

these holes. What we're seeing is acid rain actually being made."

"We can definitely see now that pollution from any given area is not just a local problem. Due to shifting weather fronts, it can be a problem on a regional, national— or even a global scale.

—Frank Corrado, director of EPA's Region V Public Affairs Office, from Environment Midwest.

### Florida Establishes Manatee Refuge

Help is on the way to save the manatee, the endangered sea mammal thought to be a marine relative of the elephant.



Manatee diorama, Hall N

The Game and Fresh Water Fish Commission of Florida, the state with nearly all the nation's manatees, is working with the U.S. Fish and Wildlife Service to create the equivalent of wildlife refuges for the manatee. Swimming, boating, snorkeling, scuba diving, and surfing have been restricted or banned in 13 of the state's manatee wintering areas, and another 12 may be posted before fall.

During the cooler months, manatees are attracted to the warm water outflows of power plants. When large numbers are gathered into these relatively small areas, the animals are more vulnerable to disturbances than during the summer months, when populations are more dispersed. However, this gathering into a more well-defined area also makes possible the creation of refuges to protect manatees during the winter.

The West Indian manatee (*Trichechus manatus*) is a retiring gentle vegetarian which can reach a length of 12 feet and weigh almost a ton. Adult manatees eat as much as 100 pounds of underwater vegetation daily. Despite its unflattering popular name "sea cow," the myth of a half woman, half fish sea creature—the mermaid—is thought to have stemmed from the first human sighting of this sea mammal with the expressive face.

Manatees were once fairly common along the coast of Florida and Georgia, but were exploited for meat, hides, and oil during the 17th and 18th

boats, barges, or fishing vessels. Research now underway indicates that propeller size may be a more important factor than boat speed in manatee deaths.

Flood control structures with automatically-operated water level gates are another big contributor to the manatee's demise. Five such structures in Dade County, under the jurisdiction of flood control districts, are the major culprits. Adjustments to prevent manatees from being caught or crushed by the gates, such as reducing their operating speed or adding structures to prevent entrance, require the coopera-

centuries. Today, only about 800 to 1,000 West Indian manatees remain in Florida, plus another 100 in Puerto Rico.

Human activities such as recreational pursuits and environmental controls are the major cause of the manatee's disastrous decline. The U.S. Marine Mammal Commission concluded its 1978 Annual Report with the statement: "The species may well become extinct in the foreseeable future throughout its range in this country unless decisive, meaningful actions are taken to cope with the basic problem, which has been and remains one of controlling human activities."

Manatees, with a cruising speed of four to ten km an hour, typically float near the surface, within easy reach of boat propellers. These collisions are the main known cause of death among manatees—most bear deep ridges on their backs from encounters with motor-

tion of these units of government.

Monofilament nylon fishing line discarded by fishermen causes problems for curious manatees, who may first play with it, but then become hopelessly tangled. Fishing nets or crab pot lines are another hazard.

The increasing pollution of inland streams destroys the manatee's food source. And sudden cutoffs of warm water discharges from generating plants (or extremely cold weather) may bring on thermal shock.

To compound the problem, the animals suffer from the curiosity or even the maliciousness of humans. Some are hounded to death by overeager photographers; others bludgeoned by gourmands of manatee venison. All told, nearly 100 die yearly from the above mentioned human influences.

Add to this the manatee's slow reproductive rate—one calf every five 33



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years—and it's easy to see why its existence is threatened. Despite more than 70 years of protection, the decline continues. In 1907, Florida outlawed the killing or molesting of the huge beast, punishable by a \$500 fine, or six months in jail, or both. In addition, it is protected by the federal Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973, violation of which carries a maximum \$20,000 fine and one year prison sentence. Rewards of up to \$2,500 are available for persons providing information leading to a conviction under the protection laws.

But these well-intentioned laws are only now being utilized. So, in 1976, under the provisions of the Endangered Species Act, the U.S. Fish and Wildlife Service appointed a "manatee recovery team" with the authority to write protective regulations and outline recovery efforts, including needed research. The team never acted or even met. A new team appointed in 1978 adopted some state-written regulations establishing ten basic protection areas. To enforce this protection, Florida has spent \$81,000 posting these areas, and assigned half of its 240 marine patrol officers to police them in winter.

These new manatee protection activities are a step in the right direction, but whether they're long enough strides to span the yawning gap called "extinction" remains to be seen.—Mike Lecese, *National Wildlife Federation*.

(See also "The Remarkable Manatee, by Thor Janson, in the May, 1979, *Bulletin*.)

### A Whale of a Singer

Humpback whales, it turns out, are true composers of the animal world — their songs are continuously evolving.

Analysis of songs collected over a 20-year period reveals that the songs change progressively from year to year. According to Roger Payne, of the New York Zoological Society, the only other animal to exhibit such complicated behavior is man. Payne even compares it to the evolution of language.

The songs have a definite structure, even though humpback whales in, say, Hawaii will sing a different song than those in Bermuda. For example, each song contains about six themes that follow in the same order, and each phrase contains two to five sounds. If a theme is deleted, the others stay in order. Since the laws of composition are the same between two isolated herds, Payne feels that whales inherit, genetically or through learning, a set of song rules.

Since whales only sing in winter, researchers first thought song changes were the result of a flawed memory; the whales, they thought, forgot part of the

song over the summer and improvised each fall upon returning to their winter grounds. But new recordings show that when whales return they sing last season's song flawlessly. Improvisations then occur as winter progresses. For instance, an old phrase may decrease in frequency as the weeks pass, only to be replaced by a new phrase.

So far, researchers are unable to define the purpose of these elaborate songs. They speculate that they may be love songs since they occur during what is believed to be the breeding season and they are only sung by adults. While all singers that have been closely studied are male, researchers are unable to determine the sex of most whales they observe. They also find it difficult to tell which whale is singing.

Humpback whales are the only known species to have a song, although other whales repeat a low monotonous loud tone that can be heard for hundreds, perhaps thousands of miles.

### Piranha Range Increasing

Piranhas are apparently extending their range in South America. Officials in the southern Brazilian state of Santa Catarina, beyond the previous range of the fish, reportedly have warned people against swimming in rivers.

This follows the disappearance of farm animals, attributed to piranhas, and a recent attack on two fishermen near the town of Florianopolis.

Press reports from Rio de Janeiro said the rivers of Santa Catarina were more than 2,500 km from the Amazon, normal habitat of the piranha. However officials said ducks migrating from the region often unwittingly carried piranha eggs stuck to their feathers, which would explain how the fish had appeared so far to the south.

### Man Sentenced for Violating Federal Wolf and Gun Acts

A Burton, Mich., man has been sentenced to three years in federal prison and fined \$1,000 after pleading guilty to transporting two wolves into Michigan in violation of the Federal Lacey Act, and for being in possession of a firearm as a convicted felon.

He was sentenced to one year in prison and fined \$1,000 on the wolf charge and sentenced to an additional two years on the firearms charge. The sentences are to be served concurrently. The man is believed to be the first person in the U.S. to be sentenced to federal prison for violating federal and state laws pertaining to the protection of wolves. The lengthy investigation, initiated in Minnesota, April, 1977, revealed that the man purchased two wolves from a fur farm and transported them into Michigan on May 30, 1979.

## 25 Animal Species Added to Endangered List

Several gazelles and deer, some from the Peoples Republic of China, and the red-necked Amazon parrot are among the 25 foreign species that have been classified as endangered by the Interior Department's U.S. Fish and Wildlife Service. The rule, listing the species from numerous countries in Asia, Africa, and South America, was published in the June 25, 1979, *Federal Register*.

Habitat destruction and subsistence or uncontrolled killing are the primary causes for most of the species' decline. All are considered endangered by the International Union for the Conservation of Nature and Natural Resources.

Listing the wildlife under the Endangered Species Act will aid in their conservation by prohibiting all interstate or foreign commerce of these species without a permit and by requiring federal agencies to refrain from funding, authorizing, or carrying out any activities in the affected foreign countries that would jeopardize the species' continued existence. Federal agencies must also utilize their authorities to promote the conservation of these species. As a result of the listings, foreign currencies and U.S. personnel also become available to assist the countries in developing management and conservation programs.

The newly classified endangered species and their countries of origin are: Iriomote cat—Iriomote Island, Ryukyu; Malabar large spotted civet—India; Bactrian deer—USSR, Afghanistan; Barbary deer—Tunisia, Algeria, Morocco; Corsican deer—Corsica, Sardinia; Yarkand deer—Chinese Turkestan; Jentink's duiker—Liberia, Sierra Leone, Ivory Coast; western eland—Senegal to Ivory Coast; simian fox—Ethiopia; Arabian gazelle—Arabian peninsula, including Israel; Pelzeln's gazelle—Somalia; sand gazelle—Arabian peninsula, Jordan; Saudi gazelle—Israel, Iraq, Jordan, Syria, Saudi Arabia, Kuwait.

Swayne's hartebeest—Somalia, Ethiopia; Tora hartebeest—Ethiopia, Sudan, Egypt; Fea's muntjac—Burma, Thailand; Ryukyu rabbit—Ryukyu Islands; Formosan sika—Taiwan; North China sika—Shansi Province, China; South China sika—Yangtze valley, China; Zanzibar suni—Zanzibar Island, Tanzania; Arabian tahr—Oman; red-necked Amazon parrot—Dominica.







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