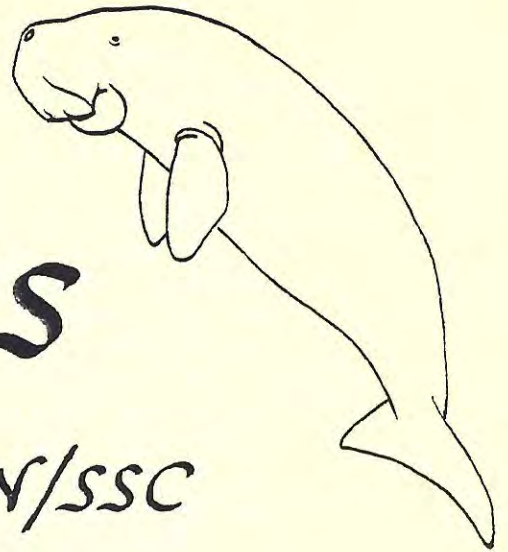


Sirenews



Newsletter of the IUCN/SSC Sirenia Specialist Group

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CAPTURING DUGONGS FOR CAPTIVITY: A COMMENT

In the April 1987 edition of *Sirenews*, there was a report that the Toba Aquarium in Japan had acquired a young dugong (named "Serena") to replace the member of its captive pair that had recently died. The new dugong was captured in the Philippines and donated to the Toba Aquarium by Philippines President Aquino.

Considerable controversy surrounded the capture of "Serena". There were allegations that other dugongs were killed in the process, that the dugong population of the area was too small to sustain the removal of animals, and that the animal was too small to be reared successfully in captivity.

It was also suggested that the dugong should have been obtained from Australia, where substantial numbers of dugongs are known to occur. The relevant Australian Government Agency advised that their policy does not allow the export of dugongs to commercial oceanaria such as Toba.



UNION INTERNATIONALE POUR LA CONSERVATION DE LA NATURE ET DE SES RESSOURCES
INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES

Commission de la sauvegarde des espèces—Species Survival Commission

Sirenews is edited by Daryl P. Domning, Dept. of Anatomy, Howard University, Washington, D.C. 20059 USA. It is supported by the Species Survival Commission of IUCN, the U.S. Fish and Wildlife Service, and the U.S. Marine Mammal Commission.

I suggest that the following guidelines should be adopted with respect to the capture of dugongs for captivity:

- (1) The institution wishing to capture the dugong should be required to fund an aerial survey to estimate the dugong population of the proposed capture area. A local population of at least 100 dugongs should be the minimum required for a capture permit to be issued for one dugong. Permits should not be granted to remove dugongs from populations subject to traditional hunting.
- (2) An established benign capture method such as hoop-netting or bull-dogging should be used. Hoop-netting, the recommended technique, has now been used successfully on three occasions in Australia and Saudi Arabia. The technique has been documented in the following paper:
Marsh, Rathbun, Smith, Peters, and Limpus. Dugong capture techniques. [See Recent Literature, below.]
(I can provide copies of this paper. I hope that it will be released as a U.S. National Technical Information Service Report in the near future.)
- (3) Experience has shown that the growth rate of dugongs in captivity is much slower than that in the wild. Animals should be at least 1.8 m long, preferably more than 2 m long, when captured.
- (4) Dugongs are very sociable and affectionate. Permits should only be granted to institutions which plan to keep more than one dugong.
- (5) The permit should be granted only if the institution has access to a suitable source of seagrass that has been shown to be able to sustain the impact of regular harvest.
- (6) Institutions wishing to keep dugongs in other than tropical climates will require the capacity to heat the water in the holding tank. - Helene Marsh

LOCAL NEWS

AUSTRALIA

More Dugongs in the Great Barrier Reef Marine Park. - In the last quarter of 1986, dugongs were censused from the air at an overall sampling intensity of 10.9% over an area of 5480 sq. km within the inshore areas of the northern third of the Central Section of the Great Barrier Reef Marine Park, and at an overall intensity of 10.7% over a corresponding area of 15091 sq. km in the Capricorn Section of the Park. Sightings were corrected for perceptual bias (the proportion of animals visible in the transect which were missed by observers) and availability bias (the proportion of animals that were invisible due to water turbidity) using survey-specific correction factors. The resultant population estimate for the northern half of the Central Section was 1024±192 dugongs at an overall density of 0.19±0.04/sq. km, a precision of 19%. The population estimate for the Capricorn Section was 2144±428 dugongs at an overall density of 0.14±0.03/sq. km, a precision of 20%. The highest densities of

animals were seen on coastal seagrass beds in water depths of less than 5 m. Maps of density and distribution have been drawn.

The estimated dugong population for the areas of the Great Barrier Reef Marine Park surveyed to date totals over 11,000 animals. I consider this to be an underestimate as the correction for the proportion of animals that are invisible due to water turbidity is probably conservative. We plan to finish surveying the Great Barrier Reef Marine Park by the end of 1987, and to have surveyed the eastern coast of Queensland and Torres Strait by mid-1988. - Helene Marsh

Radio-tracking Update. - The young male dugong tagged with a VHF transmitter in October 1986 was recaptured using a hoop-net in May 1987 and the transmitter replaced. It has remained close to where it was caught for almost a year, using a home range of approximately 9 sq. km. We plan to capture three dugongs in the Starcke River area in the Cairns Section of the Great Barrier Reef Marine Park later this year and to fit them with satellite transmitters. - Helene Marsh

BELIZE

Manatee Awareness Program. - William L. Hasse, Assistant Director of the Belize Zoo, reports under date of 18 May 1987:

"The Belize Zoo has a manatee awareness/education program underway in Belize, and has been giving slide programs to school groups, distributing posters in coastal and cay areas, furnishing a ten-minute video on Belize's manatees to interested parties, and has just held an essay contest in the schools promoting the importance of manatee conservation. In the future, we plan to include a manatee exhibit at the zoo to help build additional public awareness regarding manatees in Belize."

This program is supported in part by funds from Florida's Save the Manatee Club. Sharon Matola, the Zoo's Director, writes (30 May) that the manatee video is frequently broadcast on Belizean television. "The videos were given to the stations as gifts, and since a certain percentage of their broadcasting must be local, the short, informative VHS is often shown.... We can always tell when the video has been shown because always, shortly afterwards, we will get a rash of manatee sightings called in. (At the end of the video, they announce that the zoo is monitoring manatee sightings, and if one is spotted, please notify The Belize Zoo.) ... Also, the British army regularly turns in sightings to us that they make from helicopter missions.

"[Although] we've never done any type of serious survey about [manatee] awareness in Belize ... I can relate an incident that happened to me last February. I was down along the coast in southern Belize, having led a natural history tour down there, and was giving out manatee posters. I gave one to a creole woman, about 50 years old. The poster has a picture of a manatee on it and the following message, 'Please Help Us to Protect the Manatee.' And the woman pointed at the manatee and this conversation ensued:

"Creole lady - 'Yes, mon, we need to protect the manatee, because this part tastes like chicken, this part tastes like

beef, and this part like pork. And if you catch one manatee, you can feed the whole village, mon!

"Me - 'I understand that, Miss Doris, but let me say just one thing about that. The momma manatee only has a baby once every three or four years; now if you keep hunting them for barbecue, what's going to happen to the manatee?'

"And she straightened up and said, 'Yes, mon!! I saw it on TV!! If we keep hunting our manatees, they'll become distinct!!'

"... Actually, the story has a happy ending. She said that she didn't eat manatee any more, anyway. Her grandchildren wouldn't let her."

BRAZIL

Manatee Project Status. - Vera da Silva, widow of Robin Best, writes concerning the situation of INPA's manatee project as of July 1987. The Division of Aquatic Mammals is now reduced to only three persons in addition to assistants, technicians and secretarial help. Elton Colares, a student of Robin who was doing a thesis on manatee reproductive physiology, is now working with otters. He plans to move to São Paulo next year for his doctoral work, accompanied by his wife Ioni, who has been working on a master's thesis on manatee feeding and nutrition. Vera is continuing her own work on river dolphins. They are trying to contract others to work in Manaus and supervise other student projects; but at present there is a freeze on new contracts. The Division's new installations, located some 200 km from Manaus, have been ready for almost a year, but animals are not yet being transferred there, pending the contracting of new personnel.

[At last report, Dr. Iain J. Gordon of the University of Cambridge, England, was awaiting approval of his contract to join the manatee project in Manaus as Robin Best's replacement. - Ed.]

Vera also plans to finish the studies, begun by Robin, of radio-tagged manatees at the Curuá-Una hydroelectric reservoir, and manatee age determination using x-rays of flippers and growth rings in ear bones. Some collaborative projects with foreign researchers will hopefully also be finished, including ones with Jim Gallivan on manatee activity and physiology. She and her colleagues are trying hard to keep the manatee project going, but at present the only source of funds for manatee studies in Amazonia is the electrical company ELETRONORTE, which is primarily interested in using manatees for weed control.

Finally, Vera reports the sad news that Catuêté Albuquerque, who had begun a study of T. manatus on the Brazilian coast, died recently and has not been replaced.

DEATH REPORTED

Catuêté Albuquerque

May 1987, in Brazil (?)

CUBA

Lourdes T. Ferrer reports the following data on a male manatee that drowned in a fishing net at Ensenada de Caballones, province of Sancti Spiritus, on the south coast of Cuba (date not given): weight, 363 kg; length, 310 cm; maximum girth, 220 cm; length of flipper, 40.25 cm; width of flipper, 17.25 cm; length of tail, 77.05 cm; width of tail, 71.30 cm; distance from snout to flipper, 48.30 cm.

FLORIDA

Exotic Weevils Introduced for Aquatic Weed Control. - The Spring 1987 issue of Aquaphyte, the newsletter of the Center for Aquatic Plants of the Institute of Food and Agricultural Sciences, University of Florida, Gainesville, reports on two recent introductions of exotic insects to serve as biological controls on aquatic macrophytes. The introductions were carried out by the U.S. Army Corps of Engineers in cooperation with the U.S. Department of Agriculture and the University of Florida.

On April 29, 1987, 1000 Brazilian weevils (Neohydronomus pulchellus) were released into Lake Okeechobee, Florida. This species feeds and lays its eggs only on Pistia stratiotes, and has reportedly been used successfully in Australia to control Pistia. Ten to twelve individuals can kill one plant. It is believed that the insects will provide perpetual control of Pistia in Florida within two or three years.

The following day, 1200 individuals of Bagous affinis, a weevil native to India and Pakistan, were released on the shore of West Lake Tohopakaliga in Kissimmee, Florida. The larvae of this species attack and destroy tubers of Hydrocharitaceae, especially Hydrilla verticillata, that are buried in the soil. However, they cannot survive under water and so are only effective during droughts or draw-downs of reservoirs. Likewise, the adults feed on portions of Hydrilla that are not submerged. It is hoped that the weevils will curtail regrowth of the weed after the lake is again flooded.

These are the first large-scale tests in the United States of biological control of these prolific weeds. Both Pistia and Hydrilla, of course, are also eaten by manatees, and the introduction of Hydrilla in particular has been credited with making possible the increase in numbers of manatees in Crystal River and neighboring areas of northwest Florida in recent decades. It would be ironic if biological control of these weeds succeeded to the point of undermining the manatees' resource base. But hopefully the entomologists are right this time and the insects will not overstep their appointed bounds. - DPD

IVORY COAST

Buddy Powell was recently hospitalized for hepatitis and malaria, but we are relieved to hear that he is now feeling much better and is back at work. With the following news from Ivory Coast and Nigeria, he sends word that "all is going quite well"; his main complaint is that he is deprived of cold beer.

Wildlife Conservation International's (WCI) manatee research project in Ivory Coast has now been in progress for 18 months. Since the last report to Sirenews in October 1986, six more West African manatees have been captured and released with VHF radio-tags. All six manatees were taken in traditional manatee traps used by local fishermen.

These traps are constructed from a number of wooden stakes stuck in the bottom and secured together with vine. The stakes are placed to form a small semi-circle (2.5 x 1 m) open at one end. A sliding door of sharpened stakes is placed on the open end. The door is held open by a system of smaller sticks which are balanced together to act as a trigger mechanism. The trap itself is usually placed in water about one meter deep. The trap is then baited nightly with fresh cassava peels thrown randomly inside the trap. When the manatee enters to eat the cassava, he accidentally pushes the trigger stick and the door falls. The manatee is held uninjured in the corral. Normally he would be killed when found by the owner of the trap. For research purposes this type of trap has proven very useful for capturing and radio-tagging manatees unharmed.

The capture rate using this method can be quite impressive. For example, using two traps, we caught five manatees in eight days. Unfortunately, illegal use of these traps still persists in many areas of Ivory Coast. In one small river, for example, we saw nine such traps in various stages of repair. Based on our own capture success, it seems likely that their continued use by poachers may pose a serious threat to the local manatee population.

We have had few problems with our tagging and monitoring program. The VHF radio transmitters developed by the U.S. Fish and Wildlife Service and Telonics have worked well. We now have one female that has been monitored for nearly nine months. Some problems have developed, however, when the tags have become entangled in a fishing net and broken away at the weak link. It has also proven sometimes problematic to continuously monitor manatee movements due to the very difficult logistics in more remote areas. In this regard, we hope to acquire outside funds to place a PTT satellite transmitter on a West African manatee.

We are finding that coastal West African manatees generally are very similar in habits to their Florida cousins. However, they feed almost exclusively on emergent vegetation such as Echinochloa pyramidalis, the rhizomes and leaves of Nymphaea lotus, and the leaves and shoots of Rhizophora racemosa. They are also frequently found directly off villages in places where the discards of cassava are thrown. I have been told by locals that manatees come to the villages to eat the cassava peels. What appear to be remnants of cassava have been found in manatee fecal material.

Our tagged manatees have largely remained in the coastal lagoons; on only a few occasions have they ascended rivers. They appear to be primarily solitary, but loose associations with up to six other individuals have been noted. In general, West African manatees seem extremely secretive and shy. They are, probably with good reason given hunting pressure, quite difficult

for a casual observer to see. Our preliminary tracking data suggest that they feed and travel primarily at night; during the day they rest quietly in the middle of a lagoon or river. Three "resting" areas have been identified where small aggregations (5-10 individuals) of bottom-resting manatees are often seen. These resting places are in midstream where there are shallows less than 2 m deep.

After this rainy season we will conduct a series of aerial census and distribution surveys over the coastal lagoons and major rivers. In cooperation with the University of Abidjan, we have begun an extensive project to identify and map vegetation found along the coastal lagoons and rivers. Environmental monitoring of the lagoon waters is continuing on a routine basis.

Our training program is progressing well. We now have an Ivorian botany student and wildlife officer associated with the project. WCI has invited Mr. Moussa Kienta of the Malian ministry of water and forests and Mr. Paul Ishaya, a wildlife biologist from Nigeria, to visit and observe the manatee project for two weeks in December. Both of these individuals have demonstrated considerable interest in establishing manatee research and conservation programs in their respective countries. It is hoped that the training and experience they will receive in Ivory Coast will assist them with their endeavors. - James A. Powell

NIGERIA

Between 1 and 14 April 1987, I visited Nigeria at the invitation of the Nigerian Conservation Foundation and the Plateau State Tourism Corporation. The primary objectives were to survey the status of West African manatees (Trichechus senegalensis) in the Pandam region of the lower Benue River system (BRS) and to assess local attempts at conserving them. Pandam contains a small lake that has been declared a manatee reserve by Plateau State. It is the site where Dr. Sylvia Sikes conducted research on manatees in the early 1970's. Two zoos, one at Jos and the other at Makurdi, were also visited to inspect their facilities and methods for holding captive manatees.

A simple survey method was used to assess the status of manatees in the Pandam region. This method has been used extensively by the U.S. Fish and Wildlife Service and myself in South and Central America and Africa. It entails interviews, using standardized questions, of fishermen and others knowledgeable about the area. This information is coupled with first-hand observations for manatee sign (e.g., feces, cropped leaves) and aerial reconnaissance flights. This method has been found to yield much useful information in a relatively short time and at minimal expense.

The survey included primarily the Pandam region and other associated rivers to determine the relative importance of Pandam lake to manatees. A close inspection of Pandam was made by boat to look for spoor and evidence of feeding activity. Aerial surveys were conducted over the Niger River near its confluence with the Benue River to look for manatees and to obtain an overview of the area and habitat. We could not fly over Pandam because of the limited range of the aircraft.

Based on the results of this trip, and information reported by Sikes, it appears that manatees in the BRS, including the Pandam reserve, are very different in habits from those found in coastal regions such as Ivory Coast [see report above]. Manatees in the BRS are constrained in their movements and access to food by low water during the dry season. As a result, during the wet season manatees begin to move into lakes, such as Pandam, via temporary streams. They will also seek refuge in oxbows or deeper pools of larger rivers. They then spend the dry season in these lakes and pools which, as the water level drops, become isolated. In Pandam lake I found that there were a number of aquatic and emergent plant species which could provide food for manatees. Among the few that I could tentatively identify were: Ceratophyllum sp., Jussiaea sp., Najas sp., Typha sp., Nymphaea sp., and Echinochloa sp.

At Pandam I saw no definite sign of manatee presence. Fishermen say that during the height of the dry season, because of the decreased availability of food, manatees do not feed or defecate. This might explain why I could find no sign even though the fishermen assured me that they were in the lake. If the fishermen's observations are correct, it is a very interesting fact and one that should be investigated more thoroughly. Robin Best, for example, has reported similar behavior for T. inunguis.

Manatees seem to be found in every tributary of the BRS that allows access during the rainy season. They were even reported to reach Yankuri Game Reserve via the Pie River at times.

Their overall numbers, however, appear to be depleted. In all reports from fishermen it was stated that manatees were once more common, but because of hunting pressure they are now more difficult to find. I was given three manatee harpoons and one bottle of manatee oil. The manatee is hunted for its meat, but it is actually more valued for its long-lasting oil, which is said to have excellent medicinal properties.

Pandam and other lakes like it in the BRS seem to serve as natural refugia for manatees during the dry season. It would appear that Pandam, along with the other lakes, is extremely important for the manatees' survival in that region.

Plateau State is very interested in developing a manatee conservation program at Pandam to follow up on the work begun by Dr. Sikes. To this end, one of their wildlife managers will be sponsored by Wildlife Conservation International to make a preliminary visit to the manatee research project in Ivory Coast. It is hoped that he will be able to return to Nigeria to develop a similar program for Pandam or some other region of Nigeria.

The zoo at Jos has been unable to maintain manatees alive for longer than three years. They have lost four or five manatees since the manatee facility was constructed in the early 1970's. It appears that the water temperature in the pool cannot be kept warm enough during periods of exceptionally cool weather (Jos is located on a 1500-m plateau). Health problems, possibly complicated by cold stress and perhaps inadequate diet, may have resulted in the Jos zoo's poor record with keeping manatees. It was also reported that some may have died from skin infections.

The zoo at Makurdi presently has one manatee at its facility. Its sex is unknown. This animal, from cursory

observation, seems to be in fairly good health; that is, it is not emaciated or suffering from skin lesions. The zoo has lost two other manatees in the past few years. I was told that it has had up to 10 manatees at one time.

The director of the zoo at Jos has agreed to a moratorium on capturing manatees until the facilities have been improved and more information is available on the condition of wild stocks. The directors at both Jos and Makurdi seem very keen on promoting manatee conservation. They are to be complimented on their attempt to regulate the taking of manatees from the wild.

I was very pleased to see the degree of interest in manatees and their conservation in Nigeria, particularly that shown by Plateau State and the Nigerian Conservation Foundation. This interest should be cultivated and organized into a manatee conservation and management program for Nigeria to insure that manatee numbers do not continue to decrease below a sustainable level. - James A. Powell

SAUDI ARABIA

Dugong Replenishment Project. - Between August and October last year, almost all of the suitable dugong habitat in the Arabian Gulf was surveyed by helicopter. Parallel transects were flown at 2-nautical-mile intervals at an altitude of 500 feet for an overall survey intensity of 8.8%. The survey included the waters of Saudi Arabia, Bahrain, Qatar and the United Arab Emirates and covered an area of 34,604 sq. km. Using the techniques developed by Marsh (unpubl.; see Sirenews No. 6), dugong sightings were corrected for perceptual bias (proportion of visible dugongs not seen by observers) and availability bias (proportion of dugongs not near the surface and therefore not visible, or available to be counted). The resultant population estimate was 7582 ± 821 dugongs at a density of 0.21 ± 0.07 per square kilometer.

These results are remarkably similar to those of Marsh for eastern Cape York Peninsula in northern Australia (Sirenews No. 6). In that area of 31,288 sq. km, Marsh calculated a dugong population of 8106 ± 1125 at a density of 0.26 ± 0.04 per sq. km. As northern Australia has long been considered to be one of the last strongholds for dugongs in the world, these results confirm the Arabian Gulf as a significant dugong habitat.

These estimates also demonstrate the need for dedicated quantitative aerial surveys to establish the abundance of sirenians in the marine environment. As a result of qualitative overflights in the early 1980's, it was believed that the dugong population of the western Arabian Gulf prior to the 1983 Nowruz oil spill was only about 50-70 animals. When 38 dugongs died at the time of the oil spill [see Sirenews Nos. 1, 4, and 5], grave concern was expressed for the future of dugongs in the area and sensational and now apparently unjustified claims were made in the international press. Such reactionary responses, based on minimal data, are likely to do more harm than good to sirenian conservation in the long term.

Using observer-specific perceptual bias correction factors but no availability correction factor (because of lack of

information on surfacing behavior), the dolphin population in the study area was estimated to be made up of 3100±280 Tursiops truncatus, 1300±200 Sousa chinensis and 1600±200 unidentified dolphins.

During September 1986 an unknown event or events resulted in the deaths of at least 7 dugongs, over 500 dolphins and tens of thousands of fish along the Gulf coasts of Saudi Arabia and Qatar. Although these deaths are well documented in extent, their cause has not yet been established and the Regional Organization for the Protection of the Marine Environment (ROPME) and the Meteorology and Environmental Protection Administration (MEPA) are continuing their investigations.

During 1987 the Dugong Replenishment Project will continue with surveys of the Saudi Arabian and North Yemen Red Sea coastline and parts of the Arabian Gulf. These later surveys will help elucidate seasonal patterns in dugong distribution which will be related to water temperature and seagrass patterns.

In June we will attempt to deploy two satellite (PTT) and VHF transmitters on wild-caught dugongs. This aspect of the work has been made possible through the very considerable assistance of Galen Rathbun and Helene Marsh. - Anthony Preen

ABSTRACTS

Lack of Bile Acids in the West Indian Manatee (Trichechus manatus latirostris): First Report of Bile Alcohol Sulfates as the Dominant Surfactant in Bile of a Mammal (S.S. Rossi, L.R. Hagey, C.D. Schteingart, A.F. Hofmann, S. Kuroki, T. Hoshita, E.H. Mosbach, and D.K. Odell). - Gallbladder bile from the West Indian manatee, an herbivorous aquatic mammal of monophyletic origin dating back to the early Eocene period, was found to lack bile acids, in contrast to the bile of all mammals. Instead, manatee bile contained a mixture of bile alcohol sulfates. The dominant bile alcohol identified by TLC, mass spectrometry, and NMR spectroscopy was 5 β -cholestane-3 α ,6 β ,7 α -25,26-pentol. The trivial name α -trichechol is proposed for this previously undescribed compound. Other C27 bile alcohol sulfates (pentols and tetrols) present at lesser amounts were likewise identified and found to be epimers at C6 and C7 of α -trichechol. The manatee presumably lacks the ability to oxidize the 26-hydroxy group to a carboxylic acid functionality, and thus resembles primitive vertebrates such as the coelacanth and shark. In contrast to the bile alcohols of fishes, however, the trichechols lack a 12-OH group. It is not known if trichechols function as biological surfactants to promote lipid digestion. NIH grants DK21506, DK32130, grant-in-aid from the Falk Foundation e.V. (West Germany), NIH grants RR01614 and HL-24061. [From 1987 Fall Meeting of the American Physiological Society, San Diego, Calif., Oct. 11-15, 1987.]

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particularly extensive and unusually detailed. A review of recent literature on sirenian phylogeny is also included.]

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