the submersed plant and animal communities and interfere with water movement and navigation (Bruner 1982; Attionu 1976).

Water lettuce can also serve as a host for at least two genera of mosquitoes (Holm et al. 1977). Both vegetative and seed reproduction is possible. Reproducing rapidly through brittle stoloniferous offshoots (Sculthorpe 1967), water lettuce can increase vegetative biomass very quickly to cover an entire lake (Dewald and Lounibos 1990). If unchecked by biological controls or human intervention waterlettuce can form large floating mats and cause many of the same problems associated with water hyacinth and giant salvinia, including reduced boating, fishing, hunting, and swimming access.

A complete list of fish, shellfish, and aquatic plants considered harmful or potentially harmful in Texas is found in Appendix C. Currently, no state agency has the legislative authority to regulate other organisms such as amphibians, reptiles, mammals, and waterfowl Therefore, no comprehensive list of invasive amphibians, reptiles, etc., exists for Texas. Section 5A1f of the Management Options section of this plan is designed to help alleviate this problem

The Aquatic Vegetation Management Plan is found in Appendix E. A guidance document for aquatic vegetation management in Texas was developed in conjunction with the Plan and contains information about the use of biological, chemical, and physical control of aquatic vegetation. See web pages below.

http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_pl_t3200_1066_1.pdf
http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_pl_t3200_1066_2.pdf

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PATHWAYS OF NON-NATIVE AQUATIC INTRODUCTIONS

Major pathways through which non-native species are introduced into aquatic environments (not listed in priority order) include:

Aquaculture and pet trade: Historically, it has been assumed that a primary path for both intentional and unintentional introductions of exotic fishes and freshwater mollusks has been the pet trade and the aquaculture industry. Lachner et al. (1970) reported over 6,000 species of tropical freshwater fish alone had been recognized as of possible interest to aquarium trade. That number only increases when one takes into account mollusks, crustaceans, and marine fishes as well. Wholesale importers, culture facilities, and retail pet stores raise, transport, and sell non-native fresh and salt water plants, fish, and invertebrates. The intentional and unintentional release or escape of species into the wild through the industry and aquarium hobbyist has led to numerous introductions. More recently, improved shipping and maintenance methods have expanded the number and kinds of species available to hobbyists. Internet sales have increased availability, but confounded tracking of exotic species.

Biological control: Selected non-native species, usually target predators, have been intentionally introduced to control the growth and spread of other introduced species. History shows that achieving good biological control of unwanted organisms is difficult. For example, introducing grass carp to control unwanted aquatic vegetation in inland water bodies can result in the reduction or elimination of native plant species if inappropriate stocking rates are used.

Ballast water and hull-fouling: Ballast discharge and hull fouling are two ways in which boats and ships can introduce organisms into new habitats. Ballast water can contain aquatic plants, animals and pathogens. Marine vessels take on and discharge millions of tons of ballast water daily in ports and harbors around the world. It is estimated that 3,000 species of animals and plants are transported daily around the world in ballast water (National Research Council 1996). The discharge of ballast water is considered a major pathway for aquatic introductions because of the huge volume of water carried as ballast. As of 2009 the Port of Houston had been ranked first in the nation in foreign tonnage for 14 consecutive years (Port of Houston 2010).

Offshore platforms and rigs: As a cost effective measure, petroleum companies reuse jack up rigs, drilling rigs and various platforms. These structures are typically stationary long enough to establish mature reef ecosystems representing a complete food web from sessile encrusting animals to top predators. As the structures are towed from location to location, the rate of movement is slow enough to permit the entire animal community to follow the rig to its new location and establish themselves in a new area. There is no reason to believe these animals would be incapable of reproducing and potentially becoming invasive.

Boats: Recreational boats can be a major pathway for the introduction of ANS in freshwater. ANS such as hydrilla, giant salvinia, and zebra mussels can survive for long periods of time on boat trailers and hulls, as well as in live wells used by anglers.

Channels, canals, locks: Depending on the species in question, channels, canals, and locks create artificial connections between waterways, allowing the free movement of species across physical barriers. Additionally, they can also facilitate the transport of species by recreational boats and larger vessels. Alternatively, these structures may help slow the spread of other species. Consideration should be given to ANS dispersal when construction or removal of these types of structures is planned.

Interbasin water transfer: Transferring water from one river basin to another provides the opportunity for non-native species to expand their distribution. Transporting water from Lake Texoma (Red River Basin) through Sister Grove Creek (Trinity River Basin) to Lake Lavon resulted in the recent spread of zebra mussels in Texas.

Live bait: Commercially-sold live worms, minnows and other aquatic organisms for the recreational fishing industry can result in unwanted introductions. For example, species formerly used as bait such as sheepshead minnows (*Cyprinodon variegatus)* have devastated natural pupfish populations. At times even packing material may harbor ANS and result in introductions through unintentional release.

Nursery industry: Nurseries, garden centers and mail-order catalogs sell non-native plants for aquatic gardens and ponds. Some nurseries have been found selling many species of non-native aquatic plants including giant salvinia, hydrilla, water hyacinth, and water lettuce. Non-native plants purchased through these outlets are in some cases intentionally discarded in public waterways. It is possible that species sold and placed in private ponds may be introduced into public waters after excessive rain and flooding events. Additionally, non-native plants accidentally attached to horticultural species can be discarded and introduced into the environment unintentionally or intentionally.

Scientific research institutions, schools, and public aquariums: Private and public research laboratories, schools, and public aquariums use non-native species for testing, teaching, and research. Although Texas requires a research permit for species listed as "harmful or potentially harmful", individuals who do not follow strict protocols may nevertheless accidentally release specimens. Accidental release may also occur when those protocols do not exist, as with unlisted species.

Recreational fisheries enhancement: Although the practice of federal and state agencies importing exotic game fish to enhance recreational fishing has largely gone by the wayside, the results of such activity often remains. Additionally, in some cases there were accidental releases of other exotic species during the stocking processes that are still present in state waters. Private citizens have also transported and released their favorite fish, shellfish, or aquatic plant species into a body of water, hoping a viable population will develop. For example, there has been evidence for many years that some private

citizens have introduced hydrilla into lakes to "help" enhance fisheries production and catch rate in various Texas waters.

Restaurants, seafood retail, and processing: Shipments of live seafood provide an opportunity for species introductions when individuals improperly dispose of unused product, packing materials (such as seaweed and salt water), and shipping containers. Associated live organisms either in or on the product may pose an additional threat. For example, live non-native oysters, even if they are properly handled, may harbor a number of attached non-native species on their shells. Improperly discarded shells could provide a pathway for the introduction of new species. Snakeheads that were found in Maryland waters and drew national attention in recent years were originally imported for human consumption. One man releasing these fish in a single pond cost the state of Maryland over three-quarters of a million dollars. In 2003, TPWD discovered an industry near Houston producing water spinach (*Ipomoea aquatica*), which is a prohibited species in Texas, for the Asian food market. After a thorough risk analysis and evaluation in 2009 it was determined that water spinach posed a very low environmental risk in Texas. Producers may now grow and sell water spinach with a permit, and it may be possessed for personal consumption.

GOALS, STRATEGIES, AND ACTIONS

GOAL 1:

Coordinate all aquatic nuisance species management activities within Texas and collaborate with regional programs such as the Gulf and South Atlantic States Regional Panel, the Mississippi River Basin Regional Panel, and the Western Regional Panel, as well as national and international programs.

1A. Problem: ANS oversight responsibilities are primarily assigned to one agency, Texas Parks and Wildlife Department. However, management activities may be conducted by a wide range of federal, state, and local entities.

1A1. Strategic Action: Coordinate ANS management programs and actions within Texas and ensure coordination with regional, national and international programs.

1A1a. Task: Participate in a legislatively supported inter-departmental Texas Invasive Species Coordinating Committee (TISCC) to foster cooperation and coordination on ANS tasks. The committee will include representatives from the state agencies most affected by ANS. Agencies that are currently members include:

Texas Parks and Wildlife Department (TPWD)
Texas Department of Agriculture (TDA)
Texas AgriLife Extension Service (TAES)
Texas State Soil and Water Conservation Board (TSSWCB)
Texas Forest Service (TFS)
Texas Water Development Board (TWDB)

Other interested federal, state, and local government entities and stakeholder groups will be included as members of an Advisory Committee. An ANS coordinator position will work on behalf of TISCC.

1A1b. Task: TPWD will continue to actively participate in the Gulf and South Atlantic States Regional Panel, the Mississippi River Basin Regional Panel, and the Western Regional Panel of the ANS Task Force.

GOAL 2:

Prevent the introduction of new ANS into Texas waters.

Education, a primary component of prevention, is separately addressed as Goal 4.

2A. Problem: New introductions of ANS into Texas waters can cause ecological and economic damage. Prevention is the most cost effective and ecologically sensitive method of preventing such problems. It is far less costly to prevent introductions of ANS organisms than to eliminate them (if possible) once established

2A1. Strategic Action: Coordinate with other states, non-governmental organizations (NGO's), and Mexico to prevent the spread of ANS into Texas.

2A1a. Task: Continue to implement and modify as appropriate the State Aquatic Vegetation Management Plan (Appendix E), and develop a management plan for animal ANS.

2A1b. Task: Participate in implementation of national management plans such as those developed for green crabs and mitten crabs, as well as implementation of guidelines developed in the report entitled *Generic Nonindigenous Aquatic Organisms Risk Analysis Review Process* (RAM 1996).

2A1c. Task: Conduct a scientific risk assessment to determine the priority ranking for action on new ANS threats that may arise and to verify or make changes to initial subjective assessments of ANS risks.

2A1d. Task: Based on the outcome of the risk assessment, reevaluate priorities and refine or develop additional individual or multiple species action plans.

2A1e. Task: Facilitate participation in regional and national conferences to increase awareness of ANS issues by other state agencies.

2A1f. Task: Participate in the Gulf of Mexico Regional Panel, Mississippi River Basin Regional Panel, and the Western Regional Panel of the ANS Task Force.

2A1g. Task: Participate in the Gulf States Marine Fisheries Commission effort to coordinate and implement regional ANS activities.

2A1h. Task: Work with the Arizona Game and Fish Department, Louisiana Department of Wildlife and Fisheries, New Mexico Department of Game and Fish, Oklahoma Department of Wildlife Conservation and Mexico (if they are in agreement) to develop cooperative measures

designed to address concerns regarding intentional introductions of nonnative aquatic species in shared waters. In addition, TPWD will work with the International Boundary and Water Commission to address ANS issues in the Rio Grande.

2.A.1.i. Task: Continue to consult with appropriate federal agencies relative to invasive species issues and management such as United States Geological Survey (USGS), United States Department of Agriculture (USDA), United State Bureau of Reclamation (BOR), United States Fish and Wildlife Service (USFWS), and the United States Army Corps of Engineers (ACOE) individually, collectively when necessary, and through the ANS Task Force Regional Panels (2A1f above).

2A2. Strategic Action: Foster federal, state, and local coordination on ANS issues.

2A2a. Task: Communicate with maritime cargo vessel representatives, the National Oceanic and Atmospheric Administration, the Gulf of Mexico Fisheries Management Council, American Association of Port Authorities, U.S. Coast Guard and other interested groups to explore commercial shipping practices, such as ballast water exchange and ANS infested anchor chains to identify opportunities for preventing ANS introductions.

2A2b. Task: Work with state and federal agencies, and other affected parties such as marina operators and associations, private consultants, etc. to prioritize monitoring efforts and develop response protocols.

2A2c. Task: Review existing state laws and regulations to identify and provide information regarding gaps in statutes and rules that serve to protect State waters from aquatic nuisance species introductions.

2A3. Strategic Action: Prohibit, control, or permit the importation of nonnative aquatic species based on their invasive potential.

2A3a. Task: Review and update the current Harmful or Potentially Harmful Exotic Fish, Shellfish, and Aquatic Plants species list as appropriate.

2A3b. Task: Develop and implement, through the Aquatic Nuisance Species Management Plan, an annual process to: identify potential new threats to state waters; identify the threats associated with the spread of existing ANS, and assess the relative environmental risks associated with these threats.

2A4. Strategic Action: Increase enforcement and awareness of existing laws controlling the transport, propagation, sale, collection, possession, importation, purchase, cultivation, distribution, and introduction of ANS.

2A4a. Task: Continue current Game Warden training for ANS identification, laws, and regulations. Game Warden training will be expanded to include more frequent updates and/or workshops on ANS issues, as well as inclusion of state troopers, other commissioned police officers, and others such as park rangers, etc. whose duties may place them in a position to recognize new invaders or prohibited species and alert the proper authorities.

2A4b. Task: Work with Texas A&M University, TAES, and other state agencies to distribute information on ANS law to businesses that import aquatic organisms, including information on existing penalties for the intentional introduction of any nonnative species in Texas waters.

GOAL 3:

Detect, monitor, contain, manage, reduce, or eradicate populations of aquatic nuisance species as quickly as possible with a minimum of environmental impact.

3A. Problem: A number of potentially very damaging ANS are spreading closer to Texas waters. Continuous monitoring is necessary to reduce the possibility of new infestations as much as possible by allowing the most rapid response possible.

> 3A1. Strategic Action: TPWD already has an extensive aquatic species monitoring program in place including coastal resource surveys, commercial landing surveys, creel surveys, fish surveys, and habitat surveys. These programs will be continued and modified as appropriate to ensure the highest possible probability of invasive species early detection given available manpower and financial resources.
>
> > 3A1a. Task: Develop a GIS database to show the locations of ANS sightings and established populations in Texas. Obtain GIS maps developed in Louisiana, Oklahoma, New Mexico, and Mexico to provide additional information on threats and rates of spread of species in the Gulf of Mexico region.
> >
> > 3A1b. Continue to provide scientific cooperation and monitoring of the health of Texas bays and estuaries, including the sharing of historic data to NOAA's National Centers for Coastal Ocean Science.

3B. Problem: Small populations of ANS are most easily eradicated. The State Aquatic Vegetation Management Plan (31 Texas Administrative Code §§ 57.930-57.963) is designed for management, control, and/or eradication of nuisance aquatic plants. However, there are no current plans for rapid response to new exotic animal invasions.

> 3B1. Strategic Action: Develop rapid response plans for specific ANS known to be an eminent threat to Texas waters. The emergency response plans should address management/control options, permitting, funding, equipment, resources, staffing, and stakeholder input.
>
> > 3B1a. Task: Establish and administer an ANS Emergency Fund. These readily available funds would be used to finance a quick initial response to the introduction of an ANS. This fund will require a $100,000 commitment from federal sources and a combined $50,000-$100,000 commitment from state, local, and private organizations in Texas. Provide information regarding legislation to establish the fund if necessary.

GOAL 4:

Educate the public and appropriate resource user groups to the importance of preventing ANS introductions, and how the harmful impacts of ANS can be reduced.

4A. Problem: Accidental introductions occur through the actions of the public such as naively releasing nonnative aquarium plants and animals into natural waters. The current state of public awareness of ANS issues and laws is inadequate to address the problem.

4A1. Strategic Action: Continue to compile, develop and coordinate the dissemination of educational materials on ANS that will increase general public awareness of the ANS problem.

4A1a. Task: Develop a coordinated public education and communication plan for ANS. The plan will encompass all potential ongoing TPWD activities into which ANS education and communication can be incorporated, as well as activities of other cooperating state agencies.

4A1b. Task: Include ANS issues as a prominent part of the TPWD website including images and instructions on how to identify and report new ANS sightings. If possible, website information will include links to important ANS links such as:

http://haccp-nrm.org/, http://www.protectyourwaters.net/, http://aquaplant.tamu.edu, http://www.habitattitude.net/, http://www.texasinvasives.org/,

and others as appropriate.

4A1c. Task: Develop and include on the TPWD website GIS maps showing the locations of ANS sightings and established populations in Texas.

4A1d. Task: Revise and republish an aquatic plant identification manual for Texas, update existing material on fish and other aquatic animals, adapt materials from other states for Texas, and make use of existing online resources to enable residents as well as resource managers to identify non-native aquatic animal and plant species as well as common native species.

4A1e. Task: Facilitate the utilization of ANS information to be distributed to community watershed groups and provide training for volunteers to participate in monitoring programs.

4A1f. Task: Facilitate and continue partnerships with newspapers, television stations, radio stations, and other media outlets to reach a broad range of the public with ANS messages.

4A1g. Task: Include ANS text and graphics in as many state publications as appropriate, and develop a library of images and graphics for ready use.

4A1h. Task: Facilitate the use of classroom ready information and materials developed for kindergarten through twelfth grade education.

4A1i. Task: Facilitate the use of ANS educational materials that identify good practices for the pet trade that can be shared with retail and wholesale suppliers of aquarium fish, plants and supplies.

4A1j. Task: Develop a recognition program for the pet trade to acknowledge those with outstanding outreach programs and responsible ANS prevention policies.

4A2. Strategic Action: Develop and distribute educational material specifically for groups affected by ANS introductions and/or have the ability to observe introductions first-hand.

4A2a. Task: Provide training and identification materials to the aquaculture industry, and encourage industry personnel to report sightings of suspected ANS.

4A2b. Task: Encourage fishing groups, fishing and boating guides, anglers, naturalists, commercial fishermen, recreational boaters, aquarium enthusiasts, and other interested groups to monitor and report ANS occurrences, and provide them with information on how to recognize and dispose of ANS.

4B. Problem: Decision makers need to be aware of the threat of ANS to Texas' marine and freshwater resources so they can develop policies, direct agencies to develop ANS programs, and appropriate funds to carry out education, research, prevention, control, and management activities.

4B1. Strategic Action: TPWD will provide educational briefings on the threats and solutions to ANS invasions for decision makers when appropriate.

4B1a. Task: TPWD staff, including the ANS coordinator will provide educational briefing to state legislators and legislative staff, and to local elected officials and their staffs on the threat of ANS and potential solutions.

GOAL 5:

Identify relevant problems, develop and conduct research, and disseminate research results dealing with ANS that are identified as species of concern in Texas.

5A. Problem: More information is needed in order to develop effective prevention, management, and control programs, to create accurate education programs, and to weigh the relative risks of ANS invasions.

5A1. Strategic Action: Assess the risk of ANS introductions to human health, ecosystems, and the economy including outdoor recreation.

5A1a. Task: Utilizing current literature as well as new research results, examine the population dynamics, ecology, and impacts of current and potential invaders. Conduct risk assessments on selected ANS.

5A1b. Task: Characterize potential ANS by identifying and describing traits associated with successful, high-impact invaders, particularly those present in Gulf Coast estuaries, coastal regions, lakes, streams, and other aquatic habitats elsewhere in the south and southwestern U.S.

5A1c. Task: Characterize resources and habitats most sensitive to invasion in Texas.

5A1d. Task: Compile a list of experts with a broad knowledge of aquatic taxonomic groups that are capable of identifying current and potential ANS.

5A1e. Task: Maintain a database of ongoing ANS research efforts.

5A1f. Task: Continue to maintain a list of nonnative species known to occur in Texas waters and riparian areas.

5A1g. Task: Develop a process to disseminate new information about ANS to researchers and resource managers. Foster research relationships with such groups as Texas A&M University, Texas State University, University of Texas, the Galveston Bay Foundation, and the Gulf States Marine Fisheries Commission, among others, in order to improve data collection capability, and to coordinate research efforts.

5B. Problem: Many of the pathways by which ANS invasions occur are not well understood. Geographically-referenced data about the extent of ANS invasions and pathways of introduction are important in order to gain a better understanding of where ANS that are introduced into or near Texas might spread, and how fast it might happen.

These data will help in the development of strategies for eliminating ANS entry pathways.

5B1. Strategic Action: Develop baseline assessments.

5B1a. Task: Compile geographically-referenced maps of major human activities that affect aquatic resources, and compare with invasions of ANS. These comparisons should help highlight interactions among human activities, introduction pathways, and the establishment of ANS.

5B1b. Task: Compare and contrast ANS management and control strategies throughout the world for species of interest in Texas, and develop Best Management Practices for established populations or potential invasions of ANS.

GOAL 6:

Take appropriate steps to insure that federal and state rules and regulations sufficiently promote the prevention and control of ANS.

6A. Problem: As problems associated with ANS increase, regulatory authorities must adapt their management practices. Texas laws should be examined to ensure they are sufficient to provide for the development of an effective, coordinated, and funded state program that will guard against ANS invasions.

6A1. Strategic Action: Review laws for gaps and overlaps that govern ANS in Texas; compare those laws to other states' ANS laws; and provide information to improve the ability to protect Texas waters from the introduction and spread of ANS.

6A1a. Task: Engage a law student or legal professional to conduct a review of Texas' ANS law.

6A1b. Task: Identify the potential for improved coordination and new legislation necessary to strengthen ANS related statutes in Texas.

6A1c. Task: Review the compatibility of Texas statutes with federal laws, including the National Invasive Species Act.

6A1d. Task: Review and report on the potential development of Gulf Coast standards based on a review of the statutes in Gulf of Mexico states, and Mexico.

6A1e. Task: Monitor the reauthorization of the National Invasive Species Act, and work with the Texas Governor's Office and Congressional delegation as needed to ensure that interests in Texas are addressed.

EXISTING AUTHORITIES AND PROGRAMS

See Appendices B, C, D, E, H, and I

PRIORITIES FOR ACTION

Currently, the highest ANS priorities in Texas are invasive aquatic plant species that affect the availability, quality, and use of water, as well as the viability of other aquatic life. Invasive aquatic plant species cause significant problems and are easily transported from one water body to another on boat trailers, in live wells, on boat motors, etc. Examples of significant problems typically associated with invasive aquatic plant populations in Texas are: 1) clogged power plant intakes which can shut down power production; 2) increased resistance that impedes the flow of water for both agricultural and municipal use and exacerbates flood potential by increasing water channel drag; and 3) increased the danger to water enthusiasts who may become entangled in plant growth.

In an effort to mitigate the damage caused by invasive aquatic plants in Texas, governmental and non-governmental entities, as well as individual property owners spend millions of dollars collectively statewide each year on plant control. For example, over a million dollars was spent on Lake Conroe alone for vegetation control over a two-year period from 2006 to 2008.

Specific priorities to address the problems associated with invasive aquatic plants include: 1) educational campaigns; 2) increased enforcement of possession, sales, and transportation regulations; 3) continued management and control programs that include an Integrated Pest Management approach to the use of traditional techniques such as herbicide use, biological controls, physical removal, and environmental manipulation; and 4) establishment and management of native plant communities in order to reduce the availability of open niches that may be utilized by invasive exotic species.

Priorities to address problems associated with invasive aquatic animal species should focus on the prevention of invasive diseases and their animal vectors while improving the protection of native species. The West Nile virus is just one example of a disease transported through an exotic vector that has negatively impacted human health. While most aquatic animals cause damage by either out competing native species or through habitat alteration, some ANS, such as apple snails, are vectors for problematic parasites like the rat lungworm, which can infect humans. Such diseases are not always a significant threat to human health, but the likelihood of more aggressive infectious diseases should not be overlooked.

Ecological diversity can be significantly reduced by invading aquatic animal species. For example, the Asian tiger prawn could potentially reduce the penaeid shrimp, blue crab, and oyster populations through direct predation and the introduction of disease. Reductions in abundance to these native shrimp, crab, and oyster populations could lead to a collapse of commercial fisheries This collapse, in turn could lead to increase community related fiscal problems. The Asian tiger prawn has been collected in

Louisiana and is well suited to the temperature regime of the Texas coast. Invasions from lionfish, Australian jellyfish and multiple crayfish species could also result in ecological and economic impacts to Texas.

Specific priorities to address the threats associated with aquatic animal invaders are: 1) to educate the public about harmful exotic species; 2) enforce existing laws and regulations pertaining to invasive aquatic species and proactively limit newly identified threats (particularly those in neighboring water bodies); 3) create a mechanism for reporting exotic specimens; 4) continue to manage and control existing invasive animal population; 5) continue to proactively protect existing habitats to reduce the availability of exploitable niches; and 6) support research that yields new biological controls and control mechanisms for invasive aquatic animals.

IMPLEMENTATION TABLE

Goal 1

Coordinate all aquatic nuisance species management activities within Texas and collaborate with regional programs such as the Gulf and South Atlantic States Regional Panel, the Mississippi River Basin Regional Panel, and the Western Regional Panel, as well as national and international programs.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
1A1a	Create and fund an ANS coordinator position	TSSWCB	TSSWCB	ANSTF, TDA, TFS, TPWD, TWDB,	65	1	65	1	65	1
1A1b	Participate in the inter-departmental Texas Invasive Species Coordinating Committee (TISCC)	TSSWCB	TSSWCB	TCEQ, TDA, TFS, TPWD, TWDB,	10		10		10	
1A1c	Participate in appropriate ANS Regional Panel activities	ANSTF TPWD	TPWD	TPWD	3		3		3	

IMPLEMENTATION TABLE

Goal 2

Prevent the introduction of new ANS into Texas waters.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
2A1a	Continue to implement and modify as appropriate the State Aquatic Vegetation Management Plan	ANSTF	TPWD		1,600 (Based on the FY 2011 budget)		1,600		1,600	
2A1b	Participate in implementation of national management plans	TPWD	TPWD		1.5		2		2	
2A1c	Conduct a scientific risk assessment to determine the priority ranking for action on new ANS threats	ANSTF TPWD	TPWD		2		2		2	
2A1d	Based on risk assessment, reevaluate priorities and refine or develop additional individual or multiple species action plans	TPWD	TPWD	TDA, TISCC	5		5		5	
2A1e	Facilitate participation in regional and national conferences to increase awareness of ANS issues by other state agencies	TPWD	TPWD	TISCC	1		1		1.5	

IMPLEMENTATION TABLE

Goal 2 [Continued]

Prevent the introduction of new ANS into Texas waters.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
2A1f	Participate in the Gulf of Mexico Regional Panel, Mississippi River Basin Regional Panel, and the Western Regional Panel	ANSTF TPWD	TPWD	ANSTF	1		1.5		2	
2A1g	Participate in the Gulf States Marine Fisheries Commission effort to coordinate and implement regional ANS activities	TPWD	TPWD	GSMFC	1		1		1	
2A1h	Work with neighboring states and Mexico (through IBWC) to address introductions of nonnative aquatic species in shared waters	ANSTF TPWD	TPWD	Mexico, IBWC, LDWF, surrounding state agencies	100		110		120	
2A1i	Continue to consult with appropriate federal agencies relative to invasive species issues	TPWD	TPWD	ACOE, BOR, IBWC, FWS, USDA, etc.	1		1		1	

IMPLEMENTATION TABLE

Goal 2 [Continued]

Prevent the introduction of new ANS into Texas waters.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
2A2a	Communicate with all appropriate federal and state agencies, as well as industry organizations relative to ballast water exchange, hull fouling, anchor infestation, etc.	TPWD	TPWD	TPWD, TISCC	1		1		1	
2A2b	Prioritize monitoring efforts and develop response protocols in coordination with other agencies and organizations	TPWD	TPWD	TPWD, TDA, TISCC	3		2		2	
2A2c	Review existing state laws and regulations to identify and provide information regarding gaps	TPWD, TDA	TPWD	TISCC	1		1		1	
2A3a	Review and update current Harmful or Potentially Harmful Exotic Fish, Shellfish, and Aquatic Plants species list	TPWD, TDA	TPWD, TDA	TDA, TDA, TISCC	2		2		2	

IMPLEMENTATION TABLE

Goal 2 [Continued]

Prevent the introduction of new ANS into Texas waters.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
2A3b	Develop and implement a process to identify potential threats and assess the relative environmental risks	TPWD, TDA, TCEQ, TDH	TPWD	TISCC, TDH	10		15		15	
2A4a	Continue and expand current Game Warden training for ANS identification, laws and regulations	TPWD	TPWD	TISCC	3		3		3	
2A4b	Distribute information on ANS laws and penalties to businesses that import aquatic organisms	TPWD TDA	TPWD TDA	TPWD TDA	2		2		2	

IMPLEMENTATION TABLE

Goal 3

Detect, monitor, contain, manage, reduce or eradicate populations of aquatic nuisance species as quickly as possible with a minimum of environmental impact.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
3A1a	Develop a GIS database of ANS sightings and populations in Texas, and obtain GIS maps from surrounding states to provide additional information	TPWD	TPWD	TISCC	10		5		5	
3A1b	Provide scientific cooperation and monitoring of the health of Texas bays and estuaries, including the sharing of historic data to NOAA's National Centers for Coastal Ocean Science.	TPWD	TPWD	NCCOS	10		10		10	
3B1a	Work to establish an ANS Emergency Fund for initial response activities	Federal agencies, TPWD, local entities	TPWD, TISCC	Federal agencies, TISCC	30		30		30	

IMPLEMENTATION TABLE

Goal 4

Prevent the introduction of new ANS into Texas waters.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
4A1a	Develop an education and communication plan for ANS	ANSTF	TPWD		2		2		2	
4A1b	Include information about identification and reporting of ANS species on TPWD website	TPWD	TPWD		1		1		1	
4A1c	Include maps and population information on TPWD website	TPWD	TPWD	TIPPC	1		1		1	
4A1d	Revise and republish aquatic plant identification manuals for Texas.	TPWD	TPWD		10					
4A1e	Distribute ANS information to community groups and provide training for volunteers	TPWD	TPWD		5		5		5	

IMPLEMENTATION TABLE

Goal 4 [Continued]

Prevent the introduction of new ANS into Texas waters.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
4A1f	Facilitate and continue partnerships with media outlets	TPWD	TPWD	TISCC	1		1		1	
4A1g	Include ANS text in appropriate publications and develop a library of graphics for ready use	TPWD	TPWD	TISCC	1		1		1	
4A1h	Facilitate the utilization of classroom ready information material (K-12)	TPWD	TPWD	TISCC						
4A1i	Facilitate the utilization of ANS educational materials for the pet trade	TPWD	TPWD	TISCC	3		3		3	
4A1j	Develop a recognition program for pet trade outreach programs and policies	TPWD	TPWD	TISCC	1		1		1	
4A2a	Provide training to aquaculture companies and encourage them to report sightings of suspected ANS	TPWD	TPWD	TISCC	2		2		2	

IMPLEMENTATION TABLE

Goal 4 [Continued]

Educate the public and appropriate resource user groups to the importance of preventing ANS introductions, and how the harmful impacts of ANS can be reduced.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
4A2b	Encourage reporting ANS occurrences and recognition and disposal of ANS weeds	TPWD	TPWD	TISCC	5		5		5	
4B1a	Brief state legislators and local elected officials on ANS and potential solutions	TPWD, TDA, TCEQ, TDH	TPWD	TISCC, TDH	1		1		1	

IMPLEMENTATION TABLE

Goal 5

Identify relevant problems, develop and conduct research, and disseminate research results dealing with ANS that are identified as species of concern in Texas.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
5A1a	Examine the dynamics, ecology, and impacts of invaders, and assess their risk	TPWD TDA	TPWD TDA	TISCC members	25		25		25	
5A1b	Characterize potential ANS by traits associated with successful invaders	TPWD TDA	TPWD TDA	TISCC members						
5A1c	Characterize resources and habitats most sensitive to invasion in Texas	TPWD TDA	TPWD TDA	TISCC members						
5A1d	Compile a list of experts with knowledge of aquatic taxonomic groups	TISCC members	TISCC members	TISCC members	1		1		1	
5A1e	Maintain a database of on going ANS research efforts	TISCC members	TISCC members	TISCC members	1		1		1	
5A1f	Continue to maintain a list of nonnative species known to occur in Texas waters and riparian areas	TPWD TDA	TPWD TDA	TISCC members	1		1		1	

IMPLEMENTATION TABLE

Goal 5 [Continued]

Identify relevant problems, develop and conduct research, and disseminate research results dealing with ANS that are identified as species of concern in Texas.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
5A1g	Develop a process to disseminate ANS information to researchers and resource managers and to foster research relationships	TISCC members	TISCC members	TISCC members	1		1		1	
5B1a	Compile geographically referenced maps of major human activities that affect aquatic resources, and compare with invasions of ANS	TPWD TDA	TPWD TDA	TISCC members	10		10		10	
5B1b	Compare ANS management and control strategies for species of interest in Texas, and develop Best Management Practices for established populations or potential invasions of ANS	TPWD	TPWD	TISCC members	10		10		10	

IMPLEMENTATION TABLE

Goal 6

Take appropriate steps to insure that federal and state rules and regulations sufficiently promote the prevention and control of ANS.										
Tasks		**Funding source**	**Entity**	**Cooperating organization**	**Cost estimate $1,000s Year 1**	**FTE Y1**	**Cost estimate $1,000s Year 2**	**FTE Y2**	**Cost estimate $1,000s Year 3**	**FTE Y3**
Number	**Title**									
6A1a	Conduct a review of Texas' ANS law	TPWD, TDA	TPWD, TDA	TISCC members	2		2		2	
6A1b	Identify potential for improved coordination and new ANS legislation	TPWD, TDA, TISCC	TPWD, TDA, TISCC	TISCC members	1		1		1	
6A1c	Review compatibility of Texas statutes with federal laws	TPWD, TDA, TISCC	TPWD, TDA, TISCC	TISCC members	2		2		2	
6A1d	Review potential of Gulf Coast standards based on statutes in Gulf of Mexico states, and Mexico	TPWD	TPWD	Federal Agencies	2		2		2	
6A1e	Monitor the reauthorization of the NISA, and work with the Texas Governor's Office and Congressional delegation to ensure that Texas' interests are addressed	TPWD, TDA, TISCC	TPWD, TDA, TISCC	TPWD, TDA, TISCC	1		1		1	

FY 12 TASKS

- Hire ANS coordinator.
- Participate in the multi-agency Texas Invasive Species Coordinating Committee.
- Review the respective responsibilities of NGOs, state, federal, and regional entities, and develop coordination process.
- Develop a database that GIS maps can be built from to show the locations of ANS infestations.
- Develop a reporting system to receive information on suspected ANS.
- Develop a public education and communication plan.
- Provide educational briefings to state legislators, legislative staff, and locally elected officials.
- Develop, maintain, and publish a list of experts with a broad knowledge of aquatic taxonomic groups.
- Maintain a database of ongoing Gulf Coast and national ANS research efforts.
- Develop a process to inform researchers and resource managers of recent and emerging ANS information and research.
- Develop and implement new regulations in accordance with new legislative mandates.

FY 13 TASKS

- Increase Texas' capacity for addressing ANS issues.
- Coordinate ballast water management and treatment standards development.
- Develop individual and multiple species action plans for selected species.
- Develop an annual process to: identify potential new threats to state waters; identify the threats associated with the spread of existing ANS; assess the relative environmental risks associated with these threats; and report findings.
- TISCC subcommittees work with specific industry sectors to reduce ANS threats.
- Initiate a training program for state troopers and commissioned fish and game enforcement officers on ANS identification and laws and regulations.
- Develop ANS information to be distributed to community watershed groups.
- Implement a public education and communication program.
- Oversee research to:
    1. Publish a revised ANS identification manual for Texas.
    2. Characterize potential ANS by identifying and describing traits associated with successful high-impact invaders.
    3. Compile maps that illustrate major human activities and associated ANS invasions.
    4. Develop Best Management Practices for established ANS populations and potential invasions of in Texas.

PROGRAM MONITORING AND EVALUATION

ANS monitoring will be conducted by Inland and Coastal Divisions of TPWD, in cooperation with other federal, state, and local entities. Official TPWD monitoring programs that will be used to detect ANS are described in Appendix G.

TPWD, the state agency in Texas responsible for natural resource management, will review and approve all ANS management, monitoring, and control efforts in accordance with applicable laws and regulations. Additional input will be derived from TISCC.

An annual report will be prepared and disseminated, highlighting the progress of the Texas State Comprehensive Management Plan, and will include information about accomplished tasks, as well as new issues that may arise. The annual report will be made generally available.

GLOSSARY

Accidental introduction: Introduction of a non-indigenous species that occurs as a result of activities other than purposeful importation, transportation, or introduction, such as by the discharge into open waters of ballast water or water used to transport live fish, mollusks, or crustaceans for aquaculture or other purpose (often unknowing release of non-indigenous organisms without any specific purpose). Improper disposal (e.g., "aquarium dumping"), or similar releases is considered an intentional introduction, not an accidental introduction.[1]

Aquatic nuisance species (ANS): (1) any non-native aquatic organism that threatens the diversity, abundance, or ecological stability of native aquatic or riparian species, (2) any non-native aquatic organism that threatens the commercial, agricultural, aquaculture or recreational activities supported by a body of water, or that threatens human health and safety.

Ballast water: Any water and associated sediments used to adjust the trim and stability of a vessel.[1]

Biodiversity: The variability among living organisms and the environments to which they belong; including diversity at the genetic, species, population, and ecosystem levels.[1]

Biological control: The use of living organisms, such as predators, parasites, and pathogens, to control pest insects, weeds, or diseases.[1]

Coastal waters: All the salt water of this state (as defined in Texas Parks and Wildlife Code §65.3) including that portion of the Gulf of Mexico within the jurisdiction of the state extending nine nautical miles from the Gulf shoreline.

Control: Activities that eliminate or reduce the effects of ANS without being able to eradicate completely, develop means to adapt human activities and facilities to accommodate infestations, or prevent the spread of ANS from infested areas. Control may involve activities to protect native species likely to be adversely affected by ANS and restoration of native species or habitat.[1]

Environmentally sound: Methods or activities that minimize adverse impacts to the structure and function of an ecosystem and adverse effects on non-target organisms and ecosystems.

Eradicate: The act or process of eliminating an aquatic nuisance species.[1]

Established: When used in reference to a species, this term means occurring as a reproducing, self-sustaining population in an open ecosystem (i.e., in waters where the organisms are able to migrate or be transported to other waters).[1]

Exotic: A non-indigenous plant or wildlife resource not normally found in public water of this state. [APPENDIX C]

Fouling: Entanglement, clogging, or obstruction by an undesired organism that may threaten the diversity or abundance of native species or the ecological stability and/or uses of infested waters.[1]

Infestation: An invasive population that is living in and overrunning an ecosystem to an unwanted degree or harmful manner.[1]

Intentional introductions: The import or introduction of nonindigenous species into, or transport through, an area or ecosystem where it is not established in open waters for a specific purpose, such as fishery management. Includes introductions when the purpose of such import or transport is not direct introduction into an open ecosystem, such as improper disposal ("aquarium dumping"), or similar releases.[1]

Integrated Pest Management: The control of pests utilizing a practical, economical, and scientifically based combination of chemical, biological, mechanical or physical, and cultural control methods. Coordinated application of non-chemical control methods is emphasized in order to reduce or eliminate the need for pesticides. Integrated pest management is a balanced approach, which considers hazard to the environment, efficacy, costs, and vulnerability of the pest. It requires: (1) identification of acceptable thresholds of damage; (2) environmental monitoring; and (3) a carefully designed control program to limit damage from the pest to a predetermined acceptable level.[1]

Introduction: The transfer of an organism to an ecosystem outside the historic range of the species of which the organism is a member.[1]

Invasion: An infestation of an aquatic nuisance species.[1]

Invasive species: A nonindigenous or cryptogenic species that may threaten the diversity or abundance of native species or the ecological stability and/or uses of infested waters and, the introduction of which into an ecosystem may cause harm to the economy, environment, human health, recreation, or public welfare.[1]

Native species: A species within its natural range or natural zone of dispersal (i.e., within the range it could or would occupy without direct or indirect introduction and/or care by humans).[1]

Non-indigenous species: Any species or other viable biological organism that enters an ecosystem beyond its historic range.[1]

Nonnative: Any species introduced by man into an ecosystem outside its native range (includes exotic plus transplanted).[1]

Nuisance: See "Invasive". Editor's note: The term "nuisance" is used in early legislation and text regarding aquatic invasive species. Currently both "nuisance" and "invasive" are considered acceptable terminology.[1]

Parasite: An organism that grows, feeds, and is sheltered on or in a different organism while contributing nothing to the survival of its host.[1]

Pathogen: Any agent that causes disease in plants or animals; typically referring to microbes such as bacteria, viruses, or protozoan parasites.[1]

Pathway: The means by which aquatic species are transported between ecosystems.[1]

Population: All individuals of a single species within a defined habitat or geographic area.[1]

Prevention: Measures to minimize the risk of unintentional introductions of nonindigenous aquatic species that are, or could become, ANS into waters of the United States.[1]

Risk assessment: A science based process to evaluate the economic and/or environmental risk(s) of non-indigenous species.[1]

Species: A group of organisms all of which have high degree of physical and genetic similarity, can generally interbreed only among themselves, and show persistent differences from members of allied species. Species may include subspecies, populations, stocks, or other taxonomic classifications less than full species.[1]

Stakeholders: Any and all interested parties.[1]

Task Force: The Aquatic Nuisance Species Task Force established under section 1201 of NANPCA (1990).

Treatment: Mechanical, physical, chemical, biological, or other process or method of killing, removing, or rendering infertile, harmful organisms.[1]

Unintentional introduction: Any introduction of a non-indigenous aquatic species that occurs as the result of activities other than the purposeful or intentional introduction of the species involved. For example, the transport of nuisance non-indigenous species in ballast water, live wells, or in water used to transport fish, mollusks, or crustaceans for agriculture, aquaculture, fish management, or other purposes.

Vector: A biological pathway for a disease or parasite (i.e., an organism that transmits pathogens to various hosts). Not a synonym for "Pathway".[1]

Watershed: An entire drainage basin, including all its biotic and abiotic components.

[1]Adopted from "State of Hawaii Aquatic Invasive Species (AIS) Management Plan," September 2003.

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APPENDIX A. TEXAS AND ITS WATERWAYS

APPENDIX B. TEXAS PARKS AND WILDLIFE DEPARTMENT STATUTORY AUTHORITY

Texas Parks and Wildlife Code
Sections 66.007, 66.0071, 66.0072, 66.012

Sec. 66.007. EXOTIC HARMFUL OR POTENTIALLY HARMFUL FISH AND SHELLFISH.

(a) No person may import, possess, sell, or place into the public water of this state exotic harmful or potentially harmful fish or shellfish except as authorized by rule or permit issued by the department.

(b) The department shall publish a list of exotic fish and exotic shellfish for which a permit under Subsection (a) is required.

(c) The department shall make rules to carry out this section.

(d) A fish farmer may import, possess, or sell harmful or potentially harmful exotic fish species as provided by Section 134.020, Agriculture Code.

(e) In this section:

(1) "Exotic fish" means a nonindigenous fish that is not normally found in the public water of this state.

(2) "Exotic shellfish" means a nonindigenous shellfish that is not normally found in the public water of this state.

(3) "Public water" has the meaning assigned by Section 66.015.

(f) A fish farmer may not import, possess, propagate, or transport exotic shellfish unless the fish farmer furnishes evidence required by the department showing that the shellfish are free of disease.

(g) The commission may adopt rules to control a disease or agent of disease transmission that:

(1) may affect penaeid shrimp species; and

(2) has the potential to affect cultured species or other aquatic species.

(h) If one or more manifestations of disease is observed in any cultured marine penaeid shrimp species, the department shall immediately place the aquaculture facility under quarantine condition. The department shall determine, by rule, the meaning of "manifestation of disease" and "quarantine condition" under this section.

(i) The department may coordinate with the Texas Animal Health Commission regarding testing for diseases.

(j) Except as provided in Subsection (k), an operator of an aquaculture facility under quarantine condition may not discharge waste or another substance from the facility except with approval of the department and a wastewater discharge authorization from the Texas Commission on Environmental Quality.

(k) Even if under quarantine condition, an aquaculture facility shall discharge wastewater or another substance as necessary to comply with an emergency plan that has been submitted to and approved by the department and incorporated into a wastewater discharge authorization issued by the Texas Commission on Environmental Quality.

(l) On receiving notice from an owner of the observance of manifestations of disease, the department shall immediately:

(1) notify the Department of Agriculture, the Texas Commission on Environmental Quality, and the Texas Animal Health Commission; and

(2) advise the Department of Agriculture, the Texas Commission on Environmental Quality, and the Texas Animal Health Commission regarding the appropriate action to be taken.

Sec. 66.0071. REMOVAL OF HARMFUL AQUATIC PLANTS. On leaving any public or private body of water in this state, a person shall immediately remove and lawfully dispose of any exotic aquatic plant on the list of prohibited plants adopted under Section 66.0072 that is clinging or attached to the person's:

(1) vessel or watercraft; or

(2) trailer, motor vehicle, or other mobile device used to transport or launch a vessel or watercraft.

Sec. 66.0072. EXOTIC HARMFUL OR POTENTIALLY HARMFUL AQUATIC PLANTS.

(a) In this section:

(1) "Exotic aquatic plant" means a nonindigenous aquatic plant that is not normally found in the public water of this state.

(2) "Public water" has the meaning assigned by Section 66.015.

(b) A person may not import, possess, sell, or place into the public water of this state an exotic harmful or potentially harmful aquatic plant except as authorized by commission rule or a permit issued by the department.

(c) The commission by rule shall adopt a list of exotic aquatic plants that may not be imported into or possessed in this state without a permit.

(d) The commission may enact an emergency rule as provided by Chapter 2001, Government Code, to add an exotic aquatic plant to the list of prohibited plants if the plant is determined to be harmful or potentially harmful.

(e) This section does not apply to any microalgae imported, possessed, used, or sold for biofuel, academic, or research and development purposes. The department shall consult with the Department of Agriculture as necessary to administer this section and may not adopt rules or permits for microalgae imported, possessed, used, or sold for biofuel, academic, or research and development purposes without written approval from the Department of Agriculture of the rules or permits.

(f) The commission shall adopt rules to implement this section.

Sec. 66.012. PENALTIES.

(a) Except as otherwise provided by this section, a person who violates a provision of this subchapter or a rule adopted by the commission under this subchapter commits an offense that is a Class C Parks and Wildlife Code misdemeanor.

(b) A person who violates Section 66.003, 66.004, 66.005, 66.006(c), 66.009, 66.015, 66.021, or 66.0091 of this code commits an offense that is a Class B Parks and Wildlife Code misdemeanor.

(c) An offense under Section 66.004, 66.006(c), or 66.015 is a Class A Parks and Wildlife Code misdemeanor if it is shown at the trial of a person for the offense that the person has been previously convicted one time of a violation of the same section.

(d) An offense under Section 66.004 or 66.015 is a Parks and Wildlife Code felony if it is shown at the trial of a person for the offense that the person has been previously convicted two or more times of a violation of the same section.

(e) An offense under Section 66.007, 66.0072, 66.020(f), or 66.020(g) or a proclamation adopted by the commission under those sections is a Class B Parks and Wildlife Code misdemeanor if it is shown at the trial of a person for the offense that the person has been previously convicted one time of a violation of the same section.

(f) An offense under Section 66.007, 66.0072, 66.020(f), or 66.020(g) or a proclamation adopted by the commission under those sections is a Class A Parks and Wildlife Code misdemeanor if it is shown at the trial of a person for the offense that the person has been previously convicted two or more times of a violation of the same section.

APPENDIX C. EXOTIC SPECIES RULES

TEXAS ADMINISTRATIVE CODE
Title 31 NATURAL RESOURCES AND CONSERVATION
Part 2 TEXAS PARKS AND WILDLIFE DEPARTMENT
Chapter 57 FISHERIES
Subchapter A HARMFUL OR POTENTIALLY HARMFUL EXOTIC FISH, SHELLFISH AND AQUATIC PLANTS

[Except as stated in source note all regulations were adopted December 2006 or earlier.]

RULE §57.111 DEFINITIONS

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

(1) Aquaculture or fish farming--The business of producing and selling cultured species raised in private facilities.

(2) Aquaculturist or fish farmer--Any person engaged in aquaculture.

(3) Aquaculture facility--The property, including all drainage ditches and private facilities where cultured species are produced, held, propagated, transported or sold.

(4) Aquaculture complex--A group of two or more separately owned aquaculture facilities located at a common site and sharing privately owned water diversion or drainage structures.

(5) Beheaded--The complete detachment of the head (that portion of the fish from the gills to the nose) from the body.

(6) Certified Inspector--An employee of the Texas Parks and Wildlife Department who has satisfactorily completed a department approved course in clinical analysis of shellfish.

(7) Cultured species--Aquatic plants or wildlife resources raised under conditions where at least a portion of their life cycle is controlled by an aquaculturist.

(8) Clinical Analysis Checklist--A TPWD form specifying sampling protocols and listing certain characteristics which may constitute manifestations of disease.

(9) Department--The Texas Parks and Wildlife Department or a designated employee of the department.

(10) Director--The executive director of the Texas Parks and Wildlife Department.

(11) Disease--Contagious pathogens or injurious parasites which may be a threat to the health of natural populations of aquatic organisms.

(12) Disease-Free--A status, based on the results of an examination conducted by a department approved shellfish disease specialist that certifies a group of aquatic organisms as being free of disease.

(13) Exotic species--A nonindigenous plant or wildlife resource not normally found in public water of this state.

(14) Grass carp--The species Ctenopharyngodon idella.

(15) Gutted--The complete removal of all internal organs and entrails.

(16) Harmful or potentially harmful exotic fish--

(A) Lampreys Family: Petromyzontidae--all species except Ichthyomyzon castaneus and I. gagei;

(B) Freshwater Stingrays Family: Potamotrygonidae--all species;

(C) Arapaima Family: Osteoglossidae--Arapaima gigas;

(D) South American Pike Characoids Family: Characidae--all species of genus Acestrorhyncus;

(E) African Tiger Fishes Family, Subfamily Alestiidae: Hydrocyninae--all species of genus Hydrocynus;

(F) Piranhas and Pirambebas: Family Serrasalmideae, Subfamily: Serrasalminae--all species except pacus of the genus Piaractus;

(G) Payara and other wolf or vampire tetras: Family Characidae, Subfamily: Rhaphiodontinae--all species of genera Hydrolycus and Rhaphiodon, including Cynodon;

(H) Dourados: Family Characidae, Subfamily: Bryconinae--all species of genus Salminus;

(I) South American Tiger Fishes Family: Erythrinidae--all species;

(J) South American Pike Characoids Family: Ctenolucidae--all species of genera Ctenolucius and Boulengerella, including Luciocharax and Hydrocinus;

(K) African Pike Characoids Families: Hepsetidae and Ichthyboridae--all species;

(L) Electric Eels Family: Electrophoridae--Electrophorus electricus;

(M) Carps and Minnows Family: Cyprinidae--all species and hybrids of species of genera: Aspius, Pseudoaspius, Aspiolucius (Asps); Abramis, Blicca, Megalobrama, Parabramis (Old World Breams); Hypophthalmichthys or Aristichthys (Bighead Carp); Mylopharyngodon (Black Carp); Ctenopharyngodon (Grass Carp); Cirrhinus (Mud Carp); Thynnichthys (Sandkhol Carp); Hypophthalmichthys (Silver Carp); Catla (Catla); Leuciscus (Old World Chubs, Ide, Orfe, Daces); Tor, including the species Barbus hexiglonolepsis (Giant Barbs and Mahseers); Rutilus (Roaches); Scardinius (Rudds); Elopichthys (Yellowcheek); Catlocarpio (Giant Siamese Carp); all species of the genus Labeo (Labeos) except Labeo chrysophekadion (Black SharkMinnow);

(N) Walking Catfishes Family: Clariidae--all species;

(O) Electric Catfishes Family: Malapteruridae--all species;

(P) South American Parasitic Candiru Catfishes Subfamilies: Stegophilinae and Vandelliinae--all species;

(Q) Pike Killifish Family: Poeciliidae--Belonesox belizanus;

(R) Marine Stonefishes Family: Synanceiidae--all species;

(S) Tilapia Family: Cichlidae--all species of genera Tilapia, Oreochromis and Saratherodon;

(T) Asian Pikeheads Family: Luciocephalidae--all species;

(U) Snakeheads Family: Channidae--all species;

(V) Old World Pike-Perches Family: Percidae--all species of the genus Sander except Sander vitreum;

(W) Nile Perch Family: Centropomidae (also called Latidae)--all species of genera Lates and Luciolates;

(X) Seatrouts and Corvinas Family: Sciaenidae--all species of genus Cynoscion except Cynoscion nebulosus, C. nothus, and C. arenarius;

(Y) Whale Catfishes Family: Cetopsidae--all species;

(Z) Ruffe Family: Percidae--all species of genus Gymnocephalus;

(AA) Air sac Catfishes Family: Heteropneustidae--all species;

(BB) Swamp Eels, Rice Eels or One-Gilled Eel Family: Synbranchidae--all species;

(CC) Freshwater Eels family: Anguilliidae--all species except Anguilla rostrata;

(DD) Round Gobies Family: Gobiidae--all species of genus Neogobius, including N. melanostoma.

(EE) Temperate Basses Family: Moronidae--all species except for Morone saxatilis, M. chrysops and M. mississippiensis and hybrids between these three species;

(FF) Temperate Perches Family: Percichthyidae--all species, including species of the genus Siniperca (Chinese perches).

(17) Harmful or potentially harmful exotic shellfish--

(A) Crayfishes Family: Parastacidae--all species;

(B) Mittencrabs Family: Grapsidae--all species of genus Eriocheir;

(C) Zebra Mussels Family: Dreissenidae--all species of genus Dreissena;

(D) Penaeid Shrimp Family: Penaeidae--all species of genera Penaeus, Litopenaeus, Farfantepenaeus, Fenneropenaeus, Marsupenaeus, and Melicertus (all previously considered Penaeus) except L. setiferus, Far. aztecus and Far. duorarum.

(E) Oyster Family: Ostreidae--all species except Crassostrea virginica and Ostrea equestris.

(F) Applesnails and Giant Rams-Horn Snail: all genera and species of the Family Ampullariidae (previously called Pilidae), including Pomacea and Marisa, except spiketop applesnail (Pomacea bridgesii).

(18) Harmful or potentially harmful exotic plants--

(A) Giant or Dotted Duckweed Family: Lemnaceae--Landolita punctata;

(B) Salvinia Family: Salviniaceae--all species of genus Salvinia;

(C) Water hyacinth Family: Pontederiaceae--Eichhornia crassipes (floating water hyacinth) and E. azurea (rooted water hyacinth);

(D) Waterlettuce Family: Araceae--Pistia stratiotes;

(E) Hydrilla Family: Hydrocharitaceae--Hydrilla verticillata;

(F) Lagarosiphon Family: Hydrocharitaceae--Lagarosiphon major;

(G) Eurasian Watermilfoil Family: Haloragaceae--Myriophyllum spicatum;

(H) Alligatorweed Family: Amaranthaceae--Alternanthera philoxeroides;

(I) Paperbark Family: Myrtaceae--Melaleuca quinquenervia;

(J) Torpedograss Family: Gramineae--Panicum repens;

(K) Water spinach (also called ong choy, rau mong and kangkong) Family: Convolvulaceae--Ipomoea aquatica.

(L) Ambulia--Limnophila sessiflora;

(M) Narrowleaf False Pickerelweed--Monochoria hastata;

(N) Heartshaped False Pickerelweed--Monochoria vaginalis;

(O) Duck-lettuce--Ottelia alismoides;

(P) Wetland Nightshade--Solanum tampicense;

(Q) Exotic Bur-reed--Sparganium erectum;

(R) Brazilian Peppertree--Schinus terebinthifolius;

(S) Purple Loosestrife--Lythrum salicaria.

(19) Harmful or potentially harmful exotic species exclusion zone--That part of the state that is both south of SH 21 and east of I-35, but not including Brazos County.

(20) Immediately--Without delay; with no intervening span of time.

(21) Manifestations of disease--Manifestations of disease include, but are not limited to, one or more of the following: heavy or unusual predator activity, empty guts, emaciation, rostral deformity, digestive gland atrophy or necrosis, gross pathology of shell or underlying skin typical of viral infection, fragile or atypically soft shell, gill fouling, or gill discoloration.

(22) Nauplius or nauplii--A larval crustacean having no trunk segmentation and only three pairs of appendages.

(23) Operator--The person responsible for the overall operation of a wastewater treatment facility.

(24) Place of business--A permanent structure on land where aquatic products or orders for aquatic products are received or where aquatic products are sold or purchased.

(25) Post-larvae--A juvenile crustacean having acquired a full complement of functional appendages.

(26) Private facility--A pond, tank, cage, or other structure capable of holding cultured species in confinement wholly within or on private land or water, or within or on permitted public land or water.

(27) Private facility effluent--Any and all water which has been used in aquaculture activities.

(28) Private pond--A pond, tank, lake, or other structure capable of holding cultured species in confinement wholly within or on private land.

(29) Public aquarium--An American Association of Zoological Parks and Aquariums accredited facility for the care and exhibition of aquatic plants and animals.

(30) Public waters--Bays, estuaries, and water of the Gulf of Mexico within the jurisdiction of the state, and the rivers, streams, creeks, bayous, reservoirs, lakes, and portions of those waters where public access is available without discrimination.

(31) Quarantine condition--Confinement of exotic shellfish such that neither the shellfish nor the water in which they are or were maintained comes into contact with water in the state and with other fish and/or shellfish.

(32) Shellfish disease specialist--A person with a degree in veterinary medicine or a Ph.D. who specializes in disease of shellfish.

(33) Triploid grass or black carp--A grass carp (Ctenopharyngodon idella) or black carp (Mylophryngodon piceus) that has been certified by the United States Fish and Wildlife Service as having 72 chromosomes and as being functionally sterile.

(34) Waste--Waste shall have the same meaning as in Chapter 26, §26.001(6) of the Texas Water Code.

(35) Water in the state--Water in the state shall have the same meaning as in Chapter 26, §26.001(5) of the Texas Water Code.

(36) Wastewater treatment facility--All contiguous land and fixtures, structures or appurtenances used for treating wastewater pursuant to a valid permit issued by the Texas Commission on Environmental Quality.

Source Note: The provisions of this §57.111 adopted to be effective January 2, 1997, 21 TexReg 12414; amended to be effective December 29, 1997, 22 TexReg 12535; amended to be effective June 21, 1998, 23 TexReg 6507; amended to be effective July 19, 2000, 25 TexReg 6772; amended to be effective April 30, 2001, 26 TexReg 3219; amended to be effective June 29, 2005, 30 TexReg 3728; amended to be effective May 14, 2007, 32 TexReg 2665

RULE §57.112 GENERAL RULES

(a) Scientific reclassification or change in nomenclature of taxa at any level in taxonomic hierarchy will not, in and of itself, result in redefinition of a harmful or potentially harmful exotic species.

(b) Except as provided in §57.113 of this title (relating to Exceptions), it is an offense for any person to release into public waters, import, sell, purchase, transport, propagate, or possess any species, hybrid of a species, subspecies, eggs, seeds, or any part of any species defined as a harmful or potentially harmful exotic fish, shellfish, or aquatic plant.

(c) Except as specifically authorized in writing by the department, it is an offense for anyone to remove a live grass carp from public waters where grass carp have been introduced under a permit issued by the department.

(d) Violation of any provision of a permit issued under these rules is a violation of these rules.

Source Note: The provisions of this §57.112 adopted to be effective January 2, 1997, 21 TexReg 12414; amended to be effective May 26, 2008, 33 TexReg 4183

RULE §57.113 EXCEPTIONS

(a) A person who holds a valid Exotic Species Permit issued by the department may possess, propagate, sell and transport to the permittee's private facilities exotic harmful or potentially harmful fish, shellfish and aquatic plants only as authorized in the permit provided the harmful or potentially harmful exotic species are to be used exclusively:

(1) as experimental organisms in a department approved research program; or

(2) for exhibit in a public aquarium approved for display of harmful or potentially harmful exotic fish, shellfish and aquatic plants.

(b) A person may possess exotic harmful or potentially harmful fish or shellfish, exclusive of grass carp, without a permit, if the fish or shellfish have been gutted, or in the case of oysters, if the oysters have been shucked or otherwise removed from their shells.

(c) A person may possess grass carp harvested from public waters that have not been permitted for triploid grass carp, without a permit, if the grass carp have been gutted.

(d) A person who holds a valid exotic species permit issued by the department may possess, propagate, transport or sell water spinach, triploid grass carp, bighead carp, blue tilapia (Oreochromis aureusa), Mozambique tilapia (O. mossambica), Nile tilapia (O. nilotocusa), or hybrids between the three tilapia species, unless otherwise provided by conditions of the permit or these rules.

(e) An aquaculturist who holds a valid exotic species permit issued by the department may possess, propagate, transport, or sell Pacific white shrimp (Litopenaeus vannamei) provided the exotic shellfish meet disease free certification requirements listed in §57.114 of this title (relating to Health Certification of Exotic Shellfish) and as provided by conditions of the permit and these rules.

(f) An operator of a wastewater treatment facility in possession of a valid exotic species permit issued by the department may possess and transport permitted exotic species to their facility only for the purpose of wastewater treatment.

(g) A person may possess Mozambique tilapia in a private pond or private facility subject to compliance with §57.116(d) of this title (relating to Exotic Species Transport Invoice).

(h) The holder of a valid triploid grass carp permit issued by the department may possess triploid grass carp as provided by conditions of the permit and these rules.

(i) A licensed retail or wholesale fish dealer is not required to have an exotic species permit to purchase or possess:

(1) live individuals of triploid grass carp, bighead carp, blue tilapia, Mozambique tilapia, Nile tilapia or hybrids of those species held in the place of business, unless the retail or wholesale fish dealer propagates one or more of these species. However, such a

dealer may sell or deliver these species to another person only if the fish have been gutted or beheaded; or

(2) Live Pacific white shrimp (Litopenaeus vannamei) held in the place of business if the place of business is not located within the exclusion zone described in §57.111 of this title (relating to Definitions). However, such a dealer may only sell or deliver this species to another person if the shrimp are dead and packaged on ice or frozen.

(j) The department is authorized to stock triploid grass carp into public waters in situations where the department has determined that there is a legitimate need, and when stocking will not affect threatened or endangered species, coastal wetlands, or specific management objectives for other important species.

(k) An aquaculturist who holds a valid exotic species permit issued by the department may possess, propagate, transport and sell Pacific blue shrimp (Litopenaeus stylirostris) provided the exotic shellfish are cultured under quarantine conditions in private facilities located outside the harmful or potentially harmful exotic species exclusion zone, and meet disease free certification requirements listed in §57.114 of this title (relating to Health Certification of Exotic Shellfish) and as provided by conditions of the permit and these rules.

(l) A person operating a mechanical plant harvester in accordance with the provisions of a valid exotic species permit issued by the department may remove and dispose of prohibited plant species from public or private waters only by means authorized in the permit.

(m) Any person may possess water spinach for personal consumption.

Source Note: The provisions of this §57.113 adopted to be effective January 2, 1997, 21 TexReg 12414; amended to be effective December 29, 1997, 22 TexReg 12535; amended to be effective June 21, 1998, 23 TexReg 6507; amended to be effective July 19, 2000, 25 TexReg 6772; amended to be effective April 30, 2001, 26 TexReg 3219; amended to be effective June 29, 2005, 30 TexReg 3728; amended to be effective May 14, 2007, 32 TexReg 2665; amended to be effective May 26, 2008, 33 TexReg 4183

RULE §57.114 HEALTH CERTIFICATION OF EXOTIC SHELLFISH

(a) All disease free certification of harmful or potentially harmful exotic shellfish must be conducted by a shellfish disease specialist approved by the department.

(b) Any person importing live harmful or potentially harmful exotic shellfish from facilities outside the state must prior to importation:

(1) provide documentation to the department that the harmful or potentially harmful exotic shellfish to be imported have been inspected and certified as disease-free by a department-approved shellfish disease specialist; and

(2) receive acknowledgment from the department that the requirements of paragraph (1) of this subsection have been met.

(c) Any person in possession of harmful or potentially harmful exotic shellfish for the purpose of production of post-larvae must provide to the department monthly certification that nauplii and post-larvae have been examined and are certified to be disease-free. If certification cannot be provided, the harmful or potentially harmful exotic shellfish must be maintained in quarantine condition until the department acknowledges in writing that the stock is disease-free or specifies in writing condition(s) under which the quarantine can be removed.

(d) Any person in possession of harmful or potentially harmful exotic shellfish stocks who observes one or more of the manifestations of disease appearing on the clinical analysis checklist provided by the department shall:

(1) immediately place the entire facility under quarantine condition, immediately notify the department and immediately request an inspection from a certified inspector; or

(2) immediately place the entire facility under quarantine condition, immediately notify the department and immediately submit samples of the affected harmful or potentially harmful exotic shellfish to a department approved shellfish disease specialist for analysis. Results of such analyses shall be forwarded to the department immediately upon receipt.

(e) Upon receiving a request from a permit holder under subsection (d)(1) of this section, the certified inspector shall inspect the private facility, complete the clinical analysis checklist provided by the department, and submit copies of the checklist to the department and the permit holder.

(f) No more than 14 days prior to harvesting ponds or discharging any waste into or adjacent to water in the state, the permittee shall:

(1) have a certified inspector visit the facility and examine samples of the shellfish from each pond or other structure from which waste will be discharged or from which harmful or potentially harmful exotic shellfish will be harvested or from any other pond or structure that in the opinion of the certified inspector requires further investigation and shall submit the results of the examination to the department on the clinical analysis checklist; or

(2) submit samples of the harmful or potentially harmful exotic shellfish from each pond or other structure containing such shellfish to a department approved shellfish disease specialist for analysis no more than 14 days prior to the first discharge or harvest and submit the results of such analyses to the department immediately upon receipt.

(g) If the results of an inspection performed under subsection (f)(1) of this section indicate the presence of one or more manifestations of disease, the permittee shall immediately place the entire facility under quarantine condition and immediately submit samples of the harmful or potentially harmful exotic shellfish from the affected portion(s) of the facility to a department approved shellfish disease specialist for analysis. Results of such analyses shall be forwarded to the department immediately upon receipt.

(h) If the results of analyses performed under subsection (f)(2) of this section indicate the presence of disease, the permittee shall immediately place the entire facility under quarantine condition.
(i) If the results of inspections or analyses of harmful or potentially harmful exotic shellfish from a private facility quarantined under subsections (d), (g) or (h) of this section indicate the presence of disease, the facility shall remain under quarantine condition until the department removes the quarantine condition in writing or authorizes in writing other actions deemed appropriate by the department based on the required analyses.
(j) If the results of inspections or analyses performed under subsection (f) of this section indicate the absence of any manifestations of disease, the permittee may begin discharging from the facility.
Source Note: The provisions of this §57.114 adopted to be effective January 2, 1997, 21 TexReg 12414; amended to be effective December 29, 1997, 22 TexReg 12535; amended to be effective June 21, 1998, 23 TexReg 6507; amended to be effective June 29, 2005, 30 TexReg 3728; amended to be effective December 26, 2006, 31 TexReg 10340

RULE §57.115 TRANSPORTATION OF LIVE EXOTIC SPECIES
(a) Transport of live harmful or potentially harmful exotic species is prohibited except by:
(1) An aquaculturist in possession of a valid exotic species permit and an exotic species transport invoice;
(2) a commercial shipper acting for the permit holder in possession of an exotic species transport invoice; or
(3) persons holding harmful or potentially harmful exotic species pursuant to limitations of §57.113 of this title (relating to Exceptions).
(b) An aquaculturist transporting live triploid grass or black carp must have sales invoices which account for all triploid grass or black carp being transported and a copy of the United States Fish and Wildlife Service certification declaring that the carp being transported have been certified as being triploid in addition to meeting requirements of Chapter 134 of the Agriculture Code.
Source Note: The provisions of this §57.115 adopted to be effective January 2, 1997, 21 TexReg 12414; amended to be effective April 30, 2001, 26 TexReg 3219; amended to be effective December 26, 2006, 31 TexReg 10340

RULE §57.116 EXOTIC SPECIES TRANSPORT INVOICE
(a) An exotic species transport invoice shall contain all the following information correctly stated and legibly written: invoice number; date of shipment; name, address, and phone number of the shipper; name, address, and phone number of the receiver; fish farmer's Aquaculture license number and exotic species permit number, if applicable;

number and total weight of each harmful or potentially harmful exotic species; a check mark indicating interstate import, interstate export, or intrastate type of shipment. A completed invoice shall accompany each shipment of harmful or potentially harmful exotic species sold or transferred, and shall be sequentially numbered during the permit period; no invoice number shall be used more than once during any one permit period by the permittee.

(b) The exotic species transport invoice shall be provided by the permittee; one copy shall be retained by the permittee for a period of at least one year following shipping date and one copy shall be forwarded to the department's Exotic Species Program Leader.

(c) The permittee is responsible for supplying completed copies of the exotic species transport invoice to out-of-state dealers from which the permittee has purchased and or received harmful or potentially harmful exotic species, or to whom harmful or potentially harmful exotic species are transferred so that shipment will be properly marked and numbered upon delivery to the permittee in Texas.

(d) Owners, or their agents, of private ponds stocked with Mozambique tilapia or triploid grass carp by an Exotic Species Permit holder shall retain a copy of the Exotic Species Transport Invoice for a period of one year after the stocking date or as long as the tilapia or triploid grass carp are in the water, whichever is longer.

RULE §57.117 EXOTIC SPECIES PERMIT: FEE AND APPLICATION REQUIREMENTS

(a) The department shall charge a nonrefundable exotic species permit application fee as follows:

(1) application for new, renewed, or amended exotic species permit which requires facility inspection--$250;

(2) application for renewed or amended exotic species permit requiring no facility inspection--$25;

(3) renewal applications received more than one year after the renewal date will require an additional inspection and cost $250.

(b) To be considered for an Exotic Species Permit, the applicant shall:

(1) meet one or more of the following criteria:

(A) possess a valid Aquaculture License;

(B) possess a valid permit from the Texas Natural Resource Conservation Commission authorizing operation of a wastewater treatment facility;

(C) possess a department approved research proposal involving use of harmful or potentially harmful exotic fish, shellfish or aquatic plants; or

(D) operate a public aquarium approved for display of harmful or potentially harmful exotic fish, shellfish or aquatic plants;

(2) complete and submit an initial exotic species permit application on a form provided by the department;

(3) submit an accurate-to-scale plat of the facility specifically including, but not limited to, location of:

(A) all private facilities and owner's name and physical address including a designation on the plat of all private facilities which will be used for possession of harmful or potentially harmful exotic species;

(B) all structures which drain private facilities;

(C) all points at which private facility effluent is discharged from the private facilities or the fish farm;

(D) all structures designed to prevent escapement of harmful or potentially harmful species from the fish farm;

(E) any vats, raceways, or other structures to be used in holding harmful or potentially harmful exotic species;

(4) demonstrate to the department that an existing fish farm, private facility or wastewater treatment facility meets requirements of §57.129 of this title (relating to Exotic Species Permit: Private Facility Criteria);

(5) remit to the department all applicable fees.

(c) Applicants for an exotic species permit for culture of harmful or potentially harmful exotic shellfish must meet all exotic species permit application requirements and requirements for disease free certification as listed in §57.114 of this title (relating to Health Certification of Exotic Shellfish).

(d) An applicant for an exotic species permit shall provide upon request from the department documentation necessary to identify any harmful or potentially harmful exotic species and confirm the source of origin for the species for which a permit is sought.

(e) An applicant for an Exotic Species Permit whose facility is located within the harmful or potentially harmful exotic species exclusion zone as defined in §57.111 of this title (relating to Definitions) must submit an Emergency Plan to the department for review and approval. The plan shall include measures sufficient to prevent release or escapement of permitted harmful or potentially harmful exotic species into public water during a natural catastrophe (such as a hurricane or flood).

RULE §57.118 EXOTIC SPECIES PERMIT ISSUANCE

(a) The department may issue an Exotic Species Permit only to:

(1) a fish farmer and only for species listed in §57.113 of this title (relating to Exceptions);

(2) a wastewater treatment facility operator;

(3) department approved research programs; or

(4) a public aquarium for display purposes only.

(b) The department may issue an exotic species permit upon a finding by the department that:

(1) all application requirements as set out in §57.117 of this title (relating to Exotic Species Permit: Fee and Application Requirements) have been met;

(2) the fish farm operated by the applicant and named in the permit meets or will meet the design criteria listed in §57.129 of this title (relating to Exotic Species Permit: Private Facility Criteria);

(3) the applicant has complied with all provisions of the Parks and Wildlife Code, §§66.007, 66.0072, and 66.015 and these rules during the one-year period preceding the date of application.

(c) Permits issued for fish farms, private facilities or wastewater treatment facilities under construction shall not authorize possession of harmful or potentially harmful exotic fish, shellfish or aquatic plants until such time as the department has certified that the fish farm, private facilities or wastewater treatment facility as-built meets the requirements in §57.129 of this title (relating to Exotic Species Permit: Private Facility Criteria).

RULE §57.119 EXOTIC SPECIES PERMIT: REQUIREMENTS FOR PERMITS

a) A copy of the Exotic Species Permit shall be:

(1) made available for inspection upon request of authorized department personnel; and

(2) prominently displayed on the premises of the fish farm, private facilities or wastewater treatment facility named in the permit.

(b) Permittee must provide access to all facilities covered by the application to authorized department personnel during any hours in which operations pursuant to the exotic species permit are ongoing.

(c) If a permittee discontinues fish farming, research activities or public aquarium display involving harmful or potentially harmful exotic species or discontinues wastewater treatment, the permittee shall:

(1) immediately and lawfully sell, transfer or destroy all remaining individuals of that species in possession; and

(2) notify the department's Exotic Species Program Leader at least 14 days prior to cessation of operation.

(d) Upon a request, a permittee shall provide an adequate number of fish, shellfish, or aquatic plants to authorized department employees for identification and analyses.

(e) In the event that the fish farm, private facilities or a wastewater treatment facility of a permit holder appears in imminent danger of overflow, flooding, or release of harmful or potentially harmful exotic fish, shellfish or aquatic plants into public water, the permittee shall:

(1) immediately notify the department;

(2) immediately begin implementation of the department approved Emergency Plan.

(f) Except in case of an emergency, a holder of an exotic species permit authorizing possession of *Litoenaeus vannamei* must notify the department at least 72 hours prior to, but not more than seven days prior to any harvesting of permitted shellfish. In an

emergency beyond the control of the permittee, notification of harvest must be made as early as practicable prior to beginning of harvest operations.
(g) A holder of an exotic species permit authorizing possession of harmful or potentially harmful exotic species may sell or transfer ownership of live individuals only to the holder of a valid exotic species permit specifically authorizing possession of transferred species.
(h) Upon discovery of release or escapement of harmful or potentially harmful exotic fish or shellfish from any private facilities authorized in an exotic species permit, the permittee must immediately halt discharge of all private facility effluent from the fish farm. If the permittee's private facility is located within a fish farm complex, upon discovery or release or escapement of harmful or potentially harmful fish or shellfish, the permittee must immediately halt discharge of all private facility effluent.
(i) A holder of an exotic species permit must notify the department's Exotic Species Program Leader in the event of escapement or release of harmful or potentially harmful exotic fish or shellfish, within two hours of discovery.
(j) All devices required in the exotic species permit for prevention of discharge of harmful or potentially harmful exotic fish, shellfish, or aquatic plants must be in place and properly maintained prior to and at all times such species are in possession.
(k) All private facility effluent discharged from a fish farm holding exotic harmful or potentially harmful species must be routed through all devices for prevention of discharge of exotic species as required in the permit.
(l) A permittee must notify the department's Exotic Species Program Leader in the event of change of ownership of the fish farm named in that permittee's exotic species permit. Notification must be made immediately.
(m) Permits are not transferable from site to site.

RULE §57.120 EXOTIC SPECIES PERMIT: EXPIRATION AND RENEWAL
(a) Exotic Species Permits required by these rules expire on December 31 of the year issued.
(b) The department may renew an Exotic Species Permit upon finding that:
(1) the applicant has met application requirements in §57.117 of this title (relating to Exotic Species Permit: Fee and Application Requirements);
(2) the facility will meet all applicable facility design criteria listed in §57.129 of this title (relating to Exotic Species Permit: Private Facility Criteria);
(3) the applicant has complied with all provisions of the Parks and Wildlife Code, §§66.007, 66.0072, 66.015, and these rules during the one-year period preceding the date of agency action on the application for renewal; and
(4) the applicant has submitted a renewal application and all required annual reports to the department as required in §57.123(a) and (b) of this title (relating to Exotic Species Permit Reports).

RULE §57.121 EXOTIC SPECIES PERMIT—AMENDMENT

(a) Exotic species permits may be amended upon a finding by the department that:

(1) the applicant has complied with all provisions of the Parks and Wildlife Code, §§66.007, 66.0072, 66.015, all provisions of the permit, and these rules during the one-year period preceding the date of application;

(2) the applicant has met all applicable application requirements under §57.117 of this title (relating to Exotic Species Permit--Fee Application Requirements); and

(3) the facilities as altered will meet the private facility criteria in §57.129 of this title (relating to Exotic Species Permit).

(b) Exotic species permits must be amended to reflect any:

(1) addition or deletion of species of harmful or potentially harmful exotic fish, shellfish, or aquatic plants held pursuant to the permit;

(2) intended redistribution of harmful or potentially harmful fish, shellfish, and aquatic plants into private facilities not authorized in the permit;

(3) change in methods of preventing discharge of harmful or potentially harmful exotic fish, shellfish, and aquatic plants;

(4) change in discharge of private facility effluent from fish farms or wastewater treatment facilities; and

(5) change in existing design criteria listed in §57.129 of this title (relating to Exotic Species Permit--Private Facility Criteria).

(c) Applicants seeking amendment of exotic species permits, including those issued prior to January 23, 1992, must meet all application requirements listed in §57.117 of this title (relating to Exotic Species Permit--Fee and Application Requirements) and facility design criteria listed in §57.129 of this title (relating to Exotic Species Permit--Private Facility Criteria).

RULE §57.122 APPEAL

An opportunity for hearing shall be provided to the applicant or permit holder for any denial of an exotic species permit or a triploid grass carp permit or where the terms of issuance are different from those requested by the applicant.

(1) Requests for hearings shall be made in writing to the department no more than 30 days from receipt of the denial notification.

(2) All hearings shall be conducted in accordance with the rules of practice and procedure of the Texas Parks and Wildlife Department and the Administrative Procedure Act.

RULE §57.123 EXOTIC SPECIES PERMIT REPORTS

(a) The Exotic Species Permit holder shall submit an annual report that accounts for importation, possession, transport, sale, transfer or other disposition of any harmful or

potentially harmful exotic species handled by the permittee. This report shall be submitted on forms provided by the department with the application and shall be due January 10 of each year.
(b) An Exotic Species Permit holder who has imported, possessed, transported, transferred or sold triploid grass carp shall provide a copy of each exotic species transport invoice issued and a copy of each triploid grass carp certification received by the permittee for triploid grass carp purchased during the past year with their annual report.

RULE §57.124 TRIPLOID GRASS CARP; SALE, PURCHASE

(a) Triploid grass carp may be sold only by a holder of an exotic species permit authorizing possession of triploid grass carp, and only to:
(1) a person in possession of a valid exotic species permit authorizing possession of triploid grass carp; or
(2) a person in possession of a valid triploid grass carp permit, and only in an amount less than or equal to that number specified in the permit.
(b) A person who holds a valid triploid grass carp permit may purchase triploid grass carp only from a Texas fish farmer in possession of a valid exotic species permit authorizing possession of triploid grass carp, and only in an amount less than or equal to that number specified in the triploid grass carp permit.
(c) A holder of an exotic species permit may obtain triploid grass carp only from:
(1) the holder of a valid exotic species permit authorizing possession of triploid grass carp; or
(2) a lawful source outside of the state.
(d) A fish farmer in possession of an exotic species permit must notify the department not less than 72 hours prior to taking possession of any and all shipments of triploid grass carp received from any source. Notification must include:
(1) number of triploid grass carp being purchased;
(2) source of triploid grass carp;
(3) final destination of triploid grass carp;
(4) name of certifying authority who conducted triploid grass carp certification; and
(5) name, address and fish farmer's Aquaculture license number (if applicable) of both shipper and receiver.

RULE §57.125 TRIPLOID GRASS CARP PERMIT; APPLICATION, FEE

(a) The department may issue a triploid grass carp permit for stocking of triploid grass carp in private or public waters.
(b) To be considered for a triploid grass carp permit, the applicant shall:
(1) complete an initial triploid grass carp permit application on a form provided by the department;

(2) submit this application to the department not less than 30 days prior to the proposed stocking date; and

(3) remit to the department the sum of the cost of the triploid grass carp permit application fee and the triploid grass carp user fee, if required.

(c) The department shall charge a triploid grass carp permit application fee in the amount of the sum of a $15 application flat fee plus $2.00 for each triploid grass carp requested on the triploid grass carp permit application form. In the case of permit denial, the triploid grass carp permit application flat fee is not refundable. All fees shall be waived in the case of applications to stock triploid grass carp in public water.

(d) An applicant for a triploid grass carp permit or a permittee shall allow inspection of their facilities and ponds or lakes by authorized employees of the department during normal business hours.

Source Note: The provisions of this §57.125 adopted to be effective January 2, 1997, 21 TexReg 12414; amended to be effective January 29, 2007, 32 TexReg 332

RULE §57.126 TRIPLOID GRASS CARP PERMIT; TERMS OF ISSUANCE

(a) The department may issue a triploid grass carp permit upon a finding that:

(1) applicant has completed and submitted to the department a triploid grass carp permit application;

(2) applicant has remitted to the department all pertinent fees;

(3) all information provided in the triploid grass carp permit application is true and correct;

(4) applicant has not been finally convicted, within the last year, for violation of the Parks and Wildlife Code, §§66.007, 66.0072, 66.015, or these rules;

(5) issuance of a triploid grass carp permit is consistent with department fisheries or wildlife management activities;

(6) issuance of a triploid grass carp permit is consistent with the Parks and Wildlife Commission's environmental policy;

(7) issuance of a triploid grass carp permit and subsequent stocking does not conflict with specific management objectives of the department; and

(8) issuance of a triploid grass carp permit and subsequent stocking will not detrimentally affect threatened or endangered species populations, or their habitat; and

(9) issuance of a triploid grass carp permit and subsequent stocking will not detrimentally affect coastal wetland and estuarine ecosystems.

(b) A permittee shall allow, upon request, the take of a reasonable number of grass carp from the permittee's body of water by department personnel for determination of triploid status.

(c) In determining the number of triploid grass carp authorized for possession under a triploid grass carp permit the department shall consider the surface area of the pond or

lake named in the permit application, and as appropriate, the percentage of the surface area infested by aquatic vegetation.

RULE §57.127 DENIAL

The department may deny a triploid grass carp permit upon a finding that the applicant fails to satisfy any of the required criteria for issuance of a permit listed in §57.124 of this title (relating to Triploid Grass Carp; Sale, Purchase).

RULE §57.128 EXOTIC SPECIES PERMITS, TRIPLOID GRASS CARP PERMITS; REVOCATION

The department may revoke an exotic species permit or a triploid grass carp permit upon a finding that the permittee has violated any provision in these rules or rules promulgated under the Parks and Wildlife Code, §66.015, or any conditions of the permit during the valid permit period.

RULE §57.129 EXOTIC SPECIES PERMIT: PRIVATE FACILITY CRITERIA

(a) The fish farm or wastewater treatment facility must be designed to prevent discharge of water containing adult or juvenile harmful or potentially harmful exotic species, their eggs, seeds or other reproductive parts from the permittee's property.

(b) Fish farms holding harmful or potentially harmful exotic fish or shellfish shall have at least three appropriately designed and constructed permanent screens placed between any point in the fish farm where harmful or potentially harmful exotic fish or shellfish are intended to be in water on the fish farm and the point where private facility effluent first leaves the fish farm.

(1) Screen mesh shall be of an appropriate size for each stage of exotic fish or shellfish growth and development.

(2) One screen must be permanently affixed in front of the final discharge pipe in the harvest structure and remain in place while the pond is in use. This screen and backing material must be of sufficient strength to withstand a water level differential of the height of the discharge area.

(3) At those facilities which discharge into public waters, one screen must be secured over the terminal end of the discharge pipe at all times. This screen must be secured in such a fashion as to prevent escape of permitted species. A second, additional screen must be secured over the terminal end of the discharge pipe during all harvest activities.

(4) Screens must be designed and constructed such that screens can be maintained and cleaned without reducing the level of protection against release of harmful or potentially harmful exotic fish or shellfish. The department may approve alternate methods of preventing discharge of harmful or potentially harmful exotic fish or shellfish upon a finding that those methods are at least as effective in preventing discharge of adult or juvenile harmful or potentially harmful exotic species, their eggs, or other reproductive

parts from the permittee's property. The point of discharge of all mechanical harvesting devices must be double screened to prevent escapement of harmful or potentially harmful fish or shellfish.
(c) Fish farms which are to contain species or hybrids of species listed in §57.113 of this title (relating to Exceptions) and wastewater treatment facilities containing permitted exotic species which are within the 100-year flood plain, referred to as Zone A on the National Flood Insurance Program Flood Insurance Rate Map, must be enclosed within an earthen or concrete dike or levee constructed in such a manner to exclude all flood waters and such that no section of the crest of the dike or levee is less than one foot above the 100-year flood elevation. Dike design or construction must be approved by the department before issuance of a permit.
(d) Fish farms containing harmful or potentially harmful exotic shellfish shall be capable of segregating stocks of shellfish which have not been certified as free of disease from other stocks of shellfish on that fish farm.
(e) A fish farm containing harmful or potentially harmful exotic fish or shellfish must have in place security measures designed to prevent unrestricted or uncontrolled access to any private facilities containing harmful or potentially harmful exotic fish or shellfish. Security measures must prevent unauthorized removal of such species from the fish farm.
(f) For fish farms that are part of a fish farm complex, the following additional facility standards shall apply.
(1) Each permittee shall maintain in the common drainage at least one screen for preventing the movement of harmful or potentially harmful exotic fish or shellfish between the point where private facility effluent from the permittee's fish farm enters the common drainage and each point where an adjacent fish farmer's private facility effluent enters the common drainage. The adequacy of design and construction of such screens or other structures shall be determined by the department as provided in subsection (a)(1) of this section.
(2) Each permittee within the complex must have authority to stop the discharge of private facility effluent from the complex in the event of escapement or release of such fish or shellfish from that permittee's fish farm.

RULE §57.130 EXOTIC SPECIES INTERSTATE TRANSPORT PERMIT
(a) Transport of live harmful or potentially harmful exotic species originating from a point of origin outside the state of Texas and being transported through Texas to a destination outside of the state of Texas is prohibited except by the holder of an Exotic Species Permit or an Exotic Species Interstate Transport Permit.
(b) Anyone transporting live harmful or potentially harmful exotic species must provide documentation accounting, collectively, for all exotic species being transported.

RULE §57.131 EXOTIC SPECIES INTERSTATE TRANSPORT PERMIT: APPLICATION AND ISSUANCE

(a) The department shall charge a nonrefundable Exotic Species Interstate Transport Permit application fee of either:

(1) $25 for individual permits; or

(2) $100 for an annual permit.

(b) To apply for an Exotic Species Interstate Transport Permit an applicant shall:

(1) complete and submit an Exotic Species Interstate Transport Permit application on a form provided by the department;

(2) remit to the department's Exotic Species Program Leader all applicable fees.

(c) An applicant for an Exotic Species Interstate Transport Permit shall provide documentation upon request from the department necessary to identify any harmful or potentially harmful exotic species and source of origin of the species for which the permit is sought.

(d) The department may issue an Exotic Species Interstate Transport Permit upon a finding that all provisions of subsections (a)-(c) of this section have been met.

RULE §57.132 EXOTIC SPECIES INTERSTATE TRANSPORT PERMIT: PERMITEE REQUIREMENTS

(a) A copy of the Exotic Species Interstate Transport Permit shall be made available for inspection immediately upon request of authorized department personnel.

(b) Permittee must provide access to shipments of exotic species to authorized department personnel during the effective date of the permit.

(c) Permittee must notify the department's Exotic Species Program Leader in writing or by facsimile transmission at least 72 hours prior to transport of live harmful or potentially harmful exotic species indicating transport date, intended transportation route, and name and physical address of recipient.

(d) While transporting harmful or potentially harmful exotic species within the state of Texas, a holder of an Exotic Species Interstate Transport Permit must notify the department's Exotic Species Program Leader in the event of escapement or release of harmful or potentially harmful exotic species within two hours of release.

(e) Except as provided by the terms and conditions of the Exotic Species Interstate Transport Permit, offloading or transfer of shipments of harmful or potentially harmful exotic species in the state of Texas is prohibited.

RULE §57.133 EXOTIC SPECIES INTERSTATE TRANSPORT PERMIT: EXPIRATION AND RENEWAL

(a) Exotic Species Interstate Transport Permits expire as stated on the permit.

(b) A separate Exotic Species Interstate Transport Permit must be issued for each vehicle, trailer or other such transporting unit when transporting live harmful or potentially harmful species through the state.

RULE §57.134 WASTEWATER DISCHARGE AUTHORITY

(a) An applicant for an initial exotic species permit must provide the following:
(1) written documentation demonstrating that the applicant possesses the appropriate valid wastewater discharge authorization or has received an exemption from the Texas Natural Resource Conservation Commission if the fish farm, fish farm complex or private facility is designed such that a discharge of waste into or adjacent to water in the state will, or is likely to occur; or
(2) adequate documentation to demonstrate that the facility is designed and will be operated in a manner such that no discharge of waste into or adjacent to water in the state will, or is likely to occur.
(b) An applicant for an amendment or a renewal of an exotic species permit must provide the following:
(1) written documentation demonstrating that the applicant possesses or has timely applied for and is diligently pursuing the appropriate wastewater discharge authorization or exemption from the Texas Natural Resource Conservation Commission in accordance with 30 TAC Chapter 321, Subchapter O, if the fish farm, fish farm complex or private facility is designed such that a discharge of waste into or adjacent to water in the state will, or is likely to occur; or
(2) adequate documentation to demonstrate that the facility is designed and will be operated in a manner such that no discharge of waste into or adjacent to water in the state will, or is likely to occur.
(c) An exotic species permittee whose wastewater discharge authorization or exemption is revoked, suspended or annulled by the Texas Natural Resource Conservation Commission (TNRCC*) will be treated as an applicant for an initial permit under subsection (a) of this section.

RULE §57.135 MEMORANDUM OF UNDERSTANDING BETWEEN THE TEXAS PARKS AND WILDLIFE DEPARTMENT, THE TEXAS NATURAL RESOURCES CONSERVATION COMMISSION, AND THE TEXAS DEPARTMENT OF AGRICULTURE

The provisions of 30 TAC §7.103 (relating to Memorandum of Understanding (MOU) between the Texas Commission on Environmental Quality (Commission), the Texas Parks and Wildlife Department (TPWD), and the Texas Department of Agriculture (TDA), which were adopted by the Commission to take effect January 9, 2001, are adopted by reference.

Source Note: The provisions of this §57.135 adopted to be effective December 29, 1997, 22 TexReg 12535; amended to be effective July 26, 2001, 26 TexReg 5422; amended to be effective June 29, 2005, 30 TexReg 3728

RULE §57.136 PENALTIES

The penalties for violation of this subchapter are prescribed by Parks and Wildlife Code, §66.012.

APPENDIX D. TEXAS PARKS AND WILDLIFE DEPARTMENT PENALTIES

§ 12.403. CLASSIFICATION OF OFFENSES. (a) Offenses are designated as Parks and Wildlife Code misdemeanors or Parks and Wildlife Code felonies.

(b) Misdemeanors are classified according to the relative seriousness of the offense into three categories:

(1) Class A Parks and Wildlife Code misdemeanors;

(2) Class B Parks and Wildlife Code misdemeanors; and

(3) Class C Parks and Wildlife Code misdemeanors.

(c) Section 12.41, Penal Code, does not apply to classifications of offenses under this code.

Added by Acts 1985, 69th Leg., ch. 267, art. 3, § 1, eff. Sept. 1, 1985.

§ 12.404. CLASS A PARKS AND WILDLIFE CODE MISDEMEANOR. An individual adjudged guilty of a Class A Parks and Wildlife Code misdemeanor shall be punished by:

(1) a fine of not less than $500 nor more than $4,000;

(2) confinement in jail for a term not to exceed one year; or

(3) both such fine and imprisonment.

Added by Acts 1985, 69th Leg., ch. 267, art. 3, § 1, eff. Sept. 1, 1985. Amended by Acts 1997, 75th Leg., ch. 1256, § 11, eff. Sept. 1, 1997.

§ 12.405. CLASS B PARKS AND WILDLIFE CODE MISDEMEANOR. An individual adjudged guilty of a Class B Parks and Wildlife Code misdemeanor shall be punished by:

(1) a fine of not less than $200 nor more than $2,000;

(2) confinement in jail for a term not to exceed 180 days; or

(3) both such fine and imprisonment.

Added by Acts 1985, 69th Leg., ch. 267, art. 3, § 1, eff. Sept. 1, 1985. Amended by Acts 1997, 75th Leg., ch. 1256, § 12, eff. Sept. 1, 1997.

§ 12.406. CLASS C PARKS AND WILDLIFE CODE MISDEMEANOR. An individual adjudged guilty of a Class C Parks and Wildlife Code misdemeanor shall be punished by a fine of not less than $25 nor more than $500.

Added by Acts 1985, 69th Leg., ch. 267, art. 3, § 1, eff. Sept. 1, 1985. Amended by Acts 1987, 70th Leg., ch. 535, § 1, eff. Sept. 1, 1987.

§ 12.4061. PARKS AND WILDLIFE CODE STATE JAIL FELONY. (a) An individual adjudged guilty of a Parks and Wildlife Code state jail felony shall be punished by confinement in a state jail for a term of not more than two years or less than 180 days.

(b) In addition to confinement, an individual adjudged guilty of a Parks and Wildlife Code state jail felony may be punished by a fine of not less than $1,500 and not more than $10,000.

Added by Acts 1999, 76th Leg., ch. 959, § 3, eff. Sept. 1, 1999.

§ 12.407. PARKS AND WILDLIFE CODE FELONY. (a) An individual adjudged guilty of a Parks and Wildlife Code felony shall be punished by confinement in the institutional division of the Texas Department of Criminal Justice for any term of not more than 10 years or less than two years.

(b) In addition to imprisonment, an individual adjudged guilty of a Parks and Wildlife Code felony may be punished by a fine of not less than $2,000 nor more than $10,000.

Added by Acts 1985, 69th Leg., ch. 267, art. 3, § 1, eff. Sept. 1, 1985. Amended by Acts 1997, 75th Leg., ch. 1256, § 13, eff. Sept. 1, 1997.

APPENDIX E. AQUATIC VEGETATION MANAGEMENT PLAN

31 Texas Administrative Code subchapter L
Aquatic Vegetation Management Rules
§§ 57.930-57.934 and 57.936
(includes the State Plan as § 57.932).

§57.930. Definitions. The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise. All other words and terms in this subchapter shall have the meanings assigned in the Texas Parks and Wildlife Code.

(1) Canal – an artificial waterway used for the transportation of water for agricultural and/or industrial purposes but for no other purpose.

(2) EPA - the United States Environmental Protection Agency.

(3) Governing entity - the state agency or other political subdivision with jurisdiction over a public body of surface water.

(4) Integrated pest management - the coordinated use of pest and environmental information and pest control methods to prevent unacceptable levels of pest damage by the most economical means and in a manner that will cause the least possible hazard to persons, property, and the environment. Integrated pest management includes consideration of ecological, biological, chemical, and mechanical strategies for control of nuisance aquatic vegetation.

(5) Licensed Applicator - a person who holds a valid license for aquatic herbicide application from the Texas Department of Agriculture.

(6) Local plan - a local aquatic vegetation management plan authorized by Parks and Wildlife Code, §11.083 and meeting the requirements in §57.933 of this title (relating to Adoption and Applicability of Local Aquatic Vegetation Plans) and §57.934 of this title (relating to Local Aquatic Vegetation Plan).

(7) MCL - maximum contaminant level.

(8) Nuisance aquatic vegetation - any non-native or native vascular plant species that is determined, in consideration of TPWD guidance, to have the potential to substantially interfere with the uses of a public body of surface water.

(9) Public body of surface water - any body of surface water that is not used exclusively for an agricultural purpose. The term does not include impounded water on private property or water being transported in a canal.

(10) Public drinking water provider - any person who owns or operates a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals at least 60 days out of the year.

(11) State plan - the state aquatic vegetation management plan authorized by Parks & Wildlife Code, §11.082, and described in §57.931 of this title (relating to State Aquatic Vegetation Plan Applicability) and §57.932 of this title (relating to State Aquatic Vegetation Plan).

(12) TDA - the Texas Department of Agriculture.

(13) TNRCC* - the Texas Natural Resource Conservation Commission.

(14) TPWD - the Texas Parks and Wildlife Department.

(15) Treatment proposal – a submission to TPWD on a TPWD-approved form that describes intended measures to control nuisance aquatic vegetation.

(16) Water district - a conservation and reclamation district or an authority created under authority of Section 52(b)(1) or (2), Article III, or Section 59, Article XVI, Texas Constitution, that has jurisdiction over a public body of surface water. The term does not include a navigation district or a port authority.

§57.931. State Aquatic Vegetation Plan Applicability. The state plan governs throughout the state except where a governing entity has adopted an approved local plan.

§57.932. State Aquatic Vegetation Plan.

(a) Requirements Applicable to All Measures to Control Nuisance Aquatic Vegetation.

(1) Purpose. The purpose of the state aquatic vegetation plan is to provide for the coordination, oversight, guidance and where applicable public notice and enforcement of all activities related to the management of nuisance aquatic vegetation on public bodies of surface water. This includes, but is not limited to, coordination, oversight, public notification and enforcement of all aquatic herbicide use to protect state fish and wildlife resources and habitat and to prevent unreasonable risk from the use of

any aquatic herbicide.

(2) Standards. All measures that a person undertakes to control nuisance aquatic vegetation shall be consistent with the principles of integrated pest management as defined in §57.930 of this title (relating to Definitions). A guidance document prepared by TPWD will describe measures to control nuisance aquatic vegetation, and the minimum standards applicable to governing entities that regulate a public body of surface water and persons who propose to treat nuisance aquatic vegetation. The guidance document will include:

(A) Encouragement of the growth and, where lacking, establishment of native aquatic vegetation that provides habitat for fish, the food chain that supports desirable fish populations, other desirable aquatic organisms and wildlife without interfering with reasonable recreational use, navigation, drinking water supply, flow of water to power plants, industrial use, irrigation, or other beneficial uses;

(B) Encouragement of efforts to address the root causes supporting the overgrowth of nuisance aquatic vegetation;

(C) Support for continued monitoring and assessment activities to identify new nuisance aquatic vegetation species and act appropriately to eliminate or minimize ecological impacts;

(D) Support for continued research and evaluation of vegetation control methods that will cause the least possible hazard to persons, property and the environment as required by application of integrated pest management principles;

(E) Encouragement of public input in decision-making processes;

(F) Encouragement of ongoing education and outreach efforts as to the importance of managing aquatic vegetation to assure the ecological health of public waters;

(G) Information to guide individuals wishing to treat nuisance aquatic vegetation; and

(H) Criteria for choosing management responses to nuisance aquatic vegetation problems based on the uses of the water body and the nature of the problem. These criteria may take the form of a three-tier system: Tier I, which calls for immediate response and eradication; Tier II, which calls for ongoing control where nuisance aquatic

vegetation is well-established; and Tier III, which calls for monitoring and a contingency plan in case the problem worsens. The three-tier system is subject to change as provided in paragraph (3) of this subsection.

(3)Modification of Guidance. TPWD will publish notice in the Texas Register and seek input from interested parties when it proposes to modify the guidance document. TPWD will also mail notice to persons who so request. Notice shall be provided at least 60 days prior to the effective date of any changes to the guidance document. The notice shall describe the proposed modifications and the reasons for the modifications, and how comments on the proposed modifications may be made to TPWD.

(4) Review by TPWD. Prior to undertaking any measures to control nuisance aquatic vegetation, a person operating under the state plan shall provide to TPWD a treatment proposal, on a form included in the guidance document, no later than the 14th day before the measures are to begin. TPWD will review and may disapprove or amend any treatment proposal and will respond no later than the day before the proposed control measures are to begin. Where appropriate, TPWD will provide technical advice and recommendations regarding prevention of nuisance aquatic vegetation problems. The person submitting the treatment proposal shall have the burden of demonstrating compliance with the state plan. Where a local plan governs, treatment proposals are not subject to TPWD review, approval, and amendment, but are to be submitted to TPWD (pursuant to §57.934(b) of this title, relating to Local Aquatic Vegetation Plan)) for informational purposes.

(b) Additional Requirements Applicable to the Use of Aquatic Herbicides to Control Nuisance Aquatic Vegetation.

(1) No person shall apply aquatic herbicide in a public body of surface water where the state plan governs unless the herbicide is applied in a manner consistent with the state plan. No person shall apply aquatic herbicide in a public body of surface water where a local plan governs unless the herbicide is applied in a manner consistent with the local plan. Where a local plan has been adopted and approved, the requirements of the local plan supersede the requirements of this subsection.

(2) All persons intending to apply an aquatic herbicide shall provide

written notice to the governing entity, TPWD, all public drinking water providers that have an intake within two river miles of a site at which an application of aquatic herbicide is proposed to occur, and all persons who have requested notice (TPWD will maintain a list) no later than the 14th day before the application is to occur. The notice shall include:

(A) the dates of the proposed application;

(B) all label information for the aquatic herbicide to be applied;

(C) a statement that TPWD's guidance document has been reviewed and the proposed herbicide application is consistent with the principles of integrated pest management as set forth in subsection (a)(2) of this section and that document;

(D) information demonstrating that the proposed application will not result in exceeding:

(i) the maximum contaminant level of the herbicide in finished drinking water as set by the TNRCC* and the EPA; or

(ii) if the aquatic herbicide does not have an MCL established by the TNRCC* and the EPA, the maximum label rate; and

(E) TDA applicator license number, if any.

(3) An individual who is not a licensed applicator may not apply aquatic herbicides unless the governing entity affirmatively finds, after receiving the proper notice as provided in subsection (b)(2) of this section, that the application will be consistent with the state plan. The governing entity shall respond to the notice given by an individual who is not a licensed applicator no later than the day before the date the application is scheduled to occur.

(4) An individual who is a licensed applicator may apply aquatic herbicide after notice consistent with subsection (b)(2) of this section if the governing entity finds that the application would be consistent with the state plan or does not disapprove the application no later than the day before the application is to occur.

(5) After receiving notice of a proposed application of aquatic herbicide, a governing entity, or TPWD in the absence of such an entity, shall:

(A) provide the individual proposing the application with the state plan;

(B) notify the individual in writing that it is a violation of state law to apply aquatic herbicides in a public body of water in a manner inconsistent with the state plan; and

(C) determine whether the proposed application is consistent with the state plan.

(6) The governing entity shall prohibit the proposed application of aquatic herbicide if the governing entity finds that the proposed application is inconsistent with the state plan, or, if the proposed application is consistent with the state plan, so notify the person.

(7) State money shall not be used to pay for treatment of a public body of surface water with an aquatic herbicide unless the application of the herbicide is performed by an applicator licensed for aquatic herbicide application by the TDA.

(8) Any application of aquatic herbicide shall comply with label rates approved by the EPA.

§57.933. Adoption and Applicability of Local Aquatic Vegetation Plans. A local aquatic vegetation plan may be adopted and shall apply to particular public bodies of surface water as provided in Texas Parks and Wildlife Code, §11.083. A governing entity intending to operate under a local aquatic vegetation plan shall seek approval of its proposed local aquatic vegetation plan under §57.934 of this title (relating to Local Aquatic Vegetation Plan).

§57.934. Local Aquatic Vegetation Plan.

(a) To be approvable by TNRCC*, TPWD, and TDA, a local plan must meet the minimum standards set forth in §57.932 of this title (relating to State Aquatic Vegetation Plan). Additional or more specific requirements are approvable.

(b) A local plan may take into account the particular needs and uses of the public body or bodies of surface water to which it will apply. The local plan may allow herbicide use if the person proposing to apply the herbicide notifies the governing entity not later than the 14th day before the proposed date of application. The local plan shall provide that treatment proposals shall be submitted concurrently to TPWD and the governing entity (on the form provided in the guidance document) no later than the 14th day before the measures are to begin and that the governing entity will review and may

disapprove or amend any treatment proposal and will respond no later than the day before the proposed control measures are to begin. The person submitting the treatment proposal shall have the burden of demonstrating compliance with the local plan.

(c) Proposed local plans should be developed in cooperation with TPWD, TDA, and TNRCC*, and shall be submitted to TPWD on a form prepared by TPWD. TPWD will coordinate review of the plan by TNRCC* and TDA.

(d) Governing entities shall seek and encourage public participation in the creation and review of local plans. At a minimum, TPWD, TNRCC*, or TDA will hold at least one public meeting in the area affected by the local plan. Public comment will be received by TPWD, TNRCC*, and TDA for 30 days after the local plan is submitted for agency approval. TPWD, TNRCC*, and TDA will review and respond to local plan submittals within 60 days of receipt.

§57.936. Recordkeeping. Governing entities shall retain copies of the following documents generated under this subchapter for a minimum of five years from generation: all local plan submissions and approvals, all treatment proposals submitted to TPWD, all notices received and provided, all control measures taken by the governing entity (including records of date, place, location, type, and amount of all aquatic herbicide applications), and any other information relevant to a particular individual request for shoreline treatment.

***TNRCC is now Texas Commission for Environmental Quality (TCEQ)**

APPENDIX F. ANS COORDINATOR, JOB DESCRIPTION

Statewide Invasive Species Coordinator

Job Title: Statewide Invasive Species Coordinator

Start Date: To de determined

Agency: To be determined

Location: Austin, TX

Job Description: The Statewide Invasive Species Coordinator (SISC) would be responsible for the following activities:

1. Coordinate quarterly meetings and correspondence for the Texas Invasive Species Coordinating Committee (TISCC), under the direction of the current Committee Chair.
2. Pursue federal funding and local matching fund opportunities for invasive species throughout the state.
3. Coordinate the dissemination of information about invasive species and maintain the TISCC webpage.
4. Develop a database or clearinghouse of invasive species projects within the state and distribute related information to TISCC members.
5. Coordinate with members of the TISCC and other stakeholders on invasive species issues including management, control, research and education.
6. Other duties as assigned by the TISCC.

Qualifications: Minimum of B.S. degree in natural resources, plant sciences, or related field.

Work Experience: Minimum of 5 years experience with invasive species or similar issues. Strong written and oral communication skills required. Experience with GIS/GPS, computer software programs, web development, contract submission, and public awareness programs preferred.

Salary: $50,000 - $80,000 per year, plus benefits (commensurate with education level and experience)

Application Procedure: To be determined

APPENDIX G. TPWD MONITORING PROGRAMS

I. COASTAL RESOURCES SURVEYS

DESCRIPTION OF SURVEY:

Coverage

Coastal waters - All of the salt water of the state including all major bays, minor bays and that portion of the Gulf of Mexico within the jurisdiction of the state extending nine nautical miles from the Gulf shoreline.

Sampling Frequency
Trawls 1,680/year, 960/year in the Gulf
Bag seine 2,040/year
Gillnets 760/year
Oyster dredges 1,080/year

Gears Used
Trawl, gillnet, bag seine, oyster dredges

Station Descriptions
Stratified random sampling

Sponsoring Agency/Organization
Texas Parks and Wildlife Department

Contact Person
Mark Fisher
361-729-2328

Disposition of Data (computerized – format, paper forms, etc.)
Computerized

Timeliness of Data Availability
Reports due annually

Accessibility
Data or summary report information available

II.COMMERCIAL LANDING SURVEYS

DESCRIPTION OF SURVEY:

Coverage
Coastal waters

Sampling Frequency
Monthly reports

Gears Used
NA

Station Descriptions
NA

Sponsoring Agency/Organization
Texas Parks and Wildlife Department

Contact Person
Mark Fisher
361-729-2328

Disposition of Data (computerized – format, paper forms, etc.)
Computerized

Timeliness of Data Availability
Reports due annually

Accessibility
Data or summary report information available

III.CREEL SURVEYS

DESCRIPTION OF SURVEY:

Coverage
Coastal waters and inland lakes

Sampling Frequency
1014 survey days per year (Coastal Fisheries)
Selected lakes have differing frequencies (Inland Fisheries)

Gears Used
NA

Station Descriptions
Stratified Randomized

Sponsoring Agency/Organization
Texas Parks and Wildlife Department

Contact Persons
Mark Fisher (Coastal)
361-729-2328

Ken Kurzawski (Inland)
512-389-4591

Disposition of Data (computerized – format, paper forms, etc.)
Computerized

Timeliness of Data Availability
Reports due annually

Accessibility
Data or summary report information available

IV. FRESHWATER FISH SURVEYS

DESCRIPTION OF SURVEY:

Coverage
Public water bodies

Sampling Frequency
Minimum of once every four years

Gears Used
Electofishing gear, gillnet, trapnet, seine

Station Descriptions
Randomized sampling design

Sponsoring Agency/Organization
Texas Parks and Wildlife Department

Contact Person

Earl Chilton
512-389-4652

Ken Kurzawski
512-389-4591

Disposition of Data (computerized – format, paper forms, etc.)
Computerized

Timeliness of Data Availability
Reports due annually

Accessibility
Data or summary report information available

V. FRESHWATER HABITAT SURVEYS

DESCRIPTION OF SURVEY:

Coverage
Public water bodies

Sampling Frequency
Minimum of once every four years

Gears Used
GIS/GPS equipment, depth finder, bathymetry information, grappling hook.

Station Descriptions
Entire water body

Sponsoring Agency/Organization
Texas Parks and Wildlife Department

Contact Person
Earl Chilton
512-389-4652

Chris Moret
409-384-9965

Disposition of Data (computerized – format, paper forms, etc.)
Computerized

Timeliness of Data Availability
Reports due annually

Accessibility
Data or summary report information available

APPENDIX H.TEXAS DEPARTMENT OF AGRICULTURE STATUTORY AUTHORITY

AGRICULTURE CODE

SUBTITLE B. HORTICULTURAL DISEASES AND PESTS

CHAPTER 71. GENERAL CONTROL

SUBCHAPTER D. NOXIOUS AND INVASIVE PLANTS

§ 71.151. LIST REQUIRED. (a) The department by rule shall publish a list of noxious and invasive plant species that have serious potential to cause economic or ecological harm to the state. The department may publish lists of noxious and invasive plant species organized by region.

(b) In preparing or amending a list under this section, the department shall:

(1) consult with representatives from the agriculture industry, the horticulture industry, the Texas Cooperative Extension, the Texas Department of Transportation, the State Soil and Water Conservation Board, and the Parks and Wildlife Department;

(2) consider any available scientific data and economic impact information for each plant species; and

(3) use any standard criteria established by the department.

Added by Acts 2003, 78th Leg., ch. 900, § 1, eff. Sept. 1, 2003.

Amended by: Acts 2005, 79th Leg., Ch. 618, § 2, eff. September 1, 2005.

§ 71.152. NOXIOUS OR INVASIVE PLANT SALE, DISTRIBUTION, OR IMPORTATION PROHIBITED. (a) A person commits an offense if the person sells, distributes, or imports into the state a noxious or invasive plant species included on the department's list described under Section 71.151.

(b) An offense under this section is a Class C misdemeanor.

(c) A person commits a separate offense for each noxious or invasive plant item or unit sold, distributed, or imported.

Added by Acts 2003, 78th Leg., ch. 900, § 1, eff. Sept. 1, 2003.

Amended by: Acts 2005, 79th Leg., Ch. 618, § 3, eff. September 1, 2005.

§ 71.153. LOCAL REGULATION. (a) A political subdivision may not adopt an ordinance or rule that restricts the planting, sale, or distribution of noxious or invasive plant species.

(b) This section does not limit the preparation and distribution of educational materials relating to plants of local concern.

Added by Acts 2005, 79th Leg., Ch. 618, § 4, eff. September 1, 2005.

§ Sec. 71.154. DISCLAIMER REQUIRED. (a) A public entity, other than the department, that produces for public distribution to commercial or residential landscapers a list of noxious or invasive terrestrial plant species that includes a species growing in this state shall provide with the list a disclaimer that states: "THIS PLANT LIST IS ONLY A RECOMMENDATION AND HAS NO LEGAL EFFECT IN THE STATE OF TEXAS. IT IS LAWFUL TO SELL, DISTRIBUTE , IMPORT, OR POSSESS A PLANT ON THIS LIST UNLESS THE TEXAS DEPARTMENT OF AGRICULTURE LABELS THE PLANT AS NOXIOUS OR INVASIVE ON THE DEPAATMENT' S PLANT LIST. "

(b) A public entity, other than the department, that produces a list of noxious or invasive terrestrial plant species in printed material made for public distribution to commercial or residential landscapers, including a newspaper, trade publication, notice, circular, or Internet website, shall post the disclaimer required by Subsection (a) in at least 12-point type in a conspicuous location readily visible by persons viewing the list.

(c) The department shall adopt rules requiring a public entity to include the disclaimer required by Subsection Cal in a manner equivalent to the manner described by Subsection Cbl for publication of the entity's list of noxious or invasive terrestrial plant species through media not described by Subsection (b), including billboards, radio productions, and television productions.

APPENDIX I. TEXAS DEPARTMENT OF AGRICULTURE REGULATIONS

TEXAS ADMINISTRATIVE CODE
Title 4 AGRICULTURE
Part 1 TEXAS DEPARTMENT OF AGRICULTURE
Chapter 19 QUARANTINES AND NOXIOUS AND INVASIVE PLANTS
Subchapter T NOXIOUS AND INVASIVE PLANTS

RULE §19.300 NOXIOUS AND INVASIVE PLANT LIST

(a) The following plants have serious potential to cause economic or ecological harm to the state.

Figure: 4 TAC §19.300(a)

Common Name	**Botanical Name**
Noxious plants	
alligatorweed	*Alternanthera philoxeroides*
balloonvine	*Cardiospermum halicacabum*
Brazilian peppertree	*Schinus terebinthifolius*
broomrape	*Orobanche ramosa*
camelthorn	*Alhagi camelorum*
Chinese tallow tree	*Triadica sebifera*
Eurasian watermilfoil	*Myriophyllum spicatum*
giant duckweed	*Spirodela oligorrhiza*
giant reed	*Arundo donax*
hedge bindweed	*Calystegia sepium*
hydrilla	*Hydrilla verticillata*
itchgrass	*Rottboellia cochinchinensis*
Japanese dodder	*Cuscuta japonica*

kudzu	*Pueraria montana* var. *lobata*
lagarosiphon	*Lagarosiphon major*
paperbark	*Melaleuca quinquenervia*
purple loosestrife	*Lythrum salicaria*
rooted water hyacinth	*Eichhornia azurea*
saltcedar	*Tamarix* spp.
salvinia	*Salvinia* spp.
serrated tussock	*Nassella trichotoma*
torpedograss	*Panicum repens*
tropical soda apple	*Solanum viarum*
water spinach	*Ipomoea aquatica*
water hyacinth	*Eichhornia crassipes*
waterlettuce	*Pistia stratiotes*
Invasive plants	
Chinese tallow tree	*Triadica sebifera*
kudzu	*Pueraria montana* var. *lobata*
saltcedar	*Tamarix* spp.
tropical soda apple	*Solanum viarum*

(b) Unless permitted by the Texas Department of Parks and Wildlife Code §66.007 or by the Texas Department of Agriculture, a person commits an offense under the Texas Agriculture Code, §71.152, if the person sells, distributes or imports into the state the plants listed in subsection (a) of this section in any live form.

(c) For the purpose of this section, the term "distributes" does not include the accidental or unintentional movement of noxious plant material in the course of legitimate construction activities or agricultural activities, including but not limited to, re-seeding, transportation of agricultural products and the movement of farm or earth moving equipment.

Source Note: The provisions of this §19.300 adopted to be effective January 6, 2005, 29 TexReg 12163; amended to be effective June 10, 2007, 32 TexReg 3171

RULE §19.301 Disclaimer Required for Certain Plant Lists Produced by Public Entities Other Than the Department; Required Format

(a) A public entity other than the department that produces for public distribution to commercial or residential landscapers a list of noxious or invasive terrestrial plant species that includes at least one species currently growing in Texas shall include the disclaimer prescribed by §71.154 of the Texas Agriculture Code.

(b) If the list described in subsection (a) of this section is published in a television broadcast, the disclaimer prescribed by Texas Agriculture Code, §71.154, must be included within the broadcast and either:
(1) read immediately following publication of the list; or
(2) appear visually in a legible graphic displayed for at least 15 seconds during or immediately following publication of the list.

(c) If the list described in subsection (a) of this section is published in a radio broadcast, the disclaimer prescribed by Texas Agriculture Code, §71.154, must be included within the broadcast and read immediately following publication of the list.

(d) If the list described in subsection (a) of this section is placed on a billboard, the disclaimer prescribed by Texas Agriculture Code, §71.154 must also be placed on the same billboard and the height of the disclaimer lettering must be no less than one-fifth of the height of the lettering of the list on the billboard.

(e) If the list described in subsection (a) of this section is placed on or within media not expressly listed or described in Texas Agriculture Code, §71.154 or subsections (b) - (d) of this section, the disclaimer prescribed by Texas Agriculture Code, §71.154 must be placed on or within the other media using sufficient size or duration of presentation so as to be conspicuously visible and legible to, as well as accessible by, those viewing the published list.

This agency hereby certifies that the adoption has been reviewed by legal counsel and found to be a valid exercise of the agency's legal authority.

Filed with the Office of the Secretary of State on August 11, 2011