

**PLAN FOR THE MANAGEMENT OF  
AQUATIC NUISANCE SPECIES  
IN IOWA**

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AQUATIC NUISANCE SPECIES  
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## EXECUTIVE SUMMARY

Aquatic nuisance species (ANS) are a source of significant ecological and socio-economic problems throughout North America. Invasive ANS such as Eurasian watermilfoil, purple loosestrife, and zebra mussels have already invaded Iowa's aquatic ecosystems. While their initial impacts have been limited and localized in nature, there is little doubt that these ANS pose a serious threat to water resources in Iowa. The *Plan for the Management of Aquatic Nuisance Species in Iowa* represents an important step in developing a coordinated and proactive effort by the state of Iowa to deal with the threats posed by ANS.

The purpose of the *Plan for the Management of Aquatic Nuisance Species in Iowa* is to provide guidance in the development of management actions and funding mechanisms needed by state agencies, local governments, and aquatic resource user groups to address the prevention, control, and abatement of ANS that have invaded or may invade the waters of the state.

The development of a state ANS management plan, as called for in Section 1204 of the Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990, provides an opportunity for federal cost-share support for implementation of the plan. NANPCA, reauthorized in 1996 as the National Invasive Species Act (NISA), specifies that state plans identify feasible, cost-effective management practices and measures that can be implemented by the state to prevent and control ANS infestations in a manner that is environmentally sound. Approval of the state management plan by the Federal Aquatic Nuisance Species Task Force is required in order for Iowa to be eligible for federal cost-share support provided by NANPCA.

The goals of this plan are designed to address different stages of ANS invasion: (1) the introduction of ANS transported into Iowa from waterbodies outside of the state; (2) the spread of an established, reproducing population of ANS in Iowa to uninfested waterbodies; and (3) the colonization of ANS populations within waterbodies, including the harmful impacts resulting from colonization.

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

Goal I: Minimize the risk of further introductions of ANS into the state of Iowa.

Goal II: Limit the spread of established populations of ANS into uninfested waters in Iowa.

Goal III: Eradicate or control to a minimal level of impact the harmful ecological, economic, social, and public health impacts resulting from infestation of ANS in Iowa.

Included in the *Plan for the Management of Aquatic Nuisance Species in Iowa* are discussions of existing problems; a summary of federal, regional, and state policy; a listing of non-indigenous species known to exist in Iowa; identification of existing priority ANS which includes Eurasian watermilfoil, purple loosestrife, and zebra mussels; and a discussion of regional ANS that pose a threat to Iowa waterbodies. Also included in the plan are detailed descriptions of proposed

management actions including strategies and tasks needed to address these goals; a guide for program implementation and associated timelines; and a description of the process for program evaluation.

The *Plan for the Management of Aquatic Nuisance Species in Iowa* is focused on the identification of feasible, cost-effective management practices to be implemented in partnership with private and public interests for the environmentally sound prevention and control of ANS. The eight objectives identified in the plan are structured to achieve the goals of this plan through the implementation of strategic actions and tasks designed to solve specific problems. The strategic actions and specific tasks needed to address these objectives are outlined in the implementation table provided with this plan.

The implementation tables accompanying this plan also summarize the funding needed to initiate this plan. Currently, an annual appropriation of \$100,000 is dedicated to Eurasian watermilfoil related tasks. Funds needed for implementation of a state ANS program in Iowa totals \$182,000. Once implementation of the program has been accomplished, a permanent funding mechanism will need to be established to support ongoing activities addressing the threat posed by ANS in Iowa.

To ensure that the goals of this plan are being effectively addressed, a procedure for monitoring and evaluating the implementation of strategies and tasks will be initiated. This evaluation will focus on the feasibility and cost-effectiveness of management activities. This evaluation process is summarized in the strategic planning table accompanying this plan. The plan will be periodically revised and adjusted based upon the practical experience gained from implementation, scientific research, and new tools as they become available.

The effort to develop a state ANS management plan for Iowa was led by Department of Natural Resources, Iowa Eurasian Watermilfoil Program, personnel and the Iowa Aquatic Nuisance Species Task Force (Appendix A). Public comments were solicited from local governments, regional entities, public and private organizations, and resource user groups that have expertise and interest in the control of ANS. Comments were considered and revisions have been made to the plan.

## INTRODUCTION

Aquatic nuisance species (ANS) are the cause of significant ecological and socio-economic problems throughout North America. Invasive species, such as Eurasian watermilfoil, purple loosestrife, and zebra mussels, are being introduced into the United States at an alarming rate. After introduction, populations often grow quickly and spread rapidly due to lack of natural controls. Once established, they displace native species, impede municipal and industrial water systems, degrade ecosystems, reduce recreational and commercial fishing opportunities, and can cause public health problems.

A number of these ANS have become established in the United States and represent a threat to the nation's aquatic resources. As introduction and spread of ANS continues, the associated problems intensify and create a wide variety of ecological and socio-economic problems for water users. In 1990, the Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA) was passed to address ANS problems in the United States. While programs created by this legislation were initially aimed at problems in the Great Lakes region, passage in 1996 of the National Invasive Species Act (NISA) established a national goal of preventing new introductions and limiting the dispersal of existing ANS in the United States.

According to Rendall (1997), the following points must be considered in addressing ANS issues and establishing ANS management programs. These points have provided guidance in the development of the *Plan for the Management of Aquatic Nuisance Species in Iowa*.

- There are many pathways of introduction and spread for ANS, most of which are related to human activities, both accidental and intentional. New species continue to be introduced and spread within North America through these pathways.
- Introductions have many costs associated with them: control and management costs; long-term ecosystem changes; and loss of recreational opportunities.
- Often there are no acceptable controls available for use in natural waterbodies once ANS become established.
- Once species are successfully introduced, any control efforts will be very expensive and eradication very unlikely.
- Prevention is the best course of action. Management plans, education programs, and regulations are strategies that can help in preventing the spread of ANS.

The coordinated efforts contained within this plan are designed to protect the citizens of Iowa and its aquatic resources from the multitude of potential losses associated with ANS plants and animals. This plan focuses on preventing the accidental introductions of new ANS, limiting the spread of existing ANS, and controlling or eradicating ANS where environmentally feasible. The intentional introduction of non-indigenous species for aquaculture, commercial, or recreational purposes is addressed to insure that these beneficial introductions do not result in

accidental ANS introductions, and to improve information sharing among those agencies responsible for regulating intentional introductions.

It is the intent of the State of Iowa to prepare for the introduction of destructive ANS currently found in regional waters and take measures to prevent their infestation of state waterbodies. While Iowa moved quickly to deal with the introduction of Eurasian watermilfoil, efforts to address other ANS introductions has not been coordinated and effective. By using the Iowa Eurasian Watermilfoil Program as a model, Iowa has the opportunity to develop a program which has the potential to create a coordinated effort that will allow the state to effectively deal with both existing and potential ANS threats before they cause environmental and economic damage.

While the potential for federal funding provided incentive for the development of a state management plan, this plan was developed primarily to serve as an essential guide to state agencies, local governments, public and private organizations, and aquatic resource user groups in developing management strategies, designing public awareness/educational materials, and prioritizing activities related to ANS issues. While the Department of Natural Resources will be the state agency responsible for administration of this plan, it is expected that there will be broad participation in ANS programs and activities by various state and local entities. The *Plan for the Management of Aquatic Nuisance Species in Iowa* will provide guidance in coordinating these programs and activities.

The *Plan for the Management of Aquatic Nuisance Species in Iowa* is designed to provide coverage of all natural and man-made waterbodies within the state of Iowa as well as the Mississippi, Missouri, and Big Sioux Rivers. Efforts will be made to coordinate ANS management activities on the Mississippi River with the states of Wisconsin and Illinois, as well as the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. Similar efforts will be made to coordinate ANS management activities on the Missouri River with the state of Nebraska and the U.S. Army Corps of Engineers and on the Big Sioux River with the state of South Dakota.

The Iowa Aquatic Nuisance Species Task Force was responsible for developing the *Plan for the Management of Aquatic Nuisance Species in Iowa*. Members of the planning committee assumed an active role in the preparation of the plan by reviewing draft plans and providing guidance. A list of the task force members is provided in Appendix A. The Iowa Department of Natural Resources was the lead agency assigned to coordinate the drafting of the plan and the Iowa Eurasian Watermilfoil Program coordinator served as the task force chair. Throughout the development process, meetings of the task force were convened for review of the plan. Following review of the final draft, the plan was made available for 30 days for public review and comment. Public comments from this review process were considered and revisions have been made to the plan. (Appendix E)

The *Plan for the Management of Aquatic Nuisance Species in Iowa* will be reviewed and revised annually, or more frequently if needed to address the unexpected arrival of new ANS. Advances in knowledge of ANS management techniques could warrant alterations in proposed management strategies. The specific tasks employed to accomplish the goals and objectives of



the plan must remain flexible to assure efficiency and effectiveness. While this version of the *Plan for the Management of Aquatic Nuisance Species in Iowa* is a good starting point for identifying and integrating existing ANS programs, and implementing new programs, future editions will be necessary to fully achieve Iowa's ANS goals.

# AQUATIC NUISANCE SPECIES AUTHORITIES AND PROGRAMS

## State Authorities and Programs

The State of Iowa currently has a very limited number of statutory and regulatory authorities with which it addresses or potentially can address the issue of prevention and control of ANS. Those that do exist were developed in response to individual target species and specific concerns as they arose. Because of this, Iowa does not have a comprehensive, coordinated, and vigorously enforced policy framework to deal with ANS and their impacts. For this reason, one objective of Iowa's ANS management plan will be to identify gaps within state policies and statutes and develop recommendations for improvements. Such improvements may entail developing new legislation and regulations, revising existing authorities, and developing methods for improving enforcement, coordination, and information dissemination regarding new or existing authorities.

The following existing authorities and policies have been identified relative to Iowa's management of ANS.

### Teasel, multiflora rose, and purple loosestrife prohibited - exceptions (Code of Iowa, 317.25)

Prohibits the sale of purple loosestrife (*Lythrum salicaria*) within the state of Iowa. Specifies exemptions for sterile or non-aggressive varieties when used for ornamental purposes. Regulation administered by the Department of Agriculture and Land Stewardship.

### Iowa Eurasian Watermilfoil Law (Code of Iowa, 456A.37) See Appendix B.

Prohibits the transport of Eurasian watermilfoil on public roads, placing a trailer or launching a watercraft with Eurasian watermilfoil attached in public waters, and operating a watercraft in a marked Eurasian watermilfoil infestation area. Specifies criteria to be addressed in a state Eurasian Watermilfoil Management Plan. Regulation administered by the Department of Natural Resources.

### Prohibited stocking (Code of Iowa, 481A.83)

Prohibits the stocking or introduction of live fish into waters of the state of Iowa. Specifies exemptions for hooked bait fish and privately owned ponds and lakes. Regulation administered by the Department of Natural Resources.

### Licensed aquaculture units - requirements (Code of Iowa, 481A.143)

Prohibits the import of live fish, viable eggs, or semen of any species of the salmonid family (trout, salmon, or char) and ictalurid family (catfishes and bullheads), including hybrids without a fish importation permit. Requires that all fish, eggs, or semen must be inspected and found free of disease detrimental to the state's fishery resources. Regulation administered by the

Department of Natural Resources.

## **Federal Regulations**

The current federal effort regarding the management of ANS is a patchwork of laws, regulations, policies, and programs. At least twenty agencies currently work at researching and controlling non-indigenous species. Federal laws which apply directly to the introduction of non-indigenous species include the Lacey Act, the Federal Noxious Weed Act, the Federal Seed Act, the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, and the National Invasive Species Act of 1996. The Endangered Species Act could also have indirect application if an ANS was shown to threaten the survival of a federally listed species, such as the Higgin's eye pearly mussel (*Lampsilis higginsii*) or the Topeka shiner (*Notropis topeka*).

# **AQUATIC NUISANCE SPECIES PROBLEMS AND CONCERNS**

## **Introduction**

Several ANS have already been introduced and dispersed in Iowa by various pathways. The environmental and socio-economic costs resulting from ANS infestations will only continue to rise with further introductions. Although an awareness of the problems caused by ANS is emerging, the solutions are often not readily available. This comprehensive state plan for the management of ANS provides guidance for preparing management actions to address the prevention, control, and impacts of ANS that have or may invade and alter the aquatic resources of Iowa.

A newly introduced species, if it becomes established through reproduction, can disrupt the natural ecosystem by altering the composition, density, and interactions of native species. This disruption can cause significant alterations to foodwebs, nutrient dynamics, and biodiversity. New introductions also can cause costly socio-economic impacts even if effective prevention and control mechanisms are established. Eventually, each newly introduced species will become integrated into an ecosystem that is in a constant state of flux; or the population will not survive and become extinct (New York State Department of Environmental Conservation, 1993).

The number of new ANS introductions in Iowa will continue to grow as new and existing ANS become established in midwestern states, especially in those that border Iowa. Most of these introductions will be the result of human activities. There are many ways that organisms may be transported. For example: turtle traps or fish seines containing fragments of Eurasian watermilfoil may be transported from an infested waterbody to one that is uninfested.

Major pathways through which ANS are introduced into waterbodies include aquaculture, aquarium trade, commercial navigation, transport via vessel fouling, recreational boating and fishing, sale of bait fish, research activities, and distribution through interconnected waterways. In Iowa, there is very limited regulation of these pathways.

## **Threatened Impact of Aquatic Nuisance Species in Iowa**

In Iowa, many ANS represent a potential threat to the environment, industry, and the economy by creating negative impacts. These negative impacts include:

- Alterations in nutrient cycling pathways in aquatic ecosystems;
- Changes in the ecology of lakes and rivers;
- Decreased habitat value in infested waters;
- Decreased property values;
- Decreased recreational opportunities;
- Decreased water quality;
- Economic impact to shellfish industry;
- Fouled water intakes;
- Frequently burned out irrigation and water pumps;

- Impacts on power generation;
- Impeded water flow and interference with efficiency of water delivery systems;
- Increased risk of flooding due to increased biomass in water or clogging lake outlets;
- Increased safety concerns for swimmers;
- Loss of biodiversity;
- Stunted fish populations due to dense biomass of introduced species;
- Federal Threatened and Endangered Species Act listed species, such as the Higgin's eye pearly mussel (*Lampsilis higginsii*) or the Topeka shiner (*Notropis topeka*).

The following two sections on non-indigenous aquatic animals and non-indigenous aquatic plants provides information on those species which currently exist in Iowa or which represent a threat to the aquatic resources of Iowa. Draft lists for each category (non-indigenous aquatic animals and non-indigenous aquatic plants) have been prepared and are intended to provide a basis for discussion and further work identifying the presence, distribution, status, and threat of non-indigenous species. These lists will be updated, maintained, categorized, and standardized as new information is received and assimilated.

### **Non-indigenous Aquatic Animals**

A draft list of non-indigenous aquatic animals in Iowa is included in Appendix C and is based on existing data. As such, the list is undoubtedly incomplete as information on non-indigenous aquatic animals in Iowa is limited. In general, non-indigenous aquatic plants in Iowa have received far more research and management attention than ANS animals. The following ANS species are considered of special concern in Iowa; bighead carp, round goby, rudd, ruffe, rusty crayfish, spiny water flea, white perch, and zebra mussel. Currently, only the zebra mussel is considered a priority species. A discussion of each species follows.

**Bighead carp (*Hypophthalmichthys nobilis*).** The bighead carp is a large, deep bodied cyprinid introduced into North America from eastern Asia. This species is a filter feeder that strains planktonic organisms from the water with long comb-like gill rakers. While no data is presently available concerning the effects of this species on river ecosystems and their fisheries, observed habitat preferences suggest that bighead carp may directly impact populations of paddlefish (*Polyodon spathula*), as well as other commercially valuable filter feeders (Tucker et. al., 1998). Bighead carp are currently found in Iowa waters but do not appear to be causing any severe problems at this point. Because this situation may change as bighead carp become more wide spread in Iowa, monitoring of this species will be needed.

**Round goby (*Neogobius melanostomus*).** Both the round goby and the tubenose goby were introduced via ballast water into the St. Clair River, near Detroit in 1990. The tubenose goby has not thrived, but the round goby has spread into Lake Erie and Lake Michigan where the largest populations are found. The round goby was observed in the St. Louis River Estuary in Lake Superior during the summer of 1995. The primary concern with the round goby is the tremendous range expansion exhibited since its introduction in 1990. It is a very aggressive fish, and feeds voraciously upon bottom-feeding fishes (e.g., sculpin, darters, and logperch), snails, mussels, and aquatic insects. The Great Lakes fisheries, particularly those in Lake Michigan and Lake Erie, are threatened by this ANS due to its robust characteristics and ability to displace

native species from prime habitat and spawning areas (Jude, 1993). While the round goby has not been reported from Iowa waters, the rapid spread of this species in the Great Lakes suggests that it possesses a significant ANS threat to all midwestern states, including Iowa.

**Rudd (*Scardinius erythrophthalmus*).** Introduced into the United States in the early 1900's as a baitfish, this Eurasian native can now be found in 21 states, including five which border Iowa. Similar in appearance to the golden shiner (*Notemigonus crysoleucas*), the rudd is capable of growing to 20 inches in length. Currently, the rudd is one of the most rapidly spreading non-indigenous fishes in the United States. Presently, the greatest threat posed by the rudd is its ability to hybridization with the golden shiner which may endanger that species genetic integrity (Fuller, 1999). While little is known about the threat posed by rudd, its present proximity to Iowa indicates the need to monitor the spread of this ANS.

**Ruffe (*Gymnocephalus cernuus*).** A Eurasian fish of the perch family, the ruffe was introduced to North America in the 1980's, most likely through the ballast water of a seagoing vessel. This ANS has few predators, no commercial or recreational value and is replacing valuable native fishes. Since its introduction, the ruffe has become established in the nearshore waters of western Lake Superior, with an estimated average rate of range expansion of 18 shoreline miles per year. By the fall of 1994, ruffe populations were found in Michigan waters of Lake Superior and in August of 1995, three ruffe were discovered in a commercial harbor in northern Lake Huron, more than 300 miles east of the previously known range. The ruffe has become the most abundant species in Duluth Harbor. Based on observations of present ruffe migration rates along with native fish population displacement in Lake Superior, as well as past experience with ruffe in European waters, it appears that ruffe will be in direct competition with yellow perch and whitefish populations. Walleye populations are affected indirectly through a change in the food chain composition brought on by the proliferation of the ruffe. Based on moderate estimates of expected declines of yellow perch, whitefish, and walleye, the annual economic loss to the U.S. sport and commercial fisheries is estimated at approximately \$119 million if the ruffe suddenly proliferates to all regions (Leigh, 1994). While there have been no reports of ruffe from Iowa, this highly adaptive species poses a threat similar to that of the round goby.

**Rusty crayfish (*Orconectes rusticus*).** The normal distribution of the rusty crayfish includes Illinois, Indiana, and Ohio. However, in recent years its distribution has expanded as a result of usage of live crayfish as bait by anglers. When introduced into new habitats, it quickly displaces native crayfish and becomes over abundant. As a result of its voracious appetite, it competes with other aquatic organisms for food. Because its feeding behavior includes consumption of submerged aquatic vegetation, large populations of rusty crayfish can adversely impact native plant populations (Minnesota Department of Natural Resources, 1992). While originally reported as occurring in Iowa (Phillips, 1980), further investigation has revealed that the crayfish identified as the rusty crayfish is either a new species similar to the rusty crayfish or a northern variant of the golden crayfish (*Orconectes luteus*). Until the taxonomic problems associated with the rusty crayfish in Iowa are resolved, the threat posed by this species remains unknown.

**Spiny water flea (*Bythotrephes cederstroemi*).** The spiny water flea, a likely ballast water introduction, is a tiny crustacean with a sharply barbed tail spine. The northern European native was first found in Lake Huron in 1984. The spiny water flea is now found throughout the Great

Lakes and in some inland lakes. Although scientists do not know exactly what effect this invader will have on aquatic ecosystems, resource managers suspect that the water flea will compete directly with other zooplankton or larval fish for food (Caceres and Lehman, 1990). Although there have been no reports of the spiny water flea in Iowa, this ANS warrants continued attention because of its occurrence in several regional states.

**White perch (*Morone americana*).** A native to the Atlantic coast region of North America, the white perch invaded the Great Lakes in the 1950's through the Welland and Erie canals. Since its arrival, it has been associated with declines in both walleye (*Stizostedion vitreum*) and white bass (*Morone chrysops*) in those areas where it has become well established due to predation on the eggs of both of these species. This miniature member of the true bass family also feeds heavily on baitfish utilized by other game species. It is known to hybridize with white bass, resulting in the dilution of the gene pools of both species (Jude, 1997). In Iowa, the white perch represents a threat similar to that posed by the ruffe.

**Zebra mussel (*Dreissena polymorpha*).** The zebra mussel is one of the best known invaders of the Great Lakes region and other areas of the country where it has spread. Since introduction in the United States, this aquatic nuisance species has caused serious economic and ecosystem impacts and prompted passage of federal ANS legislation. The zebra mussel, a highly opportunistic mollusk, reproduces rapidly, and consumes microscopic aquatic plants and animals from the water column in large quantities. The potential impact on fisheries can be profound. Economic impacts are as pervasive as the ecosystem impacts. Due to the infestation of zebra mussel in their intake/discharge pipes, Great Lakes municipalities, utilities, and industries have incurred significant costs associated with monitoring, cleaning, and controlling infestations. According to a recent economic impact study, each of 84 Great Lakes water users reported average total expenditures of \$513,600 over the five-year period from 1989 to 1994 (Hushak et al., 1995). By the end of this century, water users across the country are expected to spend between \$2 billion and \$3 billion cleaning clogged water intakes. Commercial and recreational vessels and beach areas also are vulnerable to the negative impacts of the zebra mussel (Ruiz et al., 1995). Zebra mussels are currently found in the Mississippi River in Iowa where they are causing considerable ecological damage. However, there is no evidence that they have expanded their range into other waterbodies. Considered a priority species, zebra mussels represent a serious threat to Iowa's aquatic resources and deserve immediate management action.

### **Non-indigenous Aquatic Plants**

A draft list of non-indigenous aquatic plants in Iowa is included in Appendix D and is based on existing data. While this list is undoubtedly incomplete, non-indigenous aquatic plants in Iowa have received far more research and management attention than ANS animals. Because of this fact, the list of non-indigenous plants is probably more complete than the draft list prepared for non-indigenous aquatic animals. The following ANS species are considered of special concern in Iowa; curly-leaf pondweed, Eurasian watermilfoil, flowering bulrush, hydrilla, purple loosestrife, and reed canary grass. Two of these species, Eurasian watermilfoil and purple loosestrife, are currently considered priority species. A discussion of each species follows.

**Curly-leaf pondweed (*Potamogeton crispus*).** Curly-leaf pondweed is a perennial, rooted, submerged aquatic vascular plant that is native to Eurasia, Africa, and Australia. By 1950, most of the United States was infested by this species. Curly-leaf pondweed has a unique life cycle that gives it a competitive advantage over many native aquatic plants. This species may be photosynthetically active under thick ice, making it the first plant to appear after ice-out. By late spring, it may form dense mats which interfere with recreation and limit the growth of native aquatic plants. By early July, this plant senesces and forms vegetative propagules called turions. These turions are dispersed by water movement throughout a water body. Turions may also be transferred to uninfested waterbodies. These turions germinate in the fall, beginning a new life cycle (Catling and Dobson, 1985). Curly-leaf pondweed was first reported in Iowa from the Mississippi River in 1944. Today, it is widespread in Iowa and is usually not considered a significant problem. However, in shallow lakes it can grow dense enough to affect recreational boating and fishing. Also, it can alter the nutrient dynamics of fertile water bodies, causing heavy summer algae blooms following the mid-summer senescence of this species. Because of these problems, this species may require management activities in Iowa.

**Eurasian watermilfoil (*Myriophyllum spicatum*).** Unintentionally introduced to North America from Europe in the 1940's, Eurasian watermilfoil has undergone rapid spread and is now found in 45 states and three Canadian provinces. Watermilfoil can proliferate to high densities in lakes, producing habitat conditions that cause serious impairments to commercial fishing and water recreation such as boating, fishing, and swimming. This plant is capable of growing under a wide range of environmental conditions and on a variety of bottom substrates. Although this plant typically grows in shallow water, under clear water conditions it can exist in water up to 30 feet or more in depth. The plant's surface canopy can out-compete and eliminate native aquatic vegetation, as well as threaten native fish and wildlife populations (Smith and Barko, 1990). While probably present in the Mississippi River in the late 1980's, the first report of Eurasian watermilfoil in Iowa occurred in 1993 when an infestation was discovered in Crystal Lake, Hancock County. Because of concern over the threat of Eurasian watermilfoil, this discovery led to passage of legislation in 1996 to deal with this ANS. While eradication efforts have been quite successful in Iowa, Eurasian watermilfoil is considered a priority species which will require ongoing management actions.

**Flowering rush (*Butomus umbellatus*).** Flowering rush is an aquatic perennial plant with showy pink flowers. It grows in lakes, rivers, marshes, and other wet areas. A native of Europe, Asia, and Africa, it was introduced into North America over 100 years ago as an aquatic ornamental plant. Flowering rush is highly prolific and can exist in three forms; terrestrial, emergent, and submergent. When flowering rush becomes established, it creates dense stands which out compete native species and disrupts natural ecosystems. It can also affect recreational use of lakes and rivers by creating dense stands of both emergent and submerged forms in water depths less than 10 feet (Minnesota Department of Natural Resources, 1992). While not known to exist in Iowa, the fact that it occurs in Minnesota, Wisconsin, and Illinois suggests the likelihood that this species could potentially find its way into Iowa waterbodies.

**Hydrilla (*Hydrilla verticillata*).** Introduced into Florida waters in the early 1960's, this ANS has spread rapidly throughout the southeastern United States and has found its way into aquatic



ecosystems as far away from its point of introduction as Washington state. A highly prolific aquatic plant, this species is capable of growing 10 inches per day. Hydrilla can out compete native vegetation by photosynthesizing under low light and forming a carpet thick enough for ducks to walk on. It shades out other aquatic plants and reduces the diversity of aquatic vegetation, fish, and aquatic animals. Hydrilla also clogs waterways, making them inaccessible to swimmers and boaters (Flack and Furlow, 1996). While it was initially thought that the northward spread of hydrilla in the United States would be limited by climatic conditions, recent discoveries would seem to indicate that this is not the case. In 1972, an infestation of hydrilla was confirmed in Iowa. This infestation occurred in an aquatic garden in Pleasant Valley, Scott County, and appeared to have been introduced with the ornamental plants which had been planted in the pond. These ornamentals included water hyacinths (*Eichhornia crassipes*) which were purchased annually from suppliers in Florida. This population was chemically treated by the owner of the pond and appears to have been eradicated before it was spread to uninfested waters (Guehler and Blackburn, 1974). This confirmed report of hydrilla in Iowa indicates that new infestations by this ANS must be considered highly possible.

**Purple loosestrife (*Lythrum salicaria*).** Purple loosestrife is a perennial wetland plant from Europe and Asia that was introduced to the east coast of North America in the 1800's. Purple loosestrife is an extremely adaptive invader of marshes and lakeshores where it becomes established and rapidly out competes native cattails and other wetland plants. Highly prolific, a single plant can produce over two million seeds. Purple loosestrife also is capable of sprouting from fragments of the plant. This non-indigenous plant, while beautiful in appearance, does not provide cover, food, or nesting sites for a wide range of native wetland animals including ducks, geese, rails, bitterns, muskrats, frogs, toads, and turtles (Thompson et al., 1992). Development of wetland areas and disturbance of these moist soils increases the chances of invasion of purple loosestrife. The lack of natural predators allows it to spread unchecked (Aulwes, 1999). While currently present in Iowa, purple loosestrife has yet to cause the level of ecological disruption that other states have experienced. Despite this fact, purple loosestrife is considered a priority species requiring immediate management action.

**Reed canary grass (*Phalaris arundinacea*).** Reed canary grass is a common inhabitant of Iowa wetlands and marshes, where it forms dense clumps that typically exclude all other species. While considered a native species in the temperate regions of North America, introductions of European and Asian strains of this species and the extensive development of cultivars for agricultural uses have significantly altered the genetics of this species. Because of its rapid growth rate, it is frequently used to stabilize banks after road construction. Because of tolerance to seasonal flooding, this species has also been planted extensively on floodplains. Reed canary grass thrives in wetlands subject to nutrient runoff and represents a threat to shallow wetlands located in agricultural areas (Umbanhowar, 1996). In Iowa, reed canary grass has become the predominant aquatic plant inhabiting the shorelines of natural lakes and marshes, where it has displaced other native species. While its threat as an ANS in Iowa is not clearly understood, the fact that it is spreading and becoming a dominant species in aquatic ecosystems in Iowa warrants continued monitoring and evaluation.

## **Status of Aquatic Nuisance Species in Iowa**

ANS problems are relatively new to Iowa. Several of the special concern species mentioned in the previous text have become established in Iowa and are beginning to pose threats to aquatic ecosystems. Currently, three ANS (Eurasian watermilfoil, purple loosestrife, and zebra mussels) have begun to create ecological and socio-economic problems. These species are currently considered priority ANS in Iowa. Other ANS that have been reported as occurring in Iowa that have not yet become serious problems include bighead carp, curly-leaf pondweed, hydrilla, reed canary grass, and rusty crayfish. Additional ANS exist in states bordering Iowa and pose additional threats to Iowa's water resources.

In an effort to begin addressing ANS concerns in Iowa, legislation was passed in 1996 to deal with Eurasian watermilfoil infestations. As a result of passage of this legislation, the Iowa Eurasian Watermilfoil Program was established to address the threats posed by this non-indigenous species. This program focused on:

- detection and prevention of accidental introductions of Eurasian watermilfoil into Iowa,
- public awareness and education activities regarding Eurasian watermilfoil,
- control and/or eradication of Eurasian watermilfoil in public waters, and
- development of containment strategies for Eurasian watermilfoil infestations.

The purpose of this management plan is to expand the scope of efforts in Iowa to deal with the threats posed by all ANS. Schmitz (1990) and Kurdilla (1988) noted that many efforts to address ANS problems are implemented after the species has arrived and become widely distributed. As a result, these efforts are often reactive, too late, and ineffective. Effective and comprehensive regulations and management plans that prevent the introduction and spread of ANS in the first place are needed, rather than efforts that attempt to address the problem after an ANS has become established. By addressing the threat of ANS to Iowa's water resources at this point in time, it is hoped that the problems that other states have experienced can be either minimized or avoided all together.

## **Priorities for Action**

The purpose of the *Plan for the Management of Aquatic Nuisance Species in Iowa* is to coordinate all ANS management actions currently in progress within Iowa; to identify and implement additional ANS management actions, especially those relating to priority ANS; and to develop funding mechanisms to implement and staff an Iowa Aquatic Nuisance Species Management Program. Initially, this plan will focus on the priority species listed below. However, as this program grows and evolves, the focus of the plan will shift to the development and implementation of new programs designed to prevent or control the introduction of new ANS into Iowa waterbodies.

## Priority Species

Non-indigenous species currently considered to be priority species worthy of immediate or continued management actions include:

- Eurasian watermilfoil (*Myriophyllum spicatum*)
- purple loosestrife (*Lythrum salicaria*)
- zebra mussel (*Dreissena polymorpha*)

The management actions outlined in this plan focus on these priority species. By addressing the pathways of introduction for priority species, the introduction of other lower priority, or perhaps unidentified ANS, may also be prevented, since many share common pathways of introduction.

# MANAGEMENT ACTIONS

## Introduction

The goals of the *Plan for the Management of Aquatic Nuisance Species in Iowa* are designed to address different stages of aquatic nuisance species invasion: (1) the introduction of new ANS into the waters of Iowa from other parts of the continent or world; (2) the spread of an established, reproducing ANS population in Iowa from infested to uninfested waterbodies; and (3) the colonization of ANS populations within previously uninfested waterbodies, including the harmful impacts resulting from colonization.

The three goals on which the *Plan for the Management of Non-indigenous Aquatic Nuisance Species in Iowa* is based are as follows:

### **Goal I: Minimize the risk of further introductions of ANS into the state of Iowa.**

**Rationale:** The introduction of ANS into state waters may cause environmental, socio-economic, and/or public health impacts. The potential severity of these impacts is not known or recognized on a wide-scale basis, impeding the investment of resources needed to prevent new ANS introductions. Also, a delayed "crisis-response" approach often limits the vision and opportunity for the prevention of new introductions, leaving the state with ANS management problems that are economically costly, technically challenging, if not unfeasible to solve, and frequently irreversible. Although several damaging ANS already have been introduced into Iowa, new introductions are still highly likely. To effectively address ANS problems in Iowa and the rest of the United States, prevention of new introductions is essential.

Multiple mechanisms transport ANS into state waters; some such mechanisms transcend the authority of the state to control. A prime example is commercial barge traffic on the Mississippi and Missouri Rivers. The absence of interjurisdictional authority is problematic in regulating these interstate vectors that are capable of transporting ANS to Iowa. Cooperative efforts are necessary between state, federal and interstate agencies to promulgate and enforce regulations to ensure that transport mechanisms and management practices are employed to prevent ANS introductions. Current technology is frequently inadequate to prevent new introductions of ANS into state waters. Research on prevention strategies to minimize ANS transport is critical in the effective prevention of new introductions.

Other significant transport mechanisms that increase the potential for new introductions of ANS into state waters include the aquaculture business, recreational boating, the bait industry, fishing, waterfowl hunting, and fish stocking activities, all of which have the potential to introduce ANS as well as associated parasites and other disease organisms. In some cases, such activities are subject to little or no regulation. In cases where laws and regulations do exist, they are frequently not well-publicized and/or enforced. User groups and businesses that could potentially introduce ANS into Iowa are generally not adequately informed of ANS issues, impacts, and prevention practices.

**Goal II: Limit the spread of established populations of ANS into uninfested waters in Iowa.**

**Rationale:** The spread of established populations of ANS into uninfested state waters is largely via human activity, such as boat transfers, fishing, waterfowl hunting, commercial barge traffic, bait handling, and ornamental and landscape practices. Limiting the spread of such populations is problematic due to the numerous pathways of dispersal, the complex ecological characteristics associated with ANS populations, and the lack of feasible technology that is needed to limit the spread.

Many public and private aquatic resource user groups are not aware of existing infestations of ANS in state waters, and why they cause problems locally, regionally, and beyond. The probability of ANS spread to other waters can increase when resource user groups are not aware of how their routine activities can cause the dispersal of ANS into uninfested waterbodies. An information/education program is needed to provide information on why the spread of ANS populations needs to be limited, how the ANS populations can be reduced, and the value of a healthy aquatic ecosystem that supports a diverse native aquatic community. Information/education programming is also critical to strengthening public/private support for and statewide participation in ANS management strategies.

It is difficult to manage the spread of ANS, since infestation frequently occurs in watersheds that occupy more than one state. Cooperation among states sharing ANS infested watersheds is needed to implement consistent management strategies that will effectively limit the spread of ANS populations.

**Goal III: Eradicate or control to a minimal level of impact the harmful ecological, economic, social, and public health impacts resulting from infestation of ANS in Iowa.**

**Rationale:** The infestation of ANS in state waters can cause, to varying degrees, ecological, economic, social, and public health impacts. Strategies to control ANS in infested water bodies, in an effort to abate their impacts, are not always known or technically and/or economically feasible. Control strategies also must be designed so as not to cause significant environmental impacts.

The infestation of ANS in state waters can alter or disrupt existing relationships and ecological processes. Without co-evolved parasites and predators, some ANS out-compete and even displace native aquatic plant or animal populations. As part of this process, the invading species also can influence, to some extent, the foodwebs, nutrient dynamics, and biodiversity of the ecosystem. To abate the ecological impacts of the invading organism, it is necessary to understand the mechanisms by which the species disrupts the natural balance of the ecosystem.

Aquatic resources provide valuable economic benefits for the region/state, some of which include commercial and sport fisheries; recreational use; and water usage by manufacturers, industry, and electric power companies. (Some introduced aquatic species have provided economic benefits, such as those supporting the aquaculture and sport fishing industry.) Several ANS have been found to cause adverse economic impacts. For instance, the zebra mussel infests

the intake/discharge pipes of hundreds of facilities that use raw water from the Great Lakes, causing extensive monitoring and control costs. Eurasian watermilfoil forms thick mats on the surface of the water, which can interfere with many types of water recreational activities, such as swimming, water skiing and sailing. The invasion of the ruffe in Duluth-Superior Harbor appears to be causing the displacement of perch and whitefish populations, which could pose a serious threat to the commercial and sport fishing industry if the ruffe invasion spreads throughout the Great Lakes and inland state waters.

Organisms invading state waters can threaten public health through the introduction of disease, concentration of pollutants, contamination of drinking water, toxic algae blooms and other harmful human health effects (Ohio Sea Grant College Program, 1995). An extensive monitoring system for these ANS needs to be established to prevent human health problems from occurring in the region/state.

It is often difficult to access the ecological, socio-economic, and public health impacts of ANS in terms that are meaningful to decision makers and the general public. Actions to abate ANS impacts through control strategies are frequently impeded by circumstances, such as lack of resources needed to effectively develop and implement control strategies.

## **Management Objectives**

Eight objectives have been established which describe the strategies which the state of Iowa will use to accomplish the goals of the *Plan for the Management of Aquatic Nuisance Species in Iowa*.

**Objective 1: Coordinate all ANS management programs within Iowa and collaborate with regional and national ANS programs.**

**1A. Problem:** Currently, ANS management authority in Iowa is fragmented and the responsibility of various state agencies. Iowa needs an organized and centralized approach to ANS management to prevent duplication of effort and eliminate gaps in coverage of ANS issues. Furthermore, state ANS management efforts need to be coordinated with regional and national efforts.

**1A1. Strategic Action:** Implement a state ANS management program..

**1A1a. Task:** Receive approval of the *Plan for the Management of Aquatic Nuisance Species in Iowa* from the Federal Aquatic Nuisance Species Task Force. Approval to be received by October 31, 1999.

**1A1b. Task:** Receive approval of the *Plan for the Management of Aquatic Nuisance Species in Iowa* from the Iowa Department of Natural Resources Commission. Approval to be received by December 31, 1999.

**1A1c. Task:** Implement the Iowa Aquatic Nuisance Species Program. Implementation to be completed by July 01, 2000.

**1A2. Strategic Action:** Hire the personnel necessary to staff the Iowa Aquatic Nuisance Species Program.

**1A2a. Task:** Hire a director (1.0 FTE) for the Iowa Aquatic Nuisance Species Program. This position will coordinate and direct the Iowa Aquatic Nuisance Species Program. Position to be filled by July 01, 2000.

**1A2b. Task:** Hire eight seasonal technicians (2.0 FTE) for the Iowa Aquatic Nuisance Species Program. These three month seasonal positions will report directly to the program coordinator and will work out of the four regional fisheries offices, two technicians per region.

**1A2c. Task:** Establish and support an office at an existing Iowa DNR facility to house the Iowa Aquatic Nuisance Species Program.

**1A3. Strategic Action:** Develop partnerships with other states to evaluate the regional ANS threat and coordinate regional ANS management activities.

**1A3a. Task:** Participate in regional and national forums to ensure that ANS efforts in Iowa remain current and are coordinated with regional and national programs.

**1A3b. Task:** Establish working partnerships with ANS management programs in regional states to facilitate the sharing of data and coordination of management activities.

**Objective 2:** Prevent the introduction of new ANS into Iowa waters.

**2A. Problem:** New introductions of ANS into Iowa waters have the potential to cause environmental and economic damage. Prevention is the most cost effective and environmentally sound method of addressing this problem. Iowa presently has no comprehensive program to prevent new ANS introductions. The success of this objective is dependent upon the implementation of educational efforts described in Objective 4.

**2A1. Strategic Action.** Identify those ANS that have the greatest potential to infest Iowa aquatic resources. As part of this effort, identify existing and potential pathways that facilitate new ANS introductions.

**2A1a. Task:** Develop a regional listing of ANS and evaluate the potential threat posed by these organisms to aquatic resources in Iowa.

**2A1b. Task:** Compile information on the movement of ANS on a regional scale and use these findings to help predict the potential for invasion of these species into state waters.

**2A1c. Task:** Identify existing and potential transport mechanisms that might facilitate the introduction of these ANS into state waters.

**2A2. Strategic Action:** Identify, through use of risk assessment, those waterbodies at greatest risk of ANS infestations.

**2A2a. Task:** Compile life history and habitat preference information on those regional ANS which pose a threat of infestation into Iowa waters.

**2A2b. Task:** Conduct assessment of Iowa's aquatic resources and identify those at risk of ANS infestation(s). Compile a listing of Iowa's aquatic resources and classify their ANS risk as high, moderate, or low. This listing will be utilized in conducting the monitoring activities described in Objective 5.

**2A3. Strategic Action:** Establish interjurisdictional approaches to facilitate legislative, regulatory, and other actions needed for the prevention of new ANS introductions into state waters.

**2A3a. Task:** Participate in regional and national forums to ensure that efforts in Iowa to prevent the introduction of new ANS are coordinated with regional and national programs.

**2A3b. Task:** Establish and support coalitions among regional states, including state ANS officials, state natural resource agencies, state fisheries managers, recreational boater and angler groups, and other concerned resource users. Assist coalitions in promoting federal legislation and programmatic support for the prevention of new ANS introductions in the region/state.

**2A3c. Task:** Establish and support an interjurisdictional process to ensure compatibility and consistency between regional states and federal agencies. Federal consistency, a tool implemented by coastal management programs to ensure that federal activities/projects are compatible with enforceable policies of the state, is recommended to facilitate interjurisdictional endeavors.

**2A3d. Task:** Initiate and implement a regional approach, through cooperation with federal and other state ANS programs, to prevent new introductions of ANS into regional waters.

**2A4. Strategic Action:** The Iowa Department of Natural Resources will establish four



committees to work with representatives of businesses and industries that have been identified as potential pathways for ANS introductions to identify voluntary or regulatory measures to prevent new ANS introductions. Recommendations from each committee will be completed by December 31, 2000.

**2A4a. Task:** Establish a committee with cargo vessel representatives and other affected groups to identify measures to prevent further introductions of ANS into Iowa's waters through commercial shipping practices.

**2A4b. Task:** Establish a committee with representatives of the recreational boating industry, marinas, and other affected groups to identify measures to prevent further introductions of ANS into Iowa's waters through recreational boating activities.

**2A4c. Task:** Establish a committee with representatives of the aquarium trade industry, aquatic garden suppliers, aquatic mail order catalog industry, plant importers, and other affected groups to identify measures to prevent further introductions of ANS into state waters through this pathway.

**2A4d. Task:** Establish a committee with representatives of the aquaculture industry, commercial bait dealers, commercial fishermen, turtle trappers, clambers, and other affected groups to identify measures to prevent further introductions of ANS into state waters through this pathway.

**2A5. Strategic Action:** Conduct an effective information/education program on the prevention of new ANS introductions in state waters. The tasks related to this strategic action are outlined in Objective 4.

**Objective 3:** Eradicate or contain new ANS introductions or established populations as quickly as possible; prevent or slow their spread into uninfested areas; and reduce the size of established ANS populations.

**3A. Problem:** The state of Iowa must be able to rapidly detect new ANS introductions and the spread of established ANS so that emergency response plans can be immediately implemented while there is the potential to eradicate the problem species. Accurate information is needed about which ANS are currently present in Iowa and an estimate of their population numbers and/or densities. This information needs to be made available to appropriate authorities. The success of this objective is dependent upon the implementation of the monitoring efforts described in Objective 5.

**3A1. Strategic Action:** Survey Iowa lakes, rivers and wetlands on a periodic basis to establish an accurate assessment of ANS presence and make this data available statewide to all affected stakeholders. The tasks related to this strategic action are outlined in Objective 5.

**3A2. Strategic Action:** Identify and prioritize existing non-indigenous aquatic species to determine which warrant ANS control and/or eradication management activities.

**3A2a. Task:** Develop a complete listing of non-indigenous aquatic species currently existing in Iowa based on an accurate survey of available scientific data.

**3A2b. Task:** Establish an advisory group, with representation from all stakeholders affected by ANS problems in the state, to guide in the selection of non-indigenous species that merit ANS management.

**3A2c. Task:** Develop a process to prioritize those species determined to merit ANS management. Priority species designation to be given those ANS that represent a serious threat to aquatic resources.

**3A3. Strategic Action:** Monitor the spread of those ANS determined to be priority species. The tasks related to this strategic action are outlined in Objective 5.

**3A4. Strategic Action:** Identify and prioritize regional ANS which have not yet been introduced into Iowa waterbodies to determine which species will warrant control and/or eradication management activities.

**3A4a. Task:** Develop a complete listing of regional ANS species.

**3A4b. Task:** Establish an advisory group, with representation from all stakeholders affected by ANS problems in the state, to guide in the selection of regional ANS species that will merit ANS management, should they become introduced into Iowa waterbodies.

**3A4c. Task:** Develop a process to prioritize those regional species that will merit ANS management, should they become introduced into Iowa waterbodies. Priority species designation to be given those ANS that represent a serious threat to aquatic resources.

**3A5. Strategic Action:** Monitor state waterbodies for the introduction of those regional ANS determined to be priority species. The tasks related to this strategic action are outlined in Objective 5.

**3A6. Strategic Action:** Develop and implement management strategies to limit the spread of each ANS determined to be a priority species.

**3A6a. Task:** Develop voluntary and regulatory strategies to limit the spread of

priority ANS based on identified dispersal pathways.

**3A6b. Task:** Identify the best available technology for each management strategy and include an assessment of environmental impact where necessary.

**3A6c. Task:** Implement a watershed approach to limit the spread of ANS within the state.

**3A6d. Task:** Establish cooperative policies with states sharing watersheds to limit the spread of regional ANS populations.

**3B. Problem:** Iowa currently has an emergency response plan in place to quickly address the spread of Eurasian watermilfoil. However, no plans exist to address the spread of other existing ANS. Also, no plans exist to respond to the introduction of new ANS. Small populations of newly introduced ANS are most vulnerable to eradication. Without previously developed plans, new ANS populations can become established while agencies are developing and agreeing upon appropriate eradication measures.

**3B1. Strategic Action:** Develop emergency response plans for ANS identified as priority species. Actions outlined in these emergency response plans, when implemented will prevent the establishment and spread of these species, or minimize their impacts. The emergency response plans will include elements for implementation, funding, equipment and staffing needs, and stakeholder input.

**3B1a. Task:** Develop emergency response plans for existing priority ANS. Ongoing activity for Eurasian watermilfoil. Plans need to be prepared for purple loosestrife and zebra mussels.

**3B1b. Task:** Develop emergency response plans for those ANS identified as posing an immediate threat to Iowa waterbodies.

**3C. Problem:** Established populations of ANS in Iowa waters can spread to uninfested waters, thereby increasing their potential for economic and ecological damage.

**3C1. Strategic Action:** Develop and implement control strategies, including physical, chemical and biological mechanisms, to eradicate or reduce populations of priority ANS in state waters. These control strategies are to be based on impact assessments of those ANS identified as causing detrimental ecological, economic, social and/or public health impacts.

**3C1a. Task:** Establish protocols that will provide guidance in designing and implementing control strategies. These protocols should contain the following criteria for design of such methods:

1. *The control strategy must not create problems greater than those related to the ANS itself;*
2. *A control strategy must not have serious, long-term impacts to the environment or non-target organisms;*
3. *There must be a need to control the ANS due to causing, or the potential of causing, adverse impacts;*
4. *The control strategy must not permanently reduce (a temporary withdrawal period may be necessary for some chemical applications), the human utilization of the water body (with the exception of those waters with special resource designation), or threaten human health;*
5. *Control efforts should be directed against the areas significantly impacted, and not be broad and general in nature;*
6. *The control strategy must have a reasonable likelihood of succeeding.*

**3C1b. Task:** Support scientific research between state and federal agencies and academic institutions that investigates potential control strategies and associated environmental impacts.

**3C1c. Task:** Establish mechanisms to ensure that the control strategies developed and implemented by the state are done so in coordination with federal agencies, local governments, interjurisdictional organizations and other appropriate entities.

**3C1d. Task:** Establish mechanisms to ensure that the control strategies are based on the best available scientific information and conducted in an environmentally sound manner.

**3C2. Strategic Action:** Minimize the dispersal of established ANS in Iowa.

**3C2a. Task:** Establish a list of ANS plants and animals prohibited for sale and transport in Iowa.

**3C2b. Task:** Develop guidelines and regulations to ensure the cleaning of water-based equipment such as dredges, commercial fishing nets, turtle traps, etc., that may accidentally spread ANS when moved from infested to uninfested waters.

**3C2c. Task:** Develop regulations to quarantine waterbodies to prevent the spread of ANS into uninfested waters.

**3C2d. Task:** Develop and implement educational strategies designed to prevent the spread of ANS by educating the public and specific groups about ANS transportation pathways. The tasks related to this strategic action are outlined in Objective 4.

**3C3. Strategic Action:** Manage large populations of established ANS to reduce their size or minimize their expansion.

**3C3a. Task:** Develop ANS management plans for waterbodies identified as being infested.

**3C3b. Task:** Eradicate, where feasible, identified populations of Eurasian watermilfoil. Ongoing activity for Eurasian watermilfoil.

**3C3c. Task:** Implement a purple loosestrife control program in cooperation with state land management agencies, county weed commissioners, and other entities. This program should be based on integrated pest management principles, including the release of biocontrol agents (insects) as part of the management strategy.

**3C4. Strategic Action:** Develop and implement means of adapting human activities to accommodate infestations of ANS.

**3C4a. Task:** Support scientific research between state and federal agencies and academic institutions that investigates potential means of adapting human activities to accommodate infestations of ANS where the eradication and/or control of these species is not feasible. Develop a technology transfer program to be used in distributing research findings.

**3C4b. Task:** Seek potential beneficial and/or alternative uses for ANS and disseminate this information through a technology transfer program.

Objective 4: Educate appropriate resource user groups about the importance of preventing the introduction and spread of ANS, and how their harmful impacts can be reduced.

**4A. Problem:** New ANS introductions occur through a variety of pathways, most of which are closely related to human activities. Once introduced and established, the spread of existing ANS is often facilitated by additional human activities. Currently, public awareness of these issues and threats is inadequate to effectively address the problems of introduction and spread of ANS.

**4A1. Strategic Action:** Develop and distribute ANS educational materials to the general public that will increase awareness of the ANS problem. During the past three years, most of the following tasks have been addressed with regard to Eurasian watermilfoil as part of the Iowa Eurasian Watermilfoil Program.

**4A1a. Task:** Develop and distribute educational materials to educate the public about what ANS are, the problems they cause, and the avenues available for the public to help address this issue. Ongoing activity for Eurasian watermilfoil.

**4A1b. Task:** Develop and distribute ANS fact sheets and wallet ID cards for priority species. These fact sheets will be used to increase public awareness of the impacts of these ANS and will include information describing the methods available for preventing their spread. Species initially addressed will include Eurasian watermilfoil, purple loosestrife, and zebra mussel. Materials will include a contact number and information as to where potential sightings can be reported and specimens submitted for final identification. Ongoing activity for Eurasian watermilfoil.

**4A1c. Task:** Write and distribute quarterly press releases focusing on problems associated with ANS and how to prevent the introduction of new ANS and limit the spread of existing ANS. Ongoing activity for Eurasian watermilfoil.

**4A1d. Task:** Produce public service announcements that inform the general public about the problems associated with ANS and what can be done to prevent the introduction of new ANS and limit the spread of existing ANS. Ongoing activity for Eurasian watermilfoil.

**4A1e. Task:** Develop and distribute ANS curriculum materials for Iowa schools. Materials will focus on grades 5-12 and will be tied to existing Iowa Department of Natural Resources environmental science curriculum materials. The information will be shared with teachers at Iowa Department of Natural Resources teacher training workshops and will emphasize the concepts of ANS and why they are a threat to Iowa aquatic ecosystems.

**4A1f. Task:** Make presentations on ANS issues to lake protective associations, fishing clubs, local conservation groups (i.e. county Izaak Walton League chapters), gardening clubs, and other affected stakeholders. These presentations will serve as a vehicle for the distributions of ANS educational materials to these aquatic resource users. Ongoing activity for Eurasian watermilfoil.

**4A1g. Task:** Maintain and upgrade ANS information, both technical and non-technical, on the Iowa Department of Natural Resources website <http://www.state.ia.us/fish>. Ongoing activity for Eurasian watermilfoil, purple loosestrife, and zebra mussel.

**4A1h. Task:** Write articles about ANS for publication in magazines (i.e. *Iowa Conservationist*). Ongoing activity for all ANS.

**4A2. Strategic Action:** Develop and distribute ANS educational materials targeted at specific pathways of introduction that involve the public.

**4A2a. Task:** Develop and distribute a brochure dealing with the spread of ANS via the release of aquarium animals and aquatic ornamental plants. This brochure will be provided to pet stores and garden centers for distribution to

customers.

**4A2b. Task:** Include ANS information in the annual *Iowa Fishing Regulations* and the *Iowa Hunting Regulations*. Ongoing activity for Eurasian watermilfoil and zebra mussel.

**4A2c. Task:** Develop and distribute a brochure dealing with the spread of ANS via recreational boating activities. This brochure will be provided to all county recorders for distribution to boat owners when they renew their boat licenses. Ongoing activity for Eurasian watermilfoil. Brochures will also be made available to all boat dealers for distribution to each purchaser of a new boat in Iowa.

**4A2d. Task:** Develop and post ANS signs at all public boat ramps in Iowa. Infested sites will be posted alerting boaters to the presence of existing ANS. For waterbodies where no infestations exist, signs will be posted warning boaters to clean aquatic vegetation from their boats, trailers, and gear before leaving the boat ramp. Ongoing activity for Eurasian watermilfoil.

**4A2e. Task:** Monitor public boat ramps to distribute ANS educational materials. Monitoring will be conducted by Iowa Aquatic Nuisance Species Program seasonal employees and Iowa Department of Natural Resources conservation officers. Ongoing activity for Eurasian watermilfoil.

**4A2f. Task:** Write articles for gardening magazines, newsletters, and newspapers that explain ANS issues concerning ornamental aquatic plants and detail existing state quarantines that prohibit the sale of certain aquatic noxious weeds.

**4A2g. Task:** Prepare ANS brochures and fact sheets in cooperation with the Iowa Department of Agriculture and Land Stewardship for distribution by the Iowa State University Extension Service.

**4B. Problem:** Several business and commercial interests in Iowa represent identified pathways for the introduction of new ANS. Current educational efforts are inadequate to help these stakeholders understand and address the problems that they pose to Iowa's aquatic resources.

**4B1. Strategic Action:** Develop and distribute educational materials targeting specific pathways of introduction to appropriate business and commercial interests.

**4B1a. Task:** Develop and distribute ANS educational materials to cargo vessel representatives and other affected groups to alert them to ANS issues and the steps they can take to prevent further introductions of ANS into Iowa's waters through commercial shipping practices.

**4B1b. Task:** Develop and distribute ANS educational materials to the recreational boating industry, marinas, and other affected groups to alert them to ANS issues and the steps they can take to prevent further introductions of ANS

into Iowa's waters through recreational boating activities.

steps  
through

**4B1c. Task:** Develop and distribute ANS educational materials to the aquarium trade industry, aquatic garden suppliers, aquatic mail order catalog industry, plant importers, and other affected groups to alert them to ANS issues and the steps they can take to prevent further introductions of ANS into state waters through this pathway.

**4B1d. Task:** Develop and distribute ANS educational materials to the aquaculture industry, commercial bait dealers, commercial fishermen, turtle trappers, clambers, and other affected groups to alert them to ANS issues and the steps they can take to prevent further introductions of ANS into state waters through this pathway.

**4C. Problem:** Resource managers in Iowa lack information to effectively identify and manage ANS problems.

**4C1. Strategic Action:** Develop and distribute ANS identification and management information to resource agency staff.

**4C1a. Task:** Distribute ANS fact sheets and wallet ID cards to all Iowa Department of Natural Resources and Iowa Department of Agriculture and Land Stewardship agency field staff and Iowa State University Extension Offices.

**4C1b. Task:** Distribute ANS fact sheets and wallet ID cards to lake protective associations, municipalities using surface water supplies, city park departments, county conservation boards, and other entities with aquatic resource management responsibilities.

**4C1c. Task:** Develop an ANS slide library to be housed with the state ANS coordinator. These slides will be made available to resources agencies as appropriate.

**4C1d. Task:** Maintain and upgrade ANS information, both technical and non-technical, on the Iowa Department of Natural Resources website <http://www.state.ia.us/fish>. Ongoing activity for Eurasian watermilfoil, purple loosestrife, and zebra mussel.

**4C1e. Task:** Organize and facilitate ANS workshops for state aquatic resource managers. These workshops will emphasize ANS identification and management.

**4C1f. Task:** Develop and maintain a list of experts to whom ANS samples can be sent for identification. This list of experts will be published on the ANS web site.



**4C1g. Task:** Make presentations on ANS identification and management to lake protective associations, county weed commissioners, universities and colleges, volunteer water quality monitors, extension service personnel, professional resources management societies and organizations, and other interested parties.

**4C1h. Task:** Develop a technology transfer program to be used in distributing the research findings obtained as the result of Objective 6 activities.

**4C1i. Task:** Prepare state ANS management plans for priority species. A state ANS management plan has already been prepared for Eurasian watermilfoil. Using that plan as a model, similar plans will be prepared for purple loosestrife and zebra mussels. These plans will provide resource managers with information needed to deal effectively with these species.

**4D. Problem:** Decision-makers are often unaware of ANS problems and solutions. Their lack of information can cause them to be unwilling to provide support for ANS projects.

**4D1. Strategic Action:** Develop and provide ANS informational briefings and educational materials to key decision-makers.

**4D1a. Task:** Organize and facilitate field days for state legislators and their staff personnel. These field days will involve a trip to one or more infested sites and emphasize the problems caused by ANS currently found in Iowa along with the actions required to eliminate or minimize the problem. Potential legislative solutions will be highlighted.

**4D1b. Task:** Distribute an annual report of ANS projects and activities to state legislators. This report will detail the current status of ANS management in Iowa and will highlight successful prevention and control projects and activities.

**4D1c. Task:** Distribute educational materials to state legislators emphasizing the problems associated with ANS not yet found in Iowa. These materials will be used to stress the importance of preventing introduction of these ANS into Iowa.

Objective 5: Monitor state waters to determine the occurrence and distribution of ANS.

**5A. Problem:** Numerous potentially damaging ANS are currently found in the midwestern United States and are spreading closer to Iowa waters. Presently, there is no regional mechanism in place for sharing information concerning the occurrence and distribution of non-native aquatic species or their potential for becoming ANS. Coordination of regional ANS monitoring is needed to improve Iowa's ability to immediately recognize and respond to invasions.

**5A1. Strategic Action:** Develop partnerships with regional states to share information concerning the distribution of ANS based on monitoring activities.

**5A1a. Task:** Establish working partnerships with ANS management programs in regional states to facilitate the sharing of monitoring data.

**5A1b. Task:** Develop and maintain lists of non-indigenous species known to occur in Iowa and share that data with regional ANS management programs.

**5A1c. Task** Compile the results of monitoring activities annually and distribute this information to regional states.

**5A2. Strategic Action:** Implement a statewide ANS monitoring program.

**5A2a. Task:** Develop identification materials for each ANS that is being monitored to facilitate participation by all stakeholders.

**5A2b. Task:** Design a monitoring program to provide information that will help in developing an effective strategy to limit the spread of selected ANS populations. A network approach, including federal/regional/local agencies, public/private groups and academic institutions, is recommended. Variables to monitor might include population size, structure and range; rate of growth; type habitat; distribution; impacts on native species; and economic and other impacts on human communities.

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**5B. Problem:** Several damaging ANS are currently present in Iowa waters. While efforts are currently underway to monitor Eurasian watermilfoil and purple loosestrife, little effort has been made to monitor zebra mussels. Efforts to monitor these ANS species need to be enhanced and expanded to allow managers to effectively control the spread these species.

**5B1. Strategic Action:** Monitor the spread of Eurasian watermilfoil in Iowa.

**5B1a. Task:** Design and conduct an Eurasian watermilfoil risk assessment to identify Iowa waters that are at risk of a Eurasian watermilfoil infestation.

**5B1b. Task:** Prioritize Iowa's aquatic resources into areas of high, moderate, and low risk for Eurasian watermilfoil infestation.

**5B1c. Task:** Develop and implement an appropriate Eurasian watermilfoil monitoring program. This monitoring program will involve use of Iowa Aquatic Nuisance Species Program seasonal personnel; federal, state, and local resource managers; volunteer monitoring groups; and other interested stakeholders.

Monitoring efforts will be coordinated by the Iowa Aquatic Nuisance Species Program coordinator.

**5B1d. Task:** Publish and distribute the results of Eurasian watermilfoil monitoring activities annually to all interested parties.

**5B1e. Task:** Prepare, maintain, and publish a list of all waterbodies in Iowa that have been identified through monitoring activities as infested with Eurasian watermilfoil.

**5B2. Strategic Action:** Monitor the spread of purple loosestrife in Iowa.

**5B2a. Task:** Design and conduct a purple loosestrife risk assessment to identify Iowa waters that are at risk of a purple loosestrife infestation.

**5B2b. Task:** Prioritize Iowa's aquatic resources into areas of high, moderate, and low risk for purple loosestrife infestation.

**5B2c. Task:** Develop and implement an appropriate purple loosestrife monitoring program. This monitoring program will involve use of Iowa Aquatic Nuisance Species Program seasonal personnel; federal, state, and local resource managers; volunteer monitoring groups; and other interested stakeholders. Monitoring efforts will be coordinated by the Iowa Aquatic Nuisance Species Program coordinator.

**5B2d. Task:** Publish and distribute the results of purple loosestrife monitoring activities annually to all interested parties.

**5B2e. Task:** Prepare, maintain, and publish a list of all waterbodies in Iowa that have been identified through monitoring activities as infested with purple loosestrife.

**5B3. Strategic Action:** Monitor the spread of zebra mussels in Iowa.

Iowa

**5B3a. Task:** Design and conduct a zebra mussel risk assessment to identify waters that are at risk of a zebra mussel infestation.

**5B3b. Task:** Prioritize Iowa's aquatic resources into areas of high, moderate, and low risk for zebra mussel infestation.

**5B3c. Task:** Develop and implement an appropriate zebra mussel monitoring program. This monitoring program will involve use of Iowa Aquatic Nuisance Species Program seasonal personnel; federal, state, and local resource managers; volunteer monitoring groups; and other interested stakeholders. Monitoring will be coordinated by the Iowa Aquatic Nuisance Species Program coordinator.

**5B3d. Task:** Publish and distribute the results of zebra mussel monitoring activities annually to all interested parties.

**5B3e. Task:** Prepare, maintain, and publish a list of all waterbodies in Iowa that have been identified through monitoring activities as infested with zebra mussels.

Objective 6: Support research on ANS priority species in Iowa, and develop efficient systems to disseminate ANS research information to the research and management communities.

**6A. Problem:** Many aspects of the ANS problem remain poorly understood. Research questions relevant to the ANS problem include determining the precise risks associated with each pathway of ANS introduction, the environmental conditions which must be necessary for certain ANS to become established in Iowa waters, the likely interactions between ANS and native species, the expected impacts of ANS on Iowa's aquatic resources, and which management options will provide the best results in controlling or eradicating ANS populations.

**6A1. Strategic Action:** Support research that identifies, predicts, and prioritizes potential ANS introductions.

**6A1a. Task:** Identify critical data needed to prevent the introduction of new ANS into Iowa's waterbodies.

**6A1b. Task:** Compile and evaluate information on the ecology and management of regional ANS which pose a threat to Iowa waterbodies.

**6A1c. Task:** Attend scientific and technical conferences addressing the mechanisms and pathways by which new ANS spread and might potentially be introduced into Iowa's waterbodies.

**6A1d. Task:** Monitor ongoing research efforts in North America which are attempting to develop mechanisms for controlling the introduction of new ANS.

**6A1e. Task:** Support research that improves Iowa's ability to identify, predict, and prioritize potential ANS introductions.

**6A1f. Task:** Develop a technology transfer program to be used in distributing the research findings obtained by Strategic Action 6A1.

**6A2. Strategic Action:** Support research that investigates potential management strategies to limit the spread of existing ANS populations in Iowa.

**6A2a. Task:** Identify critical data needed to limit the spread of existing ANS into uninfested Iowa waterbodies.

**6A2b. Task:** Compile and evaluate information on the ecology and management of ANS currently existing in Iowa waterbodies.

**6A2c. Task:** Attend scientific and technical conferences dealing with the mechanisms and pathways by which existing populations of ANS spread from infested to uninfested waterbodies.

**6A2d. Task:** Monitor ongoing research efforts in North America which are attempting to develop mechanisms for controlling the spread of existing ANS populations.

**6A2e. Task:** Support research that improves Iowa's ability to control the spread of existing ANS populations.

**6A2f. Task:** Develop a technology transfer program to be used in distributing the research findings obtained by Strategic Action 6A2.

**6A3. Strategic Action:** Support research that identifies effective management activities which will allow for the successful control and/or eradicate ANS in Iowa waterbodies.

**6A3a. Task:** Identify critical data needed to control and/or eradicate ANS in Iowa's waterbodies.

**6A3b. Task:** Attend scientific and technical conferences dealing with the control and/or eradication of existing ANS populations.

**6A3c. Task:** Monitor ongoing research efforts in North America which are attempting to develop management strategies and technologies for the control and/or eradication of existing ANS populations.

**6A3d. Task:** Support research that improves Iowa's ability to control and/or eradicate existing ANS populations.

**6A3e. Task:** Develop a technology transfer program to be used in distributing the research findings obtained by Strategic Action 6A3.

**Objective 7:** Gain passage of ANS legislation in Iowa to ensure that state ANS rules and regulations efficiently promote the prevention and control of ANS in coordination with federal regulations.

**7A. Problem:** ANS law is a new and rapidly evolving field. As knowledge of ANS issues improves, new laws must be passed and existing laws adapted to address this new information. The regulatory authority and financial support afforded by integrated state and federal legislation can enable Iowa to avoid or minimize environmental and economic damage resulting from ANS infestations. While several state laws and regulations have been enacted to address specific

problems, no comprehensive effort to deal with the ANS problem has been enacted.

**7A1. Strategic Action:** Review existing laws and regulations governing ANS issues in Iowa.

**7A1a. Task:** Identify existing gaps and overlaps in ANS law in Iowa and offer suggestions for improvement.

**7A1b. Task:** Compile copies of ANS laws from other states and compare them with Iowa ANS laws.

**7A1c. Task:** Compare Iowa ANS laws to federal ANS laws to ensure compatibility.

**7A1d. Task:** Recommend changes in ANS law to improve Iowa's ability to protect state waters from the introduction and spread of ANS.

**7A2. Strategic Action:** Develop recommendations for new state ANS legislation and regulations which address the goals of the *Plan for the Management of Aquatic Nuisance Species in Iowa*.

**7A2a. Task:** Establish an interagency task force, with representation from public and private sectors, to develop recommendations for new ANS laws and regulations. State natural resources management personnel should play a role in the process to ensure that proposed rules for this are consistent with and build upon existing state and federal authorities. These suggested ANS laws and regulations should include:

- (1) Recommendations addressing: (a) inspection procedures; (b) penalties; and (c) notification procedures;
- (2) Identify the primary pathways of introduction, options for regulating each pathway, and if possible, a recommended method of pathway control for each threat. These methods of control shall include details on which entity would be responsible for implementation;
- (3) Identify the estimated costs of implementing a state program, including ideas of funding sources, for each recommended mechanism of pathway control; and
- (4) Provide recommendations for structuring and funding a state program that monitors the detection and spread of each identified ANS.

**7A2b. Task:** Forward recommended ANS laws and regulations to the Iowa Legislature for legislative consideration. The Iowa Department of Natural Resources will be responsible for implementation of this task.

**7A3. Strategic Action:** Promulgate, publicize, and enforce state laws and regulations which address ANS issues within the state.

**7A3a. Task:** Develop and implement an outreach program that informs relevant groups of the regulations and why they exist, and compliance procedures.

**7A3b. Task:** Develop and implement enforcement programs.

**7A3c. Task:** Conduct boat inspections at public boat ramps to ensure compliance with ANS regulations. Inspections will be conducted by Iowa Aquatic Nuisance Species Program seasonal employees and Iowa Department of Natural Resources conservation officers. Ongoing activity for Eurasian watermilfoil.

**Objective 8:** Establish a permanent funding mechanism for an Iowa ANS management program.

**8A. Problem:** State resources (funding and staff) for ANS management are limited. Existing resources are insufficient to deal with all ANS management problems in Iowa. Without resources, a management plan cannot be implemented in a timely manner. Early action is imperative to contain and/or eradicate pioneer infestations of ANS.

**8A1. Strategic Action:** Develop a permanent funding mechanism for ANS management in Iowa.

**8A1a. Task:** Explore ideas for permanent funding of ANS management activities in Iowa.

**8A1a. Task:** Work with the Iowa legislature to establish a permanent funding mechanism for ANS management activities in Iowa.

**8A2. Strategic Action;** Set priorities for management of existing ANS so that local, state, and federal resources can be directed in a cost-effective manner.

**8A2a. Task:** Prioritize existing ANS problems in Iowa. The Iowa Aquatic Nuisance Species Advisory Committee will be responsible for development of this priority list.

**8A2b. Task:** Set annual ANS management goals based on a priority list. The Iowa Department of Natural Resources will set their ANS management priorities each year during the annual budget cycle.

## IMPLEMENTATION

In 1996, the Iowa Department of Natural Resources established a program to address the problems posed by Eurasian watermilfoil. Results of boat access surveys and aquatic vegetation monitoring carried out as part of this program suggest that Eurasian watermilfoil and other ANS are going to continue to be a problem in Iowa. While there is an immediate concern about the spread of Eurasian watermilfoil, other ANS are fast becoming real threats to Iowa's aquatic ecosystems. Some are already creating problems, such as purple loosestrife and zebra mussels, while still others are posed to become real problems in the next several years. These include species such as ruffe, spiny waterfleas, hydrilla, and flowering rush. Addressing the issues posed by these species now will allow Department of Natural Resources personnel to deal with ANS threats in a proactive, rather than a reactive fashion.

An important component of this plan is to develop enforceable legislation and regulations related to the transport, sale, and spread of ANS. However, **only through the cooperation of the citizens of Iowa**, can the Department of Natural Resources personnel hope to effectively manage and control the spread of ANS. This cooperation can only be achieved by educating the public about this problem. While education may not completely stop the spread of ANS, hopefully it can prevent them from becoming the environmental catastrophes that they have become in other states.

To achieve the goals set forth in this plan, the state of Iowa must commit itself to the establishment and support of an Iowa Aquatic Nuisance Species Program. This program could be built on the framework of the existing Eurasian Watermilfoil Program and administered by the Department of Natural Resources. To insure interagency cooperation in dealing with ANS issues, the task force established for the development of this plan should be retained in a permanent capacity as part of an Aquatic Nuisance Species Advisory Board. This board would provide a mechanism for interagency communication and serve as the oversight and evaluation committee that is required to conduct the annual program review.

A significant obstacle to implementation of this plan is the establishment of a permanent funding mechanism. The best option for obtaining such funding is by placing a surcharge on boat registrations. Iowa has over 182,000 registered boats in the state. Because boats are registered every two years, a \$2 surcharge would generate approximately \$182,000 a year to fund an Iowa Aquatic Nuisance Species Program. This mechanism is working effectively in other states and would provide the money needed to establish and administer this program. Assessing this surcharge to boater registrations is the most logical place to look for funding because boaters would be the group most directly affected by infestations of ANS.

The following implementation table is designed to summarize how the various management actions identified in this plan will be implemented.



**Iowa ANS Management Plan Implementation Table.** This table summarizes the past and current funding allocated to each action or task and lists the estimated funding needed for future years (FY 2001 through FY 2005).



## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)					
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	
<b>1A1</b>	<b>Implement a state ANS management program</b>													
1A1a	Receive plan approval from Federal ANS Task Force		IDNR	USFWS										
1A1b	Receive plan approval from Iowa Department of Natural Resources Commission		IDNR	Various										
1A1c	Implement Iowa Aquatic Nuisance Species Program (values shown represent total program budget)	State Federal	IDNR	Various	100/1 0/0	100/1 0/0	100/1 0/0	100/1 0/0	182/3 60/0	182/3 60/0	182/3 60/0	182/3 60/0	182/3 60/0	
<b>1A2</b>	<b>Hire personnel to staff Iowa Aquatic Nuisance Species Program</b>													
1A2a	Hire a program director	State	IDNR		5/0	5/0	5/0	5/0	58/1	59/1	61/1	62/1	64/1	
1A2b	Hire eight seasonal technicians	State	IDNR		20/1	15/1	15/1	15/1	30/2	30/2	30/2	30/2	30/2	
1A2c	Establish and support an ANS office	State	IDNR		4/0	4/0	4/0	4/0	18/0	18/0	18/0	18/0	18/0	
<b>1A3</b>	<b>Develop partnerships with other states</b>													
1A3a	Participate in regional and national forums	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x	
1A3b	Establish working partnerships with regional ANS management programs	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x	
<b>2A1</b>	<b>Identify ANS with greatest potential to infest Iowa</b>													
2A1a	Develop regional listing of ANS	State	IANSP	RANSP					x/x	x/x	x/x	x/x	x/x	
2A1b	Compile information on regional scale movement of ANS	State	IANSP	RANSP					x/x	x/x	x/x	x/x	x/x	
2A1c	Identify existing and potential ANS transport mechanisms	State	IANSP	RANSP					x/x	x/x	x/x	x/x	x/x	
<b>2A2</b>	<b>Identify waterbodies at greatest risk of ANS infestations</b>													
2A2a	Compile life history information on regional ANS which pose a threat to Iowa	State	IANSP	RANSP					x/x	x/x	x/x	x/x	x/x	
2A2b	Conduct assessment of aquatic resources in Iowa and identify ANS risk	State	IANSP	IDNR	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x	
<b>2A3</b>	<b>Establish interjurisdictional approaches to facilitate action to prevent ANS introductions</b>													

2A3a	Participate in regional and national forums	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
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## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
2A3b	Establish and support regional coalitions	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
2A3c	Establish and support an interjurisdictional process to ensure compatibility	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
2A3d	Initiate and implement a regional approach to preventing new ANS introductions	State	IANSP	RANSP					x/x	x/x	x/x	x/x	x/x
<b>2A4</b>	<b>Establish committees to identify voluntary or regulatory measures to prevent new ANS introductions</b>												
2A4a	Establish a committee to identify ANS prevention measures for commercial shipping activities	State	IANSP	USACE Various					x/x	x/x	x/x	x/x	x/x
2A4b	Establish a committee to identify ANS prevention measures for recreational boating activities	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
2A4c	Establish a committee to identify ANS prevention measures for aquarium and aquatic gardening activities	State	IANSP	IDALS Various					x/x	x/x	x/x	x/x	x/x
2A4d	Establish a committee to identify ANS prevention measures for aquaculture industry activities	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
<b>2A5</b>	<b>Conduct information/education program on the prevention of new ANS introductions</b>												
<b>3A1</b>	<b>Survey Iowa waterbodies to establish an accurate assessment of ANS presence</b>												
<b>3A2</b>	<b>Identify and prioritize existing nonindigenous aquatic species</b>												
3A2a	Develop a complete listing of nonindigenous aquatic species in Iowa	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
3A2b	Establish an advisory group to select those nonindigenous aquatic species that merit ANS management	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
3A2c	Develop process to prioritize species determined to merit ANS management actions	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
<b>3A3</b>	<b>Monitor waterbodies for the spread of Iowa priority ANS</b>												
<b>3A4</b>	<b>Identify and prioritize regional ANS not yet found in Iowa</b>												

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
3A4a	Develop complete listing of regional ANS	State	IANSP	RANSP					x/x	x/x	x/x	x/x	x/x
3A4b	Establish an advisory group to select those regional ANS that merit ANS management	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
3A4c	Develop process to prioritize species determined to merit ANS management actions	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
<b>3A5</b>	<b>Monitor waterbodies for the introduction of regional priority ANS</b>												
<b>3A6</b>	<b>Develop and implement management strategies to limit the spread of priority ANS</b>												
3A6a	Develop voluntary and regulatory strategies to limit spread of priority ANS based on known dispersal pathways	State	IANSP	IDNR IDALS	Various				x/x	x/x	x/x	x/x	x/x
3A6b	Identify best available technology for each management strategy	State	IANSP	USFWS IDNR					x/x	x/x	x/x	x/x	x/x
3A6c	Implement watershed approach to limit spread of ANS within Iowa	State	IANSP	IDNR IDALS					x/x	x/x	x/x	x/x	x/x
3A6d	Establish cooperative policies with states sharing watersheds to limit regional spread of ANS	State	IANSP	BANSP					x/x	x/x	x/x	x/x	x/x
<b>3B1</b>	<b>Develop emergency response plans for those species identified as priority ANS</b>												
3B1a	Develop emergency response plans for existing priority ANS	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
3B1b	Develop emergency response plans for regional ANS posing an immediate threat to Iowa	State	IANSP	RANSP Various					x/x	x/x	x/x	x/x	x/x
<b>3C1</b>	<b>Develop and implement control strategies to eradicate or reduce populations of priority ANS in state waters.</b>												
3C1a	Establish protocols that will provide guidance in designing and implementing control strategies	State	IANSP	IDNR	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
3C1b	Support scientific research that investigates potential control strategies	Federal	IANSP	Various					20/0	20/0	20/0	20/0	20/0
3C1c	Establish mechanisms to ensure that control strategies are coordinated with federal, state, and local governments	State	IANSP	USFWS Various					x/x	x/x	x/x	x/x	x/x

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)					
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	
3C1d	Establish mechanisms to ensure that control strategies are based on the best available scientific information			USFWS	Various									
<b>3C2</b>	<b>Minimize the dispersal of established ANS Iowa</b>													
3C2a	Establish a list of ANS prohibited for sale and transport in Iowa	State	IANSP	IDALS					x/x	x/x	x/x	x/x	x/x	
3C2b	Develop guidelines and regulations to ensure the cleaning of water-based equipment	State	IANSP	IDNR	Various				x/x	x/x	x/x	x/x	x/x	
3C2c	Develop regulations to quarantine waterbodies	State	IANSP	IDNR	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x	
3C2d	Develop and implement educational strategies designed to prevent the spread of ANS	State	IANSP	IDNR	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
<b>3C3</b>	<b>Manage large populations of established ANS</b>													
3C3a	Develop ANS management plans for infested waterbodies	State	IANSP	IDNR	Various	5/0				x/x	x/x	x/x	x/x	x/x
3C3b	Eradicate identified populations of Eurasian watermilfoil	State	IANSP	IDNR		41/0	42/0	48/0	45/0	50/0	50/0	50/0	50/0	50/0
3C3c	Implement purple loosestrife control program	State	IANSP	IDALS					x/x	x/x	x/x	x/x	x/x	
<b>3C4</b>	<b>Develop and implement means of adapting human activities to accommodate ANS infestations</b>													
3C4a	Support scientific research that investigate potential means of adapting human activities to accommodate ANS infestations	Federal	IANSP	Various					10/0	10/0	10/0	10/0	10/0	
3C4b	Seek beneficial and/or alternative uses of ANS	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x	
<b>4A1</b>	<b>Develop and distribute educational materials that will increase public awareness of ANS issues</b>													
4A1a	Develop and distribute educational materials that educate the public about ANS issues	State	IANSP	IDNR	Various	3/0	3/0	3/0	6/0	3/0	0/0	3/0	0/0	2/0
4A1b	Develop and distribute ANS fact sheets and wallet ID cards for priority species	State	IANSP	IDNR	Various	2/0	2/0	2/0	4/0	3/0	0/0	0/0	2/0	3/0
4A1c	Write and distribute press releases focusing on the problems associated with ANS	State	IANSP	IDNR	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
4A1d	Produce public service announcements that inform the public about ANS issues	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4A1e	Develop and distribute ANS curriculum materials for Iowa schools	State	IANSP	IDNR Various					0/0	0/0	0/0	0/0	15/0
4A1f	Make presentations on ANS issues to various stakeholder groups	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4A1g	Maintain and upgrade ANS information on Iowa DNR website	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4A1h	Write articles about ANS issues for publication in magazines			IDNR Various									
<b>4A2</b>	<b>Develop and distribute ANS materials targeted at specific pathways of introduction</b>												
4A2a	Develop and distribute brochure dealing with ANS spread via release of aquarium animals and aquatic ornamental plants	State	IANSP	IDALS Various					0/0	0/0	10/0	0/0	0/0
4A2b	Include ANS information in annual fishing and hunting regulations	State	IANSP	IDNR	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4A2c	Develop and distribute brochure dealing with the spread of ANS via recreational boating activity	State	IANSP	IDNR Various	2/0	2/0	2/0	4/0	0/0	0/0	0/0	10/0	0/0
4A2d	Develop and post ANS signs at all public boat ramps	State	IANSP	IDNR	9/0	0/0	20/0	10/0	0/0	15/0	0/0	0/0	0/0
4A2e	Monitor public boat ramps to distribute ANS educational materials	State	IANSP	LAP Various	EWMP	EWMP	EWMP	EWMP	xx/xx	xx/xx	xx/xx	xx/xx	xx/xx
4A2f	Write articles for publication dealing with ANS problems associated with aquatic gardening	State	IANSP	IDALS Various					x/x	x/x	x/x	x/x	x/x
4A2g	Prepare ANS brochures for distribution by Iowa State University Extension Service	State	IANSP	IDALS Various					10/0	0/0	0/0	0/0	0/0
<b>4B1</b>	<b>Develop and distribute educational materials targeting specific pathways of introduction</b>												

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
4B1a	Develop and distribute educational materials which address the introduction of ANS via commercial shipping practices	State	IANSP	USACE IDNR					10/0	0/0	0/0	0/0	0/0
4B1b	Develop and distribute educational materials which address the introduction of ANS via recreational boating activities	State	IANSP	IDNR Various	2/0	3/0	3/0	6/0	0/0	10/0	0/0	0/0	0/0
4B1c	Develop and distribute educational materials which address the introduction of ANS via aquarium trade and aquatic gardening	State	IANSP	IDNR Various					0/0	0/0	10/0	0/0	0/0
4B1d	Develop and distribute educational materials which address the introduction of ANS via aquaculture and commercial fishing activities	State	IANSP	IDNR Various					0/0	0/0	0/0	10/0	0/0
<b>4C1</b>	<b>Develop and distribute ANS identification and management information</b>												
4C1a	Distribute ANS fact sheets and wallet ID cards to the field staff of all state agencies	State	IANSP	IDNR IDALS	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4C1b	Distribute ANS fact sheets and wallet ID cards to all stakeholders which manage aquatic resources	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4C1c	Develop an ANS slide library for usage by aquatic resource managers	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4C1d	Maintain and upgrade ANS information on Iowa DNR website	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4C1e	Organize and facilitate ANS workshops for state aquatic resource managers	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
4C1f	Develop and maintain a list of experts to whom ANS samples can be sent for identification	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
4C1g	Make presentations on ANS identification and management to all stakeholders with aquatic resource management responsibilities	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x



## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
4C1h	Develop a technology transfer program for distribution of research findings	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
4C1i	Prepare state ANS management plans for priority species	State	IANSP	IDNR	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
<b>4D1</b>	<b>Develop and provide ANS informational briefings and educational materials to decision-makers</b>												
4D1a	Organize and facilitate field days for state legislators	State	IANSP	IDNR					x/x	x/x	x/x	x/x	x/x
4D1b	Distribute an annual report of ANS projects and activities to state legislators	State	IANSP	IDNR	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
4D1c	Distribute educational materials to state legislators emphasizing the problems associated with ANS not yet found in Iowa	State	IANSP	IDNR					x/x	x/x	x/x	x/x	x/x
<b>5A1</b>	<b>Develop partnerships with regional states to share monitoring activity data</b>												
5A1a	Establish working partnerships with regional ANS management programs	State	IANSP	RANSP	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
5A1b	Develop and maintain list of nonindigenous species known to exist in Iowa	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
5A1c	Compile and distribute results of Iowa ANS monitoring activities	State	IANSP	Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
<b>5A2</b>	<b>Implement statewide ANS monitoring program</b>												
5A2a	Develop identification materials for each ANS being monitored	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
5A2b	Design a monitoring program which provides information to be used in developing strategies which limit the spread of ANS populations	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
<b>5B1</b>	<b>Monitor the spread of Eurasian watermilfoil</b>												
5B1a	Design and conduct an Eurasian watermilfoil risk assessment to identify at risk waterbodies	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
5B1b	Prioritize Iowa waterbodies with regard to the risk of Eurasian watermilfoil infestation	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
5B1c	Develop and implement Eurasian watermilfoil monitoring program	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	xx/xx	xx/xx	xx/xx	xx/xx	xx/xx
5B1d	Publish and distribute results of Eurasian watermilfoil monitoring activities	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
5B1e	Prepare, maintain, and publish a list of all waterbodies infested with Eurasian watermilfoil	State	IANSP	IDNR Various	EWMP	EWMP	EWMP	EWMP	x/x	x/x	x/x	x/x	x/x
<b>5B2</b>	<b>Monitor the spread of purple loosestrife</b>												
5B2a	Design and conduct a purple loosestrife risk assessment to identify at risk waterbodies	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
5B2b	Prioritize Iowa waterbodies with regard to the risk of purple loosestrife infestation	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
5B2c	Develop and implement purple loosestrife monitoring program	State	IANSP	IDNR Various					xx/xx	xx/x	xx/xx	xx/xx	xx/xx
5B2d	Publish and distribute results of purple loosestrife monitoring activities	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
5B2e	Prepare, maintain, and publish a list of all waterbodies infested with purple loosestrife	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
<b>5B3</b>	<b>Monitor the spread of zebra mussels</b>												
5B3a	Design and conduct a zebra mussel risk assessment to identify at risk waterbodies	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
5B3b	Prioritize Iowa waterbodies with regard to the risk of zebra mussel infestation	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x
5B3c	Develop and implement zebra mussel monitoring program	State	IANSP	IDNR Various					xx/xx	xx/xx	xx/xx	xx/xx	xx/xx
5B3d	Publish and distribute results of zebra mussel monitoring activities	State	IANSP	IDNR Various					x/x	x/x	x/x	x/x	x/x

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
5B3e	Prepare, maintain, and publish a list of all waterbodies infested with zebra mussels	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	
<b>6A1</b>	<b>Support research that identifies, predicts, and prioritizes potential ANS introductions</b>												
6A1a	Identify critical data needed to prevent the introduction of new ANS	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	
6A1b	Compile and evaluate information on the ecology and management of regional ANS	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	
6A1c	Attend conferences addressing pathways by which new ANS may be introduced into Iowa	State	IANSP	Various				x/x	x/x	x/x	x/x	x/x	
6A1d	Monitor research efforts aimed at controlling the introductions of new ANS	State	IANSP	Various				x/x	x/x	x/x	x/x	x/x	
6A1e	Support research that improves Iowa's ability to identify, predict, and prioritize potential ANS introductions	Federal	IANSP	Various				10/0	10/0	10/0	10/0	10/0	
6A1f	Develop technology transfer program to distribute research findings	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	
<b>6A2</b>	<b>Support research to limit the spread of existing ANS populations in Iowa</b>												
6A2a	Identify critical data needed to limit the spread of existing ANS to uninfested waterbodies	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	
6A2b	Compile and evaluate information on the ecology and management of existing ANS	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	
6A2c	Attend conferences dealing with the mechanisms and pathways by which existing ANS spread	State	IANSP	Various				x/x	x/x	x/x	x/x	x/x	
6A2d	Monitor research efforts aimed at controlling the spread of existing ANS	State	IANSP	Various				x/x	x/x	x/x	x/x	x/x	
6A2e	Support research that improves Iowa's ability to control the spread of existing ANS	Federal	IANSP	Various				10/0	10/0	10/0	10/0	10/0	
6A2f	Develop technology transfer program to distribute research findings	State	IANSP	IDNR Various				x/x	x/x	x/x	x/x	x/x	

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
<b>6A3</b>	<b>Support research that identifies effective management activities to control and/or eradicate ANS</b>												
6A3a	Identify critical data needed to control and/or eradicate ANS	State	IANSP	IDNR	Various				x/x	x/x	x/x	x/x	x/x
6A3b	Attend conferences dealing with the control and/or eradication of ANS	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
6A3c	Monitor research aimed at the control and/or eradication of ANS	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
6A3d	Support research that improves Iowa's ability to control and/or eradicate ANS	Federal	IANSP	Various					10/0	10/0	10/0	10/0	10/0
6A3e	Develop technology transfer program to distribute research findings	State	IANSP	IDNR	Various				x/x	x/x	x/x	x/x	x/x
<b>7A1</b>	<b>Review existing laws and regulations governing ANS issues in Iowa</b>												
7A1a	Identify existing gaps and overlaps in ANS law	State	IANSP	IAGO					x/x	x/x	x/x	x/x	x/x
7A1b	Compile copies of ANS laws from other states and compare to Iowa ANS laws	State	IANSP	IAGO					x/x	x/x	x/x	x/x	x/x
7A1c	Compare Iowa ANS laws to federal ANS laws to ensure compatibility	State	IANSP	USFWS					x/x	x/x	x/x	x/x	x/x
7A1d	Recommend changes in Iowa ANS law	State	IANSP	IAGO					x/x	x/x	x/x	x/x	x/x
<b>7A2</b>	<b>Develop recommendations for new state ANS laws and regulations</b>												
7A2a	Establish interagency task force to develop recommendations for new ANS laws and regulations	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
7A2b	Forward recommended ANS laws and regulations to Iowa Legislature for consideration	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
<b>7A3</b>	<b>Promulgate, publicize, and enforce state ANS regulations</b>												
7A3a	Develop and implement an outreach program to inform stakeholders of existing regulations	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
7A3b	Develop and implement enforcement programs	State	IANSP	IDNR					x/x	x/x	x/x	x/x	x/x

## Iowa ANS Management Plan Implementation Table

Strategic Actions/Tasks		Funds Source	Impl Entity	Coop Agency	Recent efforts (\$000 / FTE's)				Planned efforts (\$000 / FTE's)				
Plan #	Description Title				FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
7A3c	Conduct boat inspections to ensure compliance with ANS regulations	State	IANSP	IDNR LAP	EWMP	EWMP	EWMP	EWMP	xx/xx	xx/xx	xx/xx	xx/xx	xx/xx
<b>8A1</b>	<b>Develop a permanent funding mechanism for ANS management in Iowa</b>												
8A1a	Explore ideas for permanent funding of ANS management activities	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
8A1b	Work with Iowa legislature to establish a permanent funding mechanism for ANS management activities	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x
<b>8A2</b>	<b>Set priorities for management of existing ANS so resources can be directed in a cost-effective manner</b>												
8A2a	Prioritize existing ANS problems in Iowa			Various					x/x	x/x	x/x	x/x	x/x
8A2b	Set annual ANS management goals based on priority list.	State	IANSP	Various					x/x	x/x	x/x	x/x	x/x

## PROGRAM MONITORING AND EVALUATION

The monitoring and evaluation process of the *Plan for the Management of Aquatic Nuisance Species in Iowa* will enable the Aquatic Nuisance Species Advisory Committee to monitor the progress of the Iowa Aquatic Nuisance Species Program in the prevention, limitation, and abatement of ANS infestations. Monitoring and evaluation of the plan will ensure appropriate implementation of management actions and will provide the opportunity for "mid-course" alterations in the plan, if needed. By combining the best scientific and management knowledge with periodic public evaluation, the state of Iowa will be implementing an adaptive management program. The following criteria will serve as the basis for the monitoring and evaluation process.

- An oversight committee will be established within the plan implementation process for the purposes of conducting the monitoring/evaluation efforts, disseminating the results, and identifying plan amendments that address outcomes.
- The three plan goals, as presented in the Introduction will provide the focal point for monitoring and evaluation. Means to assign measurable objectives to these goals will be pursued to provide meaningful evaluation.
- The evaluation effort will place special emphasis on funding needs to successfully accomplish goals and associated tasks. This information will be used for program planning purposes.
- The evaluation process will be inclusive, involving those with implementation responsibility, resources user groups, and others affected by plan implementation. An emphasis will be placed on identifying evaluation findings with applicability to other states.
- The preparation and dissemination of an annual report highlighting implementation progress, including an evaluation of the effectiveness of the plan's strategies and tasks will be prepared by the Iowa Aquatic Nuisance Species Program coordinator. The target audience of the report will include the general public; local, state, and federal resource managers, and legislative decision-makers. These annual reports will be incorporated into state biennial water quality reports to the U.S. Congress and U.S. Environmental Protection Agency to broaden awareness of ANS issues.

The criteria listed above will be addressed by implementation of a monitoring program that will involve three components: oversight, evaluation, and dissemination of information. The responsibilities of each component include:

Oversight: An oversight committee will be established to review the progress of the Iowa Aquatic Nuisance Species Program. This committee will be composed of external publics (individuals identified as interested parties during the public review process), representatives of state natural resources management agencies, a representative from the governor's office, and members of the Iowa Aquatic Nuisance Species Task Force. The role of this committee will be

to examine progress on management actions focused on the three goals of the state ANS management plan. The committee will evaluate the success of each strategic action by examining the level of achievement of the tasks defined within each action.

Evaluation: The evaluation effort will not only examine progress, but place a special emphasis on identifying funding needs to successfully accomplish goals and associated tasks. This information will prove useful in future program planning. Evaluation will also incorporate information from those groups affected by implementation of the plan. These include individuals or organizations involved with the responsibility of implementing management actions as well as resource user groups.

Dissemination of information: An annual report will be prepared highlighting the progress of management plan actions. This report will include information on the progress being made in achieving the goals of the state management plan as well as future plans and activities. The successes, failures, and direction of the state plan will be evaluated in comparison with other regional plans. The annual report will be available to members of the general public and local, state, and federal decision makers.

The following strategic planning table is designed to summarize how the various management actions identified in this plan will be evaluated and monitored.

**Iowa ANS Management Plan Strategic Planning Table.** This table is designed to show how, when, and who will evaluate or monitor the success of each objective, strategic action, or task.

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
<b>1A1</b>	<b>Implement a state ANS management program</b>				
1A1a		Receive plan approval from Federal ANS Task Force	USFWS	10/31/99	
1A1b		Receive plan approval from Iowa Department of Natural Resources Commission	IDNR	12/31/99	
1A1c		Implement Iowa Aquatic Nuisance Species Program	IDNR	7/1/00	
<b>1A2</b>	<b>Hire personnel to staff Iowa Aquatic Nuisance Species Program</b>				
1A2a		Hire a program director	IDNR	7/1/00	
1A2b		Hire eight seasonal technicians	IDNR	7/1/00	
1A2c		Establish and support an ANS office	IDNR	7/1/00	
<b>1A3</b>	<b>Develop partnerships with other states</b>				
1A3a		Participate in regional and national forums	IANSP	Ongoing	Annual report
1A3b		Establish working partnerships with regional ANS management programs	IANSP	Ongoing	Annual report
<b>2A1</b>	<b>Identify ANS with greatest potential to infest Iowa</b>				
2A1a		Develop regional listing of ANS	IANSP	6/30/01	Final report
2A1b		Compile information on regional scale movement of ANS	IANSP	6/30/01	Final report
2A1c		Identify existing and potential ANS transport mechanisms	IANSP	6/30/01	Final report
<b>2A2</b>	<b>Identify waterbodies at greatest risk of ANS infestations</b>				
2A2a		Compile life history information on regional ANS which pose a threat to Iowa	IANSP	6/30/01	Final report
2A2b		Conduct assessment of aquatic resources in Iowa and identify ANS risk	IANSP	Ongoing	Annual report



## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
<b>2A3</b>	<b>Establish interjurisdictional approaches to facilitate action to prevent ANS introductions</b>				
2A3a		Participate in regional and national forums	IANSP	Ongoing	Annual report
2A3b		Establish and support regional coalitions	IANSP	Ongoing	Annual report
2A3c		Establish and support an interjurisdictional process to ensure compatability	IANSP	Ongoing	Annual report
2A3d		Initiate and implement a regional approach to preventing new ANS introductions	IANSP	Ongoing	Annual report
<b>2A4</b>	<b>Establish committees to identify voluntary or regulatory measures to prevent new ANS introductions</b>				
2A4a		Establish a committee to identify ANS prevention measures for commercial shipping activities	IANSP	12/31/00	Final report
2A4b		Establish a committee to identify ANS prevention measures for recreational boating activities	IANSP	12/31/00	Final report
2A4c		Establish a committee to identify ANS prevention measures for aquarium and aquatic gardening activities	IANSP	12/31/00	Final report
2A4d		Establish a committee to identify ANS prevention measures for aquaculture industry activities	IANSP	12/31/00	Final report
<b>2A5</b>	<b>Conduct information/education program on the prevention of new ANS introductions</b>				
<b>3A1</b>	<b>Survey Iowa waterbodies to establish an accurate assessment of ANS presence</b>				
<b>3A2</b>	<b>Identify and prioritize existing nonindigenous aquatic species</b>				

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
3A2a		Develop a complete listing of nonindigenous aquatic species in Iowa	IANSP	12/31/00	Final report
3A2b		Establish an advisory group to select those nonindigenous aquatic species that merit ANS management	IANSP	6/30/01	Final report
3A2c		Develop process to prioritize species determined to merit ANS management actions	IANSP	6/30/01	Final report
<b>3A3</b>	<b>Monitor waterbodies for the spread of Iowa priority ANS</b>				
<b>3A4</b>	<b>Identify and prioritize regional ANS not yet found in Iowa</b>				
3A4a		Develop complete listing of regional ANS	IANSP	12/31/00	Final report
3A4b		Establish an advisory group to select those regional ANS that merit ANS management	IANSP	6/30/01	Final report
3A4c		Develop process to prioritize species determined to merit ANS management actions	IANSP	6/30/01	Final report
<b>3A5</b>	<b>Monitor waterbodies for the introduction of regional priority ANS</b>				
<b>3A6</b>	<b>Develop and implement management strategies to limit the spread of priority ANS</b>				
3A6a		Develop voluntary and regulatory strategies to limit spread of priority ANS based on known dispersal pathways	IANSP	Ongoing	State regulations
3A6b		Identify best available technology for each management strategy	IANSP	Ongoing	Annual report
3A6c		Implement watershed approach to limit spread of ANS within Iowa	IANSP	Ongoing	Annual report
3A6d		Establish cooperative policies with states sharing watersheds to limit regional spread of ANS	IANSP	Ongoing	Cooperative agreements

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
<b>3B1</b>	<b>Develop emergency response plans for those species identified as priority ANS</b>				
3B1a		Develop emergency response plans for existing priority ANS	IANSP	Ongoing	Emergency response plans
3B1b		Develop emergency response plans for regional ANS posing an immediate threat to Iowa	IANSP	Ongoing	Emergency response plans
<b>3C1</b>	<b>Develop and implement control strategies to eradicate or reduce populations of priority ANS in state waters.</b>				
3C1a		Establish protocols that will provide guidance in designing and implementing control strategies	IANSP	Ongoing	Annual report
3C1b		Support scientific research that investigates potential control strategies	IANSP	Ongoing	Research reports
3C1c		Establish mechanisms to ensure that control strategies are coordinated with federal, state, and local governments	IANSP	Ongoing	Annual report
3C1d		Establish mechanisms to ensure that control strategies are based on the best available scientific information	IANSP	Ongoing	Annual report
<b>3C2</b>	<b>Minimize the dispersal of established ANS Iowa</b>				
3C2a		Establish a list of ANS prohibited for sale and transport in Iowa	IANSP	Ongoing	Annual report
3C2b		Develop guidelines and regulations to ensure the cleaning of water-based equipment	IANSP	6/30/01	State regulations
3C2c		Develop regulations to quarantine waterbodies	IANSP	6/30/01	State regulations
3C2d		Develop and implement educational strategies designed to prevent the spread of ANS	IANSP	Ongoing	Annual report
<b>3C3</b>	<b>Manage large populations of established ANS</b>				

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
3C3a		Develop ANS management plans for infested waterbodies	IANSP	Ongoing	Management plans
3C3b		Eradicate identified populations of Eurasian watermilfoil	IANSP	Ongoing	Annual report
3C3c		Implement purple loosestrife control program	IANSP	Done	Annual report
<b>3C4</b>	<b>Develop and implement means of adapting human activities to accommodate ANS infestations</b>				
3C4a		Support scientific research that investigate potential means of adapting human activities to accommodate ANS infestations	IANSP	Ongoing	Research reports
3C4b		Seek beneficial and/or alternative uses of ANS	IANSP	Ongoing	Annual report
<b>4A1</b>	<b>Develop and distribute educational materials that will increase public awareness of ANS issues</b>				
4A1a		Develop and distribute educational materials that educate the public about ANS issues	IANSP	Done	Educational materials
4A1b		Develop and distribute ANS fact sheets and wallet ID cards for priority species	IANSP	Done	Fact sheets/ID cards
4A1c		Write and distribute press releases focusing on the problems associated with ANS	IANSP	Ongoing	Publications
4A1d		Produce public service announcements that inform the public about ANS issues	IANSP	Ongoing	Public service announcements
4A1e		Develop and distribute ANS curriculum materials for Iowa schools	IANSP	6/30/05	Curriculum materials
4A1f		Make presentations on ANS issues to various stakeholder groups	IANSP	Ongoing	Annual report
4A1g		Maintain and upgrade ANS information on Iowa DNR web site	IANSP	Ongoing	Web site
4A1h		Write articles about ANS issues for publication in magazines	IANSP	Ongoing	Publications

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
<b>4A2</b>	<b>Develop and distribute ANS materials targeted at specific pathways of introduction</b>				
4A2a		Develop and distribute brochure dealing with ANS spread via release of aquarium animals and aquatic ornamental plants	IANSP	6/30/01	Educational materials
4A2b		Include ANS information in annual fishing and hunting regulations	IANSP	Done	Publications
4A2c		Develop and distribute brochure dealing with the spread of ANS via recreational boating activity	IANSP	6/30/01	Brochures
4A2d		Develop and post ANS signs at all public boat ramps	IANSP	Ongoing	Annual report
4A2e		Monitor public boat ramps to distribute ANS educational materials	IANSP	Ongoing	Annual report
4A2f		Write articles for publication dealing with ANS problems associated with aquatic gardening	IANSP	Ongoing	Publications
4A2g		Prepare ANS brochures for distribution by Iowa State University Extension Service	IANSP	6/30/01	Brochures
<b>4B1</b>	<b>Develop and distribute educational materials targeting specific pathways of introduction</b>				
4B1a		Develop and distribute educational materials which address the introduction of ANS via commercial shipping practices	IANSP	6/30/01	Educational materials
4B1b		Develop and distribute educational materials which address the introduction of ANS via recreational boating activities	IANSP	6/30/02	Educational materials
4B1c		Develop and distribute educational materials which address the introduction of ANS via aquarium trade and aquatic gardening	IANSP	6/30/03	Educational materials

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
4B1d		Develop and distribute educational materials which address the introduction of ANS via aquaculture and commercial fishing activities	IANSP	6/30/04	Educational materials
<b>4C1</b>	<b>Develop and distribute ANS identification and management information</b>				
4C1a		Distribute ANS fact sheets and wallet ID cards to the field staff of all state agencies	IANSP	Ongoing	Fact sheets/ID cards
4C1b		Distribute ANS fact sheets and wallet ID cards to all stakeholders which manage aquatic resources	IANSP	Ongoing	Fact sheets/ID cards
4C1c		Develop an ANS slide library for usage by aquatic resource managers	IANSP	Done	Slide library
4C1d		Maintain and upgrade ANS information on Iowa DNR web site	IANSP	Ongoing	Web site
4C1e		Organize and facilitate ANS workshops for state aquatic resource managers	IANSP	Ongoing	Annual report
4C1f		Develop and maintain a list of experts to whom ANS samples can be sent for identification	IANSP	6/30/01	Experts list
4C1g		Make presentations on ANS identification and management to all stakeholders with aquatic resource management responsibilities	IANSP	Ongoing	Annual report
4C1h		Develop a technology transfer program for distribution of research findings	IANSP	Ongoing	Annual report
4C1i		Prepare state ANS management plans for priority species	IANSP	Ongoing	Management plans
<b>4D1</b>	<b>Develop and provide ANS informational briefings and educational materials to decision-makers</b>				
4D1a		Organize and facilitate field days for state legislators	IANSP	Annual	Field days

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
4D1b		Distribute an annual report of ANS projects and activities to state legislators	IANSP	Annual	Annual report
4D1c		Distribute educational materials to state legislators emphasizing the problems associated with ANS not yet found in Iowa	IANSP	Annual	Educational materials
<b>5A1</b>	<b>Develop partnerships with regional states to share monitoring activity data</b>				
5A1a		Establish working partnerships with regional ANS management programs	IANSP	Ongoing	Annual report
5A1b		Develop and maintain list of nonindigenous species known to exist in Iowa	IANSP	Ongoing	Annual report
5A1c		Compile and distribute results of Iowa ANS monitoring activities	IANSP	Ongoing	Monitoring data
<b>5A2</b>	<b>Implement statewide ANS monitoring program</b>				
5A2a		Develop identification materials for each ANS being monitored	IANSP	Ongoing	Identification materials
5A2b		Design a monitoring program which provides information to be used in developing strategies which limit the spread of ANS populations	IANSP	Ongoing	Monitoring program
<b>5B1</b>	<b>Monitor the spread of Eurasian watermilfoil</b>				
5B1a		Design and conduct an Eurasian watermilfoil risk assessment to identify at risk waterbodies	IANSP	Done	Annual report
5B1b		Prioritize Iowa waterbodies with regard to the risk of Eurasian watermilfoil infestation	IANSP	Done	Annual report
5B1c		Develop and implement Eurasian watermilfoil monitoring program	IANSP	Done	Annual report
5B1d		Publish and distribute results of Eurasian watermilfoil monitoring activities	IANSP	Done	Annual report
5B1e		Prepare, maintain, and publish a list of all waterbodies infested with Eurasian watermilfoil	IANSP	Done	Annual report

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
<b>5B2</b>	<b>Monitor the spread of purple loosestrife</b>				
5B2a		Design and conduct a purple loosestrife risk assessment to identify at risk waterbodies	IANSP	6/30/01	Risk assessment report
5B2b		Prioritize Iowa waterbodies with regard to the risk of purple loosestrife infestation	IANSP	6/30/01	Priority list
5B2c		Develop and implement purple loosestrife monitoring program	IANSP	6/30/01	Monitoring program
5B2d		Publish and distribute results of purple loosestrife monitoring activities	IANSP	Ongoing	Annual report
5B2e		Prepare, maintain, and publish a list of all waterbodies infested with purple loosestrife	IANSP	Ongoing	Annual report
<b>5B3</b>	<b>Monitor the spread of zebra mussels</b>				
5B3a		Design and conduct a zebra mussel risk assessment to identify at risk waterbodies	IANSP	6/30/02	Risk assessment report
5B3b		Prioritize Iowa waterbodies with regard to the risk of zebra mussel infestation	IANSP	6/30/02	Priority list
5B3c		Develop and implement zebra mussel monitoring program	IANSP	6/30/02	Monitoring program
5B3d		Publish and distribute results of zebra mussel monitoring activities	IANSP	Ongoing	Annual report
5B3e		Prepare, maintain, and publish a list of all waterbodies infested with zebra mussels	IANSP	Ongoing	Annual report
<b>6A1</b>	<b>Support research that identifies, predicts, and prioritizes potential ANS introductions</b>				
6A1a		Identify critical data needed to prevent the introduction of new ANS	IANSP	Ongoing	Annual report
6A1b		Compile and evaluate information on the ecology and management of regional ANS	IANSP	Ongoing	Annual report
6A1c		Attend conferences addressing pathways by which new ANS may be introduced into Iowa	IANSP	Ongoing	Annual report



## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
6A1d		Monitor research efforts aimed at controlling the introductions of new ANS	IANSP	Ongoing	Annual report
6A1e		Support research that improves Iowa's ability to identify, predict, and prioritize potential ANS introductions	IANSP	Ongoing	Research reports
6A1f		Develop technology transfer program to distribute research findings	IANSP	6/30/02	Technology transfer program
<b>6A2</b>	<b>Support research to limit the spread of existing ANS populations in Iowa</b>				
6A2a		Identify critical data needed to limit the spread of existing ANS to uninfested waterbodies	IANSP	Ongoing	Annual report
6A2b		Compile and evaluate information on the ecology and management of existing ANS	IANSP	Ongoing	Annual report
6A2c		Attend conferences dealing with the mechanisms and pathways by which existing ANS spread	IANSP	Ongoing	Annual report
6A2d		Monitor research efforts aimed at controlling the spread of existing ANS	IANSP	Ongoing	Annual report
6A2e		Support research that improves Iowa's ability to control the spread of existing ANS	IANSP	Ongoing	Research reports
6A2f		Develop technology transfer program to distribute research findings	IANSP	6/30/02	Technology transfer program
<b>6A3</b>	<b>Support research that identifies effective management activities to control and/or eradicate ANS</b>				
6A3a		Identify critical data needed to control and/or eradicate ANS	IANSP	Ongoing	Annual report
6A3b		Attend conferences dealing with the control and/or eradication of ANS	IANSP	Ongoing	Annual report

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
6A3c		Monitor research aimed at the control and/or eradication of ANS	IANSP	Ongoing	Annual report
6A3d		Support research that improves Iowa's ability to control and/or eradicate ANS	IANSP	Ongoing	Research reports
6A3e		Develop technology transfer program to distribute research findings	IANSP	6/30/02	Technology transfer program
<b>7A1</b>	<b>Review existing laws and regulations governing ANS issues in Iowa</b>				
7A1a		Identify existing gaps and overlaps in ANS law	IANSP	Ongoing	Annual report
7A1b		Compile copies of ANS laws from other states and compare to Iowa ANS laws	IANSP	Ongoing	Annual report
7A1c		Compare Iowa ANS laws to federal ANS laws to ensure compatibility	IANSP	Ongoing	Annual report
7A1d		Recommend changes in Iowa ANS law	IANSP	Ongoing	Legislative action
<b>7A2</b>	<b>Develop recommendations for new state ANS laws and regulations</b>				
7A2a		Establish interagency task force to develop recommendations for new ANS laws and regulations	IANSP	12/31/00	Task force report
7A2b		Forward recommended ANS laws and regulations to Iowa Legislature for consideration	IANSP	12/31/01	Legislative action
<b>7A3</b>	<b>Promulgate, publicize, and enforce state ANS regulations</b>				
7A3a		Develop and implement an outreach program to inform stakeholders of existing regulations	IANSP	6/30/01	Outreach program
7A3b		Develop and implement enforcement programs	IANSP	Ongoing	Enforcement program
7A3c		Conduct boat inspections to ensure compliance with ANS regulations	IANSP	Ongoing	Annual report

## Iowa ANS Management Plan Strategic Planning Table

Plan #	Strategic Actions	What will be done	By whom	By when	Progress/status report
8A1	Develop a permanent funding mechanism for ANS management in Iowa				
8A1a		Explore ideas for permanent funding of ANS management activities	IANSP	Ongoing	Annual report
8A1b		Work with Iowa legislature to establish a permanent funding mechanism for ANS management activities	IANSP	Ongoing	Annual report
8A2	Set priorities for management of existing ANS so resources can be directed in a cost-effective manner				
8A2a		Prioritize existing ANS problems in Iowa	IANSP	12/31/00	Legislative action
8A2b		Set annual ANS management goals based on priority list.	IANSP	Ongoing	Program goals

## GLOSSARY

**ANS:** Aquatic nuisance species.

**aquatic nuisance species:** An aquatic nuisance species that threatens the diversity or abundance of native species, the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters. Reference to an aquatic nuisance species implies that the species is non-indigenous.

**baitfish:** Fish species commonly sold for use as bait for recreational fishing such as fathead minnows.

**ballast water;** Any water and associated sediments used to manipulate the trim and stability of a vessel.

**biological control:** A natural enemy of the target aquatic nuisance species that is intentionally introduced into an infested area to reduce an aquatic nuisance species.

**control:** Significantly reduce the size of an aquatic nuisance species infestation in a waterbody.

**core area:** A geographic zone containing several to many waterbodies that are heavily infested with an aquatic nuisance species.

**ecologically harmful exotic species:** non-native wild plants or animals that can naturalize, have high propagation potential, are highly competitive for limiting factors, and cause displacement of, or otherwise threaten, native plants and animals in their natural communities.

**environmentally sound:** Methods, efforts, actions, or programs to prevent introductions or control infestations of aquatic nuisance species that minimize adverse impacts to the structure and function of an ecosystem or otherwise adversely effect non-target organisms and ecosystems and, where feasible, emphasize integrated pest management techniques and non-chemical measures.

**eradicate:** eliminate an aquatic nuisance species from a waterbody.

**exotic:** A species which is not native to Iowa but has been introduced from other states or continents to Iowa.

**federal consistency:** A requirement under the Coastal Zone Management Act that stipulates that federal actions that are reasonably likely to affect land or water use or natural resources of the coastal zone be consistent with the enforceable policies of a coastal state's federally approved coastal management program (CMP). A coastal state reviews the federal action to determine if the proposed action will be consistent with the CMP.

**Great Lakes:** Lake Ontario, Lake Erie, Lake Huron (including Lake St. Clair), Lake Michigan, Lake Superior, and the connecting channels (Saint Mary's River, Saint Clair River, Detroit River, Niagara River, and Saint Lawrence River to the Canadian Border), and includes all other bodies of water within the drainage basin of such lakes and connecting channels.

**infested:** Any waterbody where an aquatic nuisance species is known to occur.

**integrated pest management (IPM):** An approach to aquatic nuisance species control that combines current technologies in an effort to maximize their effects

**native:** A plant or animal species that naturally occurs in Iowa and has not been introduced from another state or continent.

**naturalized:** A plant or animal species that is not native to Iowa, but has become acclimated here and grows or behaves as a native species.

**non-indigenous species:** Any species or other viable biological material that enters an ecosystem beyond its historic range, including any such organism transferred from one country to another.

**non-target:** Plant or animal species not intended to be harmed by a control method.

**population:** A group of individual plant or animal species.

**selective control:** A management technique which is only effective against certain species.

**unintentional introduction:** An introduction of non-indigenous aquatic species that occurs as the result of activities other than the purposeful or intentional introduction of the species involved, such as the transport of non-indigenous species in ballast or in water used to transport fish, mollusks, or crustaceans for aquaculture or other purposes.

**waters of the United States:** The navigable waters and the territorial sea of the United States.

**watershed:** An entire drainage basin including all living and non-living components.

**watershed approach:** A management scheme which considers all waterbodies within an entire drainage basin when developing an aquatic nuisance species management plan.

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## APPENDIX A

### Iowa Nonindigenous Aquatic Nuisance Species Task Force Members

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## **APPENDIX B**

### **Iowa Eurasian Watermilfoil Law**

#### **Code of Iowa Chapter 456A**

#### **Regulation and Funding – Natural Resources Department**

#### **456A.37 Eurasian water milfoil.**

1. Definitions. As used in this section:

- a. "Infestation of Eurasian water milfoil" means an infestation of Eurasian water milfoil that occupies more than twenty percent of the littoral area of a body of water.
- b. "Watercraft" means any vessel which through the buoyance of water floats upon the water and is capable of carrying one or more persons.

2. Eurasian watermilfoil management plan. Before January 1, 1998, the commission shall prepare a long-term statewide Eurasian water milfoil management plan. The plan shall address all of the following:

- a. The detection and prevention of accidental introductions into the state of Eurasian water milfoil.
- b. A public awareness campaign regarding Eurasian water milfoil.
- c. The control and eradication of Eurasian water milfoil in public waters.
- d. The development of a plan of containment strategies that at a minimum shall include all of the following:
  - (1) The participation by lake associations, local citizens groups, and local units of government in the development and implementation of lake management plans where Eurasian water milfoil exists.
  - (2) Notice to travelers of the penalties for violation of laws relating to Eurasian water milfoil.

3. Grants. The director of the department of natural resources shall accept gifts, donations, and grants to aid in accomplishing the control and eradication of Eurasian water milfoil.

4. Rulemaking. The commission shall adopt rules pursuant to chapter 17A. The rules shall:

- a. Restrict the introduction, propagation, use, possession, and spread of Eurasian water milfoil.

b. Identify bodies of water with infestation of Eurasian water milfoil. The department shall require that bodies of water be posted as infested. The department may prohibit boating, fishing, swimming, and trapping in infested bodies of water.

5. Prohibitions.

a. A person shall not do any of the following:

- (1) Transport Eurasian water milfoil on a public road.
- (2) Place a trailer or launch a watercraft with Eurasian water milfoil attached in public waters.
- (3) Operate a watercraft in a marked Eurasian water milfoil infestation area.

b. The penalty for violating this subsection is contained in section 805.8, subsection 5B. (Replaced by Section 805.8B, subsection 5.)

Section 805.8B Navigation, recreation, hunting, and fishing scheduled violations.

5. Eurasian water milfoil violations. For violations of section 456A.37, subsection 5, the scheduled fine is one hundred dollars.

## APPENDIX C

### Draft List of Non-indigineous Aquatic Animals

#### List of Non-indigineous Aquatic Animals (Priority species indicated with an \*)

Common Name	Scientific Name
<u>Amphibians</u>	
None	
<u>Fish</u>	
Rainbow trout	<i>Salmo gairdnerii</i>
Brown trout	<i>Salmo trutta</i>
Tiger muskellunge	<i>Esox</i> hybrid
Goldfish	<i>Carassius auratus</i>
Common carp	<i>Cyprinus carpio</i>
White amur	<i>Ctenopharyngodon idella</i>
Bighead carp	<i>Hypophthalmichthys nobilis</i>
Wiper	<i>Morone</i> hybrid
Spotted bass	<i>Micropterus punctucatus</i>
Redear sunfish	<i>Lepomis microlophus</i>
Saugeye	<i>Stizostedion</i> hybrid
Rainbow smelt	<i>Osmerus mordax</i>
<u>Invertebrates</u>	
Rusty crayfish	<i>Orconectes rusticus</i>
Zebra mussel *	<i>Dreissena polymorpha</i>
<u>Reptiles</u>	
None	

## APPENDIX D

### Draft List of Non-indigineous Aquatic Plants

#### List of Non-indigineous Aquatic Animals (Priority species indicated with an \*)

Common Name	Scientific Name
<u>Species not native to United States</u>	
Reed canary grass	<i>Phalaris arundinacea</i>
Yellow flag iris	<i>Iris pseudacorus</i>
Hydrilla	<i>Hydrilla verticillata</i>
European water-clover	<i>Marsilea quadrifolia</i>
True watercress	<i>Nasturtium officinale</i>
Creeping yellow cress	<i>Rorippa sylvestris</i>
Eurasian watermilfoil *	<i>Myriophyllum spicatum</i>
Robust toothcup	<i>Ammannia robusta</i>
Purple loosestrife *	<i>Lythrum salicaria</i>
Lady's thumb	<i>Polygonum persicaria</i>
Maritime dock	<i>Rumex maritimus</i> L. var. <i>fueginus</i>
Bitter dock	<i>Rumex obtusifolius</i>
Crack willow	<i>Salix fragilis</i>
Clammy hedge-hyssop	<i>Gratiola virginiana</i>
Water speedwell	<i>Veronica anagallis-aquatica</i>
Common speedwell	<i>Veronica officinalis</i>
Bog bulrush	<i>Scirpus mucronatus</i>
Barnyard grass	<i>Echinochloa crusgalli</i>
Curly-leaf pondweed	<i>Potamogeton crispus</i>

#### Species native to United States but not Iowa

Hawksbeard	<i>Crepis runcinata</i>
Butterweed	<i>Senecio glabellus</i>
Navarretia	<i>Navarretia intertexta</i>

## **Appendix E**

### **Chronology of ANS Management Plan Developmental Activities**

- 01 July 1997**      **Research and development of preliminary outline for state ANS management plan initiated.**
- 31 January 1998`**      **Draft 1.0 of state ANS management plan completed and initial review of document initiated.**
- 30 April 1998**      **Draft 2.0 of state ANS management plan completed and second review of document initiated.**
- 30 June 1998**      **Iowa Aquatic Nuisance Species Task Force formed to review current draft of plan and provide further guidance in revision of document.**
- 30 September 1998**      **Draft 3.0 of state ANS management plan completed and forwarded to task force for review.**
- 20 November 1998**      **Task force meeting held in Ames, Iowa to discuss necessary revisions to state ANS management plan.**
- 28 February 1999**      **Draft 4.0 of state ANS management plan completed and submitted to Iowa Department of Natural Resources administrators for internal review.**
- 31 March 1999**      **Draft 5.0 of state ANS management plan completed and submitted to task force for final review.**
- 10 June 1999**      **Draft 6.0 of state ANS management plan completed and made available for public review. Press release sent to over 300 newspapers utilizing the Iowa Link internet system.**
- 16 June 1999**      **Legal notice of public review posted in Des Moines Register.**
- 22 June 1999**      **Public hearing held on proposed state ANS management plan utilizing Iowa's fiber optic network. Public hearing was delivered to five regional sites (Manchester – northeast Iowa, Washington – southeast Iowa, Alleman – central Iowa, Atlantic – southwest Iowa, and Spirit Lake – northwest Iowa).**

- 29 June 1999**      **Task force meeting held in Ames, Iowa to review public comments and discuss the need for any additional revisions to state ANS management plan.**
- 15 July 1999**      **Thirty day public review period completed.**
- 16 July 1999**      **Telephone conference with task force held to review public comments and discuss the need for any additional revisions to state ANS management plan.**
- 17 July 1999**      **Final draft of state ANS management plan completed and mailed to federal Aquatic Nuisance Species Task Force for review.**