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EDITORIAL: MANATEES, GOVERNMENT, AND THE COMMON GOOD

By the time you read this, the outcome of the presidential election here in the United States may be known. For better or worse, it will have more than usually serious implications throughout the world – not least for environmental issues. Much is at stake, from survival of obscure species to the condition of the Earth’s very atmosphere, hydrosphere, and biosphere.

Issues of war and peace, social well-being, and economic security for all the world’s people understandably receive the most attention in what promises to be a very close political race. The winner’s actions in these areas will leave their visible mark on the next generation or two, and maybe beyond. But as biologists, we know that the impacts of current U.S. policies on our ecological life-support systems are apt to be much longer-lasting: climate and sea-level change, irreversible loss of biodiversity, and (the most taboo topic in American public discourse) human overpopulation. While other governments and nations are also at fault, the disproportionate share of the world’s resources consumed by Americans, together with the economic and geopolitical power of the U.S., gives us a similarly disproportionate share of the responsibility.

Sirenians are no less at risk than other wildlife. The manatee has long been a political football in Florida, never more so than now – a predictable (and predicted, in these pages) result of ever-increasing human encroachment on its habitat. Regulatory agencies attempting to protect manatees today face opposition not only from marine industries, boaters, and developers, but also from environment-unfriendly federal and state administrations and legislatures (see, for example, Pat Rose’s article below). In this climate, the scientific basis for management decisions is easily distorted or set aside in deference to the political pressures.

The George W. Bush administration’s frequent skewing of science to weaken environmental regulations has (unlike overpopulation) been extensively discussed and documented by American journalists in recent months. One noteworthy technique of this “disregulation” is a semantic one: in effect, rewriting the dictionary to make existing rules mean something different from what they say. For example (as reported in *The Washington Post*, 17 August 2004), in the Appalachian region, where coal is strip-mined by the removal of entire mountaintops, the coal industry now has broad permission to dump the waste rock into the intervening valleys, destroying the mountain streams and their biotas. Regulators accomplished this by simply renaming the waste as “fill”, which is subject to less stringent controls on where it can be put.

This technique may sound familiar to readers of *Sirenews*. As reported in our issue Number 38 (October 2002), industry interests are pressing to have the Florida manatee downlisted from “Endangered” to “Threatened” in state government parlance – never mind that “Threatened” in this Neo-Floridian dialect is synonymous with “Endangered” in the international English of the IUCN.

The Florida Fish and Wildlife Conservation Commission (FWCC) is in a crossfire between industry and boating lobbyists who demand relaxation of manatee protection, and manatee advocates who want stricter rules. In these unprecedentedly-heated circumstances, where decisions should logically be guided by scientific evidence of what protection manatees really need, one would think that FWCC would seek scientific advice as never before – for example, from its own long-standing Manatee Technical Advisory Council (MTAC) (described in *Sirenews* No. 13, April 1990). However, after more than 20 years of continuous functioning and persistence through several agency reorganizations, MTAC was quietly and without explanation allowed to go out of existence in 2002 – just when political pressure for manatee downlisting was on the rise.

FWCC has subsequently argued that the present availability of scientific advice from other, independent sources, such as the interagency Manatee Population Status Working Group (MPSWG), makes MTAC in its original form somewhat redundant. Perhaps, but there is an added cogency to specific advice on a specific decision given to an agency by its own in-house advisory body – especially when it’s on the public record, as Florida law requires. Of course, when the gist of the advice can be anticipated in advance (given the widely-disseminated conclusions of the MPSWG and other scientific sources), and is politically unwelcome in certain quarters (as is also true in this case), this added impact is not viewed by all parties as a plus.

Officially, FWCC is considering reconstitution of MTAC in some form, and inclusion in management decisions of more diverse “stakeholders”. These stakeholders include opponents of manatee protection, who are already well represented on other state advisory bodies. The stated goal is to reduce the stridency of the manatee debate –

indisputably a worthy aim. But non-scientists should not be at the table where specifically *scientific* advice is formulated, and hopefully this is not FWCC's intent. Let the scientists maintain their objectivity, and let the other stakeholders voice their political, economic, and philosophical arguments, pro and con, in the *political* forum once the scientific data are in.

FWCC's manatee biologists and rulemakers have an unenviable task, as Florida's population explosion increasingly crowds them and their options into a political corner. The politically-appointed Commissioners of the FWCC, who will make the final decision on downlisting, must realize that the stridency of the debate will not diminish if they appear to be following the Bush administration's pattern of redefining words, marginalizing objective scientific advice, and disregulating the exploitation of natural resources.

Florida's decision on downlisting manatees is presently on hold until after November 2004.

So what might come of this election? For two centuries, a foundational principle of the American republic – enshrined in the preamble of our Constitution – was the notion of the “general Welfare” or common good: the conditions that allow all people, either as groups or individuals, to reach their fulfillment more fully and easily. Over the past three-quarters of a century, commitment to this goal grew more explicit in the consensus that the citizenry as a whole should tax itself to ensure all its members some minimum of social well-being, including food, shelter, health, education, and other necessities of life, plus many other desirable services. Over the past half-century, this view of the common good expanded to include responsibility for the well-being of the biosphere, our common life-support system. The common good remains a key ingredient of the “American dream” that beckons to would-be immigrants the world over.

But in the past quarter-century, this sense of civic duty has been eroded, not only by a return toward laissez-faire capitalism, but by a still more insidious attitude that taxation itself is an intolerable imposition of government. A republic that began with the slogan “No taxation without representation” is now infected with the spirit of “No taxation even with representation”. Our representatives, who led us down this easy path, now fear to reverse course, lest they be trampled by the stampede they started.

We see all around us the effects of leading a whole generation to expect that taxes will always go down. Public services are privatized through “user fees”; public institutions are forced to seek private sponsors; compassion for the needy fades; even an army at war lacks for supplies. Though many of our patriots now favor the motto “Freedom isn't free”, they seem to think it demands only their blood, not their money.

Paying taxes will never be popular, but everyone has his or her favorite government program, whether Social Security, “homeland security”, parks, education, or endangered species. In the U.S. today, *every one* of these, *every* function of government, suffers for lack of adequate tax revenues. The common good, indeed the government itself, has been sabotaged by irresponsible tax cuts more effectively than any terrorist attack could accomplish. If overpopulation is our most taboo subject, then this is the second: neither political party is willing to admit that Americans must pay more taxes if the common good is to be preserved.

The United States' looming fiscal disaster will not serve the common good of the other inhabitants of this planet. Averting it will take not just a narrowly-won election, but an attitude adjustment for this whole society. - **DPD**

SIRENEWS: THE FUTURE ?

At the marine mammal conference in North Carolina last December, I raised the dual issue of providing for sirenian information resources in the future: the continuation of *Sirennews*, and compilation of and access to the bibliographic database. Progress has since been made on both scores, but problems remain. The bibliography has been converted to new software, but the task of making it Web-accessible has not been tackled; indeed, there is a backlog of at least a year just in keeping it updated with current citations.

As for *Sirennews*, the mailing list was switched to new software as of the last issue. Other demands on my time, however, now cast serious doubt on how much longer I can continue editing the newsletter in addition to compiling the bibliography.

In any case, after twenty-one years of the same editor, the wisest course would surely be for the Sirenia Specialist Group to make concrete plans for its publication's future. One or more capable volunteers are needed who will singly or jointly commit the equivalent of two or three person-weeks per year (assuming continuation of the present scope and format) to compile, edit, print, and distribute *Sirennews* on a regular, ongoing basis. Transition to the new editorship should begin as soon as a willing successor can be identified. - **DPD**

CORRECTION

Sirennews No. 41, April 2004, incorrectly reported that the recent birth of twin manatees in Saint-Aignan, France, was the first such captive birth in the world. The Centro Mamíferos Aquáticos/IBAMA in Pernambuco, Brazil, has brought to our attention the fact that the first captive conception and birth of twin manatees was actually registered at their facility in April 1997. This was reported in *Sirennews* No. 28, October 1997; also at the Captive Manatee Reintroduction/Release Workshop, St. Petersburg, Florida, 26-27 May 1998; at the 8th Reunion of Aquatic Mammal Specialists of South America; and the 2nd Latin America Aquatic Mammal Specialists' Congress – SOLAMAC, in 1998. Currently, the seven-year-old female twins are still alive and well in Pernambuco.

LOCAL NEWS

CARIBBEAN REGION

Caribbean Countries Urged to Protect West Indian Manatee, Turtles. - Countries that are signatories to the protocol concerning "Specially Protected

Areas and Wildlife (SPAW)" ended a meeting in Jamaica on 5 October 2004, with delegates urging support for efforts to protect critical species such as sea turtles and the West Indian manatee.

A statement issued at the end of the meeting, held in Montego Bay, said that the delegates agreed on updated criteria for listing species under the SPAW Protocol.

"The criteria, originally developed in 1990, needed to be revised in the context of recent developments in the field of biodiversity conservation. Experts of government agencies and of NGOs had prepared the modification. The criteria for listing species are a central element in the implementation of the protocol," the statement said.

It said that the meeting identified "those species in the region which require protection or regional cooperation in their management, given that they are endangered or threatened with extinction".

The statement said that the meeting agreed to "promote best and sustainable practices within the fisheries, tourism and agro-industry sectors, to protect the barrier reef in Central America".

It also agreed to "support country and community efforts to protect critical species such as sea turtles and the West Indian manatee. Also, [to] support regional cooperation for the protection of marine mammals and develop management plans for the sustainable fisheries of queen conch and lobster."

The meeting was attended by delegates from Barbados, Colombia, Cuba, Dominican Republic, France, Netherlands, Panama, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, USA, and Venezuela. Representatives from Belize, Guatemala, Jamaica, Nicaragua and the United Kingdom attended the meeting as observers, the statement added. - (Source: Caribbean Media Corporation news agency, Bridgetown, via BBC)

COLOMBIA

Manatees in Ciénaga Paredes (Santander, Colombia): Research and Education for Species Conservation. - Ciénaga Paredes (Santander, Colombia) is a marshy lake in the wetlands of the Magdalena Basin with a wide diversity of plant and animal communities. The site harbors many key species, including the vulnerable manatee *Trichechus manatus*.

In the dry season of 2002 (February), more than 18 manatees in Ciénaga Paredes were endangered by the extremely low water level. The people of the nearby communities of El Cerrito and Campoduro reported the stranding and death of a male adult manatee. The situation became very serious in October 2002, due to oil spills of nearly 500 barrels in a stream leading into the lagoon. A contingency plan was developed, and almost 70 people helped to clean up the oil, including fishermen, biologists and conservationists.

These events showed the urgent need for research and educational activities. We launched a research/conservation campaign for manatees during 2002 and 2003. The objectives of the project were identifying the critical areas/times for manatee conservation, describing current and potential threats to the species population and its habitat, and assessing the current status of this manatee population. The project also had strong social and community context: one of the aims was to assess the traditional significance of manatees, and to stimulate environmental awareness and positive behavior of local communities towards manatees.

A total of 75 in-depth interviews were conducted with fishermen living in the region and known to be familiar with

manatees. In addition to collecting data on location, feeding and stranding, the interviews attempted to cover conservation and cultural aspects. We conducted workshops with the participation of local people, especially fishermen (13 workshops) and children (14 workshops). During these meetings the importance of protecting the manatee in Ciénaga Paredes was highlighted; and we saw that there was a special local interest in the species: resident fishermen take food to the manatees during the dry season, and for 20 years there has been no manatee hunting in the region. We should build on this commitment to strengthen protection for the species.

Occurrence data for manatees were obtained from direct observations and studies of feeding tracks in aquatic vegetation. The sightings were made from a small boat close to manatee feeding areas. 213 hours of effort resulted in 777 sightings of manatees (3.64 sightings/hour). Both solitary and associated manatees were observed, but herds (10 to 18 individuals) were registered only during the driest period. Thirty-three manatee-feeding areas were registered, with the animals feeding on *Paspalum repens*, *Paspalum fasciculatum* and *Polygonum ferrugineum*. In addition, 21 fecal samples of manatees were collected. Data showed that manatee movements are dependent on food availability and water levels.

The exact number of manatees in Ciénaga Paredes is unknown. Manatees are difficult to count because they inhabit turbid waters, and their behavior makes them difficult to see. However, local residents estimated a population of 40-50 individuals. The fishermen claimed that this population has been stable through the years, because of low human-related mortality and lack of hunting.

Unfortunately, this is tempered by the fact that the manatee population in Ciénaga Paredes is threatened by habitat alteration and contamination.

Accidents to oil pipelines have already caused high pollution levels in the ecosystem, threatening the lives of local inhabitants. During the dry season in particular, manatees have to occupy small, restricted habitats, and this puts them in a vulnerable position. Oil spills within river systems and canals used by manatees endanger the local population, but this effect is difficult to quantify. In addition, this marshy lake is suffering from serious deforestation and erosion as a result of expanding cultivation. African palm farming and increase in grassland for cattle are also contributing to habitat deterioration.

To summarize, the conditions in Ciénaga Paredes are adequate for manatee survival in terms of food resources and lack of hunting activities, but habitat loss is a dangerous threat to both manatee and human populations. As ecosystem destruction is human-related, broad social and economic measures are necessary. In addition, a program to support and coordinate research and environmental education in Ciénaga Paredes is needed. For this to succeed, it is essential that government and non-government organizations and local people continue to cooperate.

Acknowledgements: This study was made possible by a grant from Sirenian International, Inc. The research team also received help from the Regional Autonomous Corporation of Santander (CAS) and the Ministry of the Environment of Colombia (MAVDT). We are very grateful for the spontaneous collaboration given by the fishing communities of El Cerrito and Campoduro, in particular we express our

gratitude to Jose Manuel Zapata "Morita". Finally, we would like to thank Sarita Kendall for suggestions and text revision. - **Castelblanco-Martínez, D. N.^{1,2,3}; V. E. Holguín¹; B. Aguilar¹; J. P. Giraldo-Vela¹; D. Caicedo¹, and F. Trujillo¹** (¹Fundación Omacha, Carrera 7ª # 27- 40, piso 4, Bogota, Colombia; ²Lab. Mamíferos Acuáticos, INPA, Manaus, Brazil; ³Universidad Nacional de Colombia)

FLORIDA

(NOTE: For detailed coverage of manatee matters in Florida, read *Manatee News Quarterly*, published by the Florida Fish and Wildlife Conservation Commission.)

Hypocrisy Prevails as Florida Legislature Erodes Manatee Protection. - At the end of April 2004, the Anti-Manatee bills, SB 540 and HB 633, were passed by the Florida Senate and House of Representatives. These bills turned out a little better than the original drafts, but remain harmful to manatees.

Using both deceptive and malicious strong-arm tactics, the leaders of the Florida Senate and House forced numerous legislators to go against their consciences and support changes to the Florida Manatee Sanctuary Act that both will make it more difficult to recover manatees from endangered status and will mean more manatees will be injured or killed. In fact, the proposed legislation would not have even made it out of the Senate Natural Resources Committee if the Senate President had not held several committee members' bills hostage to force them to support this bad legislation. We also know that House members' bills were held hostage in a similar way from pressure exerted by

the Speaker Pro Tempore, who was also the House sponsor.

Hidden within this Trojan horse of supposed studies to help manatees are limitations on the state's authority to adopt new speed zones to protect manatees and language promoting recreational boating. These new limitations take effect even before manatees are recovered from endangered status. New language is inserted into the Manatee Sanctuary Act declaring that the "mission" of the Florida Fish and Wildlife Conservation Commission (FWCC) is to both **maximize manatee protection and maximize recreational boating in Florida waterways.**

While the sponsors and marine manufacturers may pass this off as a mere statement of philosophy, it will be used by disgruntled boaters to challenge manatee protections anywhere they exist on the basis that any manatee protection at all means their recreational boating opportunities are not "increased to the highest possible" – which is Webster's definition of "maximize".

To add insult to injury, the funding for the studies that were supposed to help manatees was stricken from the bill before its final passage – leaving only more restrictions on the FWCC's authority to protect manatees.

Despite numerous editorials against this legislation from papers across Florida, criticisms from many long-time manatee and wildlife experts, and objections from most environmental and public interest organizations, the Legislature approved these changes to the Manatee Sanctuary Act that were brought forward by representatives of the marine manufacturers and the go-fast boating

groups. This harmful legislation was signed into law by Florida Governor Jeb Bush (brother of the U.S. President) on 23 June 2004. - **Patrick M. Rose** (Director of Government Relations, Save the Manatee Club) (Reprinted from *The Manatee Zone*, June 2004.)

MEXICO

México Adds Manatee Habitats to the Ramsar List. - In February 2004, the Alvarado Lagoon System (ALS) was recognized as a Wetland of International Importance and included in the list of Ramsar Sites. ALS is a lagoon and estuarine system that covers 280,000 ha on the coast of the Southern Gulf of México. It is also considered an important conservation site for many threatened species due to its habitat complexity, which includes more than 100 inner lagoons, mangrove forest, and the Papaloapan, Acula and Blanco rivers that drain into the Alvarado lagoon, and finally, into the Gulf of México (GOM). At the regional level, ALS is believed to sustain the biggest population of manatees (*Trichechus manatus*) in Veracruz State. The manatee, an endangered species in México, is an inhabitant of this ecosystem that is affected by many environmental problems such as land clearing for agriculture and cattle-grazing, increasing coastal development, gas and oil exploration, water pollution, and illegal hunting.

Since 1998, seven manatees have been rescued in ALS in a coordinated effort between the University of Veracruz (UV), the Veracruz Aquarium, State authorities, local communities, and fishermen. Manatees are mainly found entangled in gillnets or long-lines, and manatee calves are also found as orphans.

After a five-year education program developed by the UV, former manatee hunters and local fishermen have become collaborators in a monitoring program. At present, residents act as informants who report any manatee entanglement or stranding to the local authorities and researchers.

Along with ALS, other coastal manatee habitats on the GOM were recognized by Ramsar and the Ministry of Environment in México. This diversity of marine and estuarine ecosystems includes Laguna Madre in Tamaulipas State, Laguna Sontecomapan in Veracruz State, Pantanos de Centla in Tabasco State, Laguna de Terminos in Campeche State, Ria Lagartos in Yucatan State, and Laguna Yum Balam in Quintana Roo State.

This designation adds new conservation recognition and ecological value to these important ecosystems along the GOM. Some of them have already been included in the National System of Protected Areas, but others such as ALS are yet to be included. This means additional efforts must be placed on improving law enforcement, sustainable regional planning and development, and fomenting participatory projects to share with local communities better options for natural resource use. - **Alejandro Ortega-Argueta** (University of Veracruz, México & University of Queensland, Australia; e-mail: <aortegarg@yahoo.com.mx>)

PHILIPPINES

Rescue and Rehabilitation of a Neonate Female Dugong (Dugong dugon) in Guimaras/Iloilo City, Philippines. - On 24 April 2004, a fisherman in Barangay Moroguan, Jordan, Guimaras, Philippines found a dugong trapped in his filter net (locally

known as “*tangkop*”). Knowing that the animal is an endangered species, he immediately informed the proper authorities, and the dugong was finally turned over to the Southeast Asian Fisheries Development Center (SEAFDEC) substation in Igang, Nueva Valencia, Guimaras on 25 April.

Upon its arrival at the SEAFDEC substation in Igang, it was learned that the dugong was still a neonate, so the SEAFDEC staff gave the calf diluted milk powder in an infant feeding bottle. The milk was later replaced with a soya-based milk formula given three times a day. Seagrass was also offered once in a while. The dugong was placed in a floating fish cage, with its body always exposed to the sun.

Because of the remoteness of the area, technical personnel (a biologist and a veterinarian) from the Protected Areas and Wildlife Bureau-Pawikan Conservation Project (PAWB-PCP), together with some volunteers, arrived on 1 May 2004. The soya-based milk was replaced with a lactose-free milk and administered through an infant feeding bottle with an improvised teat. Further inspection of the animal revealed that the dugong was a female, about a month old, and had several scars all over the body. Foreseeing the difficulty in feeding the dugong and controlling the water temperature in the fish cage, the team agreed to transfer the calf to the SEAFDEC Aquaculture Department in Tigbauan, Iloilo City, where conditions could readily be controlled.

Even with rough waters, the dugong was successfully transferred to the SEAFDEC Tigbauan station by means of a pump boat on 2 May 2004. The calf was placed in a cement pool measuring 3 meters wide x 4 meters in length x 1 meter deep; filtered sea water

was maintained at about 60 cm deep. The dugong was closely monitored thereafter. Lactose-free milk was given at two-hour intervals and pool water temperature was maintained at 29-30°C. Playful swimming behavior, observed as loud splashing of water while swimming with the ventral side up and “rolling over,” was noted. The calf was submitted to daily exercises (chasing around the pool) in a bigger pool measuring 3.5 meters wide x 10 meters in length x 1.5 meters deep. Tanks used for the dugong were cleaned and scrubbed daily.

The dugong gained weight fairly well. Starting from 18.5 kilograms on 3 May, the dugong weighed 19.6 kilograms on 7 May. The calf would often pass out air through the anus, sometimes expelling soft, brown feces together with the air. Laboratory examination of the feces did not reveal anything significant. The calf suddenly went off-feed on 8 May and hardly moved its right flipper. After an hour observing rapid, jerky swimming movements and refusal to take milk, the dugong was found dead at about 5 AM on 9 May 2004.

Through post-mortem examination, the dugong was tentatively diagnosed to have suffered from acute gastroenteritis. The right flipper joint was suspected to be dislocated as well. Organ samples were collected for histopathological examination to further determine the cause of death of the dugong.

In the Philippines, the dugong is protected by law pursuant to Republic Act No. 9147 or the “Wildlife Resources Conservation and Protection Act of 2001.” An imprisonment of 6 to 12 years and a fine of Php 100,000.00 to 1 million pesos shall be imposed on those who have committed illegal acts such as collecting, hunting, killing, and

slaughtering the species. In addition, DENR Administrative Order No. 55, dated 21 October 1991, mandated the Pawikan Conservation Project (PCP) of the Protected Areas and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR) to implement a national program for the conservation and protection of the endangered dugong. - **Rizza Araceli F. Salinas, DVM** (resident veterinarian, Pawikan Conservation Project of the Protected Areas and Wildlife Bureau, Philippine Department of Environment and Natural Resources; Quezon Avenue, Diliman, Quezon City, Philippines; tel.: (0632)9258946 / (0632)9246031 local 223)

TANZANIA

Dugong Carcass Recovered in Tanzania. - A complete dugong carcass was recovered in the northern Rufiji Delta (Simba Uranga) in a gillnet during Tuesday night [13 Jan. 2004]. Unfortunately the animal had already drowned by the time the fishers pulled their nets on Wednesday morning. But thanks to recent awareness-raising efforts by the Mafia Island Turtle & Dugong Conservation Programme (which WWF co-supports with the UK Born Free Foundation), the fishermen delivered the carcass to District authorities on Mafia Island rather than selling the meat as they would normally have done. The meat on this animal is worth over 100,000 TSh. This is the first dugong carcass that has been delivered to any authority in Tanzania in recent decades. It was frozen overnight on Mafia and was to be handed over to the Fisheries Division/ University of Dar es Salaam/ Marine Parks & Reserves Unit for analysis. Ultimately, hopefully it can be preserved for display

at the National Museum, UDSM, or perhaps even Mafia Island Marine Park.

We should bear in mind that until the past year or so, respected marine experts in Tanzania were speculating that dugongs were extinct in Tanzanian waters. Only recently, surveys by the Mafia Island Turtle & Dugong Conservation Programme and the Wildlife Conservation Society (WCS) - co-supported by WWF and UNEP - confirmed that a small population exists around the Rufiji/ Kilwa border. Aside from anecdotal evidence and a few bones, this specimen is the latest and most substantive evidence. The pity is that there is now one less animal in Tanzanian waters, a reminder that we need to pull our fingers out to protect the few that remain. - (This and the following item communicated by **Jack Frazier** <frazierja@crc.si.edu>)

Sea Turtle and Dugong Conservation Programme, Tanzania. - Initiated in January 2001, the Tanzania Turtle & Dugong Conservation Programme is a community-based initiative committed to the protection of turtles, dugongs and related habitats through proactive community protection, research, monitoring and education / training. The aims of the programme are to:

- Protect and monitor turtle nests
- Determine dugong populations and distribution
- Identify and quantify threats
- Encourage local participation and support
- Promote education and awareness

Research on the status and distribution of the threatened dugong has revealed new evidence of two small populations in the Rufiji-Mafia-Kilwa area and further north near the border with Kenya.

- In early 2004, two adult dugongs (male and female), which drowned in gillnets off the Ruiji Delta, were returned to Mafia for research purposes. This is the first tangible evidence of their existence in Tanzanian waters for 74 years. Previously they were believed to be extinct in Tanzania
- Priority conservation recommendations include: establishing “dugong sanctuaries”, adopting the dugong as a Tanzanian flagship species, capacity building, awareness and education, and research.

- **Tanzania Turtle and Dugong Conservation Programme** (P. O. Box 1344, Dar es Salaam, Tanzania; tel: 022 266 7300; 022 745 834030; e-mail: <cmuir@africaonline.co.tz>)

WEST AFRICA

Conservation of the West African Manatee along the West African Seaboard. - In the coming months a conservation project will start in West Africa focused on the West African manatee. This project is part of the Regional Programme for the Protection of Coastal and Marine Resources (PRCM). The PRCM is a joint programme from IUCN, FIBA, WWF and Wetlands International to address conservation issues in West Africa (Mauritania to Guinea including Cape Verde) in cooperation with other international and national NGOs, governments, international and regional bodies, research institutes and multi- and bilateral donors. The project, part of the species and habitat conservation component, will be implemented by Wetlands International West Africa Programme in cooperation with the PRCM partners.

Some research has been conducted on the West African manatee and several conservation projects have already been implemented or are being implemented in the different countries in the region. The present project aims to build on these experiences and develop a comprehensive regional conservation plan. In the last year of the three-year project, support will be given for the implementation of the conservation action plan. The objectives of the project are:

- To carry out baseline surveys of the West African manatee along the West African seaboard, complemented with a literature study;
- To develop a regional network for the conservation management of the West African manatee;
- To promote the manatee as a flagship species for wetlands, by virtue of the high level of interest it generates, and for its importance in local customs and culture;
- To develop an action plan for the West African manatee along the West African seaboard, using results of surveys and a regional workshop;
- To raise awareness of the West African manatee and wetlands along the West African seaboard on national and international levels;
- To develop a proposal for a second phase of the project.

The project will start in October 2004 and will end in December 2007. For more information about the PRCM please contact Pierre Campredon (pierre.campredon@iucn.org). For more information about the West African manatee Conservation Project contact

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ABSTRACTS

The following abstract is from the Proceedings of the National Conference on Undergraduate Research (NCUR) 2003, University of Utah, Salt Lake City, Utah, 13-15 March 2003:

Manatee Directional Response to High Frequency Sounds: Preliminary Report

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Since 1974 more than 4000 dead manatees have been collected in Florida and about 30% of these deaths have been attributed to manatee boat accidents. This is because manatees feed close to the surface of the water and for reasons that are not fully apparent do not seem to be able to hear the sound of approaching boats. It has been suggested that at the surface of the water sound transmission is blocked through surface reflection and also by boat shadows. Others propose that ultra-high frequency sounds projected from approaching boats might act as warning beacons, but it is not known how wild unconditioned populations might respond to such sounds. Our group is studying two captive untrained manatees housed at Manatee Springs at the Cincinnati Zoo. To determine if these manatees can sense and respond to sounds, equipment was built by an audio engineer that would generate and record sound frequencies in the range of 3 kHz to 40 kHz. A pair of US Navy sound transducers were placed at either end of the manatee tank and sounds were transmitted into the tank at 110 dB at different frequencies. Manatee response was observed and recorded by pairs of observers and was also videotaped. Early results indicate that the manatees do respond by avoidance to a combination of the frequencies under test (15 kHz, and 10 kHz alternating at 2 Hz) but they appear to acclimate after about 15 minutes into a single run. Other effects appear to indicate a more active response early in the study and more acclimation with less response, after three months under test. The group now plans to test different combinations of frequencies for different durations in an attempt to elicit a more intense avoidance response with less acclimation over time.

The following abstract is from the Proceedings of the National Conference on Undergraduate Research (NCUR) 2004, Indiana University, Indianapolis, 15-17 April 2004 (in press).

Manatee Directional Response to Sound: Avoidance and Behavioral Effects of Audible vs. Ultrahigh Frequencies

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Our group has been studying acoustical responses and associated behaviors in manatees for the last three years to learn why they are killed in boat collisions in Florida. Previously we reported (U. Utah, 2003 NCUR) that manatees at the Cincinnati Zoo demonstrated significant positive avoidance responses (Stoneman $p=0.035$, Douglas $p=0.01$) when exposed to audible mixed frequencies (10 kHz, 15 kHz, 2 Hz repeat). We now report on the effects to ultrahigh mixed frequencies (25 kHz, 35 kHz, 2 Hz repeat) in these same animals. Research runs were generally twice weekly and consisted of 15 repeated exposures to either

experimental (sound generating) or controls (no sound). Over the period of two years data were collected in these two animals that amounted to 238 experimental runs and 62 control runs. Generated sounds at 110 dB were projected into the manatee tank, which was divided into 13 quadrants, and behaviors were videotaped and transcribed by observers, and vocalizations recorded. Data were transferred into Excel spreadsheets and analyzed statistically. In studying quadrants traversed there were no significant differences between ultrasonic runs (0.038 +/- 1.063 n= 238) and control runs (0.026 +/- 1.326, n=62), nor were there any differences in the stress behavior we describe as huddling responses. However, we are still reviewing the data on positive avoidance responses. As in our previous studies with audible frequencies, Stoneman demonstrated significantly greater general motility than did Douglas ($p = 0.0000005$). We are also in the process of reviewing our behavioral videotapes to ascertain time/quadrant/location utilizing the JWatcher program.

The following abstract is of a poster presentation at the Ohio Fish and Wildlife Service conference held at the Fawcett Center, Ohio State University, Columbus, Ohio, 6 Feb. 2004:

Manatee Acoustical Responses to Generated Frequencies in the Audible Range and Associated Avoidance Behaviors

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Since 1974 more than 1200 Florida manatees have been killed in boat collisions. Why manatees disregard the sound of approaching boat engines remains unclear. Therefore we have been studying the acoustical sensitivity and behaviors of two manatees at Manatee Springs at the Cincinnati Zoo. Our equipment can generate sound from 3 kHz to 40 kHz and can record sounds from 10 Hz to 80 kHz. To determine if manatees can also directionally locate sound sources, a pair of US Navy sound transducers were placed at either end of the tank and different sound frequencies were transmitted at 130 dB. Various combinations of audible and ultrasonic sounds were projected from either the left or right transducer in random order. Sound duration was 1 minute followed by 2-minute rest periods. During control runs no sound was projected. Observers recorded manatee behaviors, and the runs were videotaped for later analysis. Beginning and ending of runs were communicated to the observers with an indicator light system and the manatee tank was subdivided into 13 quadrants using 2 cloth grids attached to the outside of the glass viewing windows. Manatee squeaks and other sounds were recorded for computer analysis of frequency components. Results of the manatee patterns of directional movement observed and recorded during a study, as well as patterns of behavior, were then compiled and statistically analyzed. In 15 separate runs employing 15 kHz, 10 kHz repeated at 2 Hz, both manatees traveled 2.5 times farther during experimental runs vs. controls. Stoneman was more active than Douglas ($p=0.00007$). Both manatees demonstrated avoidance behaviors. (Stoneman moved away $p=0.035$, Douglas moved away $p=0.01$.) Preliminary results also suggest that manatee squeaks are frequency-modulated. This is a collaboration between Xavier University and the Cincinnati Zoo. The transducers were from the US Navy Undersea Warfare Center.

RECENT LITERATURE

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Caribbean Stranding Network: <<http://netdial.caribe.net/~mignucci/>>

Columbus (Ohio) Zoo manatee exhibit: <http://www.colszoo.org/animalareas/shores/manatee_coast/index.html>

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Dugong necropsy manual (available for downloading): <http://www.gbrmpa.gov.au/corp_site/info_services/publications/research_publications/rp64/index.html>

Florida Fish and Wildlife Conservation Commission, Bureau of Protected Species Management: <<http://www.floridaconservation.org/psm/>>

Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute (Florida manatee mortality data): <<http://www.floridamarine.org/manatees/>>

Friends of the Manatee Association, Manaus & Balbina, Brazil: <http://www.amigosdopeixe-boi.org.br/english/Ing_index2.htm> [Includes a bibliography of INPA aquatic mammal project publications and abstracts]

Fundación Salvemos al Manatí de Costa Rica: <www.fundacionmanati.org>

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Save the Manatee Club: <<http://www.savethemanatee.org>>

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Smithsonian Institution sirenian bibliography: <<http://www.si.edu/resource/faq/nmnh/sirenia.htm>> [This is a relatively short bibliography, compiled by Joy Gold, that provides a very good introduction to both the technical and the popular literature.]

Steller's sea cow: <<http://www.hans-rothauscher.de/steller/steller.htm>> [NEW ADDRESS]. This site also includes a searchable database of museum collections worldwide that contain bones of *Hydrodamalis gigas*: <<http://www.hans-rothauscher.de/steller/museums.htm>>. See also the website [in Finnish] of Dr. Ari Lampinen, Univ. of Jyvaskyla, Finland: <<http://www.jyu.fi/~ala/ilmasto/steller.htm>>

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