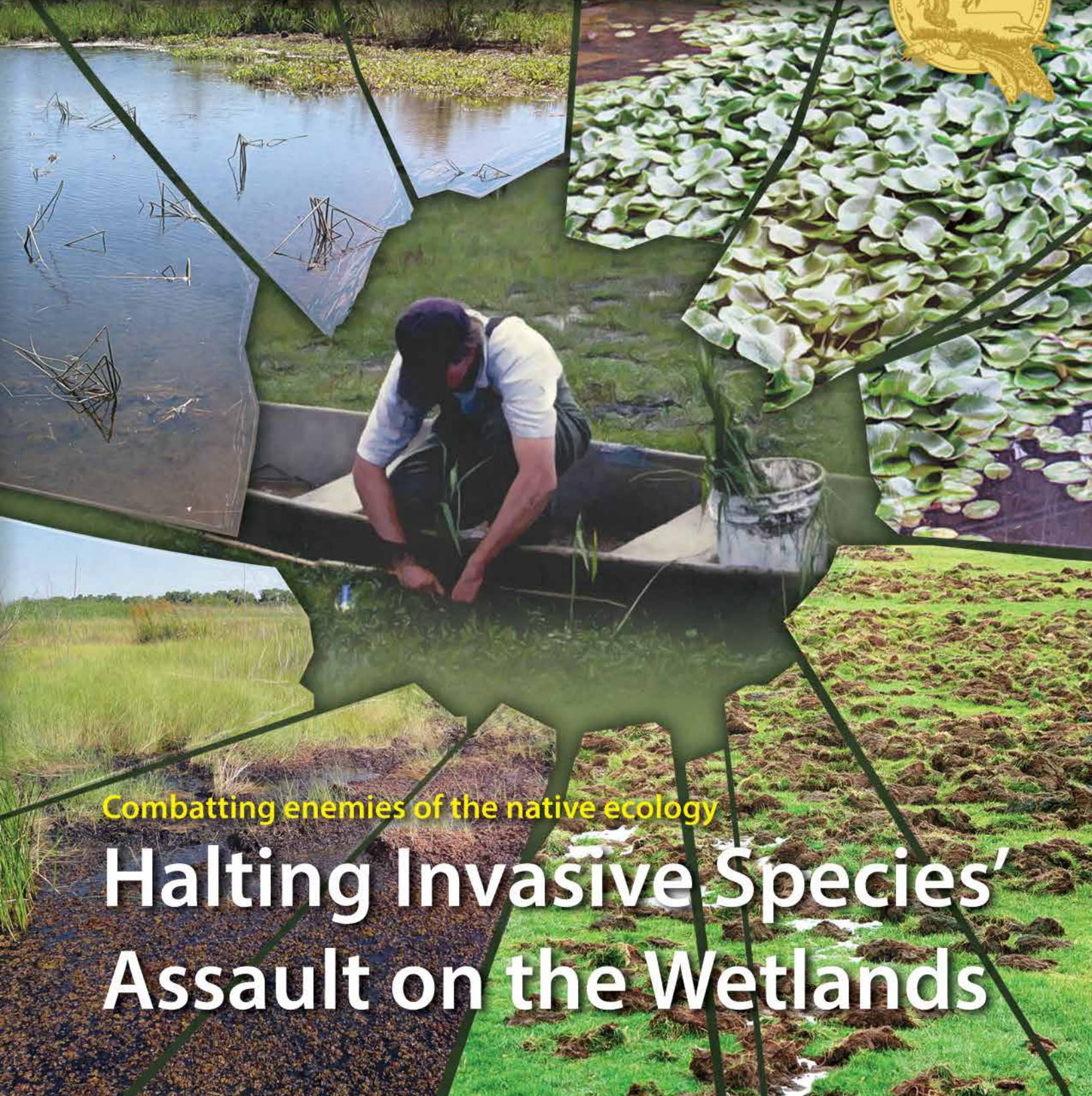


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WATER MARKS

Louisiana Coastal Wetlands Planning, Protection and Restoration News

September 2017 Number 56



Combatting enemies of the native ecology

Halting Invasive Species' Assault on the Wetlands

September 2017

Number 56

WaterMarks is published two times a year by the Louisiana Coastal Wetlands Conservation and Restoration Task Force to communicate news and issues of interest related to the Coastal Wetlands Planning, Protection and Restoration Act of 1990.

This legislation funds wetlands restoration and enhancement projects nationwide, designating nearly \$80 million annually for work in Louisiana. The state contributes 15 percent of total project costs.

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ABOUT THIS ISSUE'S COVER . . .

Invasive plants overtaking waterways, non-native animals rooting in wetland soils and devouring marsh grasses, rafts of vegetation smothering native species and battering restoration project transplants – without natural controls in the Louisiana ecosystem, alien species menace the inherent order of the wetlands.

Photo credits: CWPPRA; clockwise from top: Creative Commons; ajafoto; Ronnie Paille, Louisiana Fish and Wildlife Service; Cindy S. Steyer, USDA Natural Resources Conservation Service

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Ronnie Paille, Louisiana Fish and Wildlife Service

For more information about Louisiana's coastal wetlands and the efforts planned and under way to ensure their survival, check out these sites on the World Wide Web:

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ALLIGATORWEED, WATER HYACINTH, GIANT SALVINIA

Alien Plants Stalk Louisiana's Marshes

Sometimes they are ushered in with great fanfare and praise, coddled and cultivated for their beauty or presumed utility. Sometimes they sneak in without arousing notice or concern, skulking out of ships or packing crates to creep into paradise. Sometimes they are swept in on winds and storm tides, broken and dislocated and looking for a place to put down roots. No matter how they arrive, vegetative species alien to the wetlands but that thrive in Louisiana's climate and coastal conditions may overrun their new world. Without natural controls to keep them in check, such newcomers can become a dreaded foe: an invasive species.

How can a plant be a foe?

In federal law, "invasive species" has a precise definition: any species not native to the ecosystem which causes or is likely to cause economic or environmental harm or harm to human health.

Understanding native plants' ecological role clarifies the threats that invasives pose. Through the process of natural selection, native species have become the organisms best suited to local conditions. Over eons, they have evolved symbiotically with other organisms in the environment; native plants provide optimum food and habitat for native wildlife, which perform services such as seed dispersal and

fertilization. Forming a web of mutual dependency, a diverse, natural community functions with checks and balances that ensure its long-term stability.

"In the absence of the forces that control growth and propagation in its original habitat, an invasive species that gains a foothold can run rampant," says Cindy Steyer, a coastal vegetative specialist with the Natural Resources Conservation Service. "It can outcompete native species for space and resources and form an

Thriving under Louisiana's coastal conditions and with no natural enemy to limit its proliferation, giant salvinia can swallow entire water bodies, obstructing navigation and destroying habitat for native vegetation, fish and wildlife.

undesirable monoculture. This may sound like a small thing, but plant diversity is critical to a wetland's sustainability. If a storm wipes out a monoculture in a marsh, other plants that can recolonize the area quickly enough to prevent the substrate from eroding may not be present."

Invasives can also change a marsh's functional value, destroying habitat and food sources for insects, birds and other wildlife. "Invasives may support one kind of waterfowl or one kind of animal, but be detrimental to others," Steyer says. "They can harbor pathogens and other organisms that endanger native species. Invasives can alter plant community succession, disrupt pollination, seed dispersal and

host-plant relationships." Through hybridization, invasives can even alter native plants' genetic make-up.

As well as causing shifts in the ecological community, invasives can reshape the physical environment, altering hydrologic flow patterns and increasing shoreline erosion by smothering and killing the existing vegetative cover. Like a cancer, invasive species can overwhelm and destroy the habitat that enables its success.

Who are these bad actors?

Undoubtedly there are scores of foreign plants that tried to gain a foothold in Louisiana and just didn't make it. Maybe the climate was too hot or too cold, rainfall too seldom or

too frequent. Maybe they met up with insects or herbivores that devoured them. But Steyer mentions three species so well suited to Louisiana's conditions that they've stayed and multiplied.

Water hyacinth, an aquatic plant with a beautiful blossom, was brought to Louisiana in 1884 as an ornamental specimen. It quickly escaped into ponds, bayous and canals. "Hyacinth blocks sunlight from reaching the bottom of the water column and crowds out native aquatic vegetation – plants that root in shallow water and stabilize the substrate," says Steyer. "Damage worsens if, following a freeze or saltwater exposure, hyacinth dies back and leaves water bodies barren. Waves and



U.S. Fish and Wildlife Service

currents stir up exposed soils, increase water depth and turbidity, and prevent natives' new growth."

Another invader, alligatorweed, poses similar problems. "This troublemaker probably arrived in the late 1800s, a stow-away from Argentina," says Steyer. "Today you see alligatorweed growing on the water's surface throughout the coastal zone. Like hyacinth, it forms large, floating mats that displace native plants and shade out submerged aquatic vegetation upon which waterfowl and fish depend. Like hyacinth, alligatorweed can block drainage channels and alter water flow. In quiet bayous and small areas it can impede boat traffic and clog motors. Alligatorweed does harbor insects and invertebrates that birds and fish eat, but it is not a good source of food or habitat for other marsh creatures."

The state has long known and dealt with these two invasives, but a recent newcomer from Brazil has become the wetland bully: giant salvinia. Classified as an aquatic fern, it can grow explosively. Dense mats exclude sunlight and deplete oxygen from marsh waters. Blown against shorelines and pushed onto land by waves and high tides, they smother native emergent vegetation and hasten erosion. "This is happening in many fresh areas of our



From beauty to beast: Water hyacinth used its good looks to gain entry into Louisiana, but its lovely blossom belies its true character as a ruthless invader capable of overtaking its adopted home, choking waterways (opposite) and shading out well behaved native species.

wetlands," says Steyer. "The cumulative effect is devastating."

Why don't they just leave?

These plants seldom pose an ecological threat in their native habitats. Like our own natives, they evolved with organisms that keep them in check, or they succumb to environmental circumstances that constrain their growth. In Louisiana they have found congenial conditions without the natural

controls present in their home territory. So how can the wetlands escape domination by these invaders?

"With most invasive species, elimination is an impossible goal. Instead we aim for a degree of control," says Steyer. "Weather can help. These plants are tropical and not very cold-tolerant, so a long, cold spell can knock them back. But with average global temperatures rising, we may get less help from the weather."

A rise in water salinity can also cause die-backs, but here again recent weather has been a fickle fighter; for the past few seasons no hurricane has pushed high tides and salt water inland.

Other methods of control are chemical, mechanical, or the careful introduction of a biological agent. “Because invasive species can interrupt navigation, obstruct operation of hydrologic structures and water treatment systems, and ruin thousands of acres for fishing, hunting and other recreation, there is an economic justification for combating them,” Steyer says. “Chemicals can target specific vegetation, but they are expensive and not easy to administer over a large area. Mechanically pulling vegetation out of waterways is also difficult and costly. Currently there is a program underway to introduce a weevil that eats only salvin-

ia. Possibly there is another insect that preys exclusively on hyacinth – but releasing biological controls is done with great caution and only after lengthy testing to determine that the control itself is unlikely to become a problem.”

Living with the enemy

Steyer cites areas planted under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Coastwide Vegetative Planting project where invasive species have caused harm. “Rafts of invasives can damage even robust, well-established plantings,” she says. “If mats float onto shorelines or into created marsh areas, they can smother vegetation, leaving no root stock left to resprout. Other times, floating rafts simply knock over and uproot newly installed plants, setting back efforts to establish vegetation.”

Scientists can’t precisely predict when or where invasive plants will pose a hazard. “There are few pre-emptive actions we can take,” says Steyer. “If we know, for instance, giant salvinia could potentially invade an area, we plant early so the transplants have time to anchor their roots and grow before late summer, when salvinia is at its worst.”

Invasive species have become an established player in the dynamic ecology of the wetlands. Along with addressing other menaces to Louisiana’s coast, such as erosion and saltwater intrusion, limiting the damage and mitigating the consequences of invasive plants’ proliferation are actions upon which the health and sustainability of the wetlands depend. **WM**



SALVINIA WEEVIL: AN UNWELCOME WEED'S NATURAL ENEMY

CWPPRA Enlists a Tiny Insect to Combat the Goliath of Invasive Vegetation

The scientific name of this invasive plant aptly reflects its nature: *Salvinia molesta*. If ever a landscape could be molested by hostile vegetation, the place is coastal Louisiana and the plant is giant salvinia.

Although a number of invasive plants have plagued Louisiana's wetlands for years, the 21st century arrival of giant salvinia introduced a threat of a different order. Brought into the country through the horticultural trade as an ornamental or aquarium plant, giant salvinia proliferates rapidly; under favorable conditions it can double its surface area in three days and cover 40 square miles of open water in three months. It can stack up in a mat more than three feet thick, dense enough to

hold a man's weight. "This Brazilian native is well suited to Louisiana," says Ronnie Paille, a coastal restoration biologist at the U.S. Fish and Wildlife Service. "It thrives in freshwater areas and in lakes and ponds that do not experience strong hydrologic exchanges."

Giant salvinia's thick growth can obstruct waterways, block boat passage and increase siltation until the water body vanishes. Floating mats prevent air and sunlight from penetrating the water column, smothering plankton and shading out native vegetation. Without open surfaces, water becomes depleted of dissolved oxygen, the base of the food chain is destroyed and aquatic life dies. Wetland species that depend on open water for food and habitat

and air-breathing animals such as frogs, turtles and waterfowl are displaced. If winds and tides carry rafts of the untethered plant onto shore, the heavy mats flatten and suffocate the vegetation that stabilizes the substrate; denuded shorelines quickly erode.

Even dead, salvinia is destructive. If decaying in water, the plant consumes any remaining dissolved oxygen as it sinks to the marsh bottom. If it withers and dies on shore, it leaves behind a thin, fibrous film having insignificant organic content and vegetative mass.

Dead or alive, invasive species spell trouble in the wetlands. Capable of killing native vegetation by displacing it, rafts of dead salvinia can smother plants along shorelines and increase erosion of fragile marsh soils.

Will giant salvinia gobble up all the wetlands?

“Eradicating giant salvinia in Louisiana is probably never going to happen,” says Paille. “As with most invasive species, the goal is to control it, to reduce its prevalence and limit its proliferation.”

Salvinia spreads quickly. It can reproduce from a single broken fragment floating on water currents or hitching a ride with waterfowl and wildlife – or on the bottom of boats, boots and trailers. Educating wetland visitors about good hygienic practices is pivotal in limiting salvinia’s dispersion. This measure works in concert with conditions and practices that exploit salvinia’s vulnerabilities:

- Salvinia thrives in strong light but languishes in deep shade. However, in light shade on a moist substrate, salvinia can remain viable for more than a year.

- A 30-minute exposure to full strength sea water is lethal to salvinia; storms pushing saline waters into freshwater areas can kill it.
- Desiccation withers salvinia, although draw-downs of infected water bodies are often not feasible.
- Cold weather thins salvinia, although surviving plants multiply readily when warm weather returns.
- Certain herbicides kill salvinia, but the salvinia leaf’s hair-like surface is resistant to chemical applications.
- Mechanically pulling salvinia out of waterways can be successful, but the plant’s biomass, growth rate and swift reproduction challenge such efforts.
- Increasing the presence of a pest or pathogen exclusively affecting salvinia exercises a biological control over the plant.

Such a pest does exist. In salvinia’s native habitat, the salvinia weevil keeps the plant’s growth in check and prevents it from overtaking the landscape. Although the tiny insect was already in the United States, probably imported accidentally along with salvinia, determining the safety of releasing it in numbers great enough to beat back salvinia infestations has been a long and cautious process. After years of testing and research, scientists are convinced this weevil feeds only on salvinia and lays its eggs only on its leaves. “It would rather starve than eat anything but salvinia,” says Paille.

Salvinia leaves are covered with arching hairs that look like cooking whisks. Water resistant, submerged leaves trap air to keep the plant buoyant. Salvinia weevils feed exclusively on salvinia leaves and buds and lay their eggs in holes excavated in the plant’s tissue. Larvae feed on salvinia rhizomes. In large enough numbers, weevils can effectively control salvinia growth and spread.



Scott Bauer, USDA Agricultural Research Service



CWPPRA project sends weevils into combat

While the weevil is no less alien to Louisiana as is giant salvinia, the insects have required a great deal more encouragement to become productive residents. Weevils are sensitive to cold; in south Louisiana, adults may survive but eggs and larvae may not. The population depends on overwintering adults reproducing when temperatures warm. “Our hope is to spread weevils throughout infestation-prone areas,” says Paille. “It may take two or three growing seasons for a population to

wipe out a stand of salvinia. If a severe winter kills off the weevils or if a hurricane flushes them out, we have to restock the insects. Residual salvinia can come back quickly.”

Consequently, cultivating and distributing weevils are essential to using this biological control. First undertaken by the Louisiana Department of Wildlife and Fisheries, these activities were handed over to the Louisiana State University AgCenter in 2005. LSU raises weevils in its ponds and makes them available for release throughout the state.

Giant salvinia was overtaking this body of water when salvinia weevils began their work. Weevil damage shows as red in the photograph on the left. Taken but weeks later, the photograph on the right proves the efficacy of the tiny insect in clearing an area of salvinia infestation.

Additionally LSU scientists are researching methods to improve the weevils’ winter hardiness and to monitor the effects of distribution in release areas.

In January, 2017 the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) approved the Coastwide Salvinia Facility project to support the AgCenter in producing, harvesting, and distributing weevils and monitoring their effects and their spread.

“The project encompasses the entire Louisiana coastal region and provides funding for 20 years,” says Paille. “We expect to see dramatic reductions of salvinia in sites where weevils are released, consequently improving water quality and wildlife habitat.” **WM**



Tiny salvinia weevils are heroes in infested wetlands. Testing has proved the weevils would rather starve than eat anything but salvinia. Research is underway to increase weevil survival through winter cold snaps that kill the insects and their eggs but do not eradicate the plant itself.



Courtesy of USDA APHIS/WS

STRIKING BACK AT FERAL HOGS AND FOREIGN FISH

Alien Species Upend Marsh Ecosystems under Water and Above Ground

Imagine fishing from a boat in a lazy Louisiana bayou. Suddenly something as big as a bass leaps several feet out of the water and lunges toward you. Take cover! It's a silver carp. But although real, the danger that carps pose to boats and boaters is only a flicker of their true menace to the aquatic ecosystems in America's rivers and waterways.

Silver carp is one of five Asian carps that comprise Louisiana's most prominent invasive fish. The grass carp was brought into the United States in the 1970s to control vegetation in ponds. It prefers native submersed vegetation and larger plant algae and can eat up to 40 percent of its body weight daily.

In the 1970s aquaculture farmers imported other varieties of carp into the U.S.:

- Plankton feeders, big-head and silver carp were brought in to filter algae in catfish ponds and keep levels of dissolved oxygen high. Voracious eaters, silver juveniles can consume as much as 120 percent of their body weight every day, thereby depleting food sources for native fish.
- Black carp were imported to feed on mollusks that impart a bad flavor to farm-raised catfish. Preying indiscriminately, they increase the endangered native mollusks' risk of extinction.

While capable of performing desired functions, carp violated their welcome by escaping from their workplaces. "High water events

flushed them out of farms and into rivers and waterways," says Bobby Reed, a biologist with the Louisiana Department of Wildlife and Fisheries. "Every major flood spreads their distribution. In Louisiana, the size of the Mississippi River gives carp opportunity to disperse, but upstream they congregate in numbers that choke the rivers."

What makes a species invasive?

"Fish must meet several criteria to be identified as invasive," says Reed. "They must fill a niche that few native species occupy. They

A scientist examines the soft soil of a river floodplain ravaged by hogs after floodwaters receded. Using their tough snouts to root up vegetation, hogs can devastate large areas quickly, causing both environmental and economic damage.

must have room to expand in connected rivers and waterways. And the species must have reproductive potential. Carp grow large – some can approach 100 pounds – and send billions of eggs downstream. Juveniles moving into smaller, adjacent waters compete with native fish for space, oxygen and other resources. Young carp are prey for other fish, but they quickly outgrow their predators.”

All carp create environmental problems by

- increasing nutrient loads that promote algal blooms and hypoxia, thus degrading water quality
- exhausting food sources for other community members

- affecting the density, survival and fecundity of native species

Let's eat!

While no project conducted under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) has reported severe damage from carp, the fish can promote erosion by consuming vegetation along stream-sides and shorelines; and by out-competing native species, carp alter the wetland ecosystems that CWPPRA projects aim to protect and preserve.

With no natural checks and balances for carp in Louisiana, controlling their populations must be accomplished through other means. One

idea is to bombard them with sterilized fish. Sterilization can be accomplished through genetic engineering that inhibits viable sperm and egg, or by subjecting fertilized eggs to pressure or to cold shock. “Already regulations require that grass carp brought into Louisiana be genetically sterile,” says Reed. “If they get washed out of their home pond, they can still eat grass but they can never reproduce.”

Another control effort is to encourage carp consumption. Carp is the most popular freshwater table fish worldwide; in blind taste tests, American diners preferred carp to catfish and tilapia. Reportedly carp from American waters have a better flavor than carp raised in



Ronnie Paille, U.S. Fish and Wildlife Service

FWS employee John Savell caught this toddler-sized carp in Louisiana's waters. The fish are known to jump when agitated, posing a danger above as well as below the water's surface.



www.depositphotos.com

Although vegetation comprises the bulk of their diet, feral hogs are omnivorous, feeding on the young of both domestic and wild animals and on carrion. In Louisiana's wetlands, feral hogs searching for eggs and hatchlings pose a significant threat to alligator nests.

Asia, but getting them into Asian markets has encountered economic and logistical obstacles.

Above ground, feral hogs rip up the marsh

As serious a long-term problem as carp pose, feral hogs can devastate an expanse of marsh in the course of searching for a single meal. “Grubbing in the soft soils for roots and tubers or digging for crabs, hogs till up the marsh and disturb the substrate,” says Ronnie

imported for sport hunting, hogs know few natural enemies. They reproduce robustly – a sow can birth 12 to 20 piglets each year – easily outnumbering their predators. “Feral hogs compete with native species for food resources,” says Paille. “They destroy bird and alligator nests and eat the eggs. In agricultural settings they consume crops and degrade fields. In residential areas they damage yards and parks. They are a vector of disease for both wild and do-

many methods of controlling them,” Paille says. “Currently we can trap them or shoot them.”

Scientists are studying other alternatives, but each has a drawback.

- **Poison:** “Without knowing a physiological weakness in hogs to exploit,” says Paille, “using toxicants poses an unacceptable threat to other animals and to the environment.”
- **Oral contraceptives:** Agents to control hogs’ fertility could also limit reproduction in non-target species.
- **High-tech feeding devices:** The expense of devices using sensors to administer poisons or contraceptives exclusively to hogs prohibits wide distribution.
- **Hunting for food:** Feral hogs are reputedly tasty, but they carry diseases and pathogens that make careful cleaning imperative and present obstacles to commercial slaughter.



Brian Gratwicke

Carp are not Louisiana’s only aquatic invader. “We’re watching the appearance of the Rio Grande Cichlid,” says Bobby Reed, a biologist at LA DNR. “Probably the aquarium trade brought cichlids into Louisiana, but floods and hurricanes have expanded their range. They threaten native fish by competing for resources and harboring pathogens. Although bigger fish can eat them, over time cichlids could displace native species.”

Paille, a coastal restoration biologist at the U.S. Fish and Wildlife Service. “To cool off they create mud wallows that can convert into ponds and open water. Such disturbances increase coastal erosion.”

Descended from domestic pigs brought to the new world by Spanish explorers and from Russian boars

mestic animals. Economically and environmentally, feral hogs are a costly problem.”

Wily swine are hard to control

Scientists predict that feral hogs, assisted by a warming climate, could spread to every county in the continental United States within five decades. “We don’t have

Paille suggests that liberalizing hunting regulations could decrease feral hog numbers in the wetlands. “There is some movement in this direction,” he says. “Under certain circumstances nighttime hunting is permitted. Shooting from helicopters is currently most effective, but it’s expensive. Still, when compared to the damage hogs are capable of rendering, conducting annual aerial hunts may be our best option.” **WM**

WATERMARKS INTERVIEW WITH MICHAEL MASSIMI

Environmental Scientist and Invasive Species Coordinator,
Barataria-Terrebonne National Estuary Program

WATERMARKS: Can you summarize reasons scientists are so concerned about invasive species?

MASSIMI: Invasive species come from somewhere else – either by accident or by intent – and there are few natural agents controlling their growth and spread. With highly successful rates of reproduction, they compete for resources, displace native species, change predator-prey relationships, reduce diversity and degrade habitat. Their dominance reduces the functions and values of wetland ecosystems.

WATERMARKS: What about the expense? Can we justify the cost of controlling them?

MASSIMI: Management and control programs are expensive, but estimates of the economic damage caused by invasive species in the United States top \$120 billion annually – and this figure doesn't consider many of the ecological impacts and their possible ripple effects. What effect will Asian carp actually have on our fisheries? What's the dollar value of waterways closed and habitat destroyed by hydrilla? What price do we assign to the neurological damage in bald eagles, waterfowl, reptiles and amphibians caused by toxic alga that has an affinity for hydrilla? The alga and its relationship with hydrilla exemplify how the environmental degradation caused by one invasive species can pave the way for additional invasive species to enter the ecosystem.

WATERMARKS: This issue of WaterMarks discusses a few of the serious invasive species in Louisiana; what others you would add to that list?

MASSIMI: There are several. Chinese tallow trees are a long-time scourge in southern forests. They form dense monocultures that exclude native vegetation and consequently diminish food and shelter for native wildlife.

Apple snails, a more recent arrival, are the perfect invader, living both in and out of the water during different stages of their life cycle. Extraordinarily herbivorous, they destroy fish habitat by devouring vegetation and turning a plant-dominated water body into one dominated by algae. They are a host for the rat lung worm parasite, which infects raccoons and other small mammals and can be passed to humans.

Invasive insects threaten human health more directly. The Asian tiger mosquito carries diseases including dengue fever, West Nile virus and encephalitis. Formosan termites cause half-a-million dollars' worth of damage in Louisiana annually. Tawny crazy ants prey on bird nests and damage electrical boxes where they build nests. Asian citrus psyllids carry the microbial pest responsible for citrus greening disease. All these species came from elsewhere but have become widely established in Louisiana, successfully adapting to new conditions.



WATERMARKS: Do invasive species directly threaten restoration projects?

MASSIMI: Vegetative plantings are particularly vulnerable to nutria damage. Protecting newly installed woody plants with tree sleeves is expensive but very effective. The strategy with herbaceous plants is simply to set out more than can be eaten.

WATERMARKS: Do our efforts to restore the coast result in unintended consequences, such as creating new opportunities for invasive species?

MASSIMI: Initially, restored marsh habitat is very much like habitat disturbed by clearing, burning or grading. Especially in freshwater marshes, restoration leaves many niches for invasive species to take hold. But as native vegetation becomes established, it fills the niches and the disturbance is repaired. Where there is no disturbance, invasive species have little advantage.

Large-scale river diversions may actually introduce new invasive species. Certainly they will increase freshwater habitat and offer many aquatic invasive opportunities to expand



Barataria-Terrebonne National Estuary Program.

their range. When planning proposed diversions, we should consider habitat response and include the added costs of managing invasive species.

WATERMARKS: *Is there any best way to respond to invasives?*

MASSIMI: Eradication of invasive species is the Holy Grail, but it rarely happens anywhere in the world. Instead, invasive species is an ongoing control and management problem. There is no foreseeable end-game unless we can establish some equilibrium between invasive species and the forces that keep them in check.

Biological controls attempt to reestablish natural checks and balances, but we must be very careful with them. History has numerous horror stories of reckless use of biological controls – introducing giant cane toads in Australia or mongooses in Hawaii; without natural enemies, these animals became invasive themselves, seriously threatening native species.

Today biological agents are almost exclusively insect pests that evolved over millions of years in a symbiotic relationship with a single plant. Nonetheless, the pest undergoes years of rigorous testing before it is approved for release.

The salvinia weevil is a biological control. If the weevil can make salvinia just one of many of Louisiana’s wetland plants, salvinia could become a harmless exotic, no longer invasive. So might the hydrilla fly control hydrilla, and hopefully soon a flea beetle that preys on Chinese tallow trees.

Other means of combating invasive species include mechanical controls such as chopping down trees or pulling up weeds, but they tend to be labor-intensive. Chemical controls are used widely, but are expensive and often risk damaging non-target species.

Market demand can motivate people to harvest and sell invasive species – for years robust fur prices supported nutria harvests that held the population in check. Presently there are efforts to promote carp as a menu item. But market development can be a double-edged sword, sometimes leading to a desire to increase the supply of invasives!

Legislation can assist control. Right now our laws allow for the regulation of species proven to be injurious, but obviously by then it is too late. Prohibiting the entry of alien species until

Louisiana has a wealth of native species that are cultivated for coastal ecosystem restoration. Undertaking a two-year project to eradicate tallow trees at Grand Isle State Park, the BTNEP Foundation is planting live oaks, hackberry, red mulberry, wax myrtle and yaupon holly, native trees of particular value to migratory songbirds.

they are deemed non-injurious could reduce the introduction of invasives.

WATERMARKS: *Beyond the Darwinian battle for survival in the ecosystem, do invasive species affect the human experience?*

MASSIMI: Our cultural identity is closely tied to the plants and animals that are native to our region. Historically, they provide the food we eat, the resources to build our boats and houses, the materials to make our musical instruments. Invasive species can destroy that sense of place. If cypress trees draped in Spanish moss turn into a Chinese tallow tree forest, you’re not in a cypress swamp any more. If the bayou is completely covered with salvinia, you can’t boat or fish there. The sounds are different. The birds disappear. Invasive species can threaten the very essence of place, changing it and changing us forever. **WM**



CWPPRA Project Pursues Four-footed “Grass-eating Machines” *continued from back page*

turned to nutrias’ original predator – trappers – for help.

CWPPRA tackles the nutria problem

Identifying nutria as a significant threat to Louisiana’s wetlands, in 1997 the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) approved a demonstration project that funded incentives for harvesting nutria and encouraged market demand for nutria meat for human consumption. In 2002 a second CWPPRA project, Coastwide Nutria Control Program, continued the incentive approach, paying trappers for every nutria tail collected.

“Fifteen years later, we can see the success of the control program,” says Edmond

Mouton, a biologist with the Louisiana Department of Wildlife and Fisheries. “On average, each year just under 330,000 nutria have been harvested. Damage has decreased from 100,000 acres to less than 6,000 acres. Environmentally, we’ve gotten a pretty big bang for our buck while simultaneously contributing to the economy of Louisiana communities.”

Seeking an ecological equilibrium

Mouton believes complete eradication of nutria in Louisiana is logistically impossible. “The size of the population and nutria’s reproductive rate make it improbable we will ever entirely wipe them out,” he says. And although they are an invasive species, nutria have become

a member of the ecosystem, comprising a food source for alligators, birds of prey and other species. “We want to reduce nutria numbers to the point where wetlands can recover from the rodents’ herbivory on their own,” says Mouton. “If nutria numbers are small enough, they will eat marsh vegetation without destroying its roots. That will limit their damage and keep populations within the carrying capacity of the landscape.”

The CWPPRA program is funded through 2022. Although its continuance is not assured, there are mechanisms for its renewal. For the years of its operation, however, Mouton declares it an unequivocal success. “It has reduced one factor that causes coastal erosion.” **WM**



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NUTRIA CONTROL REDUCES WETLAND DAMAGE, AUGMENTS TRAPPERS' INCOME

CWPPRA Project Pursues Four-footed "Grass-eating Machines"

They thought they would make good jackets and hats, like muskrats do. They thought a fortune lay in importing them to raise in Louisiana. They thought if they escaped into the wild, alligators would keep their numbers in check. For a while, they were

right, but eventually nutria proved them wrong.

For nutria – semi-aquatic, furry rodents indigenous to South America – Louisiana is paradise: a welcoming climate, stable water levels, ample grassy food and few predators. Able to

feed themselves from birth, nutria increase soils' vulnerability to erosion by eating vegetation down to the roots. While the fur market was strong, nutria caused no harm to the wetlands, but when fur prices plunged and trapping declined, the animals' numbers burgeoned and herbivorous damage quickly followed. In the 1990s, nutria

damage in the coastal region exceeded 100,000 acres.

Natural resource managers considered various methods of control, but in the end, they

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