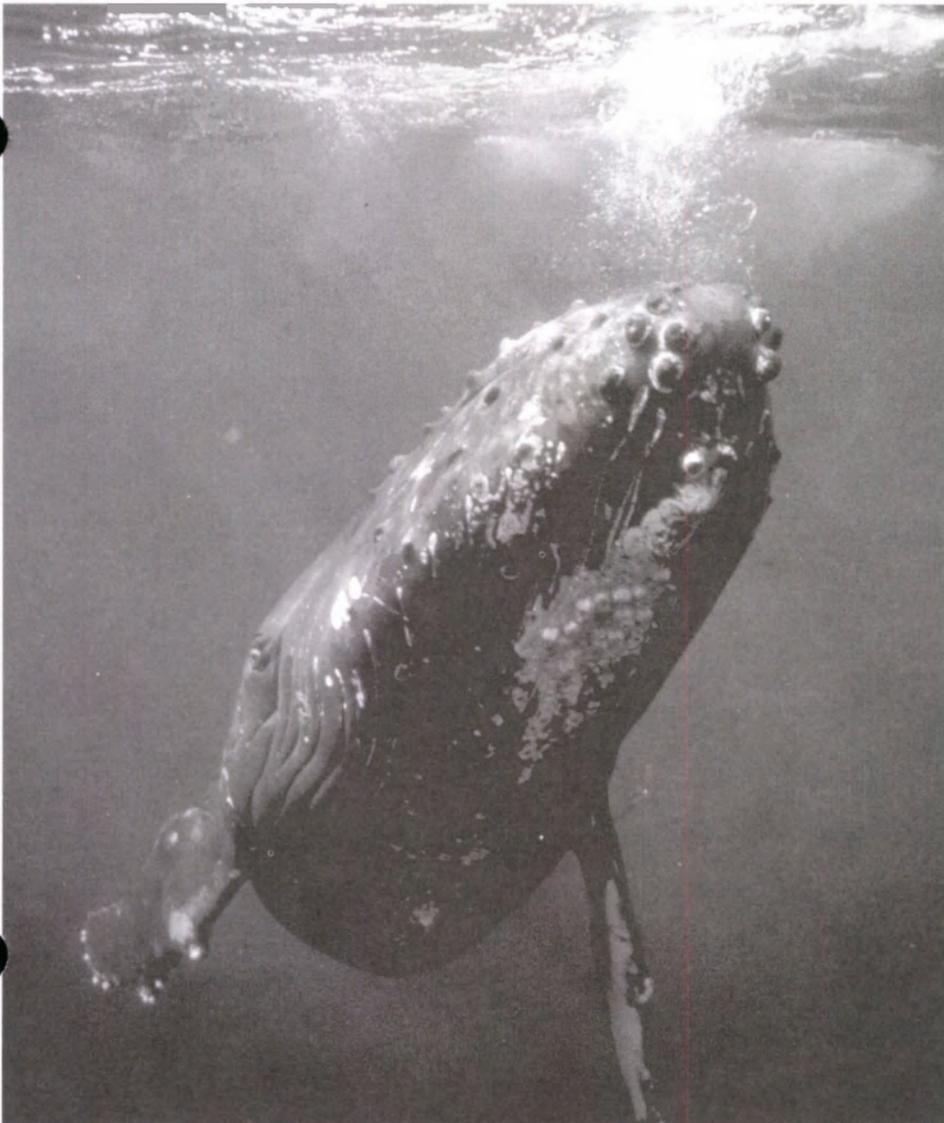


ENDANGERED *Species* BULLETIN

U.S. DEPARTMENT OF THE INTERIOR
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*E*arth is sometimes called the "Blue Planet," calling to mind the oceans that cover most of its surface. But it is becoming increasingly clear that these oceans, though vast, are not an inexhaustible resource. Overfishing, pollution, and other changes in the environment pose growing threats to the health of marine ecosystems and the life they support. Reports of depleted fisheries, disease outbreaks, and public health warnings are on the rise. In recognition of the roles that oceans play in shaping life on our planet, the United Nations has designated 1998 as the International Year of the Ocean. This edition of the Endangered Species Bulletin takes a look at U.S. efforts to conserve the endangered and threatened life of marine and related coastal ecosystems.



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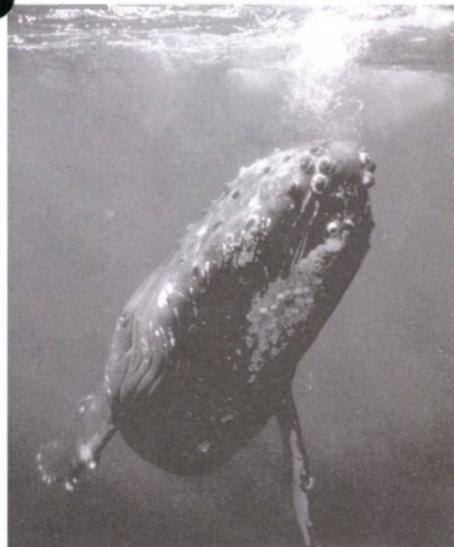
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On the Cover

The humpback whale, an endangered species, is noted for its singing, which has been called the most complex vocalization in the animal kingdom.

**Photo by Michael Nolan/
marine mammal images**

The Endangered Species Bulletin welcomes manuscripts on a wide range of topics related to endangered species. We are particularly interested in news about recovery, habitat conservation plans, and cooperative ventures. Please contact the Editor before preparing a manuscript. We cannot guarantee publication.

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by Terri Jordan

NMFS—a Partner for Endangered Species



Humpback whale
Corel Corp. photo

NMFS is part of the National Oceanic and Atmospheric Administration within the U.S. Department of Commerce. The NMFS national headquarters office is located in Silver Spring, Maryland, with five regional offices and supporting science centers in the Northeast, Southeast (including the U.S. Caribbean islands), Southwest (including Hawaii and the U.S. Pacific islands), Northwest, and Alaska.

The Endangered Species Act (ESA) assigns lead responsibility for most marine and anadromous species to the National Marine Fisheries Service (NMFS). Although most people think of the Fish and Wildlife Service (FWS) when it comes to the protection and recovery of endangered wildlife, NMFS, like its partner agency FWS, lists species and designates critical habitat, consults with Federal agencies to ensure their activities do not jeopardize listed species, prepares and implements recovery plans, develops cooperative agreements with States, enforces legal protection, and issues permits for scientific research and incidental take of listed species. Species under NMFS jurisdiction that are listed or proposed for listing include cetaceans (dolphins and whales), sea turtles, marine and anadromous (those that spend part of their life in salt water and part in fresh water) fish, seals and sea lions, and marine plants. A complete list of listed, proposed, and candidate species under NMFS jurisdiction is included in the table below.

Marine Mammals

The agency's mandate to protect species extends beyond the ESA to include marine mammals under the authority of the Marine Mammal Protection Act of 1972 (MMPA). Under this law, NMFS has Federal jurisdiction for all marine mammal species (about 45) occurring in U.S. waters, with the exception of the polar bear (*Ursus maritimus*), sea otter (*Enhydra lutris*), walrus (*Odobenus rosmarus*), and West Indian manatee (*Trichechus manatus*), which are managed by the FWS. Currently, 11 species of marine mammals native to U.S. waters, including most of

the large whale species, are also classified as threatened or endangered under the ESA.

The eastern north Pacific population of gray whales (*Eschrichtius robustus*) represents the most successful recovery of any marine mammal species. Previously hunted to near extinction, it recovered to become the first marine mammal stock removed from the list of endangered and threatened wildlife. In contrast, the northern right whale (*Eubalaena glacialis*) is a species in peril. Historically, commercial whaling severely depleted the species. More recently, ship strikes and entanglement in fishing gear are the most serious direct threats to right whales. With approximately 300 individuals remaining, NMFS is taking steps to recover the species in the North Atlantic Ocean by contributing to studies using satellite and radio telemetry to determine habitat use, assisting in aircraft surveillance flights to help ships avoid striking whales, and working with commercial fisherman to reduce the threat of whale entanglement in fishing gear.

Sea Turtles

For some species, such as sea turtles, NMFS and the FWS share responsibility. The FWS is responsible for protection of sea turtles in their nesting beach habitat, while NMFS has jurisdiction for turtles in estuarine and marine environments. Six species of sea turtles are listed either as endangered or threatened under the ESA: the loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), olive ridley (*Lepidochelys olivacea*), and green turtle (*Chelonia mydas*). In

conjunction with the FWS and State natural resource agencies, NMFS is focusing on recovery of sea turtle populations. NMFS research and monitoring activities include fishery observer programs, life history studies in marine habitats, aerial surveys, and collection of data on stranded turtles.

The southeast U.S. (North Carolina through Florida) is home to the largest assemblage of nesting loggerheads in the Western Hemisphere. The vast majority of the nesting occurs along the east coast of Florida. In recent years, between 60,000 and 85,000 nests have been recorded annually on southeast U.S. beaches. The marine and estuarine habitats of the southeast U.S. are equally critical to the recovery of the loggerhead. Considerable joint agency efforts are needed to ensure the long-term protection of both nesting and marine habitat for this species.

Florida and Hawaii are the main nesting and foraging areas for green turtles in the U.S., where the nesting populations have shown encouraging signs of recovery. But the future of this species remains at risk due to poaching, capture in nearshore gillnets, and the increasing scope and magnitude of a tumor affliction disease known as fibropapilloma. (See *Bulletin* Vol. XXI, No. 2.)

The Kemp's ridley is unusual in that it nests primarily on one main beach, Rancho Nuevo, on Mexico's northern Gulf Coast. In 1947, 40,000 females were documented to nest on a single day. The population plummeted due to overexploitation and incidental capture in commercial fisheries. Today, with strong protection of the nesting beach and the requirement to use turtle excluder devices (TEDs) in shrimp trawls, the nesting population has been increasing from approximately 700 nests per year in the mid-1980's to 2,300 nests in 1997.

TEDs are devices incorporated into shrimp trawls that prevent a turtle from drowning in the tailbag of the net by directing the turtle through an escape



Kemp's ridley sea turtle at its nesting beach

Photo by Peter Pritchard

opening. These devices have provided benefits for many species of sea turtles inhabiting the southeast Atlantic Ocean and Gulf of Mexico, and have been implemented in the shrimp fishing fleets of some foreign nations as well. NMFS has spearheaded the development and improvement of TEDs and has also provided technical assistance to foreign nations in implementing the use of TEDs in their shrimp fisheries.

Pacific Salmon

The listing of Pacific salmon stocks in the early 1990's increased NMFS' opportunities to work with western States, Native American tribes, private landowners, and other Federal agencies to recover salmon. The recovery effort for salmonids is complex due to their wide geographic range and the effect of these listing actions on a wide variety of interests. The Northwest and Southwest Regions of NMFS have taken the lead in determining the current status of seven Pacific salmonid species: chum salmon (*Oncorhynchus keta*), chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), sea-run cutthroat trout (*Oncorhynchus clarki clarki*), pink salmon (*Oncorhynchus gorbuscha*), sockeye salmon (*Oncorhynchus nerka*), and coho salmon (*Oncorhynchus kisutch*).

Volunteers examine a dead loggerhead sea turtle at Grand Isle, Louisiana.

Photo courtesy of the Aquarium of the Americas





Currently, 12 separate stocks or evolutionary significant units (ESUs) of Pacific salmonids are listed as threatened or endangered under the ESA (see table). NMFS is conducting status reviews for populations of all seven salmonid species found along the Pacific coast of the U.S. Thus far, it has determined that, in addition to those listed or proposed for listing, the biological status of some did not warrant ESA listing.

NMFS has worked closely with western States to develop strategies for species recovery, including a conservation plan with the State of Oregon to protect coho salmon and a habitat conservation plan (HCP) with the State of Washington to protect 1.6 million acres (0.6 million hectares) of inland habitat for salmon. Washington's Department of Natural Resources (DNR) began implementing its HCP in January 1997. It protects the habitat of salmonids and other species by modifying timber management practices on DNR lands for the next 70-100 years (the permit term). The new practices are intended to conserve riparian habitats that provide essential functions for freshwater aquatic systems important to salmon. Conservation measures include increased riparian buffers, additional wind buffers in wind throw prone areas, road maintenance and abandonment plans, and a strong

monitoring plan. NMFS works very closely with tribes that depend upon salmon, helping the tribes maintain their culture and exercise their treaty rights. NMFS is currently working with about 50 non-Federal landowners to develop HCPs that cover vast areas of salmon habitat in the western States.

In July of 1997, NMFS updated its Candidate Species List. The list includes species for which reliable information is available that a listing may be warranted. However, NMFS will require further information (i.e., status review) before it makes a decision to propose any of these species for listing. Currently, 22 species (including vertebrate populations) are classified as candidate species. (See table.)

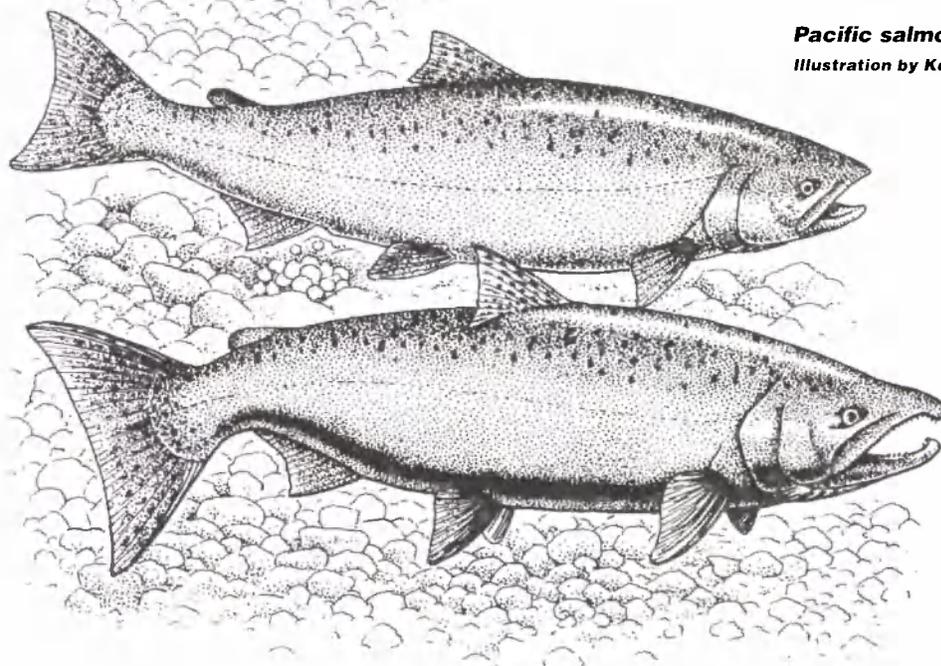
As a vital partner in the effort to protect and restore our Nation's vulnerable wildlife heritage, NMFS faces monumental challenges. However, the cooperative relationships being forged with other government agencies, Native American tribes, and the private sector provide hope that the conservation goals we all share can eventually be achieved.

Terri Jordan is a Fishery Biologist with the NMFS Headquarters' Office of Protected Resources in Silver Spring, Maryland.

Opposite page: Two marine mammal species for which NMFS has responsibility.

Above: Gray whale
National Marine Mammal Lab photo

Below: Steller sea lion
Photo by Craig Johnson



Pacific salmon
Illustration by Kendall Morris

NMFS Species List

Listed/Proposed

Fish			
Common Name	Scientific Name	Population/Range	ESA Status
Salmon, chinook	<i>Oncorhynchus tshawytscha</i>	Snake River Fall	Threatened
	<i>Oncorhynchus tshawytscha</i>	Snake River Spring/Summer	Threatened
	<i>Oncorhynchus tshawytscha</i>	Sacramento River Winter-Run	Endangered
Salmon, coho	<i>Oncorhynchus kisutch</i>	Southern Oregon- Northern California Coast	Threatened
	<i>Oncorhynchus kisutch</i>	Central California Coast	Threatened
Salmon, sockeye	<i>Oncorhynchus nerka</i>	Snake River	Endangered
Sturgeon, Gulf	<i>Acipenser oxyrinchus desotoi</i>	Gulf of Mexico	Threatened
Sturgeon, shortnose	<i>Acipenser brevirostrum</i>	Canada to Florida	Endangered
Totoaba	<i>Cynoscion macdonaldi</i>	Gulf of California	Endangered
Trout, cutthroat	<i>Oncorhynchus clarki clarki</i>	Umpqua River, Oregon	Endangered
Trout, steelhead	<i>Oncorhynchus mykiss</i>	Lower Columbia River	Proposed Threatened
	<i>Oncorhynchus mykiss</i>	Snake River Basin	Threatened
	<i>Oncorhynchus mykiss</i>	Klamath Mountains Province	Proposed Threatened
	<i>Oncorhynchus mykiss</i>	Upper Columbia River	Endangered
	<i>Oncorhynchus mykiss</i>	Southern California	Endangered
	<i>Oncorhynchus mykiss</i>	Central California Coast	Threatened
	<i>Oncorhynchus mykiss</i>	California Central Valley	Proposed Endangered
	<i>Oncorhynchus mykiss</i>	Oregon Coast	Proposed Threatened
	<i>Oncorhynchus mykiss</i>	South-Central Coast	Threatened
<i>Oncorhynchus mykiss</i>	Northern California	Proposed Threatened	
Mammal			
Common Name	Scientific Name	Population/Range	ESA Status
Dolphin, Chinese River	<i>Lipotes vexillifer</i>	Yangtze River, China	Endangered
Dolphin,	<i>Platanista minor</i>	Indus River Indus River, Pakistan	Endangered
Porpoise, harbor	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	Proposed Threatened
Porpoise, harbor, Gulf of California (Vaquita, Cochito)	<i>Phocoena sinus</i>	Gulf of California	Endangered
Sea lion, Steller	<i>Eumetopias jubatus</i>	East of 144° Long	Threatened
	<i>Eumetopias jubatus</i>	West of 144° Long	Endangered
Seal, Caribbean monk	<i>Monachus tropicalis</i>	Range-wide	Endangered
Seal, Guadalupe fur	<i>Arctocephalus townsendi</i>	Mexico, Southern California	Threatened
Seal, Hawaiian monk	<i>Monachus schauinslandi</i>	Hawaiian Islands	Endangered
Seal, Mediterranean monk	<i>Monachus monachus</i>	Mediterranean Sea	Endangered
Seal, Saimaa	<i>Phoca hispida saimensis</i>	Lake Saimaa, Finland	Endangered
Whale, blue	<i>Balaenoptera musculus</i>	Range-wide	Endangered
Whale, bowhead	<i>Balaena mysticetus</i>	Range-wide	Endangered
Whale, finback	<i>Balaenoptera physalus</i>	Range-wide	Endangered
Whale, humpback	<i>Megaptera novaeangliae</i>	Range-wide	Endangered
Whale, right	<i>Eubalaena glacialis</i>	Range-wide	Endangered
	(including <i>australis</i>)		
Whale, sei	<i>Balaenoptera borealis</i>	Range-wide	Endangered
Whale, sperm	<i>Physeter macrocephalus</i> (catodon)	Range-wide	Endangered

NMFS Species List (cont.)

Reptile

Common Name	Scientific Name	Population/Range	ESA Status
Sea turtle, green	<i>Chelonia mydas</i>	Range-wide	Threatened, certain populations endangered
Sea turtle, hawksbill	<i>Eretmochelys imbricata</i>	Range-wide	Endangered
Sea turtle, Kemp's (Atlantic) ridley	<i>Lepidochelys kempii</i>	Range-wide	Endangered
Sea turtle, leatherback	<i>Dermochelys coriacea</i>	Range-wide	Endangered
Sea turtle, loggerhead	<i>Caretta caretta</i>	Range-wide	Threatened
Sea turtle, olive (Pacific) ridley	<i>Lepidochelys olivacea</i>	Range-wide	Threatened, certain populations endangered

Plant

Common Name	Scientific Name	Population/Range	ESA Status
Seagrass, Johnson's	<i>Halophila johnsonii</i>	Southeast Florida	Proposed Threatened

Candidate

Fish

Common Name	Scientific Name	Population/Range	ESA Status
Grouper, Warsaw	<i>Epinephelus nigritus</i>	MA south to Gulf of Mexico	Candidate
Grouper, Nassau	<i>Epinephelus striatus</i>	NC south to Gulf of Mexico	Candidate
Hind, speckled	<i>Epinephelus drummondhayi</i>	NC south to Gulf of Mexico	Candidate
Jewfish	<i>Epinephelus itajara</i>	NC south to Gulf of Mexico	Candidate
Pipefish, opossum	<i>Micropphis brachyurus lineatus</i>	Florida, Indian River Lagoon	Candidate
Rivulus, mangrove	<i>Rivulus marmoratus</i>	Southeast Florida	Candidate
Salmon, Atlantic	<i>Salmo salar</i>	Gulf of Maine DPS	Candidate
Salmon, chinook	<i>Oncorhynchus tshawytscha</i>	West Coast	Candidate
Salmon, chum	<i>Oncorhynchus keta</i>	West Coast	Candidate
Salmon, coho	<i>Oncorhynchus kisutch</i>	Puget Sound/Straits of Georgia ESU	Candidate
	<i>Oncorhynchus kisutch</i>	Oregon Coast ESU	Candidate
	<i>Oncorhynchus kisutch</i>	Lower Columbia River ESU	Candidate
	<i>Oncorhynchus kisutch</i>	SW Washington ESU	Candidate
Salmon, sockeye	<i>Oncorhynchus nerka</i>	West Coast	Candidate
Shad, Alabama	<i>Alosa alabamae</i>	AL, FL	Candidate
Shark, Dusky	<i>Carcharhinus obscurus</i>	Atlantic, Gulf of Mexico, Pacific	Candidate
Shark, Night	<i>Carcharhinus signatus</i>	Atlantic, Gulf of Mexico	Candidate
Shark, Sand Tiger	<i>Odontaspis taurus</i>	Atlantic, Gulf of Mexico	Candidate
Silverside, Key	<i>Menidia conchorum</i>	Florida Keys	Candidate
Sturgeon, Atlantic	<i>Acipenser oxyrinchus oxyrinchus</i>	Atlantic	Candidate
Topminnow, salt marsh	<i>Fundulus jenkinsi</i>	TX, LA, MS, AL, FL	Candidate
Trout, searun cutthroat	<i>Oncorhynchus clarki clarki</i>	West Coast	Candidate
Trout, steelhead	<i>Oncorhynchus mykiss</i>	Middle Columbia River ESU	Candidate

Mammal

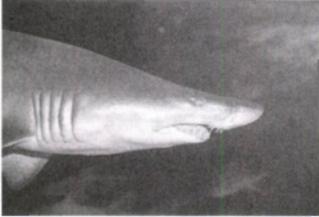
Common Name	Scientific Name	Population/Range	ESA Status
Whale, beluga	<i>Delphinapterus leucas</i>	Cook Inlet, Alaska	Candidate

Mollusk

Common Name	Scientific Name	Population/Range	ESA Status
Abalone, white	<i>Haliotis sorenseni</i>	California; Baja, CA	Candidate

NMFS Steers Marine Issues at COP10

by Nancy Daves



Sand tiger shark

Photo by Joe Smith

Volume XXII, No. 5, of the Endangered Species Bulletin contained an overview of the latest Conference of Parties (COP) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), a treaty to conserve species vulnerable to over-exploitation from international trade. The following article focuses on the actions taken at COP10 for marine species.

Although the Endangered Species Act designates the Department of Interior as the U.S. Management Authority and Scientific Authority for CITES, Interior depends on the expertise of the National Marine Fisheries Service (NMFS) in the Department of Commerce for species under NMFS' jurisdiction. All the great whales, dolphins, six seal species, the queen conch, and all hard coral species, for which NMFS has jurisdiction, are listed on either Appendix I or II of CITES. In addition, all the marine turtles and sturgeon species, protection of

which is shared by FWS and NMFS, are listed in the CITES Appendices.

Issues concerning marine species have produced some of the most contentious debates at CITES conferences. Important marine subjects addressed this year at COP10 include the following issues:

Whales

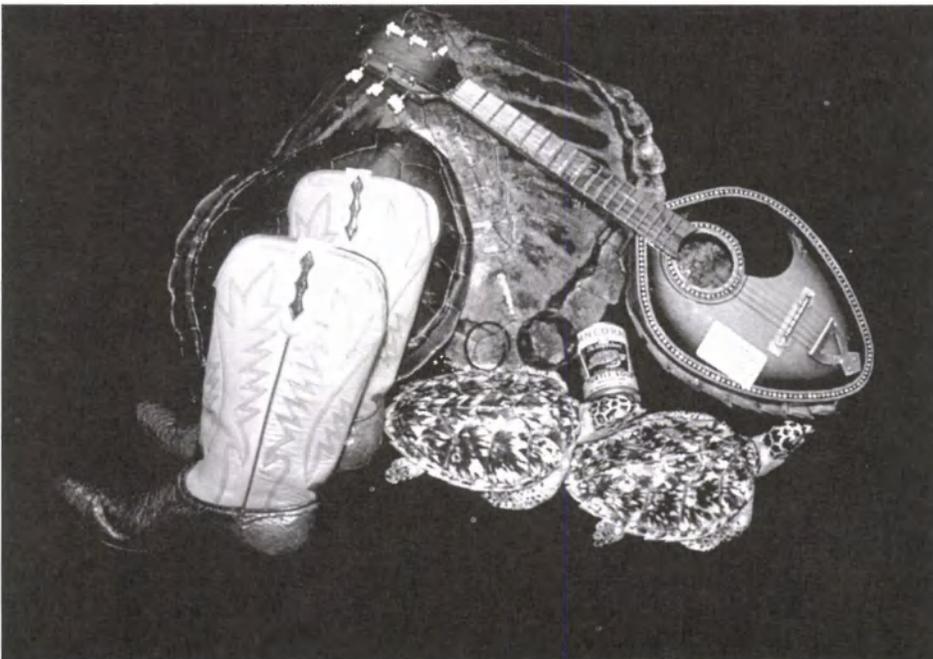
Japan and Norway submitted five separate proposals for downlisting specific whale stocks, including species found in U.S. waters, from CITES Appendix I to II. These species or populations were originally added to Appendix I of CITES in direct response to a resolution passed in 1978 by the International Whaling Commission (IWC), which requested the assistance of CITES to enforce the IWC's moratorium on commercial whaling. As long as the moratorium is in effect, the U.S. believes these species should remain in Appendix I of CITES. Fortunately, none of the whale downlisting proposals gained passage at COP10.

Sea Turtles

Cuba submitted a proposal to downlist what it calls the "Cuban" population of hawksbill turtles (*Eretmochelys imbricata*) from Appendix I to Appendix II, annotated to allow a limited trade in turtle shell stocks with Japan. As a range State for hawksbill turtles, the U.S. strongly opposed this proposal. Over-exploitation to supply the international trade is the single largest cause for the decline of this species in the Caribbean. The proposal was voted on twice during the meeting, each time failing to garner the 2/3 vote necessary for adoption.

Samples of illegally imported products made from the distinctive shells and leather of hawksbill sea turtles.

FWS photo



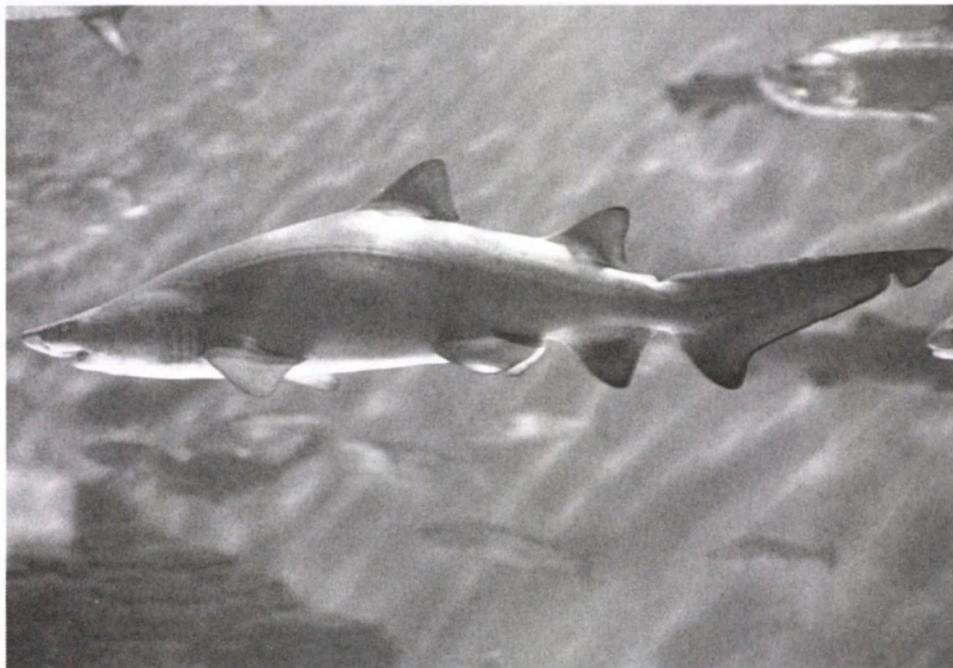
Sharks

Although no species of sharks are listed currently on CITES appendices, the Parties recognized that international trade is contributing significantly to the over-exploitation of some shark species. Sharks are long-lived, slow-growing animals with a very limited reproductive potential. History shows a pattern where expanding levels of directed fishing effort has been followed by collapse of the shark population. Increases in international demand for shark products led to a resolution 2 years ago at COP9 calling for a discussion paper on the trade and biological status of sharks.

NMFS helped the CITES Animals Committee coordinate development of the discussion paper. Included in the paper were 18 specific recommendations to 1) CITES Parties that have shark fisheries or other fisheries that take sharks as bycatch, and 2) the Food and Agricultural Organization (FAO) of the United Nations. The paper was adopted by consensus at COP10. The second part of the resolution requests that FAO and other international fisheries management organizations establish programs to further collect and assemble biological and trade data on shark species, and to report on their progress at COP11. NMFS is participating in this process and in an FAO Consultation on Conservation and Management of Sharks.

Marine Fishes

At COPI0, the U.S. also proposed establishment of a CITES Marine Fish Working Group. The main task of the group would be to investigate concerns about the CITES permitting process associated with marine fish species subject to large-scale commercial harvesting and international trade which are, or might be, included in CITES Appendix II. This proactive proposal was based on the work that NMFS has done on implementing the COP9 shark resolution and on a recognition that implementation problems would occur if marine species subject to large-scale fishing activity were listed in CITES.



Sand tiger shark on display at the Aquarium of the Americas, located in New Orleans, Louisiana

Photo by Joe Smith

Unfortunately, the resolution lost by a vote of 49 yes, 50 no. Still, the U.S. believes certain commercially harvested, internationally traded marine fish do qualify for inclusion in CITES Appendix II, and that CITES is an appropriate vehicle to regulate their trade.

Marine issues will play an increasing role at future CITES meetings, and NMFS stands ready to help the United States to take informed leadership positions in this area.

Nancy Daves is a Marine Resource Specialist with NMFS.

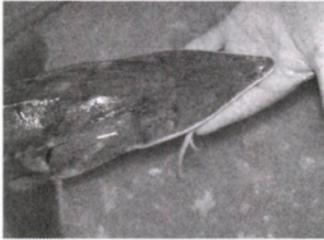
Hawksbill sea turtle

FWS photo



by Rosemarie Gnam

Protecting the Source of Caviar



Pallid sturgeon
Photo by Jim Rathert

One of the more economically significant listing proposals adopted at COP10 was the listing of the entire order Acipensiformes (which includes sturgeon and paddlefish species) on the CITES appendices. The proposal, co-sponsored by Germany and the United States, major consumers of caviar and other products from these fishes, was endorsed by the major exporting countries of Russia and Iran.

Sturgeon of the Caspian Sea region produce what is claimed to be the highest quality caviar and are the source of more than 90 percent of the world caviar trade. Russia, Kazakhstan, Azerbaijan, Turkmenistan, and Iran now supply most of this caviar. Since the mid-1970's, very marked declines in the populations of all six of the Caspian Sea's sturgeon species have been noted, especially beluga (*Huso huso*), Russian (*Acipenser gueldenstaedtii*), and stellate (*A. stellatus*) sturgeons. Five of the six

species of Caspian Sea sturgeons are considered endangered by the IUCN (the World Conservation Union). The problem has become exacerbated in recent years due to deteriorating fishery management and enforcement capabilities in the region, resulting in significant levels of poaching and illegal trade. The current take is believed to far exceed sustainable levels.

In an effort to curtail the trade in illegally obtained caviar, and to ensure the sustainable use and management of these fishes, particularly those of the Caspian Sea, sturgeon were proposed for listing on the CITES appendices. Prior to submission of the proposal, Russia and Germany hosted a multilateral consultation on the problem of sturgeon species within the framework of CITES. All countries on the Caspian Sea with sturgeon, along with the U.S., were invited. Range states discussed the scientific merit for a listing proposal and the possible solutions a CITES listing could provide. They agreed that CITES could provide a regulatory mechanism for the import/export of sturgeon products, thereby curtailing the illegal caviar trade and threats to the wild populations. In January 1997, the U.S., as a sturgeon range state and major

Sturgeon products for sale in Europe
Photo courtesy of World Wide Fund for Nature-Belgium

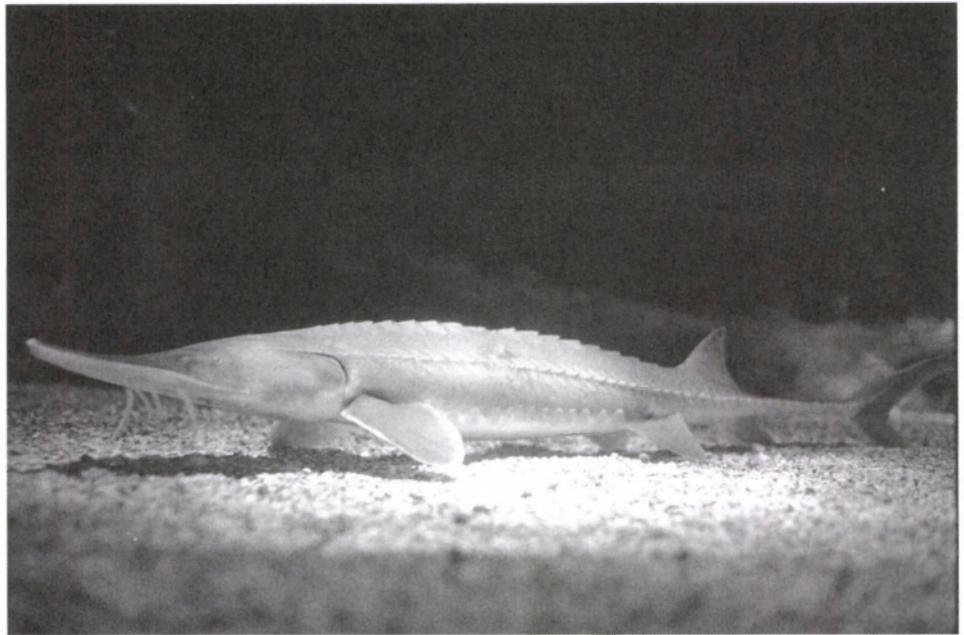


importer of Caspian Sea caviar, agreed to co-sponsor the CITES listing proposal.

At COPI0, this proposal to include all species of sturgeons not already listed in CITES was adopted unanimously. The shortnose sturgeon (*A. brevirostrum*), a U.S. species, and Baltic sturgeon (*A. sturio*) were already on CITES Appendix I, and the Atlantic sturgeon (*A. oxyrinchus*) and the American paddlefish (*Polydon spathula*) were already on Appendix II. In total, five additional sturgeon species were listed on Appendix II because of their population status and trade levels: beluga, Russian, stellate, Siberian (*A. baerii*), and ship or spiny (*A. nudiiventris*) sturgeons. Further, all other species of sturgeons not already listed in CITES before COP10 also were included in Appendix II as an aid to enforcement because their caviar is similar in appearance to that of the Caspian Sea species. The end result is that the entire order Acipenseriformes is now covered under the provisions of CITES. This will facilitate wildlife inspections at ports of entry and the detection of illegal shipments. The listing becomes effective April 1, 1998.

In addition to listing actions, the Parties adopted a resolution on the management and conservation of sturgeon species. This resolution recommends several measures, including development of a Conservation Management Action Plan for sturgeon. The resolution also provides for a "personal effects" exemption for small amounts (up to 250 grams) of caviar carried on one's person for personal consumption.

Sturgeon and their products, most notably caviar, will now require CITES permits for entry into, and export from, the U.S. These CITES permits must accompany the shipments and be presented at Customs points. Sturgeon species listed on CITES Appendix I require both a CITES export and import permit, and may not be traded commercially across international borders. Because Appendix II lists species of actual or potential conservation concern, international trade must be strictly



Atlantic sturgeon

Photo by Joe Smith

regulated to keep trade at levels that do not threaten the survival of populations in the wild. Therefore, sturgeon species listed in Appendix II require a CITES export permit or re-export certificate.

The Fish and Wildlife Service (EWS) is working on the implementation and enforcement plans for this sturgeon listing. Plans include the development of forensic techniques, such as DNA testing, to identify sturgeon products as to species and country of origin. In addition, the U.S. plans to work cooperatively with Germany and Russia on enforcement, providing technical assistance when requested. Lastly, the FWS has initiated consultations with importers and exporters of sturgeon products to inform them of this CITES listing and its requirements. Effective implementation of these CITES provisions should allow a sustainable, commercially viable trade in caviar from Appendix II species without endangering their survival.

Dr. Gnam is a Biologist in the Branch of Operations, FWS Office of Management Authority, Washington, D.C.

Acipenseriformes is a primitive group of approximately 27 species whose biological attributes make them particularly vulnerable to decline due to intensive fishing pressure. Although females produce large quantities of eggs, juvenile mortality is high. Sturgeons also are generally long-lived and slow to mature (reaching sexual maturity at 6 to 25 years), and they require large rivers for spawning. Sturgeons are fished for both meat and caviar, but caviar is the most valuable product and is in highest demand in international trade. Many species of sturgeons have fallen severely in numbers because of both habitat destruction and excessive take. Some are at serious risk of extinction.

Paddlefish and the World Caviar Trade

by Jerry L. Rasmussen
and L. Kim Graham



Paddlefish taken in the Missouri River sport fishery below Gavins Point Dam near Yankton, South Dakota, in 1995.
FWS photo

A typical catch of paddlefish taken near Buford, North Dakota, in the early 1900's.
FWS photo



Historically, paddlefish (*Polyodon spathula*) occurred in all of the major tributaries of the Mississippi River Basin and supported both sport and commercial fisheries. In recent decades, however, paddlefish stocks have been declining, and in the early 1990's the U.S. Fish and Wildlife Service (FWS) was petitioned to list the paddlefish under the Endangered Species Act (ESA).

After an extensive review, the FWS determined that the species did not merit listing at that time, but did merit attention to restore depleted stocks and degraded habitats in order to prevent the need for future listing protection. In 1992, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) adopted a U.S. proposal to regulate trade in this species by listing it on CITES Appendix II.

That same year, concerns for paddlefish and native sturgeon species

prompted the FWS to develop a *Framework for the Management and Conservation of Paddlefish and Sturgeon Species in the United States* (National Paddlefish and Sturgeon Steering Committee 1992). The framework built on population studies done previously by State wildlife agencies. In the late 1980's and early 1990's, some States in the Mississippi River basin began conducting their own internal paddlefish status reviews. As a result, certain States put the species on their own protected fauna lists and supported recovery programs. Meanwhile, many other States continued to maintain paddlefish sport and/or commercial fisheries. This inconsistency in State regulations made it obvious that something had to be done cooperatively to improve paddlefish management. It would do little good for some States to try to restore paddlefish stocks through expensive stocking programs while neighboring States maintained sport or even commercial fisheries.

Paddlefish management thus became an interstate issue. The States responded by organizing the Mississippi Interstate Cooperative Resource Association (MICRA) in 1991 and requesting the FWS, in its role of assisting States in

native fish restoration, to fund the position of MICRA Coordinator/Executive Secretary. The 28 member States of MICRA then prepared their Interjurisdictional Fisheries Initiative for the Mississippi River Drainage Basin—Comprehensive Strategic Plan (Rasmussen 1991), and sought funding for their cooperative Basinwide Paddlefish Stock Assessment Project (Oven 1995). That stock assessment has been funded by the FWS, the States, and others since 1994, with more than 22 State and Federal entities cooperatively microtagging both wild and hatchery-reared fish. To date, more than 1 million paddlefish (mostly hatchery-reared) have been tagged and released into basin waters, and data from the stock assessment project are now beginning to document paddlefish movement, growth, and population health (Heinricher-Oven and Fiss, 1996; and Bettoli and Brennan, 1997).

Early in 1997, MICRA members were alarmed to learn of a CITES permit application to export 3 metric tons of paddlefish roe from Kentucky to Japan. At approximately \$70 per pound, this harvest would be valued at nearly \$0.5 million. Biologists estimate that such a harvest would require the sacrifice of nearly 1,000 females, each providing about 7 pounds of eggs. However, since paddlefish sex cannot be easily determined externally, it is not uncommon for commercial fishers to sacrifice 4 to 5 males in their search for one female fish. This scenario could easily account for 5,000 to 6,000 paddlefish being harvested and killed under a single permit for the export of 3 metric tons of eggs. Egg shipments of this magnitude could thus pose a significant threat to the already fragile, but extremely important, paddlefish populations. Additionally, most States where commercial fishing is legal informed MICRA that demand for paddlefish eggs for caviar has been increasing. Tennessee biologists also reported to MICRA that the average size of female paddlefish harvested has decreased in the last few years, perhaps



indicating that mature female paddlefish are being over-fished. These concerns led MICRA to recommend that the FWS set a moratorium on the export of paddlefish eggs as caviar until a sustainable level of harvest that is not detrimental to paddlefish populations can be determined. Based on MICRA's recommendation and other information, the permit to export 3 metric tons of paddlefish roe to Japan was not issued.

During the summer of 1997, concerns for the conservation of both paddlefish and native sturgeon species escalated when the CITES took action to protect sturgeon species worldwide by putting all sturgeon species on CITES Appendix II. This action was in response to overfishing of sturgeon species due to the legal and illegal trade. It is expected to make importation of Asian and European sturgeon caviar into the United States more regulated than before. As a result, both legal and illegal fishing pressure on American sturgeon and paddlefish species may increase significantly. Eggs from these species are already widely used as surrogates for, and mixed with, the more popular and expensive European and Asian caviars.

While most States lack solid information about their individual sturgeon and paddlefish populations, many biologists believe there is ample evidence to

The paddlefish strains water through its gills, trapping the plankton on which it feeds.

Photo by Joe Smith

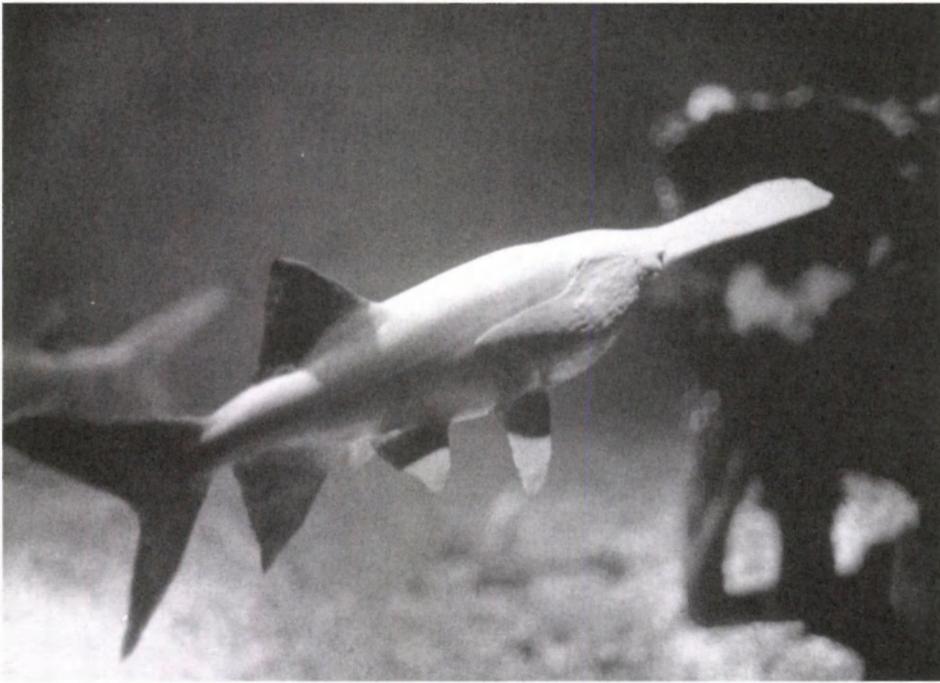


Photo by Joe Smith

indicate that (1) endangered sturgeon species are being harvested for their eggs; (2) illegal harvest of paddlefish for eggs is a problem in several States; and (3) further illegal harvest of all sturgeon species and paddlefish continues to be a problem. For these reasons, MICRA members are considering various paddlefish management alternatives, and MICRA's Executive Board will come forward with basinwide recommendations at the eighth annual MICRA meeting, to be held in Davenport, Iowa, in June 1998.

Paddlefish present a complicated interjurisdictional fishery management issue. These fish move freely up and down major rivers of the Mississippi River Basin, as well as to and from the Gulf of Mexico, and cross many management jurisdictions during their life cycle. The concerns of all interested parties, as well as the well-being of the species itself, must be accounted for in developing a basinwide management strategy. Issues such as the international caviar trade clearly make an already complicated management situation even more complex, and can only be addressed through the full cooperation of all stakeholders. It is imperative, therefore, that MICRA's on-going scientific determination of the health and size of

existing paddlefish populations in the Mississippi River Basin be completed in a timely fashion.

Jerry Rasmussen, a Fish and Wildlife Biologist with the FWS Large River Fisheries Coordination Office in Rock Island, Illinois, also serves as MICRA's Coordinator/Executive Secretary. Kim Graham, a Fisheries Biologist with the Missouri Department of Conservation in Columbia, Missouri, serves as Chair of MICRA's Paddlefish/Sturgeon Committee

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Maine Takes Lead for Atlantic Salmon

The National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) have withdrawn their proposal to protect Atlantic salmon (*Salmo salar*) in seven Maine rivers under the Endangered Species Act. Instead, the fish will be protected by a cooperative recovery effort spearheaded by the State of Maine.

The centerpiece of the protection effort is the State's newly developed Atlantic Salmon Conservation Plan, which addresses the potential impacts of aquaculture, forestry, recreational fishing, and a wide range of agricultural activities. The plan was developed during the last 2 years by a task force of scientists, academics, State employees, Native American subsistence fishers, conservationists, anglers, and private citizens, all appointed by Maine Governor Angus King. Biologists from both the FWS and NMFS were asked to serve as advisors and provided assistance.

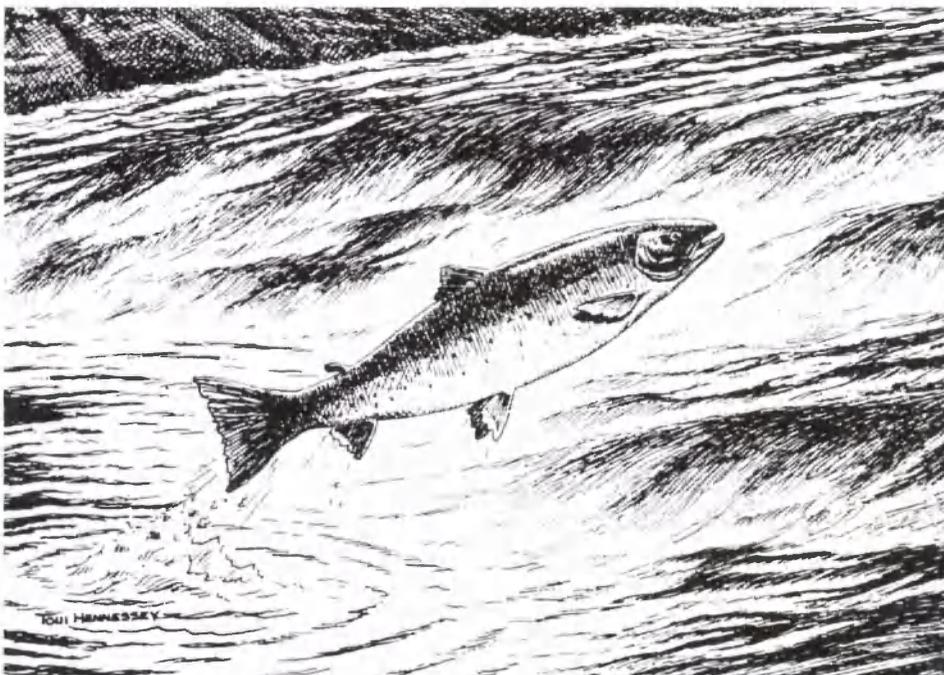
Officials emphasized that the recovery of Atlantic salmon stocks depends on full implementation and monitoring of Maine's conservation plan. It is only the second of its kind approved for a fish species. The plan calls for continuing broodstock development and stocking of Atlantic salmon in rivers, upland habitat improvement, construction of fish weirs on some of the rivers, changes in both aquaculture and agriculture operations to reduce their threats to salmon survival, and continuing monitoring and research programs to evaluate and improve recovery progress.

The State plan was accepted jointly by the two Federal agencies responsible for recovering threatened and endangered marine and freshwater fish. Both agencies are involved because Atlantic salmon spend their early life in freshwater, mature at sea, and then return to spawn in the freshwater stream or river where they were born.

The seven Maine rivers covered by the State plan are the Dennys, Machias, East Machias, Narraguagus, Pleasant, Ducktrap, and Sheepscot. The FWS and NMFS will continue to gather scientific information on salmon populations in other New England rivers, including Maine's Tunk Stream and the Kennebec and Penobscot rivers. Further, both agencies will jointly conduct yearly reviews of the appropriateness of Endangered Species Act protection for the salmon. These annual reviews will take into account progress on the State's plan, monitoring results, the status of other State and Federal protective efforts, and updated biological information.

Details on the withdrawal of the listing proposal are available in the December 18 *Federal Register*.

Illustration by Tom Hennessey



by Sally Valdes-Cogliano

FWS Coastal Habitat Programs



Piping plover

Photo by John H. Gavin

Coastal environments include some of the world's most productive wildlife habitats. Less than 10 percent of our Nation's land area consists of coastal ecosystems, but they support a much higher percentage of our wetlands, migratory songbirds, fishery resources, threatened and endangered species, and wintering waterfowl. In addition, coastal environments are an important recreational resource for millions of people. Conserving coastal ecosystems for future generations is one of the Fish and Wildlife Service's (FWS) highest priorities.

Three programs form the core of the FWS coastal conservation effort:

The **Coastal Program** identifies important resource problems and solutions, establishes partnerships to implement on-the-ground conservation projects, and encourages public involvement in the conservation of 11 of the Nation's high-priority coastal areas.

One measure of its success is the quantity of habitat protected and restored. Over the past 3 years, the Coastal Program's partnerships have reopened 267 miles of coastal streams for anadromous fish passage; restored 22,828 acres of coastal wetlands; restored 3,734 acres of coastal upland habitat; protected over 7 miles of shoreline habitat; restored 24 miles of riparian habitat; and protected 56,209 acres of habitat through the use of conservation easements.

The **National Coastal Wetlands Conservation Grant Program** provides coastal States with support for the acquisition, restoration, or enhancement of coastal wetlands and tidelands. About \$9 million in grants are awarded

annually through a nationwide competitive process. To date, \$53 million have been awarded to 24 coastal States and 1 U.S. Territory, and over 63,000 acres of coastal wetlands have, or will be, acquired, protected, or restored.

This coastal grant program is authorized by the Coastal Wetlands Planning, Protection, and Restoration Act of 1990. Coastal States are defined as those States bordering the Great Lakes, Atlantic, Gulf of Mexico, and Pacific, and include the Commonwealths and Territories of the South Pacific and the Caribbean.

The **Coastal Barriers Resource System** was established by law in 1982 and 1990. This legislation limits Federal subsidies for development within designated coastal barriers. Coastal barriers are landscape features that protect the mainland from severe storms, including hurricanes. Coastal barriers also provide important habitat to a variety of wildlife and serve as an important recreational resource. In the past, Federal subsidies encouraged the development of many fragile, high-risk coastal barriers.

The FWS is responsible for maintaining the official records and reviews of the Coastal Barrier Resource System and determining the location of private properties in relation to the System boundaries. The legislation does not prevent or regulate development in these high-risk areas; it only directs that Federal dollars not be spent to subsidize development. If individuals choose to live and invest in these hazard-prone areas, they bear the full cost of that risk instead of passing it on to the American

taxpayers. The result is a savings in Federal dollars, the protection of human lives, and the conservation of our nation's natural resources.

For more information about these programs, visit the Coastal Habitat Conservation web site at <http://www.fws.gov/~cep/coastweb.html>.

Sally Valdes-Cogliano is a Wildlife Biologist with the FWS Division of Habitat Conservation in Washington, D.C.

FWS photo



Habitat Conservation Plan for Sea Turtles

by Dawn Zattau



FWS photo

Since the turn of the century, the wide, hard-packed beaches of Volusia County, Florida, have been an attraction to tourists. The condition of the beaches was so ideal for vehicular driving that they were once used for automobile racing. The tradition of racing in Daytona Beach gave rise to the construction of the Daytona International Speedway, which continues to attract visitors to Volusia County every year.

The beaches of Volusia County, Florida, are about 52 miles (84 kilometers) long. Between 1988 and 1994, the number of sea turtle nests on Volusia County's beaches ranged from 1,359 to 2,247 for all species combined. The loggerhead (*Caretta caretta*) is the sea turtle that most commonly nests there, followed by the green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*), which was first documented as nesting there in 1996. Most nesting activity takes place at Canaveral National Seashore, on the southern end of the county, and in North Peninsula State Recreation Area, located on the north end of the county. These areas historically have been closed to public vehicular access, largely because of the soft sand there.

Each year, beginning about May 1, adult female sea turtles emerge from the ocean to deposit their eggs, about 100 in each clutch. Each female may lay several clutches per season. After about 60 days, the hatchling sea turtles emerge from the nest (usually at night) and begin their oceanic journey.

In Volusia County, human use of the beach often conflicts with sea turtles. Beachfront construction and accompanying lights have created a situation that interferes with successful sea turtle reproduction. Nesting females tend to avoid laying nests in areas where development is most dense. Even if nesting does occur, hatchling sea turtles, following their instinct to go toward the brightest horizon, either crawl directly toward artificial lights and away from the ocean or wander aimlessly until predators claim them, they dry out, or they die of exhaustion.

Under the Endangered Species Act, the "taking" of listed wildlife as a result of human activity is prohibited unless authorized by permit. Because of the potential for harm to sea turtles from beach driving, the Jacksonville, Florida, office of the U.S. Fish and Wildlife Service (FWS) contacted officials of Volusia County in June 1992, encouraging them to develop a Habitat Conservation Plan (HCP) and apply for an incidental take permit for sea turtles. Little happened until 1994, when the FWS again contacted county officials to alert them to the potential problem. As a result, the county put interim measures into place until it could prepare an HCP and incidental take permit application.

In June 1995, two local citizens who wanted stronger protection for nesting beaches filed suit against Volusia County in Federal court, alleging that the Endangered Species Act was being violated by continued beach driving and artificial lighting. The court agreed that driving activities were likely to result in unauthorized take, and in August 1995, it issued an injunction that prohibited public beach driving at night and established a 30-foot (9.1-meter) wide Conservation Zone, measured from the toe of the dune or seawall. At the same time, the court also ruled that the sea turtle lighting ordinance already in place within the county did not violate the Endangered Species Act. The judge stated that once the county had obtained approval through the HCP process, the measures established by the injunction could be lifted.

In July 1995, county officials filed a draft HCP with the FWS in an attempt to avoid the injunction; however, the document did not contain enough

information to proceed with processing of the application. The county worked with the FWS and the public to write an HCP that would provide positive conservation measures for sea turtles while allowing continued vehicular access to beaches under its jurisdiction. After the HCP and incidental take permit application were finished, the FWS published a notice in the *Federal Register* to invite public comment. Following revisions in response to the public comments, a permit was issued in November 1996, allowing incidental take of sea turtles resulting from vehicular access to the beaches. At the end of 5 years, the existing permit will expire, and the county will decide whether or not it wants to continue with the plan as is or start over with a new approach.

Prior to the implementation of the HCP, public driving was allowed on 25.7 miles (41.4 km) of the county's beaches. The implementation of the HCP established zones known as Natural Beach Areas, where public driving activity was removed. These Natural Beach Areas were placed where sea turtle nesting density was highest and corresponded to the least developed areas of the County's beaches. Collectively, the 18.9 miles (29 km) of Natural Beach Areas will protect 44 percent of Volusia County's nests from the impacts of public driving.

Transitional Areas were established along another 11.7 miles (18.8 km) of the beach in areas of medium nesting density. Public vehicular driving and parking are allowed there, except within a 30-foot-wide Conservation Zone.

Urban Areas were established on 5 miles (8.1 km) of the beach where nesting densities were lowest and development was most dense. Public vehicular driving and parking are allowed within these areas, except within a 15-foot (4.5-m) wide Conservation Zone. An estimated 96 to 98 percent of all known nests will fall within Natural Beach Areas or Conservation Zones, and nests located in areas where driving and parking are allowed will be marked for avoidance. In the event data



collection shows the conservation zones are not wide enough to provide adequate protection for sea turtles, they will be expanded. Further, as a result of the HCP, no public vehicular access is allowed at night on any portion of the County's beaches. Finally, the plan required a program to remove tire ruts in the vicinity of known nests where hatchlings are due to emerge.

Because of the public comments received, the county agreed to bring all county-owned or operated lights into compliance with guidelines established by the State of Florida. In addition, the county agreed to develop a beach lighting management plan that will address how best to handle the lighting problems affecting the remainder of the county. Enforcement of an existing lighting ordinance has been increased in an effort to bring privately-owned lights into compliance.

Although some people wanted all cars off the beach and others wanted no interference in beach uses, the final approved HCP allows continued public access to the beach while providing positive conservation measures for sea turtles. Volusia County's plan will serve as a standard for other Florida counties.

Dawn Zattau is a Fish and Wildlife Biologist in the FWS Jacksonville, Florida, Field Office.

For a sea turtle hatchling, a tire rut can become an impassable barrier.

Photo courtesy of Ecological Associates, Inc.

The county has allowed the public to drive on the beaches for as long as anyone can remember, and the driving activity has created several problems for sea turtles. Headlights and movement of vehicles on the beach at night can deter female sea turtles from coming ashore to nest. Collisions at night are another possibility. Also, vehicles on the beach often leave tire tracks in the sand deep enough to prevent hatchlings from taking a direct route to the ocean, thus making them more vulnerable to depredation, desiccation, and exhaustion. Vehicles running over nests may also harm egg development.

by Duane DeFreese and
Sandy MacPherson

Archie Carr National Wildlife Refuge



**Loggerhead sea turtle
hatchling**

Photo by David Goethe

The Archie Carr National Wildlife Refuge represents the nation's most significant land acquisition effort to protect endangered and threatened sea turtles. The idea to establish a sea turtle refuge began in the late 1980's as a direct result of the work of the late Professor Archie Carr, a world renowned expert on sea turtles who dedicated his life to their conservation. It was designated by Congress in 1989 in recognition of the need for long stretches of undisturbed sandy beaches, with little or no artificial lighting, for successful sea turtle nesting.

In North America, sea turtles nest along the coast from Virginia to Texas. High nesting concentrations are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida. The Archie Carr National Wildlife Refuge is located within a 20-mile (32-kilometer) stretch of beach on the barrier islands of Brevard and Indian River Counties on the Atlantic coast of Florida. These beaches support large nesting densities of loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles. The proposed acquisition plan for the refuge set a goal for purchase of 9.3 miles (15 km) within 4 sections of this 20-mile stretch. Three of the sections are located in Brevard County and one is in Indian River County.

Scientists have been studying sea turtle nesting activities along the beaches of the refuge for over a decade. These studies confirm that the refuge is one of the most significant nesting areas for loggerhead turtles in the world, the most significant nesting area for green turtles in North America, and an occasional nesting area for leatherback sea turtles (*Dermochelys coriacea*). From March through September, thousands of sea turtles crawl ashore to nest on the beaches of Brevard and Indian River Counties. The numerous flipper tracks left behind by the nesting females resembles the path of a night-time amphibious assault. After the arduous process of lumbering onto land, digging their nests, laying their eggs, and covering their nests with sand, the

females return to the sea and leave the eggs to develop on their own. At the end of a 2-month incubation period, hatchlings emerge from their nests and begin their dangerous trek to the sea. In the nearshore waters, they begin a long and treacherous journey through waters filled with predators and other hazards. Hundreds of thousands of hatchlings will emerge from these nests, but few will survive to adulthood. Many years will pass before the surviving female hatchlings return to their natal beaches as adults to begin the next generation.

In addition to sea turtles, the beaches, dunes, coastal scrub, and maritime hammock areas of the barrier island ecosystem within and adjacent to the Archie Carr National Wildlife Refuge provide habitat for many other animals and plants considered rare, threatened, endangered, or species of special concern by Federal and State agencies. Federally-listed species include the Florida scrub-jay (*Apelocoma coerulescens*), eastern indigo snake (*Drymarchon corais couperi*), southeastern beach mouse (*Peromyscus polionotus niveiventris*), and coastal vervain (*Verbena maritima*). The barrier island beaches also support a great diversity of resident and migratory bird species, including shorebirds, wading birds, and songbirds.

Establishment of the Archie Carr National Wildlife Refuge was the beginning of a visionary conservation program made possible by a multi-agency land acquisition and conservation partnership. State and local govern-

ments participated by adding on to the protected areas of the refuge to include the last remaining high-quality natural areas of the barrier island ecosystem. Significant purchases of coastal strand, scrub, and maritime hammocks to the west of the refuge not only protect some of the most fragile and endangered natural upland communities in the nation, but protect the sea turtle nesting beaches from artificial lighting encroachment and other human impacts as well. As a result, these local and State efforts complement the four sections of beachfront property identified for Federal acquisition and protection.

Partners in the land acquisition effort include the U.S. Fish and Wildlife Service, the Florida Department of Environmental Protection, Brevard County, Indian River County, the Richard King Mellon Foundation, The Conservation Fund, and The Nature Conservancy.

Truly exceptional contributions have come from the State of Florida and local county partnerships, which account for over 70 percent of land acquisition expenditures, and the Richard King Mellon Foundation, which accounts for over 21 percent of acquisition costs for lands on the barrier island. Federal acquisition efforts account for about 8 percent of purchases to date. In addition, the grassroots support from other non-profit conservation organizations and the local community is outstanding, and is an essential factor in the success of protection efforts for the refuge and the barrier island ecosystem. Coordination efforts have been enhanced by the formation of the Archie Carr Working Group, which is composed of representatives from numerous agencies and organizations and the local community. The members of this Working Group have a diversity of interests and objectives, but share a common vision of protecting this globally important area.

About 61 percent of the available beachfront acquisitions for the refuge have been completed. Of the original

9.3 miles of beachfront identified for acquisition, approximately 4.7 miles (7.5 km) have been acquired and 3.0 miles (4.8 km) are awaiting purchase. The remaining 1.6 miles (2.5 km) have been purchased for private development and are no longer available for the refuge. Escalating coastal development in Brevard and Indian River Counties threatens the parcels awaiting acquisition, and could result in increased lighting and beach armoring, which interfere with successful nesting. A narrow window of opportunity is left to acquire the remaining available lands needed for the refuge. Successful completion and responsible management of the Archie Carr National Wildlife Refuge are essential to ensure the long-term protection of its pristine nesting beaches for future generations of people and wildlife.

Dr. DeFreese is the Program Coordinator for the Brevard County Environmentally Endangered Lands Program in Viera, Florida. Sandy MacPherson is the FWS Southeast Region's Sea Turtle Recovery Coordinator in the Jacksonville, Florida, Field Office.



The Florida scrub jay is one of a number of threatened and endangered species that benefit from the Archie Carr Refuge.

Photo by Barron Crawford

A section of sea turtle nesting beach now protected as part of the Archie Carr Refuge.

Photo by Sandy McPherson





Regional endangered species contacts have reported the following news briefs:

Region 1

Multiple Species Conservation Program Plan This regional plan, recently approved by the U.S. Fish and Wildlife Service (FWS) and the California Department of Fish and Game (CDFG), is designed to balance urban growth and the conservation of multiple species and their habitats within a 582,000-acre (235,000-hectare) planning area in southwestern San Diego County. Implementation of the plan will result in a system of habitat preserves needed to ensure the long-term survival (and allow for the recovery of) numerous threatened, endangered, and rare species in this rapidly developing and biologically rich corner of southern California.



Least Bell's vireo

Photo by B. "Moose" Peterson/WRP©

The FWS is contributing to implementation of the Multiple Species Conservation Program, in part, by completing acquisition of lands within the authorization boundaries of the San Diego National Wildlife Refuge.

CDFG intends to use land acquisition funds to help implement the plan. One of the first pieces of land targeted for acquisition by the State is Rancho Jamul, with over 2,000 acres (810 ha) of coastal sage scrub that supports a number of sensitive species, including two listed birds—the threatened coastal California gnatcatcher (*Poliophtila californica californica*) and the endangered least Bell's vireo (*Vireo bellii pusillus*). The FWS so far has obligated \$2.75 million and the Wildlife Conservation Board, an agency within CDFG, has obligated \$1.5 million toward the purchase of Rancho Jamul.

Reported by LaRee Brosseau of the FWS Portland Regional Office.

Region 2

Sea Turtle Strandings After 3 years of a steady decline in strandings, the number of dead sea turtles found on the beach at Matagorda Island National Wildlife Refuge on the Texas coast took an ominous upward turn in 1997. As of September 1, a total of 47 carcasses had been found. This upsurge in strandings may suggest that: a) conservation efforts are paying off with more sea turtles in the nearshore waters, although still in a hazardous environment; b) regulatory efforts are inadequate and, consequently, the reservoir of sea turtles is still dwindling; c) sea turtles are having more encounters with a greater number of shrimp trawlers; or d) some combination of these factors.

Over recent years, regular surveys of the 38-mile (61-kilometer) beach on Matagorda Island have established a consistent stranding pattern. Strandings increase in April and May as water temperatures warm, then sharply drop to zero from mid-May to mid-July, coinciding with the seasonal closure of the Texas Gulf waters to shrimping. A spike in strandings occurs during the 2 weeks following the reopening of the Gulf to shrimping, when 300 to 500 shrimp boats congregate nearshore. Strandings gradually lessen as the fleet disperses along the coast. Occasional strandings continue until the water temperatures begin to drop in November and December. In 1997, the strandings followed this time line but the numbers increased.

The last issue of the *Endangered Species Bulletin* reported good news about the Kemp's ridley sea turtle (*Lepidochelys kempii*); the number of females using their native Mexican beaches is increasing and several "headstarted" females have returned to nest on their foster beach at Padre Island, Texas. Unfortunately, adult

Kemp's ridleys still compose about one-third of the strandings on Matagorda Island (15 in 1997). If the Matagorda Island beach strandings are a valid indicator of Kemp's ridley sea turtle fatalities in the Gulf, we face a long, hard road in the recovery of this species despite the recent nesting successes.

Mexican Spotted Owl (*Strix occidentalis lucida*)

When the recovery plan for the Mexican spotted owl was released in December 1995, the recovery team recommended formation of interagency and interdisciplinary "Recovery Implementation Working Teams" to oversee the plan's implementation. Six Working Teams, representing each recovery unit outlined in the recovery plan, were formed by the FWS in coordination with the recovery team. The Working Teams, which have been meeting regularly for the past year, consist of representatives of Federal and State agencies, conservation groups, local governments, the timber industry, and other interested stakeholders. Their diverse membership has allowed varying views to be discussed and allowed local interested parties to participate in recovery plan implementation.



Mexican spotted owl

FWS photo

Goodding's Onion (*Allium gooddingii*) The FWS and U.S. Forest Service are nearing completion of a cooperative agreement for the conservation of Goodding's onion on four national forests in Arizona and New Mexico. The conservation strategy outlined in the agreement is designed to prevent the need to list this species under the ESA. Goodding's onion occurs in moist forest habitats at elevations from 7,500 to 12,250 feet (2,290 to 3,735 meters). Effective conservation will require maintaining enough forest canopy to prevent excessive drying of sites and avoiding direct impacts on the plants from new developments (such as the construction of roads and stock tanks). Overall, Goodding's onion can be effectively conserved by maintaining good ecosystem health in its conifer-forest habitat.

Northern Aplomado Falcon (*Falco femoralis septentrionalis*) The FWS, volunteer biologists working with Dr. Alberto Lefon and his graduate students from the Universidad Autonoma de Chihuahua, and local landowners have continued their grassroots research on aplomado falcons breeding on private ranches in north-eastern Chihuahua, Mexico. This ongoing research revolves around monitoring reproductive success, measuring habitat characteristics, and surveying and monitoring grassland bird diversity and abundance.

The researchers are investigating how aplomado falcons have survived on large private ranches in Mexico while being essentially extirpated from primarily public land in the U.S. Determining nesting success in Mexico may help understand if natural recolonization of historic habitat in the U.S. is possible.

Research to quantify and monitor trends in grassland bird abundance as an index of prey abundance for breeding aplomado falcons was begun in 1997. That year, researchers located and monitored 24 territories, 17 with nesting pairs and 7 without. The FWS believes that a better understanding of aplomado falcon habitat requirements in Chihuahua will help identify specific recovery needs within the historically occupied Chihuahuan desert grasslands of Texas, New Mexico, and Arizona.

Reported by Larry A. Dunkeson of the FWS Albuquerque Regional Office.

Region 3

Winged Mapleleaf Mussel (*Quadrula fragosa*) A late summer/early fall 1997 survey brought good news for conservation of the winged mapleleaf mussel, a rare mollusk found only in a small area of the St. Croix River in Wisconsin and Minnesota. Biologists observed one- and two-year-old individuals, the first evidence of successful reproduction since the species was listed as endangered in 1991. In addition, one gravid female was observed. This find is of special interest because the gravidity period (the brooding period for glochidia or mussel larvae) previously was unknown, but was suspected to occur in spring or early summer rather than in late summer or early fall. The survey work was conducted by the Wisconsin Department of Natural Resources with FWS funding.

Niangua Darter (*Etheostoma nianguae*) Missouri Department of Conservation (MDC) biologists found four

adults of this small fish while snorkeling in Brush Creek in Polk County, Missouri, last summer. Brush Creek had been identified as good habitat, but the darter had not been found there since 1981. The site is within the species' designated Critical Habitat and part of the Brush Creek Earth Project, in which landowners in this area are participating in a cost-share program to improve stream habitat. Funding for the cost-share program comes from the Missouri Department of Natural Resource's Soil and Water Conservation Program, with additional assistance provided by Quail Unlimited. The FWS and MDC have been working together since 1995 to provide additional cost-share opportunities—e.g., the Partners for Wildlife and Stream Incentives Programs—for habitat improvement in other areas of the darter's range. Resource professionals feel confident that, with positive relationships with landowners and use of cost-share programs to restore stream habitats, this species can be recovered.

Reported by Kim Mitchell of the FWS Twin Cities Regional Office.

Region 4



West Indian manatee
Corel Corp. photo

West Indian (Florida) Manatee (*Trichechus manatus*) The FWS Manatee Rescue-Rehabilitation Program is preparing to send some of its captive manatees to new homes. For the first time in the program's history, the FWS has approved the transfer of manatees to qualified facilities outside Florida. Currently, more than 50 manatees are being cared for at six Florida facilities authorized by the FWS. This number includes some of the 20 to 30 manatees rescued each year. Some are treated and released, others require long-term care, and still others have been classified as non-releasable.

The relocation of these animals will clear space for the critical care of injured, orphaned, and sick manatees and will improve our ability to respond to catastrophic events.

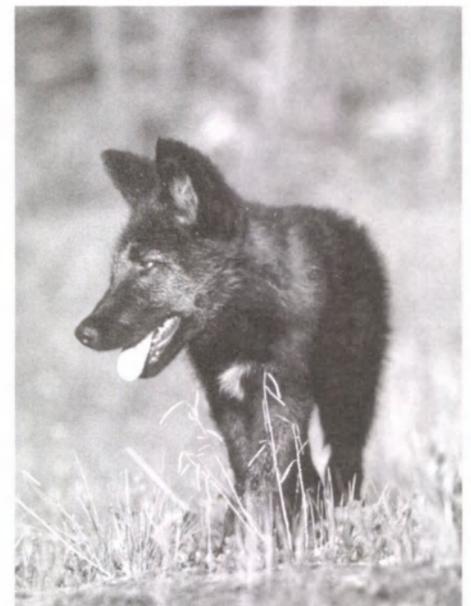
It will also provide an excellent outreach and educational opportunity for the facilities and the manatee recovery program. Five zoos nationwide have shown a keen interest in the program. Sea World of San Diego will be the first to receive manatees, with its exhibit opening early in 1998. The next facilities likely to receive manatees are the Columbus Zoo and the Cincinnati Zoo upon completion of their exhibits.

Reported by Elsie Davis of the FWS Atlanta Regional Office.

Region 6

Gray Wolf (*Canis lupus*) On December 12, 1997, the U.S. District Court for Wyoming held that the FWS final rules establishing a nonessential experimental population of gray wolves in Yellowstone National Park and central Idaho and southwestern Montana are unlawful, and it ordered the removal of all of the reintroduced wolves and their offspring from the Yellowstone and central Idaho areas. However, the judge deferred the effect of his order pending the outcome of an expected appeal. The U.S. Government has appealed the decision. Pending the outcome of the appeal, the FWS will continue to manage the wolves according to the reintroduction plan approved in 1994.

Reported by Sharon Rose of the FWS Denver Regional Office.



Gray wolf cub
Corel Corp. photo

During October and November of 1997, the Fish and Wildlife Service (FWS) published the following listing actions under the Endangered Species Act (ESA):

Proposed Listing Rules

Two Riparian Mammals Two mammal subspecies native to riparian or streamside habitats in California's northern San Joaquin Valley were proposed in the November 21 *Federal Register* for listing as endangered. Extensive habitat loss has reduced the range of the riparian brush rabbit (*Sylvilagus bachmani riparius*) and the riparian or San Joaquin woodrat (*Neotoma fuscipes riparia*) to remnant forests along the lower reaches of the San Joaquin and Stanislaus Rivers in San Joaquin County. Currently, both animals are restricted to about 200 acres (80 hectares) at Caswell Memorial State Park. Although the park has a management plan that provides some protection for these species, they remain vulnerable to threats originating outside of the park boundary.



Riparian brush rabbit
Photo by B. "Moose" Peterson/WRP©

Approximately 90 percent of the original riparian forests along Central Valley rivers have been lost to urban, commercial, and agricultural development. Prior to agricultural development, most of the floodplain was livestock pasture with uneven topography and patches of brush and trees that provided cover for wildlife. Conversion of these pastures to cultivated fields not only eliminated many of these features but also eliminated the hedge rows that provide travel corridors for animals.

During major storms, such as those that struck in the winter of 1996-1997, the remaining habitat of the brush

rabbit and woodrat is completely flooded for long periods, leaving nowhere for these animals to forage or seek cover. Survivors are forced to high ground, where the lack of cover makes them vulnerable to predators. Biologists conducting studies last spring were able to locate only a few individuals of each species.

Rough Popcornflower (*Plagiobothrys birtus*) A rare wildflower native to southwestern Oregon, this plant is an annual herb in the borage family (Boraginaceae). It grows to about 2 feet (70 centimeters) in height, produces white and yellow flowers resembling buttered popcorn, and has rough, coarse hairs on its upper stem. The rough popcornflower is found only at 10 sites in seasonal wetlands of the Umpqua Valley in Douglas County. Nine of these are on private land, while the remaining site is on State land managed by the Oregon Department of Transportation.

Most populations of the rough popcornflower are small; all 10 contain a total of only about 3,000 individual plants on a combined area of 10 acres (4 ha). It is believed to have been more abundant and widespread before the decline of wetland habitats along the Umpqua River. Threats to the remaining plants include draining or filling of the seasonal wetlands, spring and summer livestock grazing, competition from native and non-native plants, and roadside mowing and herbicide spraying. On November 20, the FWS proposed to list the rough popcornflower as endangered.

Topeka Shiner (*Notropis topeka*) In historical times, this small fish was abundant and widely distributed in streams throughout the central Great Plains and western tallgrass prairie regions in Kansas, Iowa, Minnesota, Missouri, Nebraska, and South Dakota. Today, however, it survives in less than 10 percent of its original range. The Topeka shiner depends on free-flowing streams with clear, clean water, generally with clean gravel, rock, or sand bottoms. Because of its vulnerability to changes in water quality, this fish is an indicator of stream health. Most of the Topeka shiner's decline is linked to habitat degradation in the form of increased sedimentation from accelerated soil runoff, stream channelization, tributary impoundments, and excessive water removal for irrigation. It is also threatened by the introduction of non-native predatory fish species.

The Topeka shiner is now restricted to the Flint Hills region in Kansas and a few scattered tributaries of the

Missouri and Mississippi Rivers. Many of the populations are quite small, and their geographic isolation eliminates the possibility for genetic transfer. Because of threats to the remaining habitat, the FWS proposed on October 24 to list the Topeka shiner as an endangered species.



Topeka shiner
Photo by Garold Sneogas©

Six Freshwater Snails Six species of small freshwater snails native to the Mobile River Basin of Alabama were proposed on October 17 for ESA protection. The status of endangered would go to the three in greatest peril of extinction:

- cylindrical lioplax (*Lioplax cyclostomaformis*),
- flat pebblesnail (*Lepyrium sbowalteri*), and
- plicate rocksnail (*Leptoxis plicata*).

The other three species, which are vulnerable but not in immediate danger of extinction, would be listed under the proposal as threatened:

- painted rocksnail (*Leptoxis taeniata*),
- round rocksnail (*Leptoxis ampla*), and
- lacy elimia (*Elimia crenatella*).

These species depend on clean, free-flowing stream habitats. The presence of freshwater snails reflects the quality of a watershed and, as such, has implications for people and a wide variety of wildlife. Unfortunately, all six of these Alabama snails have disappeared from more than 90 percent of their historic ranges. Dams on the Tombigbee, Black Warrior, Alabama, and Coosa Rivers slowed water currents, allowing sand and silt to cover the rock and gravel river beds where snails once lived. Today, none of the six snails proposed for listing survive in those rivers. Further, water pollution has eliminated the snails from some of the streams that remain free-flowing.

The cylindrical lioplax, flat pebblesnail, and round rocksnail can still be found in small portions of the Cahaba River drainage in Bibb and Shelby counties. The lacy elimia and painted rocksnail currently live in a few streams flowing into the Coosa River in Talladega, Chilton, and Calhoun counties, while the plicate rocksnail re-

exists only in a small section of the Locust Ford River in Jefferson County.

Florida Beach Mouse The St. Andrew beach mouse (*Peromyscus polionotus peninsularis*), a rare subspecies of the oldfield mouse, is native to a section of Florida's central panhandle coast from Gulf County to Bay County. Unlike house mice, beach mice do not seek out human dwellings or other structures for food and shelter. Instead, they rely on coastal sand dunes where they excavate burrows and feed on plant seeds and insects. Loss of natural dune habitats has reduced the range of the St. Andrew beach mouse by almost two-thirds. No more than 500 of these animals are thought to remain, all within the St. Joseph Peninsula.

The remaining habitat is vulnerable to a combination of factors, including storms, non-storm-related beach erosion, and coastal development. Direct threats to the animals include predation by free-roaming domestic cats and competition from house mice. In light of its vulnerability to extinction, the St. Andrew beach mouse was proposed on October 17 for listing as endangered. If the proposal is made final, this small mammal will join five other southeastern beach mouse subspecies that are already protected under the ESA.

The Florida Department of Environmental Protection, Gulf County, and Tyndall and Eglin Air Force Bases control some habitat within the historic range of the St. Andrew beach mouse and have already begun habitat restoration and protection initiatives. Listing would provide further protection and make additional resources available for use in recovery. Efforts to conserve and restore coastal sand dunes would not only benefit wildlife but would also improve the coastline's value to beach-goers and provide a physical buffer against the storm surges associated with severe weather.

Final Listing Rules

Nine Grassland Plants In the October 22 *Federal Register*, the FWS published a final rule to list the following nine plant taxa native to Marin, Napa, and Sonoma counties on the central coast of California as endangered:

- Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), a tufted perennial in the grass family (Poaceae);
- Napa bluegrass (*Poa napensis*), a tufted perennial bunchgrass also in the family Poaceae;

- Clara Hunt's milk-vetch (*Astragalus clarianus*), a low-growing annual herb in the pea family (Fabaceae);
- showy Indian clover (*Trifolium amoenum*), another annual in the pea family;
- white sedge (*Carex albida*), a perennial herb in the sedge family (Cyperaceae);
- Vine Hill clarkia (*Clarkia imbricata*), an annual herb in the evening-primrose family (Onagraceae);
- Pitkin Marsh lily (*Lilium pardalinum* ssp. *pitkinense*), a perennial in the family Liliaceae, with large, showy red-to-yellow flowers;
- Calistoga allocarya (*Plagiobothrys strictus*), a small annual herb in the borage family (Boraginaceae); and
- Kenwood Marsh checker-mallow (*Sidalcea oregana* ssp. *valida*), a perennial herb in the mallow family (Malvaceae).

These plants are found in a variety of habitats, including valley grasslands, meadows, freshwater marshes, seeps, and oak woodlands. Their range has been reduced, and continues to be threatened, by habitat loss and degradation, overgrazing, residential development, competition from aggressive non-native plants, plant community succession, water storage projects, and changes in hydrology. Seven of the plants already are listed by California under State law as endangered or threatened.

Two Tidal Marsh Plants Two plant taxa native to the salt and brackish tidal marshes fringing San Pablo and Suisun Bays adjacent to San Francisco Bay, California, were listed as endangered on November 20:



Suisun thistle
Photo by Brenda Greswell

- Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*), a perennial herb in the aster family (Asteraceae); and
- soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*), an annual herb in the snapdragon family (Scrophulariaceae).

Habitat fragmentation, changes in salinity, water pollution, the conversion of tidal marsh to diked seasonal wetlands (a practice used in the development of waterfowl management areas), certain mosquito abatement activities, and invasions of non-native plants are among the threats to these rare native species.

Bog Turtle (*Clemmys muhlenbergii*) Bog turtles are known for the distinctive bright orange, yellow, or red blotch on either side of the neck. They inhabit wetland habitats and are distributed sparsely over a discontinuous geographic range extending from New England south to northern Georgia. A 250-mile (400-kilometer) gap separates the species into northern and southern populations.



Bog turtle
Photo by Ken Taylor

The northern population, consisting of those turtles found from New York and Massachusetts south to Maryland, has declined by one-half in the past 20 years. Much of its wetland habitat has been altered or destroyed. Bog turtle numbers in the northeast continue to fall as habitat is invaded by non-native plants, eggs are eaten by raccoons, and adults are illegally collected for the national and international pet trade. In light of the ongoing decline, the FWS listed the northern population of the bog turtle as threatened on November 4.

At the same time, the southern population was listed as threatened because of its similarity in appearance to the less secure northern population. The FWS does not consider the southern population to be in danger of extinction, but regulating it under the ESA's similarity of appearance provision should help law enforcement officials eliminate the chances of northern bog turtles being represented in the pet trade as southern bog turtles.

BOX SCORE

Listings and Recovery Plans as of December 31, 1997

GROUP	ENDANGERED		THREATENED		TOTAL LISTINGS	SPECIES W/ PLANS
	U.S.	FOREIGN	U.S.	FOREIGN		
 MAMMALS	58	251	7	15	331	42
 BIRDS	75	178	15	6	274	74
 REPTILES	14	66	20	14	114	30
 AMPHIBIANS	9	8	7	1	25	11
 FISHES	67	11	41	0	119	78
 SNAILS	15	1	7	0	23	19
 CLAMS	56	2	6	0	64	45
 CRUSTACEANS	16	0	3	0	19	7
 INSECTS	28	4	9	0	41	21
 ARACHNIDS	5	0	0	0	5	4
ANIMAL SUBTOTAL	343	521	115	36	1,015	331
 FLOWERING PLANTS	525	1	113	0	639	390
 CONIFERS	2	0	0	2	4	1
 FERNS AND OTHERS	26	0	2	0	28	22
PLANT SUBTOTAL	553	1	115	2	671	413
GRAND TOTAL	896	522	230	38	1,686*	744**

TOTAL U.S. ENDANGERED: 896 (743 animals, 553 plants)
TOTAL U.S. THREATENED: 230 (115 animals, 115 plants)
TOTAL U.S. LISTED: 1126 (458 animals***, 668 plants)

*Separate populations of a species listed both as Endangered and Threatened are tallied once, for the endangered population only. Those species are the argali, chimpanzee, leopard, Stellar sea lion, gray wolf, piping plover, roseate tern, green sea turtle, saltwater crocodile, and olive ridley sea turtle.

For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

**There are 478 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

***Five animal species have dual status in the U.S.

ENDANGERED Species BULLETIN

U.S. Department of the Interior
 Fish and Wildlife Service
 Washington, D.C. 20240

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