



- 23 The Importance of Ethics in Conservation Biology:  
Let's Be Ethicists not Ostriches  
Marc Bekoff
- 27 The Mountain Lions of Michigan  
Kirk Johnson
- 32 *Special Series — Part II*  
An Evaluation of the ESA and Private Landowner Assurances  
Bridget Cummings and Nancy Mathews
- 35 *Marine Matters*  
The Science and Policy Behind Proposed Sea Turtle  
Conservation Measures  
Lekelia D. Jenkins
- 41 Legislative UPDATE
- 43 News from Zoos

# Letter from the Editors

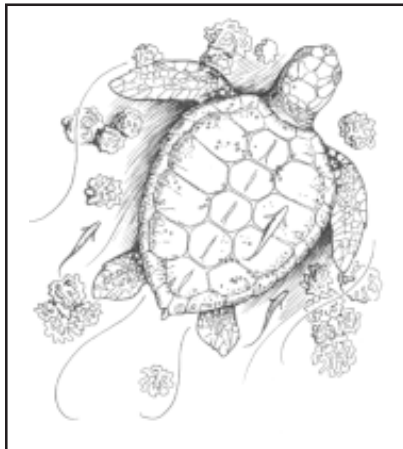
As always, we are pleased to continue providing our readers with the U.S. Fish & Wildlife Service's (FWS) *Endangered Species Bulletin*. Our ability to include this publication in every issue depends upon the production schedule at FWS. As a result, the *Bulletin* occasionally is omitted from our journal.

Last year, FWS had an unusual year, publishing only one edition of the *Bulletin*, September 2001, which is available to all readers through our web site (<http://www.umich.edu/~esupdate>). In this issue, we are including the January/February 2002 edition of the *Bulletin*, and in the future, we expect FWS to resume and maintain a bi-monthly publication schedule.

Thank you for your support, and remember, **YOU DO INTERESTING WORK!** We at the *UPDATE* want to hear about it, so we can share it with the rest of our membership. Please submit your manuscripts or contact us with potential article ideas: [esupdate@umich.edu](mailto:esupdate@umich.edu) or (734)763-3243. There are guidelines for authors on our website as well.

Best wishes,  
Beth Hahn & Jennifer MacKay

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Cover: The eastern brown pelican (*Pelecanus occidentalis*) has made a comeback but is still threatened in South Carolina. Photo credit: NOAA Photo Library.

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# The Importance of Ethics in Conservation Biology: Let's Be Ethicists not Ostriches

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## Am I preaching to the choir?

There can be no question that ethics is an essential component in animal conservation biology. For that matter, ethics is very important in *all* conservation projects, including those that deal with botanical, aquatic, atmospheric, and inanimate environs. As I write this short piece I find myself asking isn't this so obvious that you're merely preaching to the choir? Well, yes and no. Some people seem (perhaps unintentionally) to ignore ethical issues and hope they will disappear if they play "ostrich." The origin of this essay stems from a recent issue of this journal (July/August 2001) that dealt with carnivore conservation. I wrote the editor to mention my surprise that there was no essay devoted to ethical issues among the excellent contributions on this very important topic.

Here, I am concerned solely with projects that center on animals, beings who also are stakeholders in conservation efforts. The multi-dimensional, multi-level, and interdisciplinary problems with which most conservation projects are faced are very difficult, serious, and contentious, and often demand immediate attention and quick solutions. In our haste and in the frenzy of trying to put out fires before they spread (rarely before they start), and some would correctly claim that the fires spread metastatically as do many cancers, we often overlook the basic ethical principles by which most of us operate daily. These ideals include principles such as:

- ◆ do no intentional harm,
- ◆ respect all life,

◆ treat all individuals with compassion, and

◆ step lightly into the lives of other beings, bodies of water, air, and landscapes.

Surely, these principles are politically correct, but they are also ethically and ecologically correct. They demand deep reflection and should be the foundation from which all conservation projects begin. They also raise very difficult issues that easily cause people to get angry and insult one another, and mandate that we ultimately develop guidelines for adjudicating competing and conflicting agendas, even if all parties really do have the best interests of animals in mind. There clearly is no universal agreement on just what are the "best interests."

Very few people cause intentional harm in their efforts to restore or recreate ecosystems and to maintain or to increase biodiversity. The other three ideals are easily overridden either because they get lost in the shuffle or because they are too difficult to adhere to with any degree of consistency. Indeed, in some cases while it clearly is *not* one's intention to cause harm to other animal beings, the very design of some studies, or perhaps the very reality of some conservation efforts, means that inevitably some animals will die or suffer. So, for example, is it permissible to begin a reintroduction project when it is estimated and accepted that 50% of the translocated animals will die? This was the acceptable standard for attempts to reintroduce Canadian lynx into southwestern Colorado (Kloor 1999; Scott et al. 1999; Bekoff 2001). Is it permissible to subject

naive prey to introduced novel predators? Is it acceptable to do a project in which a non-prey species (e.g., coyotes in Yellowstone) will be killed by the reintroduction of a competitor (e.g., gray wolves)?

What happens in *both* locations when individuals are moved from one place to another? To my knowledge, there have been no follow-up studies in areas from which individuals have been removed to determine the effects on the remaining animals — the integrity of their social system — and on the integrity of the ecological community that remains. Are we violating one ecosystem to restore or recreate another? Is there any net gain?

While we recognize the fragility of the complex webs in most ecosystems, in many instances we do not try to understand just how delicate they are. The assumption is that we are doing no harm in the areas from which animals are removed, but we really do not know this. I fully realize that these are difficult questions with many implications about what we value. But, the questions will not disappear if we ignore them. Surely, we can do better in providing solid answers.

## What ought we do?

So, what are we to do? While people may disagree about which ethical principles should guide conservation efforts, it seems that no one would disagree that ethics *must* be factored into all conservation projects. This might mean that a project would go more slowly than some prefer, or that it might be delayed, or not done at all — at least not until more ethical

methods are developed. This might be frustrating, but perhaps having patience, especially when the "problem" at hand does not demand an immediate solution, will make for better and more effective solutions in the long term. By showing wisdom and restraint, we learn more about nature's complexities. We also need to ask if a quick-fix is the best way to proceed, especially when we lack a solid comprehension of details that could make or break a project. Prematurely implementing a multidimensional, interdisciplinary project can simply be disastrous.

In a recent series of essays (Bekoff 2000a, 2000b, 2001), I outlined some of the questions with which conservation (and other) biologists must be concerned. These included, for example, do animals have rights and if so, what responsibilities does this entail? How *should* humans treat other animals? What *ought* we do? Can we do whatever we please to other animals? Should we interfere in animals' lives when we have spoiled their habitats or when they are sick, provide food when there is not enough food to go around, or translocate them? Should our interests trump theirs? Should we be concerned with individuals, populations, species, or ecosystems? Should we let animals be and not intentionally interfere in their lives except on very rare occasions?

As big-brained, omnipresent, powerful, and supposedly omniscient mammals, we are mandated to give these questions the consideration that they demand. This requires us to develop a detailed understanding and appreciation of the behavioral and social ecology of the animals with whom we are concerned (e.g., Miller et al. 1996; Clemmons and Bucholz 1997; Caro 1998; Sutherland 1998; Berger 1999; Gosling and Sutherland 2000; Berger et al. 2001). Our understanding should also include their

cognitive capacities (Berger 1998; Berger et al. 2001), emotional lives, and also their ecosystems. These efforts will lead to more relevant, appropriate approaches and solutions. To do less is to shirk our responsibilities to ourselves, other animals, and to Earth as a whole. We all love being out there in the field. Thus, doing arduous, tedious field work should be an activity to which we look forward.

There are no right or wrong answers to many questions about how humans should treat animals. However, there are better and worse answers. Perhaps in some cases what we think is the right action is not, when the big picture is carefully analyzed. A major goal of mine is to stimulate discussion about pertinent issues among all parties so that competing agendas are given due consideration. Those who hold opposing views need to cooperate and engage in open discussion with well-reasoned dissent (Ehrlich 1997). Positions should be criticized, not the people who hold them. Personal attacks are infantile and preclude compromise. The basic question remains, *what constitutes acceptable treatment of animals?*

The editors of the volume in which my 2001 essay appeared recognized the importance of ethics. They wanted an essay that would highlight just how complex and multidimensional these issues are. However, they faced the dilemma of personal bias — whoever they selected to write an essay would likely be biased. However, one person's opinion does not render another's invalid. In fact, only two of the volume's four editors shared my views. What is important is a universal agreement that ethics is an essential element of conservation biology, as it is in any other sphere of science.

Others have realized the importance of ethical discourse. An essay that I co-wrote with the philosopher, Dale Jamieson (Bekoff and Jamieson

1996), was favorably reviewed in the journal *Ecology*. It was referred to as "a well-written and impelling plea for scientists to evaluate their experimental design and be sensitive, with respect to techniques and disturbances, to the species they are studying... [T]his paper should be 'must reading' for all biologists, conservationists, and people interested in environmental issues" (Geidt 1997). I mention this not to blow my own horn but rather to call attention to the fact that no matter what the problem at hand, ethical concerns must be an essential part of all proposed solutions. Ethics is as important as experimental techniques and statistical analyses. All scientists are responsible for maintaining the highest of ethical standards. When humans intervene into the lives of other animals we must do so by stepping lightly with humility, grace, respect, and compassion. We must accept that ethics might dictate the demise of certain projects. Thomas Berry cautions that we must have a "benign presence" when we go out into nature (Berry 1999). I agree.

Animals depend on our goodwill and mercy. Each person chooses to be intrusive, abusive, or compassionate, and each is responsible for her or his choices. Science, including conservation biology, is not value-free. Ultimately, we are all human beings with personal views of the world that drive our actions. Complicating the situation is the fact that values and sentiments change with time and are sensitive to demographic, political, and socio-economic variation, along with personal whims. And, some issues are so emotionally volatile that expecting rational discourse is less likely than winning the power ball lottery.

### **Ethical enrichment: would we do it again?**

It is in the best traditions of science to ask questions about ethics; it is not anti-science nor should it be threat-

ening to question our methods of studying animals. Ethics can enrich our knowledge of other animals and the worlds they live in and help us gain respect for them. Ethics also can broaden our range of interaction with other animals without compromising their lives. Ethical discussion can help us find alternatives to methods that do not serve us or other animals well. If we perceive ethical deliberations as unnecessary hurdles, then we lose rich opportunities to learn more about animals and ourselves. The application of ethical enrichment is a two-way street. Great discoveries come when our ethical relationship with animals is respectful and not exploitive. While animals are unable to consent to or refuse our intrusions into their lives, it is useful to ask what they might say if they could do so. We should also ask ourselves if we would do what we did again, given what we learned.

Animal rights advocates often place priority on individuals, whereas animal welfare advocates take a utilitarian position. Welfare advocates favor decisions where the presumed costs to animals are less than the benefits to humans. In conservation biology, often the interests of individuals are traded off against perceived benefits that accrue to higher levels of organization, such as populations, species, and ecosystems (Estes 1998). Biocentrists and anthropocentrists often clash because the issues are highly driven by social and personal views. These issues also are fueled by how one views man's place in nature and by what is considered to be natural (Bekoff 2001, 2002).

### **Having fun, saving the world, and educating students**

In the end, all approaches and all levels of organization need to be considered in our deliberations about human interference in nature. It is our social responsibility to do the best

we can and use all "ways of knowing" (Berkes 1999; Bradshaw and Bekoff 2001). I hope that we will all convey this message to our students, a point emphasized by the eminent ecologist, Paul Ehrlich (Ehrlich 1997). In his wonderful and bold book, *A World of Wounds*, Ehrlich wrote: "Many of the students who have crossed my path in the last decade or so have wanted to do much, much more. They were drawn to ecology because they were brought up in a 'world of wounds,' and want to help heal it. But the current structure of ecology tends to dissuade them... Now we need to incorporate the idea that it is every scientist's obligation to communicate pertinent portions of her or his results to decision-makers and the general public." And our work should be fun. Having fun, being sentimental, and doing solid science are not mutually exclusive activities (Bekoff 2002). Once again, to quote Ehrlich (1997): "In my view, no area of science can be successful (or much fun!) without a mutually supportive interaction between theory and empiricism... So let's stop arguing about theory versus empiricism and worrying about the end of our science. Instead, let's cooperate more, change some of our priorities, and have fun while we're trying to save the world."

### **Minding animals**

"The earth is, to a certain extent, our mother. She is so kind, because whatever we do, she tolerates it. But now, the time has come when our power to destroy is so extreme that Mother Earth is compelled to tell us to be careful. The population explosion and many other indicators make that clear, don't they? Nature has its own natural limitations" (His Holiness The Dalai Lama 1999).

*Achieving win-win situations for humans and animals involved in conservation efforts will be very difficult*

*but we should never stop trying.* If we fail to do so I fear that everyone — including our children and theirs — will lose, and much of the spark and spirit that sustain our attempts to make this a better world will be extinguished. Fortunately, many students are now interested in ethical issues, and there is a progressive trend toward caring more, not less, about the fate of individual animals in conservation biology. How we sense and feel the presence of individual animals directly influences how we interact with them (Abram 1996; Sewall 1999).

There is much to gain and little to lose if we move forward with grace, humility, respect, compassion and love. Surely, we will be more fulfilled if we know deep in our hearts that we did the best we could and took into account the well-being of the magnificent animals with whom we share the Earth — the awesome beings who selflessly make our lives richer, more challenging, and more enjoyable than they would be in the animals' absence. By "minding animals" (Bekoff 2002) we mind ourselves. *The power we potentially wield to do anything we want to do to animals and to nature as a whole is inextricably tied with responsibilities to be ethical human beings.* We can be no less.

### **Acknowledgements**

I thank Jennifer Jacobus MacKay, Colin Allen, Wendy Keefover-Ring, Mark Derr, and Gay Bradshaw for their comments on an earlier draft of this essay. The development of some of the ideas in this brief essay was helped along by discussion with students in my Behavioral Ecology and Conservation Biology class and in numerous discussions with Gay Bradshaw, Laura Sewall, and Joel Berger.

Marc Bekoff teaches biology at the University of Colorado, Boulder and is on the Advisory Board for the

conservation organization, Sinapu. He is the author or editor of many books (<http://literati.net/Bekoff/>) including the *Encyclopedia of Animal Rights and Animal Welfare*; *Strolling with Our Kin*; *The Smile of a Dolphin: Remarkable Accounts of Animal Emotions*; *Minding Animals: Awareness, Emotions, and Heart*; and *The Ten Trusts* (with Jane Goodall). He and Dr. Goodall recently co-founded Ethologists for the Ethical Treatment of Animals/Citizens for Responsible Animal Behavior Studies ([www.ethologicaethics.org](http://www.ethologicaethics.org)), a group in which many of the issues considered in this essay are openly discussed among scientists, other professionals, students, and interested non-scientists.

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# The Mountain Lions of Michigan

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## Abstract

*Though the mountain lion (Puma concolor) has been considered extirpated in Michigan since the early 1900s, sightings of the big cats have persisted in both the Upper and Lower Peninsulas. Reports of mountain lions increased during the 1990s, and the Michigan Department of Natural Resources (DNR) does acknowledge the existence of this species within the state. However, State officials continue to insist that the majority of these sightings involve former captive animals or misidentification of other species, rather than a wild population of mountain lions. The growing number of mountain lion sightings in recent years — by biologists, hunters, and other citizens — suggests that there may well be a small breeding population of the species in Michigan.*

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## History

In 1984, while hunting on the Patowachie-Hannaville Indian Reservation fifteen miles west of the town of Escanaba in the Upper Peninsula of Michigan, a Native American hunter spotted a mountain lion (*Puma concolor*) — also known as cougar or puma — while trying to spook some deer. The man quickly lifted his rifle and fired, wounding the cat, which responded by leaping ten feet into the air, and then running off with one leg flopping (Zuidema 1999). The hunter discovered bone fragments from the right front paw and proceeded to track the cat in light snow into a bog full of leatherleaf shrubs (Zuidema 1999). He collected the bone fragments and gave them to wildlife officials. Michael Zuidema, a retired Forester from the Michigan Department of Natural Resources (DNR), sent the bone samples to a wildlife lab at Colorado State University's College of Veterinary Medicine and Biomedical Sciences in Fort Collins, where high resolution electrophoresis determined it was indeed from a mountain lion (Zuidema 1999).

The mountain lion was originally part of Michigan's native fauna, at the top of the food chain with the black bear, (*Ursus americanus*), the wolf

(*Canis lupus*), and the wolverine (*Gulo gulo*). By the late 1800s, however, only a few of the felids still survived in remote recesses of the Upper Peninsula (UP) (Zuidema 1999). The last recorded cougar killed in Michigan was in the UP in December of 1906, near the Tahquamenon River, in Luce County (Zuidema 1999).

By the early 1900s the species was listed as extirpated in Michigan (Manville 1948). It seems clear, though, that the Tahquamenon cat was not the last of its kind in the UP, or even the Lower Peninsula. Since the 1920s, there has been a steady stream of reports of the big cats, mostly dismissed by DNR officials (Zuidema 2000, pers. comm.). There are several reliable records of people seeing pumas in the late 1930s and early 1940s, including one documented record of a cougar from the Huron Mountains of Marquette County in 1937 (Manville 1948).

Credible sightings of the felids also date from the 1960s to the present. From 1962-1992 there were valid reports of cougars from every county in the UP except for Keweenaw (Evers 1994). Many of those reports, though, were not verified by DNR officials (Minzey 2000, pers. comm.). Frequently, people

who claim to have spotted a large felid either inform the DNR too long after the a sighting or sign, or the supposed cat turns out to be another large mammal, such as a deer or wolf (Minzey 2000, pers. comm.). In addition, a large number of reported puma sightings are in areas where wolves are known residents (Minzey 2000, pers. comm.).

## Recent sightings in the Upper Peninsula

There is, however, conclusive evidence of mountain lions in Michigan. On Memorial Day in 1998, a puma was photographed on the grounds of Thistledowne, a Bed & Breakfast establishment near the town of Gulliver in southern Schoolcraft County (Hughes 2000, pers. comm.) (Figure 1). Three fuzzy photographs through a plate-glass window were taken of the cougar as it stood outside in the yard by the gazebo along the sand dunes. The animal then ran into the woods on the shore of Seul Choix Point, on Lake Michigan (McCarthy 2001, pers. comm.). Two of the photographs show the unmistakable outline of a large felid's lithe body and rounded head.

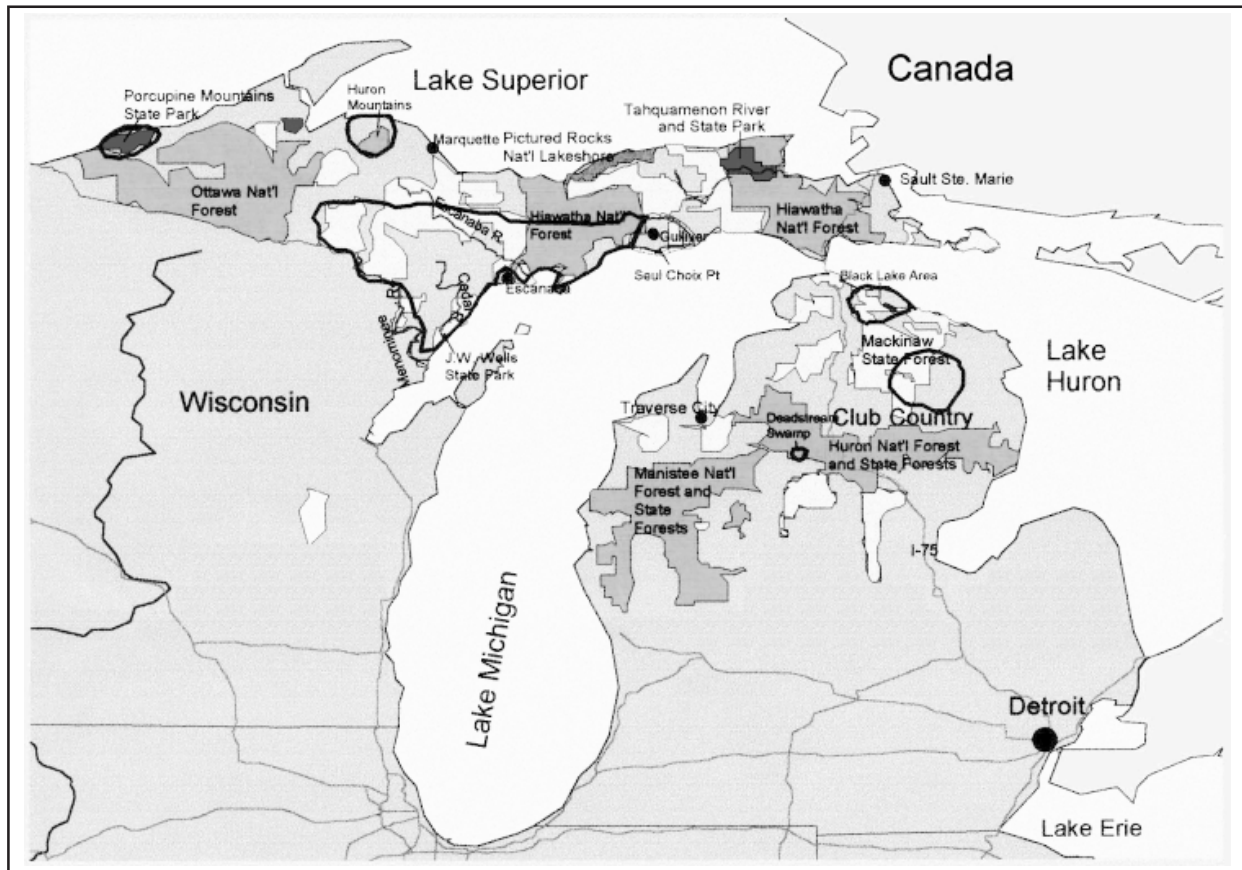
Seul Choix Point is a sandy spit of land in southern Schoolcraft

County stretching out from the bay into Lake Michigan (Figure 2). In 2000, there were several sightings of cougars on the Point (Bowman 2000, pers. comm.). In 1997 or 1998, hunters discovered a dead deer covered up with leaves in the forests on Seul Choix Point, with scrapes approximately five feet long — too long for the reach of bobcat covering its kill

tion, conducted field studies in areas of the state where there have been multiple reliable sightings of cougars (Rusz 2001, pers. comm.). Once a week between May 5, 2001, and June 1, 2001, Dr. Rusz and his team conducted research along a 33-mile-long stretch of Lake Michigan shoreline, including the sand dunes of Seul Choix Point (MWHF 2001a). The

six deer carcasses were conclusively identified (Rusz 2001, pers. comm.). The sand dunes and beaches along the lake shoreline also turned out to be a gigantic natural litter box where it was unexpectedly easy to find cougar droppings (Rusz 2001, pers. comm.).

Rusz and his team collected dozens of scat samples in the shoreline dunes covered in a manner typical of



**Figure 1.** Areas circled indicate locations of frequent puma reports in the Upper Peninsula (UP) and upper Lower Peninsula of Michigan. The known puma range is near Gulliver in the UP.

(Bowman 2000, pers. comm.). (Typically, cougars and some other large cats, including bobcats, cover their kills with leaves to hide them from scavengers.)

Seul Choix Point is one of the areas where the existence of cougars was irrefutably demonstrated in the UP, through the efforts of an independent organization not affiliated with the Michigan DNR (Rusz 2001, pers. comm.). Dr. Patrick Rusz, the Director of Wildlife Programs for the Michigan Wildlife Habitat Foundation, a non-profit research organiza-

tion discovered cougar tracks in the eastern half of the study area each week (Figure 3), with most of the tracks confined to a four-mile long strip of dunes (MWHF 2001a).

Where the tracks were most numerous, the crew found six distinct locations where deer had been killed and dragged away. In each case, the deer were killed within 40 feet of a dune crest with no sign of a chase (MWHF 2001a). There was suggestive evidence of nine cougar-killed deer dragged up the dunes, but only

pumas (MWHF 2001a). Eight feces samples were sent to Wyoming's Department of Game and Fish forensics laboratory in Laramie. The results arrived in late September 2001, and the lab concluded there was DNA evidence confirming the existence of at least two cougars in the Seul Choix area (Rusz 2001, pers. comm.).

In early 2001, the Foundation team also received a one-year-old, 10.5 inch scat from a woman in the town of Hancock, on Lake Superior's Keweenaw Peninsula in Houghton



County. This sample was also sent to the Wyoming lab and confirmed to be from a puma (MWHF 2001a). Rusz's team also verified mountain lion tracks on the Stonington Peninsula of Delta County along Lake Michigan, plus several possible cougar scats (MWHF 2001a). By the late fall of 2001, the Foundation confirmed the presence of at least seven pumas through the verification of scat, tracks and deer kills at six sites scattered over the Upper and Lower Peninsulas (Rusz 2001, pers. comm.). Such an abundance of evidence confirms that the Seul Choix cats are not just transients passing through the area, but represent a handful of resident, reproducing cougars indigenous to the UP.

Although most cougar reports come from the south central Upper Peninsula where deer densities are the highest, sightings have been reported from virtually every county in the UP (Zuidema 2000, pers. comm.). Three elderly trappers living in Delta and Menominee Counties insisted they saw cougars occasionally in the central UP over the past fifty years (Zuidema 2000, pers. comm.). One trapper reported trapping and shooting a female cougar in 1964, describing it as being a rack of bones weighing about 60 pounds which appeared to have been nursing (Zuidema 1999).

Another trapper allegedly caught a cougar in a trap five miles south of Escanaba, but the cat pulled the stake out and escaped (Zuidema 2000, pers. comm.). Zuidema collected over 600 reports of sightings or signs of mountain lions, dating back to the 1930s.

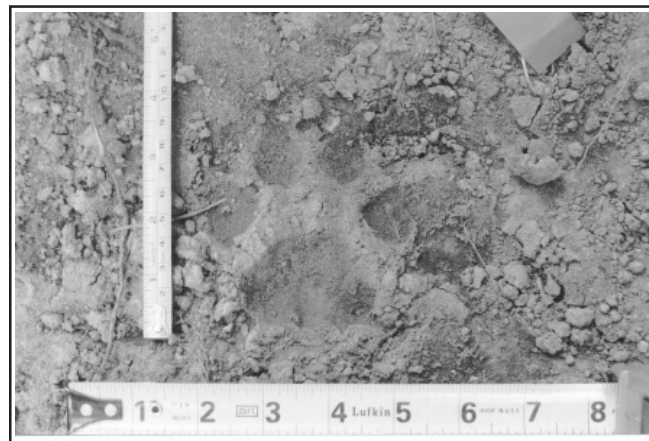
Prior to the confirmation of *Puma concolor* in the UP, there were scores of sightings of mother pumas with young, indicating the likelihood of localized breeding populations (Zuidema 2000, pers. comm.).

There has also been an increase of puma reports filed with the DNR



**Figure 2. Seul Choix Point. Photo by Patrick Rusz, 2001.**

in recent decades, especially in the 1990s. On average, the DNR receives approximately one hundred cougar



**Figure 3. Cougar tracks. Photo by Patrick Rusz, 2001.**

reports a year, but these do not include verified sightings or signs (Wagner 2000). In spite of Rusz' confirmation of some wild pumas in the UP, some DNR biologists remain skeptical that very many of the big cats reside as wild residents in the state (Robinson 2000, pers. comm.). Of the approximately 750,000 licensed hunters in Michigan, few have reported seeing

the cats. There have not been any identifiable prints, road kills, or legitimate plaster casts of tracks (Robinson 2000, pers. comm.).

In August and September 2001, the Michigan Wildlife Habitat Foundation team searched Stonington Peninsula in Delta County of the UP on three occasions and discovered additional tracks that were verified to be cougar. The team also discovered some old scats on the peninsula that are still awaiting conclusive DNA analysis (MWHF 2001a).

The 60,000-acre Porcupine Mountains State Park, bordering Lake Superior in Ontonagon County, is another area of the UP where there has been some evidence of pumas over the past few decades. The Park was spared the logger's ax and contains the largest stand of old-growth forests between the Mississippi River and the Adirondacks. Some of the maples in the Park measure three feet in diameter.

Sightings of cougars within or near the Park have been recorded in past years. In 1997 a group of deer hunters found a deer carcass cached in a tree (Sprague 2001, pers. comm.). (The Park does allow white-tailed deer hunting.) There are also earlier records of pumas in the Porcupine Mountains. In 1970, a former assistant park manager discovered cougar tracks embedded in a clay hiking trail in the Park, which had been recently soaked by rain (LaPointe 1977).

Another area with persistent mountain lion sightings is the Huron Mountains of Marquette County east of Porcupine Mountains State Park.

Like the Porcupine Mountains, the Huron hills have significant stands of old-growth cedar forests and high deer densities (Rusz 2001, pers. comm.). There have been persistent sightings in or along a 56,000-acre area within the mountains that includes the Huron Mountain Club and adjacent private property (Rusz 2001, pers. comm.). Access to the 28,000-acre Club is very restricted, and Club members have reported seeing cougars in the last few years. Moose and wolves, supposedly extirpated from the state in the early 1900s, were also reported there in every decade of the 1900s (Rusz 2001, pers. comm.).

South and east of the Huron Mountains lies the Ottawa National Forest, containing over 1.7 million acres of spruce, aspen, and isolated stands of old-growth white pine and hemlock. Ottawa contains three wilderness areas totaling over 50,000 acres, and one area, the Sturgeon River Gorge Wilderness, covers 14,193 acres with steep rugged gorges up to 300 feet deep and nearly a mile wide (USFS 2000). There have also been several puma reports within the 18,327-acre Sylvania Wilderness, lying within eastern Gogebic County and bordering northern Wisconsin.

In fact, northern Wisconsin and the UP represent one continuous ecosystem, with the UP containing more unsettled wilderness. Any lions in this region would need to be managed as one population. Abundant deer, wolves, black bears and fishers already inhabit these rugged outcroppings of the Canadian Shield, and undoubtedly, some pumas are also present.

The U.S. Forest Service typically receives two or three reports of cougars a year in the Ottawa National Forest of Gogebic County (Edde 2000, pers. comm.). Three recent records have been deemed as credible (Edde 2000, pers. comm.). The first report was on November 16,

1998, when a hunter saw a mountain lion feeding on a deer gut pile not far from the town of Ironwood. The second incident, which took place on April 16, 2000, involved a man who reported seeing a cougar chasing a rabbit through his yard, five miles south and east of the town of Wakefield. In the third incident on June 6, 2000, a man from Ironwood spotted a puma crossing Fisher Road (Edde 2000, pers. comm.). A trapper who catches a lot of bobcats is convinced cougars are in the Bessemer area (Edde 2000, pers. comm.).

### **Recent sightings in the Lower Peninsula**

Reports are even coming from the Lower Peninsula. On one occasion, while setting up baits for black bears in Huron National Forest in Alcona County 25 miles west of Lake Huron, a DNR wildlife biologist reported a puma walking on a narrow forest path (Robinson 2000, pers. comm.). He was approximately 60 yards away from the cat, and discovered tracks after it disappeared. It was unclear, however, whether this cat was actually a wild puma or an escaped/released captive.

Based on the density of reports, there is growing evidence of a resident cougar population in northeastern Lower Michigan between the towns of Mio and Rogers City and north to Cheboygan; in Emmet County near Cross Village; and between Cadillac and Traverse City in the northwest (MWHF 2001a). Two "hotspots" for puma reports are the Black Lake region of Presque Isle and Cheboygan counties and the Deadstream Swamp region of northern Missaukee County (Rusz 2001). The Deadstream Swamp is one of the most remote areas in the Lower Peninsula and is largely roadless. DNR foresters have found tracks that appeared to be cougar in the Deadstream (Rusz 2001).

The DNR also has filed some credible reports from the Lower Peninsula. In southern Missaukee County, not far from Cadillac, there was a report of tracks in late 1999. A conservation officer went out to investigate, and reportedly saw the big cat during deer season (Perez 2000, pers. comm.). There are also several other unconfirmed sightings by DNR biologists of pumas in the area (Perez 2000, pers. comm.). Parts of southern Missaukee County lies within the Pere Marquette State Forest, which connects to the much larger Manistee National Forest in the county's southwest corner. Such intact habitat could provide a forested peninsula for juvenile cougars leaving their mothers' home ranges and entering new territories, assuming that there is a very small breeding population.

Oscoda County to the west consists of state or federal owned woodlands, locally called the Club Country (Robinson 2000, pers. comm.). Nearly all the old-growth trees on the rather poor, unproductive soils of the Club Country were clear-cut by the early 1900s including northern red oak (Robinson 2000, pers. comm.). Much of the remaining private land in the region was bought in the 1940s by wealthy landowners who created large exclusive hunting reserves, but who do not live in the area (Robinson 2000, pers. comm.). On September 13, 1997, the *Detroit Free Press* newspaper published a photograph of a cougar reportedly about 10 miles from where Robinson saw his cat in Alcona County. The photo clearly showed a cougar lying in ferns and grass.

Further north on the Lower Peninsula, Rusz's research team also appears to have verified the existence of mountain lions. In July 2001, the Foundation team documented a 3.5 inch cougar track on Dale Willey's horse ranch just north of the town of Tower in the Black River Swamp region of Mackinaw State Forest

(MWHF 2001a). Willey also claimed to have seen a cougar in early July 2001, and found evidence that a puma had dragged off a newborn colt a couple days later (MWHF 2001a).

On Rusz's suggestion, Willey agreed to bulldoze a half-mile long road along the north edge of his 70-acre pasture, and check it from tracks every other day. On the fourteenth day, he found a suspected set of cat tracks, which were photographed three days later and confirmed to be cougar by retired biologist Harley Shaw, a cougar researcher from Arizona (MWHF 2001a).

In actual fact, the existence of cougars in the wilds of the Lower Peninsula had already been confirmed. In February 1997, Christi Hillaker captured a puma on videotape as it walked through woods at the edge of her yard near the town of Mesick, in Wexford County. Her video clearly showed all the distinguishing characteristics of mountain lions, including the long tail (MWHF 2001b). A few hours after the incident, her husband measured the tracks at an enormous four and a half inches in diameter. Rusz later reviewed the videotape, measuring the cat's size by a tree it passed in the background, and determined that it reached at least 28 inches at the shoulders: clearly cougar-sized. He also confirmed the tracks to be those of a puma (MWHF 2001b).

Mesick sits on the northern boundary of Manistee National Forest, and in 2000-2001 there were several reports of lions along the Big Manistee River northeast of Mesick in southern Kalkaska County (Rusz 2001, pers. comm.). Another credible report from January 1996 came from near the town of Meauwataka, about five miles from Mesick. Wildlife Biologist Marci Johnson, who

previously had worked on a cougar project in Colorado, saw a puma near town and recorded a great number of tracks in the snow (MWHF 2001a).

### Future protection in Michigan

The Michigan mountain lion was listed as a state protected species in the 1980s, off-limits to hunting (Zuidema 2000, pers. comm.). Such protection has undoubtedly allowed the state's residual resident pumas to stage a very modest comeback. In fact, finding evidence of cougars was considered the easy part—after only two days in the field the researchers found deer carcasses, scat, and tracks (Rusz 2001, pers. comm.). It has been difficult, however, to build a case for wild *Puma concolor*, as skeptics have believed that any confirmed sightings were of former captive animals (Rusz 2001, pers. comm.).

The question now is this: Will the DNR now seek to embrace the few attested cougars as natives, or will it continue to write them off as exotics? The lessons gained from Florida's experience with the Florida panther are instructive. Until the 1970s, that state dismissed recurring reports, and even isolated mortalities, of that remnant cougar population as being escaped captives or descendants of captives (Rusz 2001, pers. comm.). As in Michigan, it took the persistent efforts of independent researchers and hunters to uncover a genuine endemic population of native cougars in Florida. If Michigan's Department of Natural Resources follows Florida's example and embraces this top predator as part of the state's native fauna along with black bears and wolves, this most adaptable of all wild cats in the Western Hemisphere just might find the state's rugged wilderness an inviting home again.

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# *Special Series Part II – Education in Action*

## **An Evaluation of the Endangered Species Act and Private Landowner Assurances**

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### **Editor's Note**

*The UPDATE presents a three-part series of educational essays from Nancy Mathews' Wildlife Ecology class at the University of Wisconsin. We are presenting a selection of position papers regarding Section 10 of the Endangered Species Act. This educational exercise is an example of how the next generation of conservation biologists is being trained. In particular, the essay set reflects an emphasis on remaining sensitive to the perspectives of multiple stakeholders. Perhaps some novel ideas are embedded in these essays as well, as fresh eyes often bring new insights to old controversies.*

*Wildlife Ecology students were given sample Habitat Conservation Plans and were instructed to assume the identity of the associated landowner, who also happened to be a trained wildlife biologist. The role-playing assignment was then given as follows:*

*Please write a position paper to be presented at a Senate sub-committee hearing on reauthorization of the Endangered Species Act. Support or refute the intent of the Section 10 administrative policies that attempt to make conservation planning more palatable to private property owners. Give a brief overview of the policies and present the pros and cons of the private landowner assurances. Support your position using what you have learned in class, the Endangered Species Act, and the assigned Habitat Conservation Plan.*

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### **Introduction**

Good afternoon. My name is Bridget Cummings. I am a private landowner in Austin, Texas, with a holding of five acres. In December of 2000, I received an Incidental Take Permit from the U.S. Fish and Wildlife Service (FWS) for the Houston toad (*Bufo houstonensis*). I am in the process of developing 0.5 acres of my land for a new home that will result in a taking of Houston toad habitat. I also have been a wildlife biologist with the Texas Parks and Wildlife Department for the past six years. Based on my personal and professional experiences, I believe I am qualified to speak with authority when I say that the recent Section 10 policies of the Endangered Species Act (ESA)

adopted by the FWS adequately address the rights of private landowners, while insuring the protection of species against extinction. I am here today to speak in support of the reauthorization of the ESA, including the Section 10 amendments.

The controversy over reauthorization of the ESA involves two major players: (1) private landowners and the wise use movement, and (2) species conservation and environmental groups. The debates were sparked by Section 9 of the ESA, which states that it is illegal "to...take...any species." According to the ESA, "take" means "to harass, pursue, hunt, shoot, wound, trap, kill, capture, collect, or attempt to do such." The wise use movement has

challenged the constitutionality of the ESA based on the Takings Clause of the Fifth Amendment in the Bill of Rights, which states, "...nor shall private property be taken for public use, without just compensation." Because Section 9 of the ESA curtails private landowners' activities and development rights on their land, the wise use movement views the prohibited acts of Section 9 as a taking of their land "without just compensation."

As an initial response to the private landowners' complaints, the FWS amended the ESA in 1982, allowing for the issuance of Incidental Take Permits through the implementation of Habitat Conservation Plans (HCPs). Nonetheless, growing dissatisfaction with the restrictions

placed on private landowners created a more powerful and vocal force behind the wise use movement. In the late 1990s, the FWS incorporated the new Section 10 amendments into the ESA in order to forge a creative partnership between private landowners and the FWS, or more accurately, economic development and rare species' protection.

Section 10(a)(1)(A) established Candidate Conservation Agreements (CCAs) and Enhancement of Survival Permits with Safe Harbors agreements. Both policies encourage private landowners to enhance habitat on their land in order to promote the survival of endangered, threatened, and potentially listed species. The implementation of a CCA may eliminate the need to list species as endangered or threatened in the future. The Safe Harbors agreement attached to an Enhancement of Survival Permit assures landowners that new restrictions will not be imposed if their conservation activities either attract other endangered or threatened species to their land or if the species being managed for increases above a baseline set by the FWS.

With the new amendment policies, Section 10(a)(1)(B), which establishes HCPs, also gained the No Surprises Clause. The development of an HCP allows a private landowner to take an endangered or threatened species as long as the take is "incidental to, and not the purpose of...an otherwise lawful activity," "the effects of the taking are mitigated and minimized to the maximum extent practicable," and no net loss in the population occurs. The No Surprises Clause assures landowners that no new restrictions will be imposed if "unforeseen circumstances" arise.

### Debating the issue

Section 10 authorizes the development of private lands, in some cases, to the detriment of local, and possi-

bly regional, populations of endangered and threatened species. For this reason, environmental groups protest that these policies have tainted the vision of the ESA with an unhealthy balance of economic considerations over pure biological priorities. The environmental argument posits that private landowners should not have disproportionate control of a social good, the existence and diversity of species. They further accuse private landowners of having a bad track record in environmental matters. Private landowners, in turn, point to the government's bad environmental record, specifically that of the U.S. Forest Service and the Bureau of Land Management.

The answer to whether the private or public sector is the better resource manager is debatable. It is not debatable, however, that the ESA will not survive or be effective if it fails to address the rights and needs of those people who are most affected by the Act: the private landowners. Not only do the majority of endangered and threatened species reside on private lands, but many of these species reside exclusively on private lands. Furthermore, the federal government does not have adequate funding for species' conservation on federal lands, much less to compensate private landowners. Section 10 amendments, on the other hand, require private landowners to approach species' conservation proactively through habitat enhancement, habitat banks, mitigation credits, and mitigation funds. Another result of Section 10 amendments is an increase in biological monitoring on lands and for species that may have previously been impossible.

Critics of the Section 10 amendments also attack the assurances granted to private landowners in Safe Harbors agreements and the No Surprises Clause. Though Section 10 agreements are developed within an

adaptive management framework, assurances restrict both the government's future access to private lands and its right to implement emergency procedures and regulations that could save a species from extinction. Environmental groups again fear that disproportionate control is being handed to private landowners and that the government will have little ability to effectively handle a jeopardy situation. Landowners, however, are wary of Section 10 agreements without the inclusion of Safe Harbors agreements or a No Surprises Clause.

### Finding common ground

Despite this ongoing debate between private landowners and environmental groups, a common ground does exist. Both players admit that the intent of the ESA is a good and worthwhile cause. So the question before this subcommittee should not be whether to reauthorize the ESA, but rather, *Does the ESA with the Section 10 amendments adequately protect species from extinction while insuring the rights of private landowners?*

The Section 10 agreements, more specifically an HCP, enabled me to build a house on land that I bought over ten years ago. Prior to the amendments, I would now own five acres of relatively worthless land. In addition, I would have had to abandon my dream of building a home on this land. The HCP not only protected my development rights as a landowner, but the HCP process also brought me new awareness of the responsibilities of being a private landowner and homeowner.

Most people agree that their most valuable asset is, first, their home, and second, the land on which their home is built. Owning property, whether a home, a parcel of land, or both, is a large responsibility that requires securing deeds, building permits, water rights, road access, and mail delivery service. The construction of

my home also required an architect, a construction company, an electrician, and a plumber. Property development is not limited to these responsibilities, however. The land and its natural resources are also affected by development. If an endangered or threatened species lives on land that will be developed, the landowner should know all of the implications of development. An HCP doesn't only address a development project's impact on endangered and threatened species, but also examines how the project will affect other wildlife species, vegetation, wetlands, soils and geology, water and air quality, socioeconomic factors, and cultural resources. The HCP process provides landowners with a greater understanding of, and connection with, their land, resources, and community.

The new responsibilities affiliated with the ESA and Section 10 amendments should be viewed as the next evolutionary phase in private property rights. The 20<sup>th</sup> Century marked advances in civil rights for all people. Parents no longer own their children and husbands no longer own

their wives. White restaurant owners can no longer refuse service to the black community. As cultural awareness has progressed, private property rights have also progressed. As we learn more about the importance of species diversity and conservation, private property rights will again have to evolve.

On my land, endangered and threatened species and their habitat benefited from the Section 10 agreements. Though I destroyed 0.5 acres of potential Houston toad habitat in a suburban subdivision, I donated \$1500 to the National Fish and Wildlife Foundation for the purpose of land acquisition and management, specifically for the Houston toad. My donation was enough to buy 0.75 acres, which equates to a net increase in available Houston toad habitat. Furthermore, after construction of my home, my five-acre parcel was restored with native vegetation, including the pine and oak species with which the Houston toad is most associated.

I am also less eager to apply fertilizer and pesticides on my property. Instead, I use spot treatments, and

only when absolutely necessary. The HCP process made me aware of the detrimental effects of these chemicals, not only for the toads, but also for the health of the whole community. Lastly, I must contact the FWS when I want to engage in development beyond what is stipulated in my HCP. Neither the Houston toad, its habitat, nor I have been adversely affected by the implementation of my HCP. In fact, I believe we all have benefited.

In conclusion: species' protection should not suffer because of human conflicts. When it comes to species diversity, we are all beneficiaries. When it comes to the land, we are all connected. The ESA with Section 10 amendments and private landowner assurances adequately addresses the needs of species and the rights of private landowners. Living in society requires that people come together to solve problems for the greater good. Though the ESA may not be the ideal solution for either player, the ESA embodies a realistic compromise. The ESA with Section 10 amendments should be reauthorized.

# The Science and Policy Behind Proposed Sea Turtle Conservation Measures

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## Abstract

*In recent months, two major actions have been initiated that may change the landscape of sea turtle conservation and potentially ignite controversy. The first action involves an October 2001 proposal by the National Marine Fisheries Service to substantially amend Turtle Excluder Device regulations. The extended public comment period for this proposal concluded on February 15, 2002. In the other action, two environmental groups jointly filed a petition on January 10, 2002, to list certain subpopulations of loggerhead sea turtles (*Caretta caretta*) as endangered. Both the petition and the proposal result from public concern and scientific evidence that current conservation measures are not sufficient to allow recovery of some sea turtle populations, mostly likely loggerhead and perhaps leatherback and green turtles as well.*

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## Background

All sea turtles that traverse U.S. waters are listed under the Endangered Species Act of 1973 (ESA). The Kemp's ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) turtles are listed as endangered. The loggerhead (*Caretta caretta*), olive ridley (*Lepidochelys oliveacea*), and green (*Chelonia mydas*) turtles are listed as threatened, with the exception of two breeding populations of green turtles and one breeding population of olive ridley turtles, which are listed as endangered.

The National Research Council (1990) reported that in U.S. waters shrimp trawling is the primary source of anthropogenic mortality for sea turtles. The Council estimated that during the 1980s shrimp trawling drowned 44,000 loggerhead and Kemp's ridley turtles each year. In order to reduce this mortality, National Marine Fisheries Service (NMFS) mandated the voluntary use of Turtle Excluder Devices (TEDs) in 1987; these regulations became compulsory in 1990.

This regulation and subsequent

amendments require most shrimp and summer flounder trawlers, operating in the Southeastern U.S., to have a NMFS-approved TED installed in each net. A TED consists of an angled barrier, known as a grid, which has vertical slots wide enough to allow shrimp to pass into the net bag but narrow enough to deflect turtles out of an escape opening in the net (Figure 1). NMFS has certified a number of TED designs, which must exclude 97% of the sea turtles that enter the net. In addition, the escape opening, when stretched to form a triangle, must meet or exceed certain parameters. Along the Atlantic Coast the required width is 35 inches and the height is 12 inches; in the Gulf of Mexico the required width is 32 inches and the height is 10 inches (Federal Register 1992).

The use of TEDs, in combination with other conservation measures, appear to be partially successful in helping to recover sea turtle populations. The Turtle Expert Working Group (2000) found that the population size of Kemp's ridley turtles is increasing exponentially. However, this same report found that of the four

genetically distinct subpopulations of loggerhead turtles, only one is stable or increasing, the status of two are unknown, and the northern subpopulation has been declining since the 1970s. This downward population trend in the northern subpopulation, which ranges from North Carolina to northeast Florida, factors significantly into the activities of recent months.

## Science: population trends and fisheries bycatch

In 1980, the South Carolina Department of Natural Resources (SCDNR) began monitoring loggerhead nesting activity because the state has an extensive population of these threatened turtles (Figure 2). The quality long-term data generated from studies in South Carolina comprises a significant portion of the available knowledge about loggerhead populations, which is one of the better-studied sea turtle species. Thus this data is widely used in making policy decisions that often have ramifications for other sea turtle species, as is the case with the proposed TED regulations.

SCDNR conducted ground and aerial beach surveys on a five-year

cycle that entailed three consecutive survey years followed by two non-survey years. A female loggerhead typically nests every two or three years, so this survey design monitored approximately 83% of the nesting population. For the survey years of 1980-82, there were on average less than 5,500 nests statewide. This number decreased to about 4,000 for both the 1985-87 and 1990-92 surveys. The 1995-97 surveys revealed a further decline to less than 3,000 nests. Notably, for the first and third intervals, nesting effort diminished in excess of 25%, which represents a reduction of over 5% each year. Despite variance in nesting intensity and hurricane effects, this downward trend was determined to be statistically significant, thus indicating a true change in the overall population size (Hopkins-Murphy et al. 2001).

In an effort to determine the possible causes of loggerhead population decline, SCDNR categorized the beach survey areas as undeveloped, developed, or mixed-use. The rate of decline was consistent across these categories, which suggests that suitable nesting habitat is readily available (Hopkins-Murphy et al. 2001). This finding is in contrast to a pervasive public misconception that loss of nesting habitat is the cause of declining sea turtle populations. To the contrary, 36% of South Carolina's nesting beaches are protected from development. Furthermore, in South Carolina 70% of the nesting effort is included in nest protection projects, with hatching levels that have exceeded the 60% hatching success goal stated in the Loggerhead Turtle Recovery Plan (Hopkins-Murphy et al. 1999). Moreover, Crouse et al. (1987) used a population model to show that the reproductive value of sub-adults and adults is far greater than hatchlings. In other words, in comparison to older life stages, the mortality of



**Figure 1. Turtle excluder device (TED) manufactured by Saunders Marine Machine Shop. The oval metal ring and bars deflect the turtles. The cut in the netting is where the trap door will be placed. The bars force a turtle to the trap door which will open allowing the turtle to go free. Photo by Bob Williams, NOAA.**

hatchlings has substantially less impact on the population growth rate.



**Figure 2. North Inlet - Winyah Bay National Estuarine Research Reserve. Loggerhead sea turtles nest on South Carolina beaches from May to August. Adult and juvenile sea turtles can be observed in South Carolina estuaries during most months of the year where they feed on a variety of shellfish. Source: NOAA Photo Library.**

Given the sum of this information, mortality in the South Carolina trawl fisheries warrants examination.

Unlike other states, South Carolina has a good history of TED use, so the data are not overly biased by non-compliance. In 1988, South Carolina became the first state to enact regulations requiring the use of TEDs. By 1991, when TED regulations went into full force, most trawlers were in compliance with the law. Accordingly, in the years that followed, the number of strandings (i.e. dead sea turtles found along the shore) decreased by nearly two-thirds. However, the percent composition of strandings changed as well, less sub-adult turtles and more adult female turtles were found dead. This shift toward adult females, which are larger than subadults and reproductively active, indicates that TEDs may not exclude larger, more reproductively-valuable turtles. Thus this shift could explain the continued population decline (Hopkins-Murphy et al. 2001).

On behalf of NMFS, Epperly and Teas (1999) conducted a study in which they compared the sizes of



stranded turtles throughout the southeastern U.S. waters to the minimum opening sizes of TEDs. For the study they used data gathered by volunteers for the Sea Turtle Stranding and Salvage Network (STSSN), an organization that recovers and documents the condition of turtles stranded along the U.S. coast. These records typically include the length and width of the carapace (i.e. the upper shell) but not the body depth. In order to estimate the body depth for the STSSN data set, Epperly and Teas used data from captive and nesting turtles to create a predictive equation that could generate the body depth if provided the carapace length. The results of this comparative study, which used STSSN data from 1986-1997, shows that only 1% of stranded loggerhead turtles had a carapace width that exceeded the minimum TED opening width. However, as many as 47% of stranded loggerhead turtles and 7% of green turtles had body depths that exceeded the minimum TED height. In the last three years of the analysis, nearly 1300 stranded turtles exceeded the minimum TED opening size (Epperly and Teas 1999).

Shrimp trawling, however, is not the only fishery that takes sea turtles as bycatch. A recent study examines the effect of potential sea turtle conservation measures in the Atlantic longline fishery, as well as the shrimp trawl fishery on sea turtle population growth (Epperly et al. 2001a, 2001b). The longline fishery incidentally captures both loggerhead and leatherback turtles; however, due to data availability, this study focuses on loggerheads. The researchers use a computer model to determine the life stage and management action, most likely to stabilize or increase the Atlantic loggerhead population. Based on data from other studies, the model uses three population growth rates, of which a -3% growth rate is probably the most realistic estimate. In addition,

the model assumes that the proposed TED regulations would increase survival of benthic juveniles and adults by 30%. To explore the potential effects of conservation activities within the longline fishery and an increase in longline fishing effort, the modelers increase and decrease the survival rate of pelagic juvenile loggerheads by 10%. The 10% decrease is the most realistic scenario because increasing fishing effort has most likely increased bycatch levels. Using an initial population growth rate of -3%, the model reveals that simply decreasing mortality in the longline fishery will not allow the recovery of loggerhead populations. Rather in order to achieve a positive population growth rate for loggerheads both longline conservation measures (measures which are yet undetermined, although much research is being conducted) and the proposed TED regulations are necessary (Epperly et al. 2001a, 2001b). Because shrimp trawls kill the life-stages of turtles with the highest reproductive value and simply kill a greater number of turtles, conservation measures in the shrimp trawl fishery have a greater impact on population growth than conservation measures in the longline fishery.

### **Policy: proposed TED regulations**

On October 2, 2001, in response to the mounting scientific evidence that current sea turtle conservation measures are inadequate, NMFS announced its intention to make seven alterations to the existing sea turtle conservation regulations. These amendments would only affect the 15,000 trawlers operating in the Atlantic and Gulf waters of the southeastern U.S. and would (1) require all hard TEDs to have a grid with a minimum inside measurement of 32 inches by 32 inches; (2) require the use of either the double-cover flap TED (which has an escape opening

of at least 56 inches by 20 inches) or the leatherback modification (which has an escape opening with a minimum of 71 inch straight-line stretched mesh) (Figure 3); (3) disallow the use of the hooped hard TED; (4) disallow the use of weedless TEDs and Jones TEDs; (5) disallow the use of accelerator funnels; (6) require bait shrimpers to use TEDs in states where a state-issued bait shrimp license holder can also fish for food shrimp from the same vessel; (7) and require the use of tow time limits on small try nets (Federal Register 2001b).

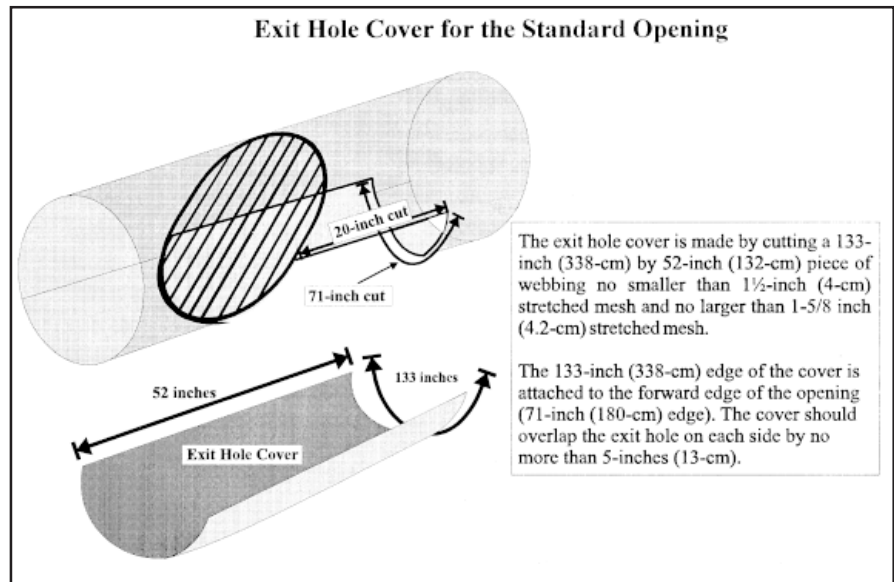
The first three amendments specifically address the scientific evidence that the current size of TED escape openings does not allow the passage of large sea turtles, specifically leatherback turtles and some loggerhead and green turtles. Leatherback turtles can weigh over 1,500 lbs.; all other sea turtles are much smaller. For example, the next largest sea turtle, the loggerhead, weighs up to 250 lbs. (NMFS and USFWS 1991, 1992). In contrast to the hooped hard TED, which would be disallowed under the proposed rule, both the double-cover flap TED and the leatherback modification allow the escape of larger turtles (Federal Register 2001a). By requiring the adoption of these TEDs, NMFS could cease using the Leatherback Contingency Plan (LCP).

The LCP mandates an expensive and inefficient procedure in which NMFS conducts weekly aerial surveys of the leatherback conservation zone during the leatherback annual spring migration from January through June. This unwieldy zone ranges from north of Cape Canaveral, Florida to the southern border of Virginia. If observers sight a congregation of ten or more leatherbacks along a 50-mile transect during replicate surveys, NMFS closes the shrimp trawl fishery in that vicinity for two weeks. A major problem with this

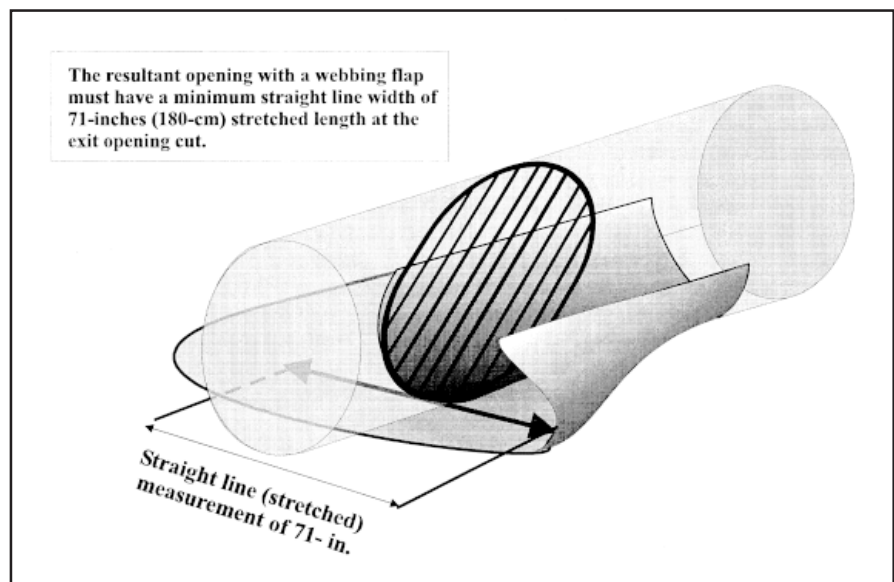
procedure is that replicate surveys are not always possible due to weather, staff availability, and equipment constraints; also, sighting less than ten leatherbacks during a replicate survey does not necessarily indicate that the turtles have left the area. Furthermore, the LCP does not cover the full spatial and temporal distribution of leatherbacks. During non-LCP months in autumn 1999, 15 leatherbacks stranded on the eastern coast of Florida; months into this epidemic NMFS finally issued an emergency closure of the fishery (Federal Register 1999). For the past 15 years, the number of leatherbacks killed in the Western Gulf of Mexico has increased, reaching a high of 21 in 1999. Leatherbacks also strand regularly in the Eastern Gulf; neither the Western nor Eastern Gulf is included in the LCP. The current level of leatherback mortality is alarming, especially given that the nesting effort at the largest leatherback rookery has decreased by over 15% each year since 1987 (Federal Register 2001b). The proposed amendments for TEDs with larger grids and escape openings should prove to be more effective than the present measures for protecting large sea turtles.

The other amendments in the proposed rule seek to improve protection for all sea turtles found along the coast of the southeastern U.S., i.e. Kemp's ridleys, hawksbills, leatherbacks, greens, and loggerheads. The amendments prohibit the use of the weedless TED and Jones TED, both of which have deflector bars that do not attach to the bottom of the grid frame. This modification allows the convenient removal of debris, but the design is structurally weak. A study has shown that if the bars, which are easily bent during trawling, become angled inward the TED will not exclude turtles.

The accelerator funnel, a device that directs and speeds shrimp toward the net bag, will be disallowed be-



**Figure 3a. Exit hole covering for the standard TED opening. Diagram from Federal Register (2001b).**



**Figure 3b. Completed standard TED opening. Diagram from Federal Register (2001b).**

cause the funnel would extend out of the larger escape opening, causing the loss of shrimp.

Previously, NMFS has excluded small try nets (i.e. small trawls used to test for the presence of shrimp) from turtle protection regulations. However, observer data document that try nets account for 43% of turtle captures (Federal Register 2001b). Moreover in 2001, shrimpers reported catching more than twenty sea turtles in their smaller try nets. NMFS rec-

ognizes that the proposed trawl time limits for small try nets will be difficult to enforce, but this is the only conservation mechanism currently available for this type of gear.

In the past, NMFS has also exempted bait shrimpers from TED regulations, in the belief that turtles do not drown in this fishery, because trawl times are short so as to catch live undamaged shrimp. But NMFS enforcement and gear specialists have seen an increase in bait shrimpers that

have more than 32 pounds of dead shrimp on board. This suggests that bait shrimpers are also trawling for food shrimp. NMFS now believes that the bait shrimp exemption is unenforceable, and thus the fishery represents a risk to sea turtle populations and so will be required to use TEDs (Federal Register 2001b).

To date there has been a mixed response to this proposed rule by constituents. Because NMFS extended the comment period, which just ended on February 15, 2002, the Service has not yet responded to the comments it received. However, late last year NMFS did issue a summary of and response to comments it received as a result of an Advanced Notice of Proposed Rule Making. Environmental organizations, federal and state agencies, STSSN volunteers, and concerned citizens support the increase in escape opening size; many of these same groups also recommended modifications to the LCP. The U.S. Fish and Wildlife Service (FWS) suggested the decertification of the hooped hard and weedless TEDs, as well as the abolishment of the bait shrimp exemption. The Georgia Department of Natural Resources recommended that a leatherback modification be adopted universally. In addition, they claimed that 30% of Georgia fishermen already use this modification because it excludes trash fish and the flap covering the escape hole helps retain shrimp. However, Commercial Fishermen of Lafitte, the Florida Fish and Wildlife Conservation Commission, and the Texas Shrimp Association opposed portions of the proposal by respectively, lobbying against the prohibition of the hooped hard TED, questioning the economic burden of the regulations, and questioning the scientific basis of the proposed rule (Federal Register 2001b).

#### **Policy: petition for reclassification**

In their concern for sea turtle conservation, two non-governmental groups

have taken legal action in order to assure that imperiled loggerhead turtles have the fullest protection that U.S. law provides. On January 10, 2002, the Turtle Island Restoration Network (TIRN) in conjunction with the Center for Biological Diversity (CBD) petitioned NMFS and FWS to list the northern and Florida Panhandle subpopulations of loggerhead turtles as endangered and to designate critical habitat for the species. The petition proposes that not only nesting habitat but also the waters in which sea turtles feed should be declared critical habitat.

In addition to the studies discussed in this article, TIRN and CBD cite the life history of loggerhead turtles as support for their request for reclassification. Although the northern subpopulation represents only 9% of U.S. loggerheads, they are disproportionately important to the health of the entire population (TEWG 2000). This is because nest temperature determines the sex of sea turtles, with warmer temperatures yielding more females; thus the northern population contributes 65% of male U.S. loggerhead turtles. Moreover, female sea turtles possess a strong fidelity for nesting on their natal beaches; migration to new nesting beaches is extremely limited, so colonization or repopulation via dispersal would take thousands of years. This is a particular concern for the Florida Panhandle subpopulation. The available data suggest there are less than 1,000 loggerhead turtles nesting in that subpopulation each year; it is possible that a single catastrophic event could extirpate the entire subpopulation (TEWG 2000). High nesting site fidelity also severely restricts maternal gene flow, so that the mitochondrial DNA profile of separate populations is distinctly different (TEWG 2000). TIRN and CBD use this and other evidence to support their request to designate these two subpopulations as

distinct population segments (DPS), which warrant protection.

Although Congress has not defined the concept of DPS, NMFS and FWS jointly declared that a population segment must be discrete, significant in relation to the remainder of its species, and satisfy ESA conservation requirements. The Services offered two standards for discreteness; the one applicable in this case is that the population must be "markedly separated from other populations of the taxon as a consequence of physical, physiological, ecological, or behavioral factors" (Federal Register 1996). To fulfill this requirement TIRN and CBD cited physical and ecological separation during nesting and genetic and morphological differences between the subpopulations, as well as quoted past NMFS and Turtle Expert Working Group (TEWG) statements. NMFS stated that it "treats these genetically distinct loggerhead turtle nesting aggregations as distinct subpopulations whose survival and recovery [are] critical to the survival and recovery of the species" (NMFS 2001). The TEWG recommended that based on genetic differences the subpopulations should "be considered independent demographically, consistent with the definition of a distinct vertebrate population segment and of a management unit" (NMFS 2001).

In determining the significance of a population segment to the overall population, NMFS has suggested four considerations, although others are possible. The two that apply in this case are (1) evidence that loss of the DPS would result in a significant gap in the range of a taxon and (2) evidence that the DPS differs markedly from other populations in its genetic characteristics. Once again the turtles' unique reproductive behavior is crucial to meeting these requirements. Namely, slow dispersal rates would guarantee a persistent range

gap if a nesting population was lost and northern subpopulation males are an important source of genetic diversity (TIRN and CBD 2002).

Once NMFS determines a population to be discrete and significant, it evaluates the conservation status of the population based on five criteria. Meeting one or more of these would qualify the species for endangered status. The two which apply in this care are (1) the present or potential destruction, modification, or curtailment of its habitat or range and (2) other natural or manmade factors affecting its continued existence. TIRN and CBD address these criteria by summarizing the numerous anthropogenic sources of mortality and habitat degradation, which include fishery bycatch, beach development, artificial lighting, and pollution (TIRN and CBD 2002). Currently this petition for reclassification is being considered for emergency listing of the subpopulations. The emergency rule would be in effect for 240 days, meanwhile the northern and Florida panhandle loggerhead turtle subpopulations would enter the normal listing process.

If brought to fruition, the reclassification of loggerhead subpopulations and the proposed TED regulations would be the most profound change in sea turtle conservation measures in the U.S. since the original TED mandate in 1987. At that time the nationally publicized conflict

climaxed when shrimpers blockaded ports in protest to the regulations. Hopefully in the intervening time, working relationships have developed among NMFS, state agencies, non-governmental groups, and industry, which will guide these potentially controversial processes to amicable and appropriate endings.

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# Legislative UPDATE

## Global Warming

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### Global warming and its effects on endangered species

Greenhouse gases (GHGs), such as carbon dioxide and nitrous oxides, occur naturally in our atmosphere to trap some of the sun's heat and warm our earth, keeping it at the hospitable average 60°F we are accustomed to. Without these gases, life as we know it could not exist; the temperatures would be far below freezing. However, the other extreme can happen as well. If there are too many GHGs in the atmosphere, the earth gets hotter, adversely affecting many species (EPA 2001).

Since the turn of the century, global mean temperatures have risen about 1°F. Since the beginning of the industrial revolution, the atmospheric concentrations of carbon dioxide has increased 30%, methane concentrations have doubled, and nitrous oxide concentrations have increased 15% (EPA 2001). Coincidence? Unlikely.

If GHG emissions continue to increase as they have, by 2100 global mean temperatures will rise another 2 to 10°F. What does this mean to us? To our species? A lot. As the earth warms, sea levels will rise (they already have risen four to eight inches). Among other things, this might cause the spread of water-borne diseases and the loss of crucial coastal habitats. Specifically, estuarine beaches, relied upon by endangered species such as the least tern (*Sterna antillarum*), will likely be destroyed; many shore birds rely on these beaches for food specific to these locations, such as horseshoe crabs. It is uncertain what will happen when this food supply is lost and habitat is decreased, but the outlook is not good (EPA 2001).

In general, global warming will have unusual consequences for many ecosystems. For example, many wetlands will dry up and deserts will get rain. Soil moisture will likely decline as temperatures increase and more water is evaporated. Storm frequency will increase as more water evaporates. Aquatic life may suffer, as ocean temperatures will increase as well. There are many possible detrimental effects of global warming, and thus it is necessary to address these problems now. Congress is beginning to recognize this, and several of their proposed solutions are outlined below.

### Bills to improve automobile efficiency and emissions

*Automobile Fuel Economy Act of 2001 (H.R.1815)*

This bill aims to increase fuel economy standards for light trucks and automobiles weighing up to 10,000 pounds (gross vehicle weight). Miles-per-gallon (mpg) standards between model years 2002 and 2004 will be no less than 22.5 mpg, between model years 2005 and 2007 will be no less than 25 mpg, and after model year 2007 will be no less than 27 mpg.

*Clean Efficient Automobiles Resulting from Advanced Car Technologies (CLEAR ACT) Act 2001 (S.760 and H.R.1864)*

Due to the United States' increasing reliance on foreign oil (which not only contributes to more emissions but also adversely affects National Security) this bill promotes the manufacture and purchase of advanced-technology motor vehicles. Such vehicle technology includes fuel cell, hybrid, battery electric, and alterna-

tive fuels. CLEAR ACT will offer monetary incentives to consumers and retailers for the selling and purchasing of these vehicles for a limited period.

### Bills to improve air quality

*Clean and Renewable Fuels Act of 2001 (S.892)*

By January 1, 2002, this bill plans to amend the Clean Air Act by prohibiting the sale and dispensing of all fuels and additives containing methyl tertiary butyl ether (MTBE) to ultimate consumers. Furthermore, three years after this is implemented, the bill will ban the manufacture and introduction of MTBE-containing fuels and additives. Under this Act, the Administrator of the Environmental Protection Agency (EPA) will be authorized to "take necessary action to protect human health and the environment" in the event of MTBE contamination of soil or water.

Moreover, the bill restricts the aromatic hydrocarbon and olefin contents of reformulated gasoline and toxic air pollutant emissions from baseline vehicles using these fuels. Finally, it requires the EPA Administrator to revise such gasoline standards.

*Clean Power Plant Act of 2001 (H.R.1335)*

This Act also amends the Clean Air Act by imposing certain limitations on mercury (Hg), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxide (NO<sub>x</sub>) emissions of fossil fuel-powered electric generating units having capacities of at least 15 megawatts. For each pollutant and carbon dioxide (CO<sub>2</sub>) unit, operators and owners will be required to produce quarterly pollutant-specific emission reports, which will be compiled and published by the EPA Administrator.

This bill also instructs the EPA Administrator to determine a generation performance standard for CO<sub>2</sub> for fossil fuel-powered electric generating units and apportion allowances among these units, with a penalty for those units that exceed such emissions standards. The allowances may be traded or carried over, thus allowing a unit to exceed the performance standard if it has sufficient emissions "credits."

*Clean Power Plant and Modernization Act of 2001 (S.1131)*

This bill will enforce certain combustion heat rate efficiency standards to be maintained by fossil-fuel generating units that begin operation within 10 years of the Act's passage. It further orders the EPA Administrator to publicize to consumers: fuel sampling and monitoring procedures for mercury emission reductions, regulations regarding discovery of unit emissions amounts, and the transfer of captured and recovered mercury.

This bill will also extend the date by which certain geothermal and solar power plants must be placed in service to receive the renewable energy tax credit. Finally, it instructs the Secretary of Energy to fund pro-

grams to promote the benefits of power generation via biomass, geothermal, solar, wind, fuel cell, clean coal, and advanced gas turbine sources.

**Bills to aid in climate change response**

*Climate Change Strategy and Technology Innovation Act of 2001 (S.1008)*

This bill would amend the 1992 Energy Policy Act, requiring the Director of the National Office of Climate Change Response to establish the United States Climate Change Response Strategy ("the Strategy") and the United States Climate Change Response Interagency Task Force to aid in the development of the Strategy. Directors of major national laboratories would be required to meet annually with the President to affirm that U.S. energy technology research is on schedule with the Strategy and the long-term goal of stabilizing greenhouse gas concentrations.

The bill also would found two divisions in the Department of Energy: the Office of Carbon Management and the Center for Strategic Climate Change Response. These divisions would, respectively, manage a Strategy-driven energy technology

research and development program and assist combined assessments of alternative climate change response scenarios and Strategy initiation.

*Climate Change Risk Management Act of 2001 (S.1294)*

This bill would amend the 1992 Energy Policy Act by ordering the President to generate a national policy, consistent with the U.N. Framework Convention on Climate Change, to alleviate the risks posed by potential climate changes. To reduce anthropogenic emissions of greenhouse gases and remove such gases from the atmosphere, the bill directs the Secretary of Energy to implement a long-term Climate Technology Research, Development, Demonstration, and Deployment Program that would address such issues. The bill lastly directs the Secretary to provide funds for such international energy deployment projects.

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*Information for Legislative UPDATE is provided by Ashley McMurray, an undergraduate student of public policy and the environment at the University of Michigan.*

# News from Zoos

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## Manatees released in Biscayne Bay

Officials released two endangered West Indian manatees into Biscayne Bay on February 5, 2002 after the manatees spent nine months at the Columbus Zoo and Aquarium. The manatees were brought to the zoo March 6, 2001 as part of the U.S. Fish and Wildlife Service's rehabilitation and recovery program. The two were then sent to SeaWorld Orlando on December 13, 2001. They had come to Columbus via SeaWorld, one of seven critical care facilities for manatees in Florida.

Brooks, two-years old, was found in April 1999 near docks about 50 miles south of Daytona Beach, Florida. When the orphaned calf arrived at the zoo, he was seven feet long and weighed 550 pounds. He is now eight feet, six inches long and weighs more than 800 pounds.

Trident, three-years old, was found in February 2000 about 60 miles north of Palm Beach, Florida. He was suffering from frostbite because he didn't migrate to warmer waters. Trident was also seven feet long when he arrived and weighed 600 pounds. He is now more than seven feet, six inches long and weighs more than 800 pounds.

It is the second time the Columbus Zoo and Aquarium has returned a manatee to the wild. In February 2000, Comet, an orphaned manatee, was released at Blue Springs State Park in Florida. [Source: Associated Press]

## Spectacular Falkland Islands with Vast Penguin and Albatross Colonies Given to WCS

The Wildlife Conservation Society (WCS), which operates several AZA-accredited zoos and aquariums in the New York City area, announced on March 5, 2002 that New York philanthropist Michael Steinhardt, a member of the WCS Board of Trustees, had donated two spectacular, uninhabited islands in the south Atlantic to the Society. The islands, part of the Falklands archipelago, are home to huge numbers of penguins, albatrosses, and other rare wildlife.

Called Steeple Jason and Grand Jason, the islands lie about 250 miles east of Argentina on the edge of the continental shelf. They support not only large populations of penguins (rockhopper, gentoo, Magellanic) and black-browed albatrosses, but also Southern giant petrel, Falklands skua, and one of the world's rarest birds-of-prey, the "johnny rook" (a.k.a. striated caracara).

Steeple Jason Island is over five miles long and nearly a mile across at its widest point. Grand Jason Island is nearly seven miles long and approximately two miles across. They are among the westernmost islands in the Falklands chain. Steeple Jason's nesting population of more than 150,000 pairs of black-browed albatrosses is considered the largest in the world.

Working in conjunction with the Falkland Islands' government and Falklands Conservation, a local environmental organization, WCS plans to construct a research station on one of the islands to gain a better understanding of the native animal species. Mr. Steinhardt will give WCS \$425,000 to build the research station, to be named the Judy and Michael Steinhardt Conservation Station, and to underwrite three years of research programs.

According to WCS Senior Conservationist Dr. William Conway, who recently returned from wildlife surveys of the Jasons, their vast bird colonies represent one of the great wildlife spectacles left on earth, comparable to the wildebeest migration of the Serengeti and to the caribou migration of the Arctic.

"The Falkland Islands have some of the last great masses of birds and the Jasons' colonies are particularly spectacular," he said. "It's truly awe-inspiring. It is the sort of thing that makes one feel small."

But the islands are more than just two isolated jewels. Long-term WCS research in neighboring Patagonia shows that the Jasons are part of a much larger, dynamic ecosystem, vital to everything from elephant seals to penguins.

"The Jason Islands are one piece of an ecosystem-wide puzzle that the Wildlife Conservation Society has been working on since the 1960s," said Dr. Andrew Taber, WCS's director for Latin America Programs. "The gift of the islands allows us to establish another conservation beachhead to further understand the natural systems that impact wildlife of the region." [Source: Wildlife Conservation Society]

# News & Events

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## **Defenders of Wildlife 2002**

The fourth national conference of Defenders of Wildlife will take place November 17-20, 2002 in Monterey, California. The title will be "From The Mountains To The Sea," which reflects the conference's focus on the biology and conservation of marine and terrestrial predators. For more information contact Sharon Wilcox at (202) 789-2844, [carnivores2002@defenders.org](mailto:carnivores2002@defenders.org), or visit <http://www.defenders.org/carnivores2002>.

## **Invasive plant symposium**

The Chicago Botanic Garden hosts the 7th annual Janet Meaking Poor Research Symposium entitled, "Invasive Plants: Global Issues, Local Challenges." The symposium will take place in Chicago on October 27-30, 2002. For more information contact Kayri Havens, [\[chicagobotanic.org\]\(http://chicagobotanic.org\), or Linda Jones, \[ljones@chicagobotanic.org\]\(mailto:ljones@chicagobotanic.org\), \(847\) 835-8261.](mailto:khavens@</a></p></div><div data-bbox=)

## **\$400K BLM grant to Chicago Botanic Garden**

The U.S. Department of Interior Bureau of Land Management (BLM) has awarded \$400,000 to the Department of Conservation Science and the Institute for Plant Conservation Biology, housed at the Chicago Botanic Garden, for use in conservation efforts. Two separate grants will be used for (1) developing and implementing a conservation internship program to assist BLM with promoting conservation of species-at-risk and managing their habitat on public lands, and (2) investigating genetics of threatened plant species in the Great Basin states of Oregon, Idaho, Utah, and Nevada.

## **Froglog Shorts**

The Declining Amphibian Populations Task Force reports that:

◆ The last known population of the Mississippi gopher frog (*Rana areolata*), numbering about 100 animals, has been given full legal protection.

◆ Also, a state-protected reserve has been set up for the giant salamander (*Andrias davidianus*) on Mount Qinling, northwest China. The reserve is one square kilometer in size and contains 47 giant salamanders, of which 40 have been rescued from elsewhere.

For more amphibian conservation news: <http://www.herpdigest.org> or <http://www.stopextinction.org>.

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*E-mail your announcements for the Bulletin Board to [esupdate@umich.edu](mailto:esupdate@umich.edu). Some items are provided by the Smithsonian Institution's Biological Conservation Newsletter.*

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