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A complete Kodiak gray whale skeleton hangs in the new visitor center at Kodiak National Wildlife Refuge in Alaska.

Heavy Weight Savings

The Refuge System has saved \$1 million on heavy equipment purchases in fiscal year 2007. Get the full story on page 27.



RefugeUpdate

January/February 2008 Vol 5, No 1

Learning *In Nature*, Not Just *About Nature*

Connecting People with Nature



Children explore natural resources along the shores of Upper Mississippi River National Wildlife and Fish Refuge. (Brady Whealon)

Children on a field trip to Mosquito Island on Upper Mississippi River National Wildlife and Fish Refuge in Minnesota explored and collected aquatic invertebrates. One little girl read about her critter and exclaimed, "If I cut my bug in half, each half will grow a new head and tail!" Children ran from all sides of the island to look at a critter that could grow a new head.

Refuge visitor services manager Cindy Samples coordinates this floating classroom project with Winona State University, which christened a former John Deere Company party boat "River Explore" and sends it out on the river

for teacher workshops and student field trips. Funding comes from Nature of Learning grants, the Hiawatha Audubon Society, a local birding club and the Winona State University Foundation.

"The experience and knowledge the refuge staff brings to each river trip leaves the children and teachers with an enriched sense of wonder and learning about our wildlife refuge," explains Ann Rethlefsen, associate professor of education at Winona State University.

People value and conserve what they care about, and they care about what they have directly experienced.



H. Dale Hall

From the Director Another Challenge in Our Resource History

Climate change is unequivocal, according to the International Panel on Climate Change, which concluded greenhouse gas concentrations now exceed levels of the past 650,000 years. The U.S. Fish and Wildlife Service is among the government agencies needing to face this challenge.

Solutions will come through an evolutionary process. The Service, with our land base in the National Wildlife Refuge System, is uniquely poised to work with U.S. Geological Survey, the premier research entity within the Department of the Interior, to pull together with other Department bureaus and help lead the effort.

The Service has the tools in place to implement adaptation strategies that can conserve fish and wildlife habitats

and maintain healthy and genetically diverse wildlife populations. We can help develop predictive tools to enable wildlife managers to forecast what would happen under various climate scenarios. Already, the Refuge System is moving forward, having worked recently, for example, with the University of Maryland Graduate Program in Sustainable Development and Conservation Biology where we developed a primer on climate change and the Refuge System. That will soon be available for all our employees.

Right now, the Service's Directorate, composed of our Assistant Directors and our Regional Directors, is looking at all facets of what we can do. We will be working with all the regions and programs to make sure that everyone understands the roles they can play. We will be

open to new approaches, to trying new experiments, to undertaking monitoring, and to do everything scientifically sound in order to move us closer to solutions. We will start the process by having at least one climate change workshop in each of our eight regions.

As the regional workshops are held across the country, our wildlife managers, our partners and our citizens will have the opportunity to get involved, to be innovative, to consider the science, and to take the time to come up with valid answers about the most valuable actions we can take.

This is hardly the first natural resource challenge the Service has faced over the course of our history. We were here for the Dust Bowl. We were here when Rachel Carson helped the world understand the environmental impacts of chemical pollutants. We have been through hurricanes and floods and droughts. I have no doubt that our employees—especially the folks in the Refuge System—will be able to do the job that is necessary in the face of a new and perplexing challenge. ♦



Geoff Haskett

Chief's Corner A Year of Accomplishments

In 2007, the bald eagle soared off the federal endangered species

refuges generated more than \$1.7 billion in economic return. That's extraordinary for a federal agency whose mission is to conserve wildlife habitat and the creatures that depend on it.

Land Acquisition

Although land acquisition funding was limited, we expanded the Refuge System by about 102,000 acres. We established Rocky Flats National Wildlife Refuge, just 16 miles northwest of Denver, on what had been a former defense site. Eventually, the refuge will have walking trails, some hunting and a visitor contact station to give people

— continued on pg 28

list. It was a year of other soaring accomplishments, as well. The President signed the omnibus spending bill that increased Refuge System funding about \$39 million above fiscal year 2007 levels to \$434.1 million for fiscal year 2008.

The Refuge System welcomed more than 37 million people in 2007. Those visitors made a measurable economic impact. Recreational use of wildlife

RefugeUpdate

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East and West: Forces of Nature Wreak Havoc

Hopper Mountain National Wildlife Refuge in southern California lost a female California condor chick as wildfire burned over much of the refuge last fall. Breeding and conservation programs have brought the number of condors to 273, up from just 22 birds in 1987. The California condor is listed as critically endangered.

The fire grew from 500 acres to 43,000 acres in a matter of hours, burning through most of the refuge by the night of October 22, including three of four canyons that contain California condor nests. The fire spared Hopper Ranch house, an historic and isolated ranch house, but more than 58,000 acres were consumed. The refuge also lost one pen that had been used for rearing and holding condors.

Hopper Mountain Refuge is home to the U.S. Fish and Wildlife Service California condor recovery program. After the fire, all free-flying adults and juveniles were accounted for as well as three of the four wild chicks. When refuge staff entered the canyon, they found one chick face down in a pile of leaves. The body was sent to the Los Angeles Zoo for study. The dead chick—condor 443—had already survived close encounters with a variety of predators, including a bear and a bobcat.



The fire that hit Hopper Mountain National Wildlife Refuge in California spared Hopper Ranch house, but consumed more than 58,000 acres. (USFWS)

San Diego National Wildlife Refuge in California was an early target of the Harris Fire. Two fire engine crews from the refuge responded and were later joined by a fire engine crew from Sacramento National Wildlife Refuge. One crew diverted the fire from the buildings on the compound, which is also local headquarters for the California Department of Fish and Game and Bureau of Land Management.

In addition to burning or destroying more than 295 homes or businesses and more than 90,440 acres of San Diego County, the Harris Fire burned about 4,150 acres of refuge land. More than 65 percent of the refuge's chaparral was burned along with 48 percent of the coastal sage scrub, habitat for the threatened coastal California gnatcatcher.

Much of the Harris Fire area was also blackened in a fire in 2003, making habitat recovery even more difficult. It takes about 20 years for chaparral to recover sufficiently from one fire to be able to withstand a repeat fire. San Diego Refuge manager Jill Terp says controlling erosion and invasive weeds is a high priority. "With much of the mountainside vegetation burned, bringing back the native scrub and chaparral while controlling invasive weeds will be a challenge for us."

In all, 40 Service firefighters and staff, including an engine from the San Luis National Wildlife Refuge and an information team from the California-Nevada Region, were deployed. Two fire-trained biologists from the Carlsbad Fish and Wildlife Office served as resource advisors.

A Burned Area Emergency Response (BAER) Team helped to assess the full scope of damage. Bill Molumby, fire management officer for southern California, credited Service fire crews and employees with exemplary duty, despite long hours under extreme stress and hazardous conditions.

Drought in the East

At Harris Neck National Wildlife Refuge in Georgia, drought reduced the numbers of nesting wood storks. An aerial survey in May 2007 counted 1,054 nests at 15 sites across southern Georgia, compared to estimates of 1,918 nests in 2006 and 1,810 nests in 2005. Wood storks depend on freshwater wetlands for feeding and security, since they count on the alligators in the water to protect stork chicks from raccoons and other small mammals.

Harris Neck Refuge hosts the largest nesting colony in Georgia with 232 nesting pairs. Supervisory refuge ranger Pat Metz says the refuge site is a little more drought-resistant than others because "we can pump water into our man-made pond." Nonetheless, a windstorm in May took many of the 2007 chicks.

A more unusual side effect of the drought has been historical or cultural. Marc Epstein, manager of Santee National Wildlife Refuge in South Carolina, says the drought has exposed miles of shallow bottoms and hundreds of feet of shoreline in several lakes. Because most of these areas have been covered with water, treasure hunters may be tempted to search for pottery shards and arrowheads. The refuge is spreading the word that collecting, searching for, removing or destroying artifacts or using metal detecting devices is strictly prohibited within refuge boundaries. ♦

Attwater's Prairie Chicken Recovery is Still a Challenge

by Terry Rossignol

The Attwater's prairie chicken is one of the most endangered birds of North America. More than 100 years ago, up to one million birds roamed the coastal prairies of Texas and Louisiana. The official 2007 spring count estimated fewer than 50 individuals at two locations: Attwater Prairie Chicken National Wildlife Refuge, about 60 miles west of Houston, and The Nature Conservancy's Texas City Prairie Preserve, about 40 miles south of Houston.

The decline can be attributed primarily to the loss of habitat. Historically, about seven million acres of coastal prairie habitat existed along the Texas coast and southwest Louisiana. Today, fewer than 70,000 acres remain.

To save the bird from extinction, the U.S. Fish and Wildlife Service initiated a captive breeding program in 1992. A pilot release of 13 males occurred on the refuge in August 1995. Since then, more than 1,100 captive-bred birds have been released into the two existing populations, with an average annual survival rate of 21 percent. We need to increase the average number of birds released every year to at least 250-300 birds to start seeing an increase in total population numbers. In general, captive-bred birds do very poorly in the wild, although we have managed to increase

the typical survival rate dramatically.

Also in 1995, the first of several "safe harbor" agreements was signed with a private landowner from Colorado County, Texas. This historic signing led to the establishment of the federal Coastal Prairie Conservation Initiative. Landowners enrolled in the initiative are required to carry out habitat management practices that benefit coastal prairie habitat (such as prescribed burning, brush control, moderate grazing, re-seeding areas to native grasses) for at least 10 years. The Service and the landowner equally share the costs to implement these practices.

Released on Private Land

More than 11 years later, the concepts behind captive breeding and habitat management came together on the ground. Twenty-two of 37 captive-bred Attwater's prairie chickens were released into the wild in September 2007 on a private ranch in Goliad County, Texas. The Refugio/Goliad County area has the largest contiguous remnant of coastal prairie in the state – about 50,000 acres. All released chickens were fitted with radios to follow their movements.

So, why release one of North America's most endangered birds on private lands? One reason is to find a solution to poor brood survival, the single-most limiting factor affecting significant progress

towards recovery.

Habitat quality, especially as it pertains to insect availability for foraging chicks, is one potential factor. Other potential factors include genetics, physiological changes and poor parental behavior attributable to the captive environment, disease/parasites and stings by the exotic red imported fire ant.

If the offspring of the birds released in Goliad County experience better survival than those on refuge, this could signal problems with habitat quality on the refuge. If similarly poor survival problems are observed with the broods in Goliad County, then we need to look for other causes.

To better understand and mitigate some of these factors, refuge staff, Student Conservation Association interns and volunteers intensely manage each brood for at least two weeks by providing freshly caught insects each day and feeding the hen and chicks every couple of hours during daylight hours. Chicks that do not receive insects during the first days of life do not survive more than seven to 10 days.

In 2007, the protocol succeeded in raising 18 chicks to six-weeks of age. This is the largest number of chicks produced on the refuge to reach the six-week milestone since the early 1990s.

Several chicks reared in this manner in 2004 and 2006 have survived for several years. If their offspring survive, the influences attributable to the captive environment could be reversed and brood survival could be improved.

Despite the many challenges this grouse faces, progress has been made in recent years. One thing is certain: recovery of the Attwater's prairie chicken requires long-term commitment and perseverance. ♦

Terry Rossignol is manager of Attwater Prairie Chicken National Wildlife Refuge and Attwater's Prairie Chicken recovery team leader.



Eighteen Attwater's prairie chickens were successfully raised to six weeks of age in 2007, the largest number of chicks produced since the early 1990s at Attwater Prairie Chicken National Wildlife Refuge in Texas. (Gary Montoya/USFWS)

Hooked on Nature

Are We Connecting a New Generation?



Today, Noah Kahn is an avid birder.

by Noah Kahn

If only I had a dime for every time someone asked how I ended up doing “whatever it is that you do.” I’ve spent some time pondering that very question myself. While the route to becoming an advocate for America’s 548 national wildlife refuges for Defenders of Wildlife, a national non-profit conservation organization, has indeed been circuitous, I think I nevertheless can reliably pinpoint the start of that path.

About six years ago, beneath an early-morning autumn sky along a winding logging road in the forests of western North Carolina, I timidly trailed behind two respected and distinguished professors. In that moment, I felt much as my orange cat, Oliver, must feel upon my periodic opening of the basement door; intensely curious about what lay ahead but a little timid and cautious just the same.

My university’s entomology department was on a week-long retreat for new graduate students in the Blue Ridge Mountains and between bouts of

jamming scraps of insect knowledge into our brains, a few in the group would go birding. Here I was, 24, and unable to tell a mallard from a wood duck! Would I make a fool of myself on this morning’s walk? I knew virtually nothing beyond blue jays, gray squirrels, and deer – sad, really, and an inevitable product of a rearing in the Atlanta suburbs, watching television instead of fishing, camping or poking around the woods.

So I kept quiet and at a comfortable distance so I wouldn’t be called upon to identify anything, all the while growing more overwhelmed with each sight and sound that revealed itself that morning. But I quickly stumbled into a scene that I remember with vivid detail still today.

Tremulous Whinny

The two professors, one imitating an agitated songbird and the other a screech owl, began making the most ridiculous sounds I’d ever heard from two grown men. A steady, soft “pshh, pshh, pshh,” was overlain and interspersed with a high tremulous whinny. And to my complete and utter astonishment, songbirds began appearing from nowhere to fill

the bushes and trees around us. Never before had the trailside shrubbery revealed its plentiful ovenbirds and towhees. The maple overhead was now overflowing with flitting songbirds, none of which I could identify at the time. A red-breasted nuthatch even landed on my professor’s cap! And before I knew it, the flock had dispersed, but not before nearly 25 species were tallied in a dizzying display of color and sound!

I was hooked; this had to have been the coolest thing I had ever seen. I quickly became and still am an avid birder. But not only a birder, a conservationist, too. For me, on that brisk fall morning, after being witness to an amazing fallout of migratory warblers, vireos, tanagers and many others, my fate was sealed. I had been moved to dedicate my life and career to wildlife conservation, a labor of love to this very day.

I’m not terribly unique. A replica of the path I traveled (and am traveling) could be laid down before virtually any kid. It is my sincere hope that more youngsters find the passionate and incredibly fulfilling connection with nature that I was lucky enough to discover.

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Red-breasted nuthatch was among the first birds that caught the fancy of Kahn, today an environmental advocate with the nonprofit organization Defenders of Wildlife. (USFWS)

Disney Scholars to Study Lizards and Wading Birds, Coral Reefs and Moose



One Disney Scholar – Prairie Johnson of California State University Chico, will do her research at Sacramento National Wildlife Refuge. (USFWS)

Six young graduate students have been awarded 2007 National Wildlife Refuge System scholarships to conduct research in Florida, California and Montana. The Centennial Commission Scholarship Fund was initiated during the Refuge System Centennial in 2003, when Roy Disney, vice chairman of The Walt Disney Company, presented a \$100,000 gift to establish a scholarship program to encourage graduate students in conservation and environmental education.

Those named 2007 Disney Scholars are:

Nicholas Osman, University of South Florida, will meet with refuge staff at Lake Wales Ridge National Wildlife Refuge in Florida to identify sites where he can survey a very specific kind of lizard – sand and bluetail mole skinks. He will look for connections among species, diet, genetics and habitat in an effort to aid ecosystem management decisions.

Nicole Athearn, University of California Davis, will research management techniques for target bird species in California's South Bay Salt Pond. She will use her findings to design management tools and models that could be applied to restoration efforts in Don Edwards San Francisco Bay National Wildlife Refuge.

Prairie Johnson, California State University Chico, will research understory plants along the Sacramento River. She wants to identify the best methods for introducing native understory species into restored forests.

Samantha Lantz, Florida Atlantic University, will study wading birds in Arthur R. Marshall Loxahatchee National Wildlife Refuge in Florida. She will look at food availability, a major factor limiting the success of avian populations.

Lisa Max, University of California Santa Barbara, will study ecosystem processes underlying Palmyra Atoll National Wildlife Refuge. Her work could contribute to management of wildlife resources at the refuge and coral reef communities elsewhere.

Megan O'Reilly, Montana State University, will study the relationships among willow vegetation, moose browsing and breeding landbirds in Red Rock Lakes National Wildlife Refuge. Her research will refine methods of assessing the condition of riparian vegetation and provide data about the impact of moose browsing on the overall health of ecosystems and landscapes. ♦

Ten Most Endangered, According to Defenders

Suburban sprawl. Invasive species. Skyrocketing land prices. Even homeland security in the form of a border fence between the U.S. and Mexico. These are some of the pressing challenges facing the 10 national wildlife refuges identified in *Refuges at Risk, America's 10 Most Endangered National Wildlife Refuges*, a report released in October 2007 by Defenders of Wildlife. The nonprofit group is a member of CARE, the Cooperative Alliance for Refuge Enhancement, a coalition of 22 national conservation organizations that have teamed up to address the funding needs of the National Wildlife Refuge System.

For each of the past three years, Defenders has profiled 10 refuges it determines face the most serious threats as a way of raising awareness and garnering support for the Refuge System. *Refuges at Risk* also highlights the Refuge System's critical importance for conserving wildlife and wildlife

habitat for the benefit and enjoyment of the American people.

Included in this year's list of 10 most endangered refuges is Trempealeau National Wildlife Refuge in Wisconsin, where invasive, non-native plants such as leafy spurge, purple loosestrife, quackgrass, smooth brome grass and black locust trees threaten to squeeze out native plants and overrun natural habitats. In both the Rappahannock River Valley National Wildlife Refuge (Virginia) and Lower Rio Grande Valley National Wildlife Refuge (Texas), the report has identified suburban sprawl and rising land prices as challenging land acquisition plans to expand and consolidate protected habitat within the Refuge System.

Others identified are Pea Island National Wildlife Refuge in North Carolina, where a highway cuts through the refuge, and Lower Rio Grande Valley National Wildlife Refuge in Texas, affected by a

proposed border fence. Increased levels of selenium and salt due to human-caused habitat changes threaten the health of migratory waterfowl at Hailstone National Wildlife Refuge in Montana, according to *Refuges at Risk*.

The other refuges among the report's list of 10 are: Yukon Flats (Alaska), Nisqually (Washington), Cape May (New Jersey), San Luis (California) and Rhode Island Complex.

Refuges at Risk also highlights the critical role the National Wildlife Refuge System has played in building America's legacy of successful wildlife conservation, such as the link between protecting natural habitats in places like the Rappahannock River Valley and the recovery of the nation's living symbol — the bald eagle. *Refuges at Risk, America's 10 Most Endangered National Wildlife Refuges* is available on the Defenders of Wildlife Web site at www.defenders.org. ♦



Yukon Flats National Wildlife Refuge in Alaska is among the 10 refuges identified as "most endangered" by the nonprofit group Defenders of Wildlife. (USFWS)

FOCUS . . . Contaminants

Mercury Found in Songbirds in New England Salt Marshes

“I was surprised to find high mercury levels in wildlife on our refuge. We had always considered the salt marsh to be the most pristine of our habitats,” said Nancy Pau, wildlife biologist at Parker River National Wildlife Refuge in Massachusetts. Parker River Refuge is one of four national wildlife refuges on which the nonprofit BioDiversity Research Institute (BRI) (<http://www.briloon.org/>) tested saltmarsh sharp-tailed sparrows for mercury contamination.

BRI biologist Oksana Lane was also “surprised to find such elevated mercury in most of the birds we sampled in several national wildlife refuges set aside to protect birds.” The other refuges are Rachel Carson in Maine, Stewart B. McKinney in Connecticut and Rhode Island National Wildlife Refuge Complex. Testing is now underway at Long Island National Wildlife Refuge Complex in New York as well. The three-year sparrow survey was based on data from 220 individual birds.

Nearly all the mercury measured in the saltmarsh sharp-tailed sparrows blood was methyl mercury, which is a more toxic form. It had been thought that mercury contamination was primarily a problem in fish or fish-eating birds. Now BRI concludes that “airborne mercury is

pervasive and its impacts are no longer limited to surface waters and the wildlife that use them.”

Mercury contamination typically comes from industrial runoff or as a byproduct of burning fossil fuels. Mercury concentrates in salt marsh environments, accumulating in food chains. The salt-marsh sharp-tailed sparrows consume invertebrates, possibly species with high mercury levels. The biological reasons for the bioaccumulation in sparrows are not yet known, but it is likely that elevated levels may cause behavioral changes in birds and possibly lead to reduced productivity. More studies – and more funding – are required to establish if and how mercury affects the birds’ health and survival.

Much to Learn from Wetland Songbirds

The refuge biologists are most eager to learn more from the sparrows. All four of the New England refuges worked closely with BRI to select study sites, monitor nesting productivity, help capture sparrows for blood sampling and, as biologist Kate O’Brien at Rachel Carson Refuge put it, “have lively discussions on how to frame research questions and gather data on a shoestring budget.”

So far, the testing has raised more questions than answers. “It’s difficult



Researchers are investigating the risk of mercury contamination to waterbirds like the American avocet on the San Francisco Bay National Wildlife Refuge Complex. (USFWS)

Mercury Contamination in Waterbirds in San Francisco Bay

A large collaborative research project is investigating the risks of mercury to waterbirds breeding on the San Francisco Bay National Wildlife Refuge Complex. The goal is to determine the actual levels of mercury contamination

in the waterbirds and its effects on reproduction, typically the most sensitive manifestation of mercury toxicity.

The study covers five species – two terns (Forster’s and Caspian), two shorebirds (American avocet and black-necked



The BioDiversity Research Institute has found elevated methylmercury levels in salt marsh sharp-tailed sparrows tested on four national wildlife refuges in New England. (USFWS)

to draw statistically valid conclusions on results thus far,” says Pau, “but consistently high mercury levels at Parker River Refuge have prompted me to engage other agencies to investigate potential sources of mercury in the watershed.” Pau says Parker River Refuge is now working with BRI to trace the mercury through the food chain, ultimately to pinpoint potential sources. EPA is also running mercury samples on invertebrates from salt marsh sites in Rhode Island and Massachusetts.

“The early research results reinforced the importance of protecting water quality,” added Pau. “Parker River Refuge is

almost entirely wetlands and activities in adjacent uplands can have a tremendous impact on habitat quality on refuge lands. To ensure ecological integrity, we must work beyond our boundaries and with a diverse array of partners.”

Similarly, at Rachel Carson Refuge, O’Brien says “we need to ensure that water coming onto the refuge, from streams, rivers and stormwater runoff is clean enough to support our wildlife objectives.” Rachel Carson Refuge manages land in 12 towns.

In 2007, Suzanne Paton, biologist with the Rhode Island National Wildlife

Refuge Complex, started monitoring productivity and survival rates of sparrows that nest in refuge marshes. The saltmarsh sharp-tailed sparrows are one of the highest priority species for coastal refuges in New England, but Paton says there is little information on whether elevated mercury levels are having an impact on these birds.

“Our emphasis has been to conduct a more in-depth look at the life cycle of these birds,” explains Paton, “including the number of nest attempts and reasons for failure, number of chicks produced, estimates of survival and total population and habitat variables.”

“We established that birds are at risk,” said BRI’s Lane. “Now we need to determine how to protect them by reducing or eliminating contaminant exposure.” O’Brien called the research fascinating and a “reminder to all of us that Rachel Carson’s message about the consequences of environmental pollution are as relevant today as it was in the 1950s.”

“Methylmercury is a powerful neurotoxin, and it is bioaccumulating in our environment at some astonishing levels,” O’Brien continued. “Humans can modify our diets to avoid overconsumption of foods that carry large mercury burdens. Wildlife cannot.” ♦

stilt) and one diving duck (surf scoter). Birds are being tagged to mark their movements and habitat use. Blood samples and feathers are being collected.

Researchers are monitoring nest success and examining chick movements and survival. Toxic levels of mercury contamination usually show up in reduced breeding effort and egg production, impaired vision hearing or motor skills and reduced chick survival.

Research began in 2005, but the U.S. Geological Survey has already reported that mercury concentrations are high enough to be a cause for concern. Higher mercury levels in the northern and southern ends of the bay may be the result of sediment transported through the watershed from quicksilver and gold mining activities.

This West Coast mercury research is funded by the CalFed Ecosystem

Restoration program and involves biologists from USGS, the U.S. Fish and Wildlife Service, San Francisco Bay Bird Observatory and Point Reyes Bird Observatory. ♦

For more information see:

<http://soundwaves.usgs.gov/2007/10/research.html>

FOCUS . . . Contaminants

Bombs Away: From Military Training Ground to National Wildlife Refuge



Frequent fires sparked by exploding ordnance helped maintain the mountain longleaf pine forests at Mountain Longleaf National Wildlife Refuge in Alabama. (Bill Garland)

by Aaron Ferster

It's the rugged ridge rising out of the Appalachian's Choccolocco Mountain on the outskirts of Anniston, Ala., that first caught the attention of the military. The topography offered an ideal background for shooting off

artillery, a place for soldiers to sharpen their skills while preparing for battle during the Spanish-American War. The War Department formally established Camp (later named a fort) McClellan on July 18, 1917.

Over the years, frequent fires sparked by exploding ordnance and other military activities at Fort McClellan helped sustain a rare natural habitat: mountain longleaf pine forests. Without fire to regularly clear out the understory of brush and kill off competing saplings, mountain longleaf pines are gradually overshadowed and displaced by hardwoods. Fires around Fort McClellan helped sustain extensive areas of longleaf, including stands of old growth more than 250 years old.

The old pines have outlasted the fort itself. The Department of Defense closed McClellan in 1999, part of a larger effort to consolidate military operations. A major part of the reuse and redevelopment plans for the site was sustaining its signature mountain longleaf pine forests. Studies by The Nature

Wetland Restoration to Improve Habitat and Reduce Pollution Impact

Settlement funds from an oil spill near Philadelphia, upstream from the Delaware River, were used to restore wetlands at one refuge in Pennsylvania, while wetland restoration on a North Carolina refuge is intended to sequester other pollutants.

Freshwater tidal wetlands at **John Heinz National Wildlife Refuge at Tinicum**, near Philadelphia, provide critical habitat for more than 300 species of birds along the Atlantic flyway. These wetlands

historically measured more than 5,700 acres, but diking, dredging and filling have reduced this to only 200 acres.

In February 2000, a subsurface oil pipeline ruptured, releasing 191,982 gallons of crude oil into a freshwater wetland impoundment within the refuge. Through the Natural Resources Damage Assessment and Restoration (NRDAR) process, a settlement for \$865,000 was reached with the responsible party. These funds, combined with a

Conservancy and Auburn University identified the habitat's importance to regional biological diversity.

The military and the McClellan Joint Powers Authority, an unincorporated, non-profit association created to help guide redevelop of former Fort property, transferred a combined 9,016 acres of land to the U.S. Fish and Wildlife Service to establish Mountain Longleaf National Wildlife Refuge. Dedication ceremonies were held June 30, 2003, and 3,000 acres of the refuge were opened to the public on December 20, 2004.

The transition from military training ground to national wildlife refuge has not been without challenges. The artillery fire that inadvertently helped sustain longleaf pine forest also created a safety hazard. While some shells fired into the surrounding hills exploded and sparked forest fires, others landed with a thud, leaving fuses and other volatile parts intact where years later they could catch the attention of an unsuspecting hunter or curious hiker. To make sure that never happens, large areas of the refuge will remain closed until unexploded ordnance is found and safely disposed of.

There has been progress. In August 2004, the Army Corps of Engineers announced government contractors had recovered and destroyed old target practice ordnance rounds along roads and firebreaks within the refuge. "To ensure complete safety, all of the items were destroyed. Whatever scrap remains is then inspected, characterized and disposed of in an appropriate manner in accordance with state and federal rules," explained Dan Coberly, a public affairs officer with the Corp's Huntsville Center. Another 2,400 acres of former practice artillery firing ranges, along with a 2,600-acre safety buffer, remain closed to the public. No specific timetable has been established for completing cleanup and opening those areas.

Another challenge confronting Mountain Longleaf Refuge is environmental contamination. "Fort McClellan had a long, rich history that included a lot of small arms fire," explains refuge manager Steve Miller. Lead, copper and other bullet constituents have led to areas of soil and water contamination. As a result, the Department of Defense, the state of Alabama, the Environmental Protection Agency and the Service

are negotiating to come up with an environmental cleanup plan that protects and restores refuge habitats and will provide for the safety of visitors within currently closed areas.

While only about one-third of the refuge is open to the public, Mountain Longleaf does have a lot to offer. In addition to perhaps the nation's most extensive fire-maintained mountain longleaf pine ecosystem, the refuge is home to Appalachian cottontail rabbits, wood frogs, scarlet tanagers, ovenbirds and the endangered gray bat. It also provides breeding habitat for many migratory birds and resident wildlife species.

"It might be another 20 years before the refuge is completely cleaned up and all areas are open to the public, but we still offer our visitors plenty of great wildlife-dependent recreational opportunities. We have hunting, wildlife photography and wildlife observation," says Miller. ♦

Aaron Ferster is a writer-editor in the Refuge System Branch of Communications.



Settlement funds from an oil spill are being used to restore 12 acres of wetlands at John Heinz National Wildlife Refuge at Tinicum in Pennsylvania. These wetlands provide critical habitat for migrating birds in the Atlantic flyway. (USFWS)

\$537,000 NRDAR settlement received from a nearby Superfund site, yielded approximately \$1.5 million for wetland restoration on the refuge.

Environmental Contaminants staff from the Pennsylvania Ecological Services Field Office worked with refuge staff to develop a restoration plan for 12 acres of freshwater tidal wetland. This area had been filled in the 1960s with dredge material from a federal navigation channel in the Delaware River.

Restoration work began in July 2007 and is slated to be completed this year. It is expected to restore the depth and

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FOCUS . . . Contaminants

Landfill Siting: Securing Protective Buffers for North Carolina's Refuges

by Sara Ward

A new law in North Carolina requires protective buffers when landfills are planned near national wildlife refuges and other environmentally sensitive areas. The state's Solid Waste Management Act of 2007 prohibits construction of landfills within five miles of national wildlife refuge boundaries, embracing the Service's recommendation for protection. The law also halted permit applications for two new solid waste landfills near refuges.

With rapid population growth in the eastern United States, the demand for landfill space is at a premium. In recent years, several new or expanded landfills have been proposed, many located close to North Carolina's national wildlife refuges. Of the 11 refuges in North Carolina, six are less than five miles from

active or closed landfills that pre-date the new law. Sediment contamination and water quality degradation have been documented at these refuges, prompting more robust pollutant monitoring and assessment of potential stormwater impacts to refuge resources.

Service environmental contaminants biologists became involved in 2005 when two new landfills were proposed near four refuges in the state, both with the potential to impact refuge resources and public enjoyment of refuge lands: a mega-landfill to be sited within one mile of Great Dismal Swamp National Wildlife Refuge and a recycling landfill less than five miles from Pocosin Lakes, Swanquarter, and Mattamuskeet National Wildlife Refuges.

The landfill proposed near Great Dismal Swamp Refuge would receive three million tons of waste each year from

Deep Fork National Wildlife Refuge Restoration after Sewage Release

by Karen Cathey

In the case of a spill, damage from contaminants can be instant. In the case of pollutants released over time into groundwater or rivers, the damage is long term. In any case, the settlement of damage claims is never instant.

In 2006, the Department of the Interior collected funds for restoration projects resulting from a sewage spill in Oklahoma six years earlier. Sewage released from a privately-owned facility killed fish, mussels and other aquatic species along almost 11 miles of the Deep Fork River. The sewage and sludge had been released into a tributary of the

Deep Fork River. The plume of sewage migrated slowly downstream into Deep Fork Refuge. The restoration funds came from settlement of a Natural Resource Damage Assessment and Restoration (NRDAR) claim.

The U.S. Fish and Wildlife Service Environmental Contaminants Program worked with the refuge staff to document injuries to trust resources. Both instream resources and their habitat were injured.

Deep River Refuge was established in 1993 to protect important bottomland hardwood forest and emergent wetland habitat along the Deep Fork River for the benefit of migratory birds, native fish and

“Of the 11 refuges in North Carolina, six are less than five miles from active or closed landfills.”



Service biologists collect contaminants data on mussels injured by a 2000 sewage release on the Deep Fork National Wildlife Refuge in Oklahoma. (USFWS)

as far away Michigan and Florida. At the end of its 27-year life, the 490-acre landfill would contain more than 100 million cubic yards of trash in a 280-foot high mound, making the site visible for up to 20 miles. Although much smaller in size, the landfill planned near the other three refuges was intended to store wastes in unlined landfill cells, creating concerns about groundwater and surface water quality.

Interagency Cooperation Leads to Protective Buffer Recommendation

Prompted by public concerns, the North Carolina General Assembly enacted a landfill moratorium in 2006 in order to study siting, design and operation of landfills in environmentally sensitive areas. With this open window for technical review and input, Service Environmental Contaminants biologists, together with refuge staff, worked with regulators from the North Carolina Division of Waste Management and a stakeholder group of the North Carolina legislature to recommend a

five-mile protective buffer around refuges in North Carolina. The recommended buffer was based on a review of technical literature on waste facility disposal siting and consideration of protective measures employed in other states, modified to meet the unique characteristics of eastern North Carolina. The buffer is essentially a five-mile zone around refuge boundaries where landfills are prohibited.

Protective buffers are important because landfill impacts to refuges can occur over large distances. Buffers can preserve the views and reduce noise and odor nuisances. Buffers also prevent alteration of wildlife foraging patterns as well as degradation of water and habitat quality.

The protective buffer is a key provision of the new North Carolina statute. The law also included provisions to compensate permit applicants for the two new landfill proposals, creating a mechanism to both protect the environmental quality of refuge lands as



Pollutant sources, like this burning landfill adjacent to Alligator River National Wildlife Refuge in North Carolina, can harm refuge plant, fish, and wildlife resources. (USFWS)

well as equitably increase the stringency of landfill siting requirements. The buffer protection provision in the new law secures tangible resource protection now and into the future. ♦

Sara Ward is in the Raleigh Ecological Services Field Office.

other wildlife species. Fifty-nine species of fish and several native mussel species are known to exist on the refuge.

Freshwater mussel species comprise a significant portion of the total biomass in freshwater benthic communities and are important in nutrient cycling. Freshwater mussels are also the most rapidly declining faunal group in the United States: 72 percent of the 297 species and subspecies are listed as endangered, threatened or of special concern. Over-harvesting, widespread habitat destruction, chronic pollution, land use changes and introduction of exotic species have caused many mussel populations to decline or disappear.

Restoring Contaminated Habitat to Give Wildlife a Future

To determine which restoration project would offer the greatest benefit to the

multiple natural resources injured by the sewage spill on the refuge, the Service evaluated projects that would benefit the river itself, including enhancement of bottomland hardwood forest within refuge boundaries. The health of the Deep Fork River is directly tied to the health of the adjacent bottomland hardwood forest ecosystem. Several tracts of bottomland forest located along the river corridor on the refuge need to be restored if they are to continue acting as a filter for contaminants, pesticides and livestock wastes.

The refuge focused on 440 acres of privately-owned land within the refuge's proposed acquisition boundary that had been cleared of their original bottomland hardwood habitat. The refuge partnered with The Conservation Fund, American Electric Power (as part of a carbon

sequestration partnership) and the Friends of Deep Fork Refuge to help secure these valuable tracts. Settlement funds were used to purchase some of this land; the purchase of one tract is still pending. This partnership involved a complex matrix of funding sources that enabled the Service to purchase land and implement reforestation of the parcels to meet common goals of all the partners.

Almost half of this cleared acreage will be replanted with hardwood seedlings this winter/spring. Enhancement of these tracts will improve water quality in the river, including that section affected by the spill, thus supporting mussel recolonization. In addition, the acquisition and protection of property will create a contiguous tract of habitat for wildlife to migrate, forage and breed.

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FOCUS . . . Contaminants

Oil Spill Response Carefully Coordinated



An oily surf scoter was one of 2,000 birds killed or oiled after a cargo ship hit the San Francisco Bay Bridge in heavy fog in November 2007. (Bill Beckon/USFWS)

More than 2,000 birds were killed or oiled in early November 2007 when the cargo ship Cosco Busan hit the San Francisco Bay Bridge in heavy fog. The impact ruptured the hull and spilled approximately 58,000 gallons of medium grade fuel oil. Most of the oil spread to central San Francisco Bay and the outer coastal areas on either side of the Golden Gate Bridge.

Oiled birds were found at several refuges in the San Francisco Bay National Wildlife Refuge Complex, including the Farallon Islands. Little shoreline was affected.

At least three marbled murrelets and two brown pelicans were found dead and several western snowy plovers were found oiled. All are threatened or endangered species. Because snowy plovers roost on the beach, they are not as much at risk as sea birds and may be able to recover if they are not too heavily oiled, explains Jim Haas, environmental

contaminants branch chief in the California-Nevada Region.

Haas coordinated about 30 U.S. Fish and Wildlife Service personnel who responded to the spill from area refuges and ecological services offices. Refuge staff also participated in Natural Resource Damage Assessment and restoration activities authorized by the Oil Pollution Act of 1990, passed after the Exxon Valdez oil spill. It authorizes the Service to respond to spills to protect trust resources and seek restoration of injured resources.

The lead oil spill response agency in California is the state Department of Fish and Game. California also sponsors an Oiled Wildlife Care Network at the University of California Davis, which has three treatment facilities along the coast as well as a network of volunteers.

Haas, until recently one of seven field spill response coordinators in Region 8, learns of spills from the state Office of Emergency Services, the Department

Oil Pits: More than Meets the Eye

More than 4,400 oil and gas wells are scattered across more than 100 national wildlife refuges. According to a Government Accountability Office report in 2003, 1,806 active wells on 36 refuges provided almost a billion dollars worth of oil and gas that year – about one percent of domestic oil production.

The GAO reported that drilling operations on refuges disrupt wildlife habitat, cause large-scale spills of oil and brine and contaminate soil and groundwater. As a result, the U.S. Fish and Wildlife Service has drafted a

handbook for refuges – currently under review – titled, *Management of Oil and Gas Activities on National Wildlife Refuge System Lands*.

The handbook provides an overview of the types of issues refuge managers should consider when dealing with oil and gas development, from noise and explosives to spills and garbage, abandoned equipment, cut, crushed or destroyed vegetation, hydrologic changes, environmental contaminants, invasive species, sensitive habitat disturbance and alteration of plant communities.

of the Interior Office of Environmental Policy and Compliance or directly from the U.S. Coast Guard. "In 95 percent of the cases," says Haas, "we just file the report because the spill has not affected Service resources. We do the triage to decide what our response will be."

The response depends on the size of the spill, the species involved, the type of product spilled, the time of year and the location. In this case, timing was critical. San Francisco Bay is a major wintering area for migratory waterfowl and there was a potential for oil spreading to marshes where endangered clapper rails forage. As it turned out, some marshes were indeed oiled but none on refuges.

Key to Effective Spill Response is Training

Effective response to oil spills requires an investment in training. Last July, a large multi-agency spill exercise was conducted on the Mississippi River. Participants included refuge managers from the Mark Twain National Wildlife Refuge Complex, biologists from the Service's Environmental Contaminants Program, the U.S. Coast Guard,

Environmental Protection Agency, Department of Homeland Security and local governments. During the intense, three-day exercise, Service personnel responded to oil and chemical product spills that had been caused by simulated earthquakes and tornadoes.

The lessons from this exercise will be used to update the Midwest Region's Spill Contingency Plan. Mike Coffey, an environmental contaminants biologist at the Rock Island, Illinois, Ecological Services Field Office, said the key lessons learned related to good response strategy planning, identifying who takes charge when response personnel are stretched thin and coordinating interstate and inter-regional resources along rivers that border multiple states and jurisdictions.

Haas says one lesson from the San Francisco spill is the need for more refuge staff to be trained in safely recovering oiled and dead birds in addition to finding them. Carcass recovery must meet three objectives, explains Catherine Berg, wildlife biologist in the Anchorage Fish and

Wildlife Field Office. It must prevent secondary contamination of resources (such as eagles or foxes feeding on oiled birds); it must satisfy law enforcement rules of evidence; and it must satisfy data protocols for natural resource damage assessments. Berg helped to outline many of these rules and responsibilities in the 2003 Service manual chapter, *Best Practices for Migratory Bird Care During Oil Spill Response*.

Chief of the Environmental Response and Restoration Branch Mark Huston notes that many Service personnel respond to spills, whether they are in the Contaminants Program, Refuges or Law Enforcement. He adds that continued training, both within the Service and on larger spill exercises, is necessary to ensure a smooth response and to protect and restore trust species. ♦

For more information see:

http://www.fws.gov/contaminants/OtherDocuments/best_practices.pdf and

http://alaska.fws.gov/fisheries/contaminants/pdf/spillresp_april.pdf

Oil waste or reserve pits are one of the many challenges confronting refuges. Oil or gas companies sometimes use reserve pits to store drilling fluids and drilling mud. A drilling company typically adds diesel, oils, detergents and other chemicals to drilling mud to improve performance. The fluids in these reserve pits are a major hazard to wildlife and birds.

Pedro Ramirez, an environmental contaminants specialist in the Mountain Prairie Region, says migratory birds often mistake an oil-covered pit for clear water. Reserve pits and production skim pits remain a significant source of mortality for birds in the United States.



Oil mixed with water in reserve pits like this one in North Dakota is toxic to birds and other wildlife. This reserve pit is lined but there is no netting to prevent wildlife access. (Pedro Ramirez/USFWS)

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Wood Ducks in the High Desert

by Christopher A. Nicolai

Most people are surprised to hear that there are wood ducks in the Great Basin of Nevada. In fact, it turns out there are more wood ducks in this region than anyone imagined.

An ongoing study involving the University of Nevada Reno and Stillwater National Wildlife Refuge has discovered that wood ducks are using a greater variety of habitats but suffer from surprisingly high mortality rates just before spring nesting season. Since Nevada is the driest state in the union, waterfowl studies have been few and far between.

The Truckee, Humboldt, Carson, and Walker rivers flowing through the Nevada portion of the Great Basin are not the traditional riparian habitat associated with wood ducks in other parts of the country. Biologist Bill Henry at Stillwater Refuge wanted to learn what was happening with the wood ducks using these rare habitat types in the Great Basin. Stillwater Refuge, near the terminus of the Carson River near Fallon, is primarily a complex of river marshes dominated by sedge meadows and open wetlands.

The habitat types preferred by wood ducks in the surrounding region are found on a river system dominated by cottonwood woodlands, manipulated to be used as a water delivery system and totally under private ownership. Henry had to find a way to answer his questions on private lands.

As a University of Nevada Reno doctoral candidate specializing in waterfowl studies, I teamed with Henry in 2003; we have been studying wood ducks along the lower Carson River ever since. We have had the privilege of cooperating with many landowners to install nesting boxes and to trap and band wood ducks on their properties. Additionally, the Nevada Waterfowl Association, University of Nevada Reno and Nevada Department of Wildlife have provided support for the Lahontan Valley Wood Duck Project.



There are more wood ducks in Nevada than anyone imagined, according to a study project involving the University of Nevada Reno and Stillwater National Wildlife Refuge. (Dave Menkel/USFWS)

Throughout the non-hunting season, we run a series of trapping sites on private properties to band wood ducks. We are able to directly assess productivity and band females and ducklings, which enables us to examine survival and harvest rates. We are working on a relatively isolated population, which results in numerous recaptures of previously marked ducks. In addition, reports of harvested banded wood ducks add to an impressive marked bird population.

Involving the Public

Approximately 300 nesting boxes have been installed on 15 properties since 2003. They are monitored weekly during nesting season. It appears that our work is paying off. Every year has resulted in more nests being found, more eggs laid and more hatching in the Fallon area. The studies do show high mortality in the pre-nesting season due to an abundance of predators, especially raccoons.

Many of the landowners are frequent participants in nest box monitoring and in banding operations. The trap locations are often baited by local birding enthusiasts who enjoy feeding

birds on their properties and are quite excited by the opportunity to assist in the study. The local birding festival uses this project as the only field trip in which participants actually get to handle wild birds. Local Boy Scout troops build nesting boxes for Eagle Scout projects. All three of the undergraduate wildlife classes from the University of Nevada Reno use this project to help train future wildlife professionals.

While the project's goal has been to learn more about a unique population of wood ducks, much has been gained by involving the public. Local landowners have built a stronger relationship with the Service. Local residents enjoy having an opportunity for hands-on experiences with wildlife in their own backyards. The public is learning about the needs of wildlife in their midst. As long as funding is available, the University hopes to continue gathering information as a training project for undergraduates in the wildlife program. ♦

Chris Nicolai is a graduate student in waterfowl ecology at the University of Nevada Reno.

Better Ways to Get Going and Keep Moving

Build a better tram – and you could attract not only more visitors to a refuge but federal transportation funds as well. A proposal to design a mass production, low environmental impact tram is one of six U.S. Fish and Wildlife Service projects to receive funding through the U.S. Department of Transportation’s Alternative Transportation in Parks and Public Lands Program (ATPPL).

This study by the Northeast Region and the Washington Office has received a \$250,000 ATPPL grant from the Federal Transit Administration. The project will begin by determining the ideal combination of vehicle features. A design team will propose a vehicle for both tours and shuttle services that will reduce carbon emissions and dependence on fossil fuels, lower maintenance costs and provide comfortable, controlled access to public lands. The ultimate goal would be to produce a prototype diesel-electric hybrid tram that is readily available for use on refuges, national parks and forests and Bureau of Land Management property. Contractors will be responsible for the actual design and manufacture of the trams.

Another ATPPL grant will purchase two trams, two trailers and six electric shuttles for three Texas state parks adjacent to **Lower Rio Grande Valley National Wildlife Refuge**. Bentsen, Llano and Resaca state parks along with refuges in the area are part of a World Birding Center. The new vehicles will improve visitor access to the universally accessible observation tower at Lower Rio Grande Valley Refuge.

Among other projects receiving grants:

- **Rocky Mountain Arsenal National Wildlife Refuge** in Colorado will be buying a rough-duty bus developed for use in Yellowstone National Park. The bus can use either biodiesel or diesel fuel.

- A \$1 million grant has been awarded to Teton County, Wyoming, for a 4.2-mile asphalt pathway along the boundary of the **National Elk Refuge**. The pathway will incorporate habitat rehabilitation efforts to minimize disruptions to wildlife. The pathway will accommodate pedestrians and bikers and will connect the refuge with the town of Jackson.

- Funds for a planning study were awarded to **Chincoteague National Wildlife Refuge** and neighboring Assateague Island National Seashore in Virginia. This project will look at both motorized and non-motorized transportation systems to relieve traffic congestion and parking shortages during high season.

- A second study at **Monomoy National Wildlife Refuge** in Massachusetts will look at ways of providing public transit service to the refuge, the town of Chatham and the South Beach Unit of the Cape Cod National Seashore and possibly connective service to Hyannis.. About 20,000 visitors come to the Monomoy Refuge Visitor Center every summer, but the refuge parking area holds about 40 cars.

Monomoy Refuge is a renowned birding hotspot as a Western Hemispheric Shorebird Reserve Network Site. It has the largest common tern colony on the Atlantic coast as well as the largest haul out site for some 7,000 gray seals. The refuge is also popular for fishing and boating. ♦



A \$270,000 alternative transportation planning grant will be used by Chincoteague National Wildlife Refuge in Virginia to study both motorized and non-motorized transportation options that can relieve traffic congestion in the popular area. (John and Karen Hollingsworth/USFWS)

Volunteers Tell their Stories

Ten years ago, Congressman Jim Saxton of New Jersey introduced the Volunteer-Partnership Enhancement Act. At the time, only two national wildlife refuges had full-time volunteer coordinators. The law encouraged recruitment and use of volunteers.

Today, 33,000 people volunteer at national wildlife refuges. In FY 2007, these volunteers gave 1,307,001 hours of service. How do they spend those hours? Read what several volunteers have to say.

Plover Patrol

By Joel Brown

This is not tough duty.

Just after 8 a.m. on a warm Saturday in June 2007, I am barefoot in the sand on the southeastern tip of Plum Island, enjoying an iced coffee and watching the sun glitter on the gentle ocean swells. Cormorants fly overhead toward Rockport. It's the beginning of my four-hour shift as a volunteer plover warden at the Parker River National Wildlife Refuge.

Half an hour later, of course, I am grunting and sweating and shredding my palms as I drag a rope weighted with four wet-sand-clogged cinder blocks across 50 yards of beach, returning the boundary line of the beach's forbidden zone to its pre-high-tide position. As regular visitors know, the vast majority of the wildlife refuge's beach is closed from spring through mid summer to protect nesting grounds of the piping plover, a threatened species.

Plover wardens are the unloved hall monitors of the beach. "They're the ones who explain to people why the beach is closed," said Jean Adams, outdoor recreation planner at Parker River Refuge. "They're basically a talking sign, because a lot of people don't read signs or ignore the signs."

Here at the south end of the refuge, a small fence festooned with "Beach

Closed" signs runs down the sand until it gives way to a rope line of orange floats held in place by the cinder blocks. The warden's job is to reinforce the line with talk, to keep people from walking where they might step on a nest or even one of the skittering plovers. A few dozen prospective wardens turn out for orientation in March, but only a fraction actually joins the crew. Those who do come to see it as a mission, and some have been doing it year after year since beach closures started in 1991.

"A disgruntled diver told me the next piping plover he sees is going on his plate," Janet Egan of North Andover on her Plover Warden Diaries blog, ploverwardendiaries.blogspot.com. "I told him there's not enough meat on them for a meal."

Joel Brown is a correspondent for the Boston Globe.

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Cleaning Out, Cutting Up and Having Fun

By Dave Shuckstes

I had no idea I would be called upon to perform such a wide variety of tasks as a volunteer at the Sewee Visitor Environmental and Education Center at Cape Romain National Wildlife Refuge in South Carolina.

I hardly got to learn where everything was located when I was asked to help the maintenance team. Neil (another volunteer) and I worked on building storage areas and shelves, putting new drywall in the ceiling, rebuilding a Boston whaler, cleaning out old storage areas, building guard rails around a rice "trunk" (dam) and repairing equipment. Where else can you get to ride an ATV around Bull's Island to fetch tools and equipment? We solved water pumping problems, equipment malfunction problems and continually found "work-arounds" to keep things going at Bull's.

In between, I was asked to help do some major construction projects and I became very adept at cutting and assembling



David Shuckstes volunteers at Cape Romain National Wildlife Refuge in South Carolina. (Patricia Lynch/USFWS)



Parker River National Wildlife Refuge in Massachusetts closes its beach from spring through mid-summer because it is nesting grounds for piping plover, a threatened species. (USFWS),

a mere couple hundred somewhere else... You would be enthralled by the personalities of individual birds, particularly when they look at you with that expression somewhere between curiosity and bad attitude.

Midway is special and the importance of the *verbesina* removal was clear... it would be easy to be overwhelmed by the vast expanses of yellow flowers. But seeing the progress that we made in some areas and seeing the progress that the Service had made elsewhere, it was also very possible to feel hopeful that, with continued effort, the problem is far from insurmountable.

major wood pieces for a kiosk at Bull's Island and a pergola at the Center.

My friends ask me why I would work so hard, as a volunteer. Maybe it is the idea that you are doing something good, that someone has got to do it, that they need me. Maybe it is the wonderful people I have met and work with.

All I know is that even though I come home dog tired, I really enjoy the day. I volunteered for the Sewee Center to keep myself active and use my physical and mental skills in my retirement years. I just had no idea that the activities would be so varied, so interesting and so much fun.

Enthralled by the Birds, Engulfed by the Weeds

By Todd Finlayson

(Todd Finlayson is one of many volunteers recruited to help control the invasive plant golden crownhead, or verbesina, on Midway Atoll. The plant spreads rapidly and limits seabird nesting and propagation of native plants. His story appeared in the Gooney Gazette, the newsletter of the Friends of Midway Atoll, which received

a \$24,700 grant from the National Fish and Wildlife Foundation's Pulling Together Initiative.)

Like most visitors to Midway Atoll National Wildlife Refuge, I landed at night. I'd heard the stories. I had seen the pictures. I knew there were birds here. I anticipated my first sighting. As the plane taxied towards the hangar, I caught my first glimpse of a Laysan albatross. Out loud, I blurted, "There's one!" A couple seconds later, the lights revealed several hundred more. I felt a little stupid.

My main appreciation for the atoll centered around the growing appreciation for the sheer number of birds: a few thousand here, a few thousand there,



Volunteer Todd Finlayson plants native grasses at Midway Atoll National Wildlife Refuge. (Christy Finlayson)

Around the Refuge System

Florida

Railroad boxcars have come to the aid of sea turtles nesting near Launch Pad 39A at the Kennedy Space Center on Merritt National Wildlife Refuge. Turtles emerge from the ocean within 200 yards of the space shuttle launch pads. The strong light from launch areas can discourage adults from coming ashore to lay their eggs. The light also disorients hatchlings seeking the moonlit sea.

Normally, the natural height of the dunes provides a buffer between the launch pad and the turtles, but the dunes were badly eroded during the 2004 hurricane season and again in 2007. Doug Scheidt, with the Kennedy Space Center life sciences support contractor Dynamac, realized that railroad boxcars are about the same height as the original dunes. The space center happens to have a rail line parallel to the beach, so Scheidt suggested that freight cars scheduled

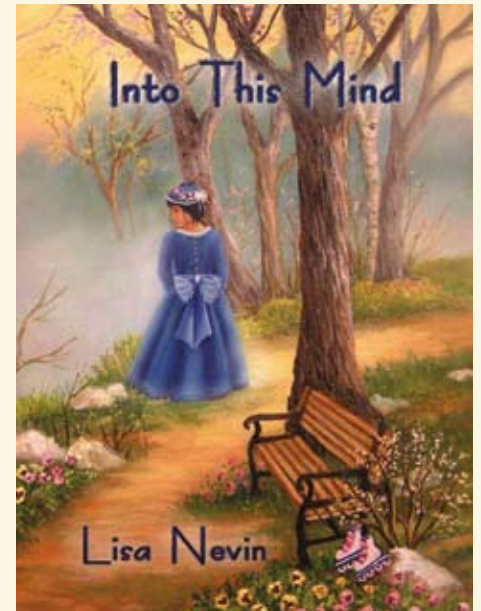
to be moved out of service be moved instead to the launch pad area. In what came to be called Operation Dark Dune, 25 rail cars were moved to their temporary seaside location, providing a light barrier between turtle nesting grounds and the shuttle launch pads. Mike Legare, wildlife biologist at Merritt Island National Wildlife Refuge, said there was indeed a net increase in the number of turtles who made it to the sea with the help of shade from the boxcars.

New York

The Federal Aviation Administration (FAA) has transferred 102 acres of land to the U.S. Fish and Wildlife Service to be managed as part of Long Island National Wildlife Refuge Complex. The West Sayville property has a colorful history, which began when a German company used it for wireless transatlantic communications – including messages that led to the sinking of the British luxury liner RMS Lusitania in 1915 and the subsequent entry of the United States into World War I. By 1939, the FAA owned the land and turned it into one of the world's most powerful transmitting facilities. The FAA cleaned the area of asbestos and PCB contamination before the Service assumed ownership in August 2007.

“The Long Island National Wildlife Refuge Complex protects some of the last significant natural areas for wildlife on Long Island,” said refuge manager Debbie Long. Grasslands on the property provide unique habitat for a variety of uncommon animals and plants, including New York's largest remaining population of federally endangered sandplain gerardia.

In addition to maintaining this grassland habitat by mowing and prescribed burns, the refuge also plans to restore approximately 42 acres of grasslands that have reverted to shrubland or small pitch pines. The restoration will connect several existing



Author Lisa Nevin was inspired to write her first novel after a walk through Assabet River National Wildlife Refuge in Massachusetts. (Diann Izzie)

grassland areas to provide larger and more diverse habitat for wildlife.

Massachusetts

An old, abandoned house at Assabet River National Wildlife Refuge became the inspiration for a novel by local author Lisa Nevin. Nevin and her husband were hiking one of Assabet River Refuge's 15 miles of trails when she spotted the old structure. The refuge has a few houses that predate its previous life as a military installation.

Nevin began wondering who might have lived in the house and ultimately wrote *Into This Mind*. The refuge became the fictional Betta Conservation Land in which a woman named Jena explores a decaying ballroom, finds herself in the mind



Long Island National Wildlife Refuge Complex in New York has acquired 102 acres of grassland habitat from the Federal Aviation Administration. The land provides habitat for the state's largest remaining population of federally endangered sandplain gerardia. (Ed Sambolin)

of a murdered woman, and discovers terrible secrets about murder and intrigue. The real Assabet River Refuge is expected to break ground for a new visitor center this spring. It will include a book store when it opens in 2009 – perhaps just in time for the sequel Nevin is writing.

Texas

The volunteer Sea Turtle Patrol for Matagorda Island National Wildlife Refuge had its most successful year yet in 2007, with a record eight sea turtle nests that produced 807 eggs. An extraordinary 83 percent of the eggs produced hatchlings. More nests were located in 2007 than in the previous four years combined.

The Sea Turtle Patrol was launched in 2003, when it appeared that endangered Kemp's Ridley sea turtles were nesting on the island. The first nesting was actually sighted in 2005. Since then, the number of nests has grown along with the number of patrollers, who include volunteers, members of the Friends of Aransas and Matagorda Island National Wildlife Refuges (FAMI), the Mid-Coast Chapter of Texas Master Naturalists and refuge staff. Volunteers donated 4,032 hours during the patrol season from April 2 to July 12.

Patrollers in 2007 also found a record 23 stranded turtles, partly reflecting the general population increase, especially among Kemp's Ridley and green sea turtles. Eight turtles were found alive and taken to the Animal Rehabilitation Keep, where six responded to treatment and recovered.

Michigan

Shiawassee National Wildlife Refuge near Saginaw is the beneficiary of a new partnership that includes Detroit Edison, The Conservation Fund and the U.S. Fish and Wildlife Service. Detroit Edison donated \$100,000 to establish a land acquisition fund that will help acquire and restore land



More sea turtle nests – including these endangered Kemp's Ridley sea turtles - were counted at Matagorda Island National Wildlife Refuge in Texas in 2007 than in the previous four years combined. (David Bowman/USFWS)

within the refuge boundaries. The utility is also helping to restore forests on the refuge. With Detroit Edison funding, 180 acres of refuge land were planted with more than 53,000 native tree seedlings in spring 2007. "Detroit Edison supports reforestation projects for several reasons," said president Gerry Anderson, "including their ability to sequester carbon dioxide emitted from our power plants." Shiawassee National Wildlife Refuge now spans 9,427 acres of bottomland-hardwood forests, rivers, marshes, managed pools, fields and croplands.

Awards

Georgia Shirilla has received the Rudolf Dieffenbach Award from the Division of Realty as the national employee of the year. Shirilla is credited with major land acquisitions at Hakalau Forest, James Campbell and Palmyra Atoll National Wildlife Refuges in Hawaii. Almost all Hawaiian land

acquisitions are complicated by the potential existence of unadjudicated Native Hawaiian land claims. To successfully acquire lands at Palmyra Atoll Refuge, Shirilla had to address potential liability associated with World War II wastes and abandoned explosives. She has developed exceptional goodwill with local landowners and a high degree of trust with local authorities, facilitating faster processing of title and other requests.

Shirilla's work led to the protection of more than 5,000 acres of habitat for four endangered forest birds in the Kona Forest Unit of Hakalau Forest Refuge, where she potentially saved the United States more than \$1 million by settling access and relocation issues. Her work also led to the protection of more than 500,000 acres at Palmyra Atoll Refuge, including one of the largest remaining undisturbed stands of *Pisonia* beach forest in the Pacific Ocean.

Whatever Happened To . . .

Kodiak Gray Whale

The Kodiak National Wildlife Refuge Visitor Center opened its doors on November 17, 2007, welcoming 1,000 visitors in a town of just 12,000 residents. The multi-level center includes an observation deck, exhibits on the Kodiak bear, local birds and salmon and a fully articulated 36-foot Kodiak gray whale skeleton, which can be viewed from multiple angles. "Pretty cool," says Stacy Studebaker, the retired science teacher who found the beached carcass in 2000, enlisted volunteers, generated grant funding and coordinated the painstaking reconstruction of the entire skeleton. (See Refuge Update *May-June 2007*).

Local artist Bruce Nelson completed 50 graphite drawings representing all 165 bones, 14 pairs of ribs, 56 vertebrae, two scapulas, two ear bones and more. Nelson says it is the first illustrated record of a gray whale. He has also created a large painting that will hang near the skeleton, showing Kodiak bears and other scavengers just beginning to feast on the dead whale.

"Bears eat dead marine mammals they scavenge off the beach in addition to all the salmon, berries and other vegetation," says Studebaker. "This will help educate the public about the varied diet of the Kodiak and illustrate the interdependence between the marine and terrestrial ecosystems."

Refuge manager Gary Wheeler is enthusiastic about the opportunities new visitor center offers. Only 10 percent of Kodiak's residents ever get to the refuge, which is accessible only by boat or plane. The visitor center, however, is right downtown.

Wheeler says opening day visitors reflected the town's diverse population, including residents of the largest Coast Guard base in the United States, people who work in the local fishing industry, and smaller groups of Filipinos and Native Alaskans. School groups are



Retired science teacher Stacy Studebaker found a beached Kodiak gray whale near Kodiak National Wildlife Refuge in Alaska. She coordinated the reconstruction of the whale skeleton, which now hangs in the new refuge visitor center in Kodiak, Alaska.

already scheduling field trips, and Studebaker hopes to continue working with the refuge to develop interpretive and educational displays for the whale. More information at <http://www.kodiakgraywhaleproject.org>.

The Big Sit

Twenty-four national wildlife refuges participated in the 2007 Big Sit during National Refuge Week in October. During a Big Sit, birders and other visitors sit in a designated 17-foot-diameter circle and count the birds that can be seen from the circle during a 24-hour period. Sitters at Pea Island National Wildlife Refuge in North Carolina got the highest count at 90 species, and landed as number six nationally among all Big Sit sites. Wheeler National Wildlife Refuge was not far behind with 84 species.

The free, noncompetitive Big Sit was initiated by 15 years ago by the New Haven Bird Club in Connecticut, which has created rules and trademarked the name. The concept was brought to the attention of national wildlife refuges by the Refuge System Birding Initiative, launched more than a year ago to enhance

relationships with the nation's estimated 46 million birders.

Shiawassee National Wildlife Refuge in Michigan hosted its first Big Sit last year. Birder Steve Kahl wrote in the refuge newsletter, "We were shooting for 72 species because the highest Big Sit total in Michigan was 71. Breaking the record would further reinforce the refuge's stature as one of the best places for birds in the state." The Shiawassee team came close to its goal – 68 species, including great horned owls, sandhill cranes, plenty of geese and a few bald eagles.

The team at Alligator National Wildlife Refuge in North Carolina even counted eight black bears and one eastern bobcat within view of the observation tower, but they don't count toward the team total. (See Refuge Update *July-August 2007*)

More information at <http://www.birdwatchersdigest.com/site/funbirds/bigsit/pastyears.aspx>

Preserve America Grant: Maritime Heritage Teachers Workshop

One day in November 2007, teachers from around Hawaii converged on

the NOAA facilities in Honolulu for a daylong workshop geared toward better understanding of the newly designated Papahānaumokuākea Marine National Monument that encompasses the Northern Hawaiian Island archipelago. Experts from the Maritime Heritage Program, the Monument staff, NOAA and the University of Hawaii's Marine Institute talked about cultural and natural resources, outreach and research programs and the agencies mandated to manage and monitor the protected areas.

The workshop was organized by the PAST Foundation (<http://www.pastfoundation.org/>) and funded by a Preserve America grant.

After gathering an array of facts and ideas, the team of teachers set about creating memorable, energizing experiences for students to help them better understand stewardship and its

nuances. One teacher suggested an Eco-Summit, with student delegations from different schools to address problems associated with protecting the Northwest Hawaiian Islands. English teachers suggested that students write a first person journal from the point of view of a baby humpback whale, sea bird or turtle, while a visual arts teacher imagined students creating a hula-style dance that would simulate migration.

The teachers will continue to share ideas electronically while the PAST Foundation staff turns their suggestions into lessons and activity plans that the teachers will then pilot. Ultimately, teachers throughout Hawaii will be able to tackle the difficult issues of stewardship with a curriculum that captures the imagination of students. (See *Refuge Update July-August 2007*)



A team of teachers, working with a Preserve America grant, is seeking ways to help students understand the natural resources of the newly designated Papahānaumokuākea Marine National Monument that encompasses the Northern Hawaiian Island archipelago. (USFWS)

Hooked on Nature — continued from pg 5

Will They Care About Wild Places?

But like many others that care about wildlife, refuges and the protection of such things, I look upon trends of rampant video game playing, digital music hoarding and many others as disturbing. Kids are undoubtedly growing less connected with nature. And if that continues, will they care about wild places when they are adults? Will they visit wildlife refuges, fund them, protect them? Will they know a mallard from a wood duck? Prevailing evidence does not provide feel-good answers to these questions.

Anyone can have that moment – that defining moment – when nature's wonders hit them like a ton of bricks. For me, it just happened to be with about 40 feathered friends in the mountains of North Carolina, a moment that quite literally changed my life.

So how do we create that moment for millions of youngsters? Certainly,

national wildlife refuges offer hope, as they provide interpretive programs, festivals and a host of activities that can open the eyes of any six- or 60-year-old. But the reach of national wildlife refuges has been hamstrung in recent times and is not yet long enough. My unsolicited two-cents: take a friend or a child by the hand, introduce them to the woods or the desert, and provide for them what those two old professors gifted to me that fateful day. ♦

Noah Kahn is the federal lands associate with Defenders of Wildlife, a nonprofit conservation organization that is a member of CARE (Cooperative Alliance for Refuge Enhancement).

Deep Fork National Wildlife Refuge Restoration

— continued from pg 13

“This project represents what can be accomplished through an innovative partnership arrangement,” says refuge manager Darrin Unruh. “It would not have been possible without the participation of the Friends of the Deep Fork National Wildlife Refuge, the Conservation Fund, and the individual landowners.”

Karen Cathey is Natural Resource Damage Assessment and Restoration (NRDAR) coordinator in the Southwest Region.

Learning In Nature, Not Just About Nature — continued from pg 1

Author Rachel Carson was convinced that connecting with nature may not initially involve the conveyance of facts or environmental concepts but rather opportunities like this to form an emotional attachment to nature. So is Richard Louv, who wrote in 2005 the book, *Last Child in the Woods – Saving Our Children from Nature-Deficit Disorder*, and participated in a Conservation Learning Summit, sponsored by the U.S. Fish and Wildlife Services. That was just the first step in what has become the Service's Children and Nature Initiative, destined to become an encompassing program.

One of the Highest Priorities

In January 2007, the Service leadership officially made "Connecting People with Nature" one of its six highest priorities. The Initiative so far has created fact sheets, a PowerPoint presentation and an internal Web site, <https://intranet.fws.gov/nctc/childrenandnature>, to help Service personnel stay current on successes and approaches that will help today's youth grow to become tomorrow's conservation constituents.

"As experts on nature, the Service and its partners can help children first to love and respect nature through experiencing it, and then to understand it," says one fact sheet. "Many efforts to connect

children with nature, by extension also connect parents, grandparents and other family members."

In May 2007, each region agreed to implement at least one schoolyard habitat project during the fiscal year. In addition, the Service hired a public health specialist to develop partnerships with the health care community in the belief that getting children moving in nature serves the dual missions of improving health and building a conservation ethic.

About 10 ambassadors from each Service region attended a National Conservation Training Center workshop in December 2007 and agreed to help develop new children and nature activities and refocus existing efforts in their regions. The latter point is key.

Engagement of All Americans

Janet Ady, leader of the Children and Nature Working Group, acknowledges that connecting children and nature is not a new idea. "There are some good environmental education programs out there, but they are not necessarily getting children outside in nature," says Ady. "The goal is child-directed time in nature, unstructured time."

Refuges will help to achieve the Service mission by giving children opportunities to discover and touch nature. At Hakalau

Forest National Wildlife Refuge in Hawaii, children plant a native tree to help restore an intact upper elevation rainforest. Each tree is tagged with the child's name. Coming back year after year, the children are able to reconnect to something good for nature and good for themselves.

Turnbull National Wildlife Refuge near Spokane, Washington, brings children to the refuge for year-round activities, including identifying aquatic insects in Pine Creek and participating in a night hike to experience the sounds and sights after dark. "Facilitators and students alike are instilled with a natural resource conscience that they will take into their day-to-day lives," says refuge manager Nancy Curry.

"Solutions to the natural resources issues we face will require the engagement and support of all Americans," says NCTC director Rick Lemon. "They must understand the facts, but more importantly, they must care."

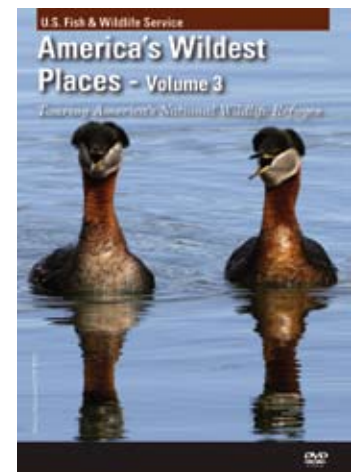
Giving children the chance to connect with nature, "should not be just another box to check off on a performance plan. It should be something we want to do, something that is part of us," says Service Director H. Dale Hall. "Now is the time for all of us to act on that desire." ♦

New DVD Tours of National Wildlife Refuges

The third volume of "America's Wildest Places" is now ready for your enjoyment. On the East Coast, viewers visit Vermont's watery Missisquoi National Wildlife Refuge and Parker River National Wildlife Refuge in Massachusetts as well as shorebirds at Virginia's Chincoteague Refuge. In the parched deserts of Cabeza Prieta Refuge in Arizona, tenacious desert mammals and plants struggle to survive along the Mexican border.

Volume I features eight refuges, including endangered whooping cranes taking off from Aransas National Wildlife Refuge in Texas, a profusion of ducks and other waterbirds at Wisconsin's Horicon Refuge, and the secretive red wolf in the swampy tracks of Pocosin Lakes Refuge in North Carolina.

Six more refuges shine on Volume 2. All three volumes may be ordered at <https://vcart.velocitypayment.com/fws/> for \$6 each or \$18 for the set.



Wetland Restoration to Improve Habitat and Reduce Pollution Impact — continued from pg 11

slope of the original creek and mudflat. Daily tidal flows will be restored by excavating two narrow breaches in an existing dike to allow free movement of tidal waters. In addition, two pedestrian bridges will be built, providing a hiking trail around the newly restored wetland. A viewing platform will also be built.

“There were unforeseen challenges in the beginning,” said refuge biologist Brendalee Phillips, “but we all worked together to come up with solutions. The site looks wonderful and I can’t wait to watch the water flow when we finally breach the dike.”

Much of the wetland design and implementation work has been supplied by U.S. Fish and Wildlife Service staff under supervision of the Pennsylvania Ecological Services Field Office, acting refuge manager Gary Stolz and refuge facility manager Mike McMenamin. Staff from many refuges worked on the project, including Blackwater, Bombay Hook, Canaan Valley, Cape May, Chincoteague, Erie, Patuxent, and Prime Hook; Harrison Lake National Fish Hatchery; and the Chesapeake Bay and Pennsylvania Ecological Services Field Offices.

Wetland Restoration Reduces Pollutants in Local Watershed

In North Carolina, wetlands are being restored to minimize the impacts of nutrient pollution and improve local water quality. Pocosins are wetlands characterized by a very dense growth of evergreen shrubs and pond pine. The typically thick layers of peat soil under pocosins act like nutrient sponges, locking up nitrogen, phosphorus and carbon in vegetation and the soil layer.

When pocosins in southeast North Carolina were drained for farming and peat mining, their nutrient retention functions were lost and some nutrients were released to adjacent waters. When these lands became part of Pocosin Lakes National Wildlife Refuge in 1990, managers began restoring natural water



Raised roads act as levees to re-flood historically drained peatlands at Pocosin Lakes National Wildlife Refuge in North Carolina. (Sara Ward/USFWS)

levels. A partnership with the North Carolina Department of Environment and Natural Resources (NCDENR) is accelerating the refuge’s ongoing restoration efforts.

Concern about the potential impact of new and larger nutrient sources, particularly a farm within a mile that produces 4 million eggs, prompted staff at Pocosin Lakes Refuge and Alligator River National Wildlife Refuge along with NCDENR, to restore more than 7,000 acres of previously drained pocosins to offset the excess nitrogen. The goal is not only to enhance habitat for wildlife by saturating these lands again, but also to re-establish the pocosins’ function as natural nutrient sponges. This hydrology restoration, which should be completed in 2008, will sequester about 200 pounds of nitrogen and 6,400 pounds of carbon per acre per year in peat soils and biomass.

The first phase of construction was completed last year, including the elevation of seven miles of roads at Pocosin Lakes Refuge. Raised roads act as levees to re-flood the historically drained peatlands. Water control structures are then used to help maintain

optimum water levels. By the time natural rainfall raises water levels to the desired level, about 3,520 acres of hydrologic wetland restoration will be completed (a process slowed by the recent drought).

When the next phase of restoration is finished, 7,500 acres will have been restored through cooperative funding and technical assistance from North Carolina and Service staffs as well as coastal and environmental contaminants programs. The restored pocosins will retain about 1.5 million pounds of nitrogen and 48 million pounds of carbon each year. ♦

Melinda Turner in the Pennsylvania Field Office and Sara Ward in the Raleigh Ecological Services Field Office in North Carolina contributed to this article.

Oil Pits: More than Meets the Eye — continued from pg 15

Production skim pits are used to separate oil from formation water produced along with the oil. A 2006 report from the Service's National Fish and Wildlife Forensic Laboratory says that 500,000 to one million birds are killed annually throughout the United States due to oil pits.

Progress is Being Made

Some progress is being made. The number of migratory birds killed in oil pits is about half what it was a decade ago. Help comes from both refuges and oil companies themselves.

Sabine National Wildlife Refuge in Louisiana began prohibiting new oil pits in 1983. Since then, Chevron-Texas has been closing and decontaminating all of the oil pits on the refuge. Chevron was expected to close the last of 25 pits in 2007, at a cost of \$1.5 million, according to *Bird Conservation* magazine (Fall 2007).

At Aransas National Wildlife Complex in Texas, project leader Charles Holbrook says the refuge now requires a "closed loop system" for drilling operations before a Special Use Permit is issued to an oil or gas company. Southwest Louisiana National Wildlife Refuge Complex also requires drilling operators to use a closed loop system. This is the safest method for avoiding environmental contamination because contaminated mud circulates within a closed shaft. The drilling mud is stored in tanks and hauled offsite for reuse at another drilling rig or for disposal when the drilling is completed.

Since 1985, national oil and gas coordinator Janine Van Norman says the



Environmental contaminants specialist Pedro Ramirez says this plastic flagging is not adequate to deter birds from landing on water contaminated by oil and drilling refuse. (Pedro Ramirez/USFWS)

Service has typically required a Special Use Permit for oil and gas operations when the Refuge System acquires land with privately owned subsurface mineral rights. That permitting process can then impose environmentally sound requirements on drilling practices. A Special Use Permit is automatically required when the federal government owns subsurface mineral rights.

For a number of years, Ramirez says oil operators have used strands of multi-colored plastic flagging suspended over oil pits to deter birds and fences to exclude larger mammals. Pointing out just how ineffective such flagging is, Ramirez now advises oil companies to net or cover a pit to effectively keep out birds and other wildlife.

The Service's upcoming handbook says refuges should "advise the oil company that, although economically cheaper, open reserve pits will probably result in a 'take' of migratory birds and, potentially, other protected species. This situation could lead to an enforcement action that may result in significant fines and penalties to the operator."

Refuges could well be faced with increased oil and gas exploration, drilling and production. Understanding the motivation, mechanics, process, effects and legal authorities governing oil and gas activity on refuge lands is critical for protecting trust resources, concludes the handbook. Successful communication with oil and gas operators and their contractors is vital so that the operators may exercise their mineral rights while the safety of refuge personnel, the public, wildlife and the refuge is vigilantly maintained. ♦

Saving Money on Heavy Iron

Since 2004, the Refuge System has benefitted from the skills of national heavy equipment coordinator Steve Flanders and seven regional coordinators. This team has led the way to more efficient and cost-effective purchases of heavy equipment.

The team works directly with manufacturers to take advantage of quantity discounts. A Blanket Purchase Agreement with John Deere, for example, includes a 4 percent discount off the federal government price for agricultural tractors. Regional coordinators also work with individual refuges to trade-in used equipment or sell it through the General Services Administration (GSA). Proceeds from GSA sales are credited to the Service for future purchases.

As the table below shows, these improved equipment management practices led to a savings of \$1 million on equipment purchases in 2007.

Total pieces of heavy equipment in the Refuge System.	3,132
Percentage over useful age.	50%
Pieces of new equipment purchased in 2007	74
Quantity discount	\$349,067
Value of trade-ins	\$308,070
Proceeds from GSA sales	\$355,493
2007 Cost Savings	\$1,012,630



Better equipment management practices saved money in fiscal year 2007. (USFWS)

Eaglet Rescue at Upper Miss Refuge

by Shirley Darling

My husband Brent and I, both members of the Friends of Pool 9, Upper Mississippi National Fish and Wildlife Refuge, had a rare experience last spring: we rescued an eaglet from a downed nest on a refuge that didn't even have an eagle nest until 1992. The eaglet is recovering at the University of Minnesota.

In 1992, a pair of nesting eagles set up housekeeping in a large maple tree on a small island on the refuge, north of Lansing, Iowa. As years went by, the nest grew bigger and became something of a tourist attraction. For many years, people recreating on the Upper Mississippi River were able to watch the eagle parents rear their young. According to Tim Loose, wildlife refuge specialist for the McGregor District, the eagles have consistently produced two to three eaglets each year over the past 15 years.



Wind downed a tree on the Upper Mississippi National Fish and Wildlife Refuge and took the lives of three eaglets. The fourth was rescued, thanks to the care of Shirley and Brent Darling, members of the Friends of Pool 9 at the Upper Miss Refuge. (USFWS)

Since eagles often reclaim the same nest year after year, nests can become quite heavy and vulnerable to strong winds. That's just what happened on May 14, 2007, when the tree came crashing down, along with its nest with four eaglets. Brent and I were out fishing two days later, when Brent noticed the fallen tree. We discovered one baby

crushed in the wreckage (two more carcasses were discovered later) and one eaglet still alive.

We carefully scooped it up and contacted Tim Loose, who called Dr. Laura Johnson of the Hillside Vet Clinic in La Crosse, Wisconsin. X-rays revealed a broken leg and broken wing. The six-pound eaglet was probably eight weeks old. Its appetite was good. A meal of dead baby mice seemed to perk the little one up. The bird was transferred to the Raptor Center at the University of Minnesota the next morning.

"It is very rare to have four eaglets in one nest," said Loose, "and a real tragedy to lose this nest since it has been such a visible landmark for so long." Fortunately, the eagle pair has not given up. They built a new nest in an adjacent tree; hopes are that the pair will continue to grace our community for years to come. ♦

A Year of Accomplishments — continued from pg 2

in Denver a place of solitude and personal rejuvenation just a step from the hubbub of a major city.

Our Built Assets

The Refuge System has more than 47,000 “built” assets – from office space and visitor centers to wildlife observation towers and production facilities for fish hatcheries. All together, they are valued at more than \$21 billion. Unfortunately, our maintenance backlog increased from \$1.5 billion to \$2.5 billion.

Comprehensive Conservation Plans

In other areas of long-standing concern, our progress has been steady and significant. We have completed Comprehensive Conservation Plans for 259 national wildlife refuges, outlining our long-term vision for what they will look like and how they will serve both wildlife and the American taxpayer. Another 168 CCPs are in the draft or comment stage. We will complete the remaining 127 CCPs by 2012, meeting the congressional deadline.

In many cases, real changes are taking place. Nisqually National Wildlife Refuge in Washington is ready to begin construction next summer to restore a 700-acre estuary that is a nursery and feeding ground for endangered Chinook



The Refuge System's Birding Initiative seeks to help birding enthusiasts better understand the vital role of national wildlife refuges in their avocation. (Karen Laubenstein/USFWS)

salmon. All five area watershed groups have contributed some of their state salmon recovery funding to finance the project, which was proposed in the refuge's CCP.

Fighting Invasives

One of the greatest threats to national wildlife refuges is invasive nonnative species. We've made some headway in fighting the problem. For example,

61 refuges received grants to engage volunteers in the mapping, treating and restoration of refuge lands. Preliminary statistics from 46 refuges show that more than 1,000 volunteers have already put in more than 10,200 hours. The fight will be a long one, but it's one we have to win.

Birding Initiative

A group of 14 renowned professionals joined together as the Birding Team, a driving force behind the Birding Initiative that will help birding enthusiasts better appreciate the importance of national wildlife refuges. The dedication and enthusiasm of the Birding Team is impressive. “The Big Sit” was the Initiative's first success, when about two dozen refuges gathered people of all ages into circles to count birds and see firsthand that national wildlife refuges are some of the best places to see wildlife. In 2008, we hope to complete a cooperative agreement with Cornell Laboratory of Ornithology. ♦

Send Us Your Comments

Letters to the Editor or suggestions about *Refuge Update* can be e-mailed to RefugeUpdate@fws.gov or mailed to *Refuge Update*, USFWS-NWRS, 4401 North Fairfax Dr., Room 634C, Arlington, VA 22203-1610.



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