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SIRENIAN BIBLIOGRAPHY NOW ONLINE

The *Bibliography and Index of the Sirenia and Desmostylia* by Daryl P. Domning, first published in hard-copy form by the Smithsonian Institution in 1996, is finally available in fully interactive and searchable digital form at <http://www.sirenian.org/biblio/>.

This long-sought goal has been accomplished with the help of Caryn Self-Sullivan and Sirenian International, who provided a home for the database in cyberspace and recruited Michael Bragg (Compendium Software Systems, LLC) to do the essential database programming and create the outstanding user interface. We all owe them a huge vote of thanks for making this research tool more readily available to the sirenian research and conservation community.

As you will see, the interface is very straightforward, user-friendly, attractive, and easy to navigate. The front material from the 1996 edition is reproduced (with updates) under the link "Introduction"; separate links give access to the Appendices; and the Bibliography and Index are each accessed by a "Browse" function. To provide cross-referencing by author within the Bibliography, hot links from all authors' names yield lists of all works by each author. A "Search" function allows searching the entire Bibliography, including titles and annotations of works, for any name or word. A "Detail" utility brings up, for any main entry, all the associated Index entries for that work, providing more information about the work's content beyond what can be gleaned from the title and annotation.

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 especes-Species Survival Commission



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Cynthia R. Taylor, Wildlife Trust, 233 Third St. N., Suite 300, St. Petersburg, FL 33701 USA

and

James A. Powell, PhD, Sea to Shore Alliance, 200 Second Ave. S., #315, St. Petersburg, FL 33701 USA

Sirenews is available online at www.sirenian.org/sirenews.html

As for content, the database now covers the literature from 1494 to 2010. For the last several years of literature, however, I have not had the time to do exhaustive searches of other databases, so coverage of the literature since about 2003 is likely to be spotty. Users are encouraged to report to me (ddomning@howard.edu) any missing references that should be included, or errors needing correction. We are also working on a way for authors to input their own publications and make corrections on their own publications in the future.

I plan to continue administering the database for at least the time being, and incorporating new references as I become aware of them; but in the future I expect to focus mainly on paleontological literature, so updating of this bibliography will increasingly depend on others. If indeed our community considers this task worthwhile, it will require significant commitment by one or more dedicated and conscientious volunteers to whom I can eventually pass the torch. **I respectfully request my colleagues**, acting through our existing organs such as the IUCN/SSC Sirenia Specialist Group, Sirenian International, Inc., and/or the Save the Manatee Club, to undertake serious deliberations on whether this information-retrieval project should continue and, if so, who should undertake it.

If it is decided that this activity is to be continued, a further decision will need to be made concerning the level of detail to be provided in the database. I envision at least six options:

1. Inclusion of only simple literature citations (author-date-title-place of publication), machine-searchable but without any indexing.
2. Annotations of works also (Abstracts could be substituted here).
3. General indexing only (indexing each work under a few subject headings, say one to five, mostly derivable from the title alone or from keywords provided in the work).
4. Detailed indexing (under each noteworthy subject mentioned in the text).
5. More detailed indexing (with page references and/or annotations in the index entries).
6. Linking citations to searchable full texts of works, accessible online.

My original concept, partly achieved in the 1996 printed edition, included all options through #5. During the past year or so, when I had to catch up on a large backlog of new literature, I could do no better in most cases than #3. Going forward, I think #5 (the most labor-intensive) will be increasingly impractical given the flood of new literature. No. 4 will be difficult as well, though very desirable. No. 3 should be the minimum acceptable level of indexing. However, given that the entire text of the Bibliography is searchable, including annotations (and abstracts if these are included), it may be felt that this ability makes an index superfluous – although I caution strongly against naïve optimism in this regard! The ultimate ideal, of course, would be #6; but for most sources it lies well in the future of technology, and even that kind of brute-force information retrieval will miss information provided by a really good index. The decision is up to you, the future users of this database.

– **Daryl Domning**

UNEP/CMS ABU DHABI TO ORGANISE DUGONG MEETING IN OCTOBER 2010

The UNEP/CMS Office in Abu Dhabi, United Arab Emirates, came into existence in late 2009, when UNEP signed a donor agreement with the Environment Agency - Abu Dhabi (EAD). The Office acts as the Secretariat for the UNEP/CMS Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats throughout their Range (Dugong MoU).

Currently the MoU has 11 signatories of the 40 or so range states, namely Australia, Comoros, Eritrea, France, India, Kenya, Madagascar, Myanmar, Philippines, United Arab Emirates, and United Republic of Tanzania. The MoU covers the East and West Pacific, East and South Asia, the Indian Ocean, East Africa and the Red Sea and the Gulf Regions.

Co-located with EAD, the UNEP/CMS Abu Dhabi Office also administers and provides technical support to the MoU on birds of prey throughout their range in Asia, Africa and Europe, and supports conservation of other regionally important species such as marine turtles in the North West Indian Ocean region. One of the aims of the UNEP/CMS Office in Abu Dhabi is to achieve an innovative but practical framework to tackle major threats of these species by providing a coordinating role to identify effective tools to secure a favorable status for relevant key migratory species internationally. The Office represents a major collaboration between UNEP and the United Arab Emirates to conserve migratory species.

The UNEP/CMS Office in Abu Dhabi is currently organising the First Official Signatory State Meeting of the Dugong MoU to be held in Abu Dhabi on 4–6 October 2010. The meeting will review the implementation of the Dugong Conservation and Management Plan and provide guidance in terms of the priorities and future policy directions in relation to implementation of the Dugong MoU in general. The meeting will also give range state governments the chance to sign the Dugong MoU in Abu Dhabi.

As a new feature the meeting will introduce lunch-time side-events, which may include presentations provided by interested individuals or NGOs on topics relevant to the conservation and management of dugongs. Expressions of interest for abstracts are currently sought via the MoU website on http://www.cms.int/species/dugong/dugong_meetings.htm. Expressions of interest will be presented to the Signatory States for their consideration to be included in the final schedule of the meeting.

Updates on the Dugong MoU activities and meetings can be found through http://www.cms.int/secretariat/abu_dhabi_intro.htm > Dugong MoU. The UNEP/CMS Office - Abu Dhabi welcomes inquiries or any further questions to Dr Donna Kwan, Programme Officer – Dugong, email: dkwan@cms.int, telephone: +971 56 6987830.

STRATEGIC DUGONG SURVEY DESIGN WORKSHOP REPORT

Under the auspices of the CMS/UNEP Dugong Memorandum of Understanding, a workshop was convened in Singapore in early March 2010 to develop a standardized questionnaire survey format which will be used in Dugong MoU-funded regional assessment projects.

The Memorandum of Understanding Concerning the Conservation and Management of Dugongs (*Dugong dugon*) and their Habitats throughout their Range was signed in Abu Dhabi in October 2007 (<http://www.cms.int/species/dugong/index.htm>). Since that time the Secretariat (based in Abu Dhabi and hosted by the Abu Dhabi Environment Agency) has worked towards developing regional assessment projects to determine current dugong population status, distribution, and threats (particularly directed take and bycatch in gillnets). As part of this process, it was apparent that a standardized survey protocol would be of great benefit for subsequent comparisons within and across regions. Such a protocol would have to be low cost and rapid, would have to have scientific rigor and be quantifiable, easy to report and flexible. The protocol would have to assess bycatch rates and thus also a degree of fishery effort, it would have to be able to determine with a degree of accuracy spatial distribution of dugongs, and be applicable across regions and cultures.

Endangered dugong populations are distributed through the shallow waters of the western Indian Ocean, Southeast Asia and the eastern Pacific, but the developing nature of many of the dugong's range states has precluded resource-intensive surveys, and knowledge of population and habitat status remains incomplete. Threats and their impacts are also poorly understood in many parts of the dugong's range, and these information gaps prevent effective implementation of conservation and management strategies. A low-cost solution to data gathering which would yield the information on which appropriate conservation initiatives could be developed was deemed a key priority which addressed a number of the provisions of the Dugong MoU Conservation and Management Plan (CMP).



Clockwise from right: Ellen Hines, Louisa Ponnampalam, Helene Marsh, Patricia Davis, Kanjana Adulyanukosol, Nicolas Pilcher, John Reynolds, Himansu Das, Melanie Siow, Donna Kwan

The meeting brought together specialists from around the world (all hereby gratefully acknowledged as the wisdom source behind this) and used the outcomes of various past interview survey initiatives to draft a dugong-oriented questionnaire-based survey which could also collect data on marine turtles and cetaceans. The survey was based in large part on the revised protocols developed by the Project GLoBAL Rapid Bycatch Assessment (<http://bycatch.env.duke.edu/>) but also drew on protocols developed at the Phuket Marine Biological Center (Thailand), at San Francisco State University (USA) and at James Cook University (Australia). The multi-disciplinary background of the workshop participants ensured that the survey design would be widely applicable across regions and issues, scientifically thorough and sound, and culture-sensitive. Following the workshop, the survey protocols were then reviewed by a number of social science and bycatch assessment experts to determine language appropriateness and scientific rigor.

The results of the surveys are expected to assist in determining the distribution and abundance of dugong populations, helping identify and map areas of important dugong habitat such as sea grass beds, and assess the risk of, and develop measures to mitigate degradation of dugong populations and their habitats. The basis of a standardized protocol approach was also designed to enhance national, regional and international information sharing and cooperation.

Two regional projects will test the new protocols during the middle half of 2010. One of these will cover Southeast Asia (Cambodia, Malaysia, Myanmar, Thailand and Vietnam) while the other will assess dugong status in Pacific island States (New Caledonia, Palau, Papua New Guinea, Solomon Islands and Vanuatu). Regional projects are also being designed for range states in East Africa, western Indian Ocean Islands and the Middle East. Results of these projects will be reviewed and assessed at the first Dugong MoU Signatory States meeting scheduled for October 2010. -**Donna Kwan**¹ & **Nicolas Pilcher**² (¹UNEP/CMS Office - Abu Dhabi, c/o Environment Agency - Abu Dhabi, Al Mamoura Building A, Al Muroor Road (Street No. 4), P.O. Box 45553, Abu Dhabi, United Arab Emirates. Email: dkwan@cms.int; ²Marine Research Foundation, 136 Lorong Pokok Seraya 2, Taman Khidmat, 88450 Kota Kinabalu, Sabah, Malaysia. Email. npilcher@mrf-asia.org)

NEW PUBLICATION ON WEST AFRICAN MANATEES

Dr. Sylvia K. Sikes has published a new book on manatees in West Africa, entitled *Manatees in West Africa: Elephants' Elusive and Rare Aquatic Cousins*. The book can be purchased online at www.manatees.org.uk. Below is a short description of the book by Dr. Sikes:

Manatees are best known to television viewers, and to those who have actually seen them in Florida. Although they occur in the Caribbean, the tropical eastern countries of South America, and the western shores and rivers of West Africa, they are very rarely seen wild and alive except by fishermen. Their close relatives, dugongs, are found only along tropical coasts of the Pacific and Indian Oceans. But they also have many similar features to their only living cousins: elephants.

Today, they are a critically endangered, gentle and harmless species of mammal. Formerly mythological attributes surrounded them, as being half fish, half beautiful women: 'mermaids'. Yet, if you can get to know them as individuals, you discover large (up to about 10ft long) real, responsive and fascinating animals.

I had this privilege in 1970 - 1977 in Benue-Plateau State, Nigeria, as Consultant Zoologist (Wildlife) for the Ministry of Natural Resources. During that period, with the enthusiastic staff of the Wildlife Unit and the support of the then governor of Benue-Plateau State, I was able to establish the existence of a viable (although rapidly diminishing) population of manatees in the area, and also to initiate conservation procedures. Moreover, my staff and I were also able to rescue several that had been captured in fishermen's nets. These we transported to a swimming pool in the Wildlife Park at Jos, the capital of Benue-Plateau State. There they received veterinary treatment, and sympathetic handling, and could also be seen by the visiting public. In 1977 we were able successfully to return two, a mother and her son, to 'the wild'.

LOCAL NEWS

MEXICO

Results of a manatee research project in Mexico (2004-2008). The Southeastern Yucatán Peninsula has one of the largest manatee populations in México. In Quintana Roo (QR) there is an estimated population of 200-250 manatees (Morales-Vela & Padilla-Saldívar 2001, 2006). Due to the important presence of manatees in this area, the Mexican government agencies Secretary of Environment and Council of Science and Technology provided funds to develop the research project "Demography, ecology and health of the manatee population in Quintana Roo, and its genetic variation and representation in México". Aquatic Park Dolphin Discovery (QR, México) donated complementary funds. This project had technical assistance from Marco Benítez (African Safari, Puebla, Mexico); Roberto Sánchez (Dolphin Discovery); James Reid, Susan Butler, Brad Stith, Robert K. Bonde, and Cathy Beck (U. S. Geological Survey Sirenia Project); Greg Bossart (Georgia Aquarium); Antonio Mignucci (Universidad Interamericana de Puerto Rico); John Reynolds III and Dana Wetzel (Mote Marine Lab); and Alonso Aguirre (Wildlife Trust).

Field work was conducted from 2004 to 2007 in QR, and also other manatee samples were occasionally taken in the Mexican states of Campeche, Chiapas, Tabasco, Veracruz, and the neighboring country of Belize. The objectives were to assess manatee demography parameters, movements, habitat use, fidelity site, general behavior, regional connectivity and health parameters in QR, and manatee genetics in México. Objectives were aimed to improve management strategies for manatee conservation in Mexico and in the Caribbean region. Until 2009 products that were obtained from the project included presentations, technical notes, reports, scientific papers and thesis. Some presentations were aimed for manatee reserve managers in QR and for the federal government. Additional documents are still in preparation, including more presentations, papers, and

two Ph. D. theses: “Assessment of manatee genetic diversity and structure in México” (by Coralie Nourisson), and “Ecology, behavior and habitat use of manatees in Bahía de Chetumal, México” (by Nataly Castelblanco). Main results of the project are briefly presented next.

Manatees were sampled at two sites in QR: Bahía de la Ascensión (BA) and Bahía de Chetumal (BCH), the latter shared with Belize. These two bays have the highest numbers of manatees in QR. The average range of water temperature in both bays was 24-31° C. A locally implemented lasso technique was used to capture manatees. This technique worked well in clear waters with depth less than 5 m. Twenty five females and 29 males were captured. Most manatees were in good physical condition, except three individuals that were undernourished. Each manatee received two PIT-tags for individual identification. PIT tags were inserted into approximately 22% of the estimated population of manatees in QR.

Hematology and serum chemistry analysis were done from blood samples. These values were obtained for the first time in México and will be useful as base parameters for wild manatees. Serum detection tests for bacteria *Brucella abortus* and *Leptospira interrogans* were done. Also viral papillomatosis tests (TmPV-1, negative results) were applied in 21 samples by Manuela Rehtanz and Greg Bossart. QR serum samples, together with samples from Florida and Puerto Rico, were analyzed for the validation of a serum immunoassay to measure progesterone and diagnose pregnancy in manatees (Tripp et al. 2008).

Feces and digestive tract content samples from BCH were analyzed to determine manatee feeding habits (Castelblanco-Martínez et al. in press). Epibionts found on manatees in QR consisted of two microcrustaceans, *Hexapleomera robusta* (Morales-Vela et al. 2008) and *Balaenophilus manatorum* (this appeared only in BCH, Suarez-Morales et al. 2010); remora fishes (*Echeneis neucratoides* in BCH and *E. naucrates* in BA); and barnacles of genus *Chelonibia*. Helminth parasites were found in feces and other dead manatee samples. Collaborative work with Mote Marine Lab, coordinated by Dana Wetzel and John Reynolds III, was carried out to detect polychlorinated biphenyls (PCBs) and organochlorine pesticides (OCPs) in manatee samples. In the exploratory contaminant analysis, PCBs and OCPs were detected in blubber and blood in manatees from BCH. Mitochondrial DNA and microsatellites analyses were done with manatee blood samples from Veracruz, Tabasco, Chiapas, Campeche and QR. These results confirm the presence of two genetically different manatee populations.

Five female manatees (4 in BCH and 1 in BA) were instrumented with VHF radio tags; poor results were obtained. Four manatees (2 females and 2 males) in BA and 15 manatees in BCH (8 females and 7 males) were instrumented with GPS tags. Information about manatee movements and general activities was obtained from GPS tags. In BA the area with highest use was Vigía Grande. Five males and one female that were tagged in BCH moved to Belize. The area with highest use in BCH was the coast of Chetumal City; in Belize the coastline of Colson Point-Mullins River was favored by some tagged manatees. The longest continuous movement for a male was 285 km in 7 days, and 175 km in 5 days for a female. This study provides the first data to infer a high connectivity among remote and important manatee habitat located along BCH and the Belize coast on a regional level.

Between 2004 and 2007, 23 dead manatees (4 females, 15 males, 4 undetermined) were found in BCH. One manatee (“Daniel”) found alone in September 2003 in Laguna Guerrero, QR, was part of a rehabilitation program in which physical and health conditions were successfully managed. However, it was difficult to change his behavior in an appropriate way so that he could feed and survive by himself in his natural environment. Due to these factors, the manatee has been kept in semi-captivity in Laguna Guerrero since early 2006. To learn more about social interactions and support rehabilitation programs, behavioral studies started recently on manatees in captivity (Hénaut et al. 2010).

Information that was obtained from this project will improve knowledge about manatees in México and Belize, and will be a useful base to develop better management and conservation rules for this important manatee population in the Caribbean. -**B. Morales-Vela and J. A. Padilla-Saldívar** (El Colegio de la Frontera

Sur (ECOSUR). Av. Centenario km 5.5, C. P. 77014. Chetumal, Quintana Roo, México. Tel. (983)8350440. E-mails: bmorales@ecosur.mx, jpadilla@ecosur.mx)

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NEW CALEDONIA

Status of Dugongs in New Caledonia. The dugong (*Dugong dugon*) is listed as a vulnerable species and information on the status of populations across the Indo-Pacific is scarce. Dugongs inhabit the shallow protected waters of New Caledonia, and were an explicit reason for the region's World Heritage listing (UNESCO, 2008). New Caledonia represents the eastern limit of dugong distribution and hosts one of the largest populations outside of Australia and the Arabian region. Standardized aerial surveys were conducted in 2003 and 2008 in order to estimate the overall abundance and distribution of the main island. The estimated abundance was $N = 1814$, $CV = 0.18$ in winter 2003 and $N = 964$, $CV = 0.25$ in summer 2008 (Garrigue et al., 2008 & 2009). Poisson regression was used to assess the relationship between the number of dugongs observed and variables known or expected to influence dugong density. Environmental variables, including their quadratic terms, plus the interaction of year with each of these variables, were considered for inclusion in the model. This analysis confirmed that, even after allowance for effects of environmental variables, dugong density was significantly related to survey year ($p = 0.0014$).

Further work is required to determine whether or not the apparent change in abundance represents a real decline or a distributional shift within the survey area or between this area and habitats external to New Caledonia. Given New Caledonia's geographic isolation, it is unlikely that seasonal immigration/emigration between New Caledonia and adjacent range states could explain the difference in estimated abundance between the two surveys. These results emphasize the need to develop conservation and long-term monitoring strategies. This is the reason why information collected from dugong aerial surveys were used in conjunction with geostatistical techniques to develop a model of dugong relative density and distribution. Relative dugong density and distribution were categorized to identify areas of low, medium or high conservation value following Grech and

Marsh (2007). Known threats were identified and their distributions were compared to the model of density of dugongs around the main island in order to identify conservation priority areas. Four main areas were recognized as conservation priority areas (Bordin, 2009). They show a high density of dugongs and the highest interaction between species and their threats. Three areas are situated on the west coast and one on the northeast coast of the main island. This kind of information represents an important basis for administering management resources. - **Garrigue C.¹, Oremus M.¹, Schaffar A.¹, and Patenaude, N.²**, (¹ Opération Cétacés Noumea New Caledonia, op.cetaces@lagoon.nc, ² LGL Toronto Canada, npatenaude@lgl.com).

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RECENT LITERATURE

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