BBP in Brief

A Newsletter of the Bahamas Biocomplexity Project

Produced by the American Museum of Natural History's Center for Biodiversity and Conservation (AMNH-CBC) **Issue 3**
October, 2004

Welcome...

This is the newsletter of the Bahamas Biocomplexity Project, or "BBP," also available at http://bbp.amnh.org/bbpinbrief/. Here you can learn about the activities and progress of the BBP team and its partners. We welcome your submissions about research progress, upcoming field plans, meetings, or any other information you feel would be of interest to project partners. Submissions for consideration in future newsletters may be made to Kate Holmes (kholmes@amnh.org) or Christine Engels (cengels@amnh.org).

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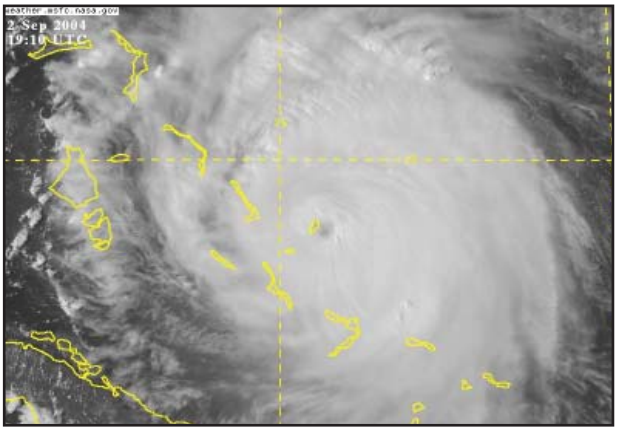
Hurricanes and Coral Reef Communities

Dan Brumbaugh (AMNH-CBC)

Two hurricanes, named "Frances" and "Jeanne," swept across the northern Bahamas this season. The storms caused several deaths across the country as well as moderate to heavy damage on several islands, including New Providence, San Salvador, Abaco, and Grand Bahama. At the Gerace Research Center on San Salvador, for example, both research buildings and dwellings were destroyed. Damage was generally lighter in the southern Exumas, where the hurricanes only produced tropical storm force winds (64 - 73 nautical miles per hour); at the Caribbean Marine Research Center on Lee Stocking Island, power was returned within several days of each storm, and roofs sustained only minor losses of shingles.



The eye of hurricane Frances approaching San Salvador, The Bahamas. © NASA

The BBP Habitat Working Group traveled to the Exumas Cays to continue its research activities shortly after these storms, and had the opportunity to hear about and observe some of the more immediate impacts to the marine environment there. The most obvious effects we saw were sand scouring that removed masses of algae and eroded some corals, light to moderate sedimentation on the reefs themselves, and accumulations of decomposing organic material (mostly algae and seagrass) on the sea floor. In some shallow sites, there were also detached small corals and large sea plumes (gorgonian corals) that may have been overturned by wave surges. Although some fish showed evidence of recent injuries that may have been storm-related, overall the fish communities showed no obvious effects from the storms, presumably because many fishes move to deeper refuges or other protected areas of the reef during storms.

Other longer-lasting hurricane effects on the Bahamian marine environment may be much harder to assess, due to an absence of adequate baseline data, coupled with the fact that certain impacts can be very localized and dependent on the specific ecological history of a site.

Most dramatically, hurricanes and other strong storms can reshape the coral communities on reefs. Prior to the wide-scale losses of Caribbean staghorn and elkhorn corals from diseases in the 1990s, moderately sheltered reefs without recent hurricanes tended to develop thick belts of these fast growing, branching corals. Elkhorn corals would grow on the reef crest or on the shallow forereef where their thick branches could withstand the daily pounding of moderate waves, whereas finer branching staghorn corals would develop dense thickets in the calmer waters below the elkhorn zone.

During subsequent hurricanes, such thickets could be shattered and fragments dispersed throughout the area. Even large, tree-like elkhorn corals, especially when weakened by bio-eroding sponges and other organisms, could get detached, broken, and thrown up onto other parts of the reef. With enough time and in the presence of intact communities of algal grazers, fragments could often regrow, and reefs could redevelop these zones of branching corals. Reefs that experienced frequent hurricanes or were located on the exposed sides of islands, however, tended to become dominated by slower growing, massive, dome shaped corals that were more resistant to physical disturbances.

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Given this dynamic of selective destruction and regrowth, coral community structure changes depending on the frequency and intensity of storm disturbances. In recent decades, however, there seems to have been some fundamental shift in the abilities of reefs to recover from physical disturbance. For example, the large-scale die-off of the branching corals means that there are now many fewer living individuals to breed and repopulate damaged areas. In addition, smaller numbers of algal grazers and increased inputs of nutrients favor algal growth, such that corals must contend with much greater levels of competition from algae than in previous decades. These and other stressful climatic processes such as sea surface warming and increased carbon dioxide absorption seem to be leading to coral reefs that lack resilience, the ability to rapidly bounce back after disturbance.

Isolated living elkhorn coral colonies standing amidst dead corals and rubble. Several live colonies (right) appear to be regrowing from a broken and mostly dead fragment of coral. D. Brumbaugh © AMNH-CBC

The Bahamas Biocomplexity Project (BBP): Where We Are and Where We're Going

Dan Brumbaugh (AMNH-CBC)

BBP team members and other collaborators are continuing their research and educational activities, ranging from conducting fieldwork and running computer simulations, to developing plans and products for marine science and conservation outreach in The Bahamas.

On the research side, although some fieldwork will continue over the next year, the BBP – having now completed year three of its five years– will increasingly be focused on completing analyses within working groups in order to move on to planned integrations across groups. These integrative efforts were discussed at the BBP's annual General Meeting in Nassau in early May 2004. In addition to bringing nearly all the project researchers together, this meeting, hosted by the College of The Bahamas (with thanks again to Dr. Pandora Johnson, Denece Mackey, and Allison Basen), made it easier for Bahamian partners and other interested parties to observe and participate in the research discussions. Presentations by the Department of Fisheries, the BEST Commission, the Ministry of Education, the Ministry of Tourism, BREEF, and the Nature Conservancy, also provided important updates about their recent activities and the Bahamian context for BBP research. We anticipate holding another General Meeting in Nassau at the end of the project (2006) when, in terms of results, there will be much more to share with our Bahamian partners and the wider public. Much has happened since the General Meeting, and below are highlights of the latest activities of the project's various working groups.

The strategy of the Habitat Working Group (HWG) has been focused on surveying potential ecoregional zones spanning the Bahamian archipelago, with attention to fish and various taxonomic groups of benthic (seafloor) species. Six major study sites have now been sampled; the last expedition was completed in October. A number of scientific talks featuring results from the HWG were presented this summer at the 10th International Coral Reef Symposium (Okinawa, Japan) and at the annual meeting of the Society for Conservation Biology (New York, NY). The HWG and the GIS Working Group have been collaborating to finish the processing and integration of key data layers, such as habitat maps of different resolutions and dimensions.

The Connectivity Working Group (CWG) is interested in analyzing the patterns of how current and potential MPA sites are connected in terms of populations of fish and other organisms across The Bahamas. Results to date include oceanographic analyses, simulation models of particle dispersal, and genetics results for staghorn corals, queen conch, and spiny lobsters (crawfish). Recent CWG discussions have focused on the coordination of additional specimen collections for the genetics work, and how best to structure future simulations in order to estimate the degree of connectivity between The Bahamas and surrounding areas, as well as the range of connections within the archipelago. Preliminary genetics results were presented at the International Coral Reef Symposium.

The Social Working Group (SWG) also continued their data collection efforts this summer, with a mix of small and large research teams working on Abaco, Eleuthera, San Salvador, and in the Exumas. The SWG expedition in the Exumas included participants from the University of Arizona and the College of The Bahamas (see Smith article, p. 5). One of the presentations at the Coral Reef Symposium featured some preliminary results on average monthly fishing incomes across habitat types.

The Center for Biodiversity and Conservation (CBC) convened a half-day meeting immediately following the General Meeting to continue discussions about marine science with regards to educational and outreach needs, and to prioritize potential collaborative projects. The meeting included about 15 representatives from 10 Bahamian governmental and non-governmental organizations. One need that was identified at the meeting led to the development this summer of an educational booklet on marine reserves. Designed to serve both as a stand-alone product as well as a complement to a traveling exhibition on marine reserves in The Bahamas, the booklet's development was overseen by the CBC, with the assistance of a Bahamian undergraduate intern, Linda Hammerton (see McKinney aritcle, p. 3 and Hammerton article, p. 4), and reviewed by many collaborators. The outreach team is also working with the Bahamas Ministry of Education, BREEF, the Bahamas National Trust, Bahamian teachers and other interested groups to develop curriculum on marine science and conservation for Bahamian school children (see Domrose and Engels article, p. 3). Although much remains to be done to achieve the research and education goals of the BBP and its partners, we are well on our way. With continuing communication, coordination and collaboration, we can expect substantial progress over the next two years towards the critical integrations across research, education, and outreach, and among biodiversity, fisheries, and other socioeconomic and cultural factors in the design of MPA networks. Please stay tuned!

Initiative for Enhancing Education about Marine Conservation in The Bahamas

Meg Domroese and Christine Engels (AMNH-CBC)

The Bahamas Ministry of Education and the American Museum of Natural History's Center for Biodiversity and Conservation, together with other interested organizations, held a meeting on 26 October 2004 at the Bahamas National Trust Retreat in Nassau to discuss methods for teaching about The Bahamas' marine environment. Discussion centered on needs and opportunities to highlight this important theme in Bahamian schools. The meeting was facilitated by Meg Domroese and Christine Engels, outreach staff of the Center for Biodiversity and Conservation.

Several participants of the October meeting. From left to right (front row), Portia Sweeting, Joan Knowles, Sheila Arthur, Shena Williams, (back row) Dorothy Rolle, Barbara Dorsett, Carolyn Dorsett, Charlotte Brown, and Shenique Albury. M. Domroese © AMNH-CBC

Participants included educators and curriculum developers, Ministry of Education science officers, as well as representatives from the Bahamas Reef Environment Educational Foundation (BREEF); the Bahamas National Trust; the Bahamas Environment, Science and Technology (BEST) Commission; and The Nature Conservancy. Portia Sweeting of Yellow Elder Primary School pointed out that the teachers in attendance collectively represented more than 94 years of teaching experience.

"There is not enough teaching using active learning, which is necessary for mastering critical thinking skills, in Bahamian schools," commented Ms. Beverly J.T. Taylor, Assistant Director of Education, Science and Technology Section, The Bahamas Ministry of Education. All of the educators present agreed that active teaching methods – those that get students to learn by doing – are the most effective for student learning. The meeting laid the groundwork for a collaborative initiative to develop active teaching methods and materials to involve Bahamian students in stewardship of the marine environment. The Center for Biodiversity and Conservation's extensive experience in promoting active learning to engage the public at all levels—from primary school to university, and from the grassroots to policymakers—is informing and enhancing the effort.

Interested persons should contact Ms. Beverly J.T. Taylor at: (242) 502-2901 or bjtt@hotmail.com or the Center for Biodiversity and Conservation, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024 USA; (212) 769-5742; fax (212) 769-5292; biodiversity@amnh.org; http://cbc.amnh.org/

Family Island Communities Learn about Marine Conservation

Casuarina McKinney (BREEF)

Communities around The Bahamas continue to learn about our important marine habitats and the need to protect them through an educational partnership between the Department of Fisheries, BREEF (the Bahamas Reef Environment Educational Foundation), and The Nature Conservancy.

"Marine conservation affects us all, not just those who make their living directly from fishing. The health of mangrove ecosystems, sand flats, seagrass beds, reefs and the open ocean affects those of us that live on land as well as the plants and animals in the sea." This is what thousands of visitors to the Fully-Protected Marine Reserves Exhibition are finding out. Marine habitats are closely connected to each other, and often support different parts of the life cycle of the species of fish, conch, and crawfish that we really care about. These connections are something to bear in mind as The Bahamas establishes a nation-wide network of marine reserves.

School children in South Andros learn about marine conservation and marine reserves. C. McKinney © BREEF

The exhibition, a 40-foot mural and accompanying posters, depicts life in our oceans, and follows the life histories of our most important marine species –the groupers, conch, and crawfish. All of these species use different habitats as they grow from juveniles to adults. Setting aside some of each of these habitats within marine reserves will have us well on our way to protecting our Bahamian marine resources for the future.

Over 900 students visited the exhibition at the Mall at Marathon, and many more saw it at Nassau International Airport. Since April, the exhibition has been traveling to the Family Islands, and has been on display in Exuma, Eleuthera, Long Island, Abaco, and Bimini. Family Island representatives for the "Community Based Conservation For Bahamian Marine Protected Areas Project" have been holding workshops on each of their islands and sharing the information that is presented in the exhibition. A booklet to accompany the exhibition, developed in collaboration with the American Museum of Natural History's Center for Biodiversity and Conservation, will be available for distribution soon.

Marine Education Internship with the American Museum of Natural History

Linda Hammerton (College of The Bahamas)

Linda Hammerton catching a cab in New York City.
© L. Hammerton

For two months over my summer break, I had the pleasure to intern with the outreach staff of the Center for Biodiversity and Conservation (CBC) of the American Museum of Natural History (AMNH). During the month of July, I worked at the CBC's office in New York City, aiding in the compilation of an educational booklet that will be a companion to the Fully Protected Marine Reserves exhibition (see article above). In August, I was back in Nassau and continued helping the CBC outreach staff plan a meeting in collaboration with the Ministry of Education for educators and conservationists to discuss methods for teaching about the marine environment.

For me the trip to New York was a totally new experience—it was my first time away from home, for so long and in such a big city. Moreover, it proved to be most memorable, exciting and informative. I learned many new things working at AMNH, not just from the staff in the CBC but also from roaming through the Museum and exploring its many different facilities. This experience not only provided me with a wealth of knowledge, but also with a great deal of exposure to other cultures and a taste of life in "The Big Apple." Information about next year's internship will be available in the Spring of 2005.

The Parks Partnership Project: Collaborations Between The Nature Conservancy and the Bahamas National Trust

Kim Thurlow (The Nature Conservancy)

The Bahamas National Trust (BNT) and The Nature Conservancy (TNC) have joined forces and are launching the Parks Partnership Project, a project funded primarily by the Bacardi Family Foundation.

Through the Partnership, BNT plans to build increased management and stewardship capacity in the Exuma Cays Land and Sea Park and in the Central Andros National Parks. The Nature Conservancy aims to provide scientific and geographical information system technology (GIS) support to the process. The three major goals of the partnership are to (1) formalize a management plan for the Exuma Cays Land and Sea Park; (2) increase management capacity of the park; and (3) develop management planning tools, which will be designed for replication in other national parks throughout The Bahamas.

Exuma Cays Land and Sea Park Headquarters on Warderick Wells. D. Brumbaugh
© AMNH-CBC

The Partnership is also helping to support the park's full-time staff and volunteers in their efforts to build nature trails, fund research, conduct wildlife inventories, and establish fees for boaters who use anchors or permanent mooring buoys. The aim is to make the park financially self-sufficient. For further information contact: Eric Carey, ecarey@batelnet.bs, (242) 393-1317, The Bahamas National Trust, P.O. Box 4015, Nassau, Bahamas, http://www.bahamasnationaltrust.com/

Bahamas Science Alliance - Andros
February 3 - 4, 2005

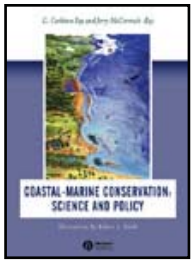
The Bahamas Science Alliance, a conference to share scientific knowledge of Andros and the Bahamian environment, is dedicated to bringing science to the people. The purpose of this conference is to highlight advances in the natural sciences and how they relate to both individual island groups and to the archipelago as a whole. Topics include current conservation initiatives and projects, fire ecology, reef ecology, ornithology, blue holes, invasive species, as well as history and culture.

Registration Deadline: January 15, 2005
Conference Location: Love at First Sight Resort, Stafford Creek, Central Andros
Registration Fee: $75.00 per person and includes the cost of lunch Friday.
Contact: Ethan Freid for information and for the application form - from Monday through Friday 8.30 A.M. - 4:30 P.M. ET
Phone: 813-253-3333 ext 3320
Fax: 813-258-7496
E-mail: ethan@ut.edu

The Bahamas in Books: Two Recent Volumes Highlight Coastal Conservation

Katherine Holmes (AMNH-CBC)

A new book co-authored by Jack A. Sobel and Craig P. Dahlgren summarizes current knowledge about fully protected marine reserves. *Marine Reserves: A Guide to Science, Design, and Use* (Island Press) takes a comprehensive look at the growing field of marine reserve science, as well as marine reserve management and policy. It provides an overview and synthesis for a broad audience including scientists, conservationists, students, marine resource managers, and stakeholders. The book includes case studies on the use of marine reserves in several places, including The Bahamas, Belize, and California's Channel Islands. The Bahamas case study describes the nation's relatively long history with marine protected areas, the creation of the Exuma Cays Land and Sea Park, and past and present research on the ecological effects and benefits of the park. This case study also highlights The Bahamas' current efforts to develop a network of marine reserves that will include both marine fishery reserves and national parks.



Another recently published book also highlights the Bahamian marine environment. *Coastal-Marine Conservation: Science and Policy* (Blackwell Publishing), co-authored by G. Carleton Ray and Jerry McCormick-Ray, describes critical issues facing coastal marine conservation and management, exploring environmental, social, and economic dimensions. The authors chose to highlight three ecologically distinct systems through case studies: the polar Bering Sea, the temperate Chesapeake Bay, and the tropical Bahamas. This book is intended for advanced undergraduate and graduate students interested in coastal and marine conservation management, and also for people active in marine management efforts.

A Student's Account about Ethnographic Research in the Exumas

Tavarrie Smith (University of the West Indies)

Tavarrie Smith, law student at University of the West Indies, and Kathleen Van Vlack, graduate student in American Indian studies at University of Arizona. © R. Stoffle

As a student from the School of Social Sciences of the College of The Bahamas (COB), I was selected to be one of four Bahamian Students to work with the team from the University of Arizona (UA), led by Dr. Richard Stoffle, a researcher with The Bahamas Biocomplexity Project (BBP). I came to the team with some experience in working with survey instruments, but joining the BBP was truly a new experience for me. Outside of meeting new and lifelong friends, the importance for marine conservation was the primary lesson for me. Our team was mainly composed of anthropologists and social scientists from both UA and COB. Research activities led us to the Exuma Cays where we listened to people talk about their traditional knowledge of the land and sea. This information was seen to be very relevant, as some of the marine protected areas planned by The Bahamas Government may directly affect fishing communities that have depended on these fishing grounds for their livelihood through generations. Throughout the project, we learned how the Exumians came to navigate and benefit from the oceans as well as farm the surrounding areas. As a Bahamian on the team, the experience was extraordinary if for no other reason than to have been enlightened on the development and traditional lifestyles of Bahamian societies.

As a recent graduate of COB and a first year law student at the University of the West Indies, I hope that in the near future my experiences and continued efforts on this project will help steer The Bahamas in the direction toward land reform and sea/land preservation methods, always first considering the people who may be affected directly or indirectly. Special thanks to Mrs. S.J Plumridge and Ms. Jessica Minnis for recommending me for this project and to Dr. Stoffle for welcoming me on the team.

Science and Technology Careers Exposition
March 14 - 18, 2005

The Bahamas Department of Education, Science and Technology Section, is proud to announce a careers exposition for Bahamian high school and first degree college students. The theme of the Exposition will be Science and Technology for All and will be held at the Wyndham Nassau Resort & Crystal Palace Casino.

For more information, please contact Ms. Beverly J.T. Taylor at (242) 502-2901 or bjtt@hotmail.com.

BBP Collaborators and Partners


The College of The Bahamas

What is BBP?

The Bahamas Biocomplexity Project (BBP) is a five-year initiative funded primarily by the National Science Foundation to investigate the complex environmental and social factors that affect the design, management, and effectiveness of networks of marine protected areas (MPAs). Researchers involved in the project include oceanographers, biologists, and social scientists from nine institutions working in collaboration with various governmental and non-governmental groups in The Bahamas.

Ultimately, the primary goal of the project is to integrate studies of natural and human processes, leading to a more sophisticated understanding of how individual MPAs work, and how they could work as part of a network throughout The Bahamas and in other coral reef ecosystems. Other important goals include the integration of this research with education and decision-making.

The BBP is funded primarily by the National Science Foundation's Biocomplexity in the Environment Program (NSF-BE). This newsletter is made possible through funding from the National Aeronautics and Space Administration (NASA).

Principal Investigator: Dan Brumbaugh

Editor in Chief: Jennifer Stenzel
Assistant Editors: Christine Engels and Kate Holmes

Contributions to future issues can be made to:
kholmes@amnh.org or cengels@amnh.org
Center for Biodiversity and Conservation
American Museum of Natural History
Central Park West at 79th Street
New York, New York 10024
http://cbc.amnh.org