Caribbean Marine Science

Official Newsletter of the AMLC
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Contents

Association News

Notes from the Editors

Our greetings to all the AMLC members. We begin by reminding everybody that the next AMLC Scientific Meeting will be held in Curacao from June 13th to June 17th. 13th to June 17th. Executive Board members are reminded that they should arrange to arrive on Saturday June 11th to attend the Board Meeting scheduled for Sunday June 12th at 9:00 a.m. The deadlines are approaching fast and those who are planning to attend should check them at the end of this issue for the information and the registration forms. You can also access this information on our website, www,amlc-carib.org by clicking on "Future Meetings. The Meeting registration fee includes the yearly membership dues which will now run from meeting to meeting rather than from January to December. In this issue we include a profile of the host institution, the Curacao Sea Aquarium with a nice photograph of the facilities. The General Interest section has a variety of articles ranging from invasive species and their threat to MPAs and how practitioners are responding, an IUCN call for temporal banning of high seas deep fish trawling, tsunami greenbelts, to African dust and the future of coral reefs.

Once again, we request contributions for the Newsletter from our members and readers. We have a very diverse membership involved in many different areas of research. Your Newsletter is an efficient way of sharing information about your projects, or even better, finding help or cooperation from other members of the Association.

New AMLC Officers - nominations

The AMLC By-Laws require that we elect a new slate of officers at the next AMLC Executive Board meeting scheduled for June 12, 2005 in Curacao. As Chairman of the Nominating Committee, I am inviting all AMLC members, Institutional and Individual, to propose candidates for the several positions. Please note that nominees do not have to be professionally associated with an Institutional Member to be nominated, but they must be members of the AMLC. As examples, our present Executive Director (Steve LeGore) is an independent consultant, one Member-at-Large (John Brock) is employed by the USGS, and the second Member-at-Large (Mark Hardin) is employed by a consulting firm not associated with the AMLC.

If you are personally interested in becoming more involved with our organization, do not hesitate to nominate yourself for any of the positions up for election. Indeed, we encourage such initiative as a means for identifying individuals wishing to

participate. Individuals nominated will be asked by the nominating Committee whether they accept the nomination before any election is held. It is therefore, not required that you obtain such a confirmation in order to nominate viable candidates.

The following Offices are up for election in Curacao:

Executive Director, term = 4 years, currently held by Steve LeGore
Vice-President, term = 4 years, currently held by Ernesto Weil
Treasurer, term = 4 years, currently held by Laurie Richardson*
Membership Director, term = 4 years, currently held by Laurie Richardson*
Secretary/Information Officer, term = 4 years, currently held by Karen Burns
Member-at-Large #1, term = 2 years, currently held by John Brock
Member-at-Large #2, term = 2 years, currently held by Mark Hardin
Member-at-Large #3, term = 2 years, currently unfilled

* These two positions have been filled by Laurie as Treasurer-Membership Director, a combined office which will be separated into separate positions in Curacao.

Elected officers will take office at the close of the Curacao Scientific Meeting in June. Please send your nominations to Ernesto Weil at eweil@caribe.net by April 15, 2005.

New AMLC List Server and Web Site

The purpose of these list servers is to facilitate communication and foster collaboration between and among our members. We recently found it advantageous to transfer our listserve operation from the FIU server to the AMLC server. You should have received a notice by e-mail. We hope all AMLC members will take advantage of this new capability – if you have any news, requests, or questions to distribute to the membership, just send a message to the email address below. The NEW list server addresses are:

members@lists.amlc-carib.org

Only AMLC members who are on the list can post to the list. Messages not from a subscribed member will not be posted. Current AMLC members are automatically subscribed, and new members are added when they join AMLC. The newsletter will be circulated electronically through our list server, which insures delivery and that only paid members are in our mailing list.

We would like to thank our Membership Director, Laurie Richardson, for getting the AMLC listserve service implemented. We also wish to express our appreciation to David Nagle, a student intern working for John Brock at the USGS in St. Petersburg, Florida, for transferring the service to the AMLC server. This is a valuable resource for all of us if we make use of it.

We have a new web site located at www.amlc-carib.org. If you forget the URL, just do a Google search on "AMLC" and it will magically appear! We owe a large debt of gratitude to David Nagle, a student intern working for John Brock at the U.S. Geological Survey office in St. Petersburg, Florida. David has volunteered a great deal of time and energy to establish and maintain our new website. There is still more to do, but steady progress is being made. Thank you, David!

Proceedings of the Trinidad Meeting

The proceeding from our previous Scientific Meeting in Port of Spain, Trinidad will be ready soon. All manuscripts are finalized and galley proofs are being prepared. We should have the published Proceedings before the Curacao meeting.

Future Meetings of the AMLC

Our next Scientific Meeting is being organized by Steve Piontek of the Curacao Sea Aquarium in Curacao and is scheduled for June13-17, 1005. One of our oldest members, the Bermuda Biological Station for Research, will host the 2006 Executive Board Meeting and the next Scientific Meeting in 2007 will be hosted by the University of the Virgin Islands.

Ernesto Weil and Isabel Urreiztieta, Editors.

Profile

We are grateful to the Curacao Sea Aquarium, who will host the 32nd Scientific Meeting of the AMLC on June 13-17, 2005.

The Curaçao Sea Aquarium opened in 1984 with the specific goal of combining a tourist based entertainment facility and a marine education and research facility. In 1998 the Education Department was formed to upgrade presentations and aquarium displays for our daily visitors and to develop interactive education programs that bring learners of all ages into contact with the living coral reef via the Curaçao Sea Aquarium. By the end of 2004 the Education Department was teaching marine biology and conservation programs to over 8,000 Curacao school children each year. These education programs have also brought to Curacao an average of 10 high school and university classes annually from Venezuela, Bolivia, Canada, the United States and several Caribbean Islands.

Research groups utilizing the Curacao Sea Aquarium facilities during the last year include: a group from the University of Illinois studying coral black band disease, a group from Hofstra and Louisiana State University studying Gobiiadae populations, a group from the University of Essen studying coral reproduction, and a joint effort by the Smithsonian Institute, Hofstra University and the American Museum of Natural History compiling a fish identification CD and a species list of Curacao waters.

In April 2004, the CSA received its first grant, $10,000 for buying new coral reef monitoring laboratory equipment from the Royal Caribbean Cruise Line's ship Adventure of the Seas.

The CSA continues to grow and evolve, and future objectives include the creation of a first class coral reef monitoring and marine research laboratory. The lab will be used to:

1. Generate new research opportunities in Curacao.
2. Enhance the educational experience of Curacao Sea Aquarium visitors through the opportunity to see scientists at work and special laboratory tours.
3. Educate 8000+ Curacao school children per year on current scientific techniques and coral reef monitoring data from Curacao waters.
4. The laboratory facilities will be made available to Curacao students for special projects, especially equipment not available in Curacao schools.
5. Attract more schools from the region that will travel to Curacao and participate in educational programs presented by CSA

The Curacao Sea Aquarium Facilities.

General Interest

Invasive species: Their threat to MPAs and how practitioners are responding

Owing in large part to increased globalization of shipping, the unintentional transfer of plants and animals from one water body to another worldwide has boomed in recent decades; many bays near major ports are now hosts to dozens or even hundreds of non-native species. Some of these visitors thrive in their new habitats, outcompeting native species and changing ecosystems, sometimes dramatically. For MPAs, such invasions pose a major threat, particularly when management is unprepared for them. Nonetheless, due to unfamiliarity with the problem, shortage of funds, or other reasons, there have been few cases worldwide in which MPA practitioners have specifically addressed the threat of invasive species in planning or management.

Vector Management

MPAs are generally designed to (a) protect species and habitats that are already on site or (b) encourage reestablishment of those that were there in the past. However, an invasive species that is particularly well suited to an ecosystem, with no natural predators, parasites, or pathogens to control its population, can change that ecosystem to one never seen before. The invader's population soars while population of competitors -for food, space, light, or other needs- shrink. A cascade of effects throughout the system may result. Examples of how invasive species have taken over marine and coastal systems include these:

-The seaweed *Caulerpa taxifolia*, originally native to the Pacific and bred in Europe for aquarium use, escaped from an aquarium in Monaco in the mid 1980s. It proceeded to colonize and smother vast areas of the Mediterranean, dispersed by anchors, fishing gear, and other pathways
-The comb jelly *Mnemiopsis leidyi*, transported in ballast water by a ship from the Americas, first appear in the Black sea in the 1980s and quickly exploded in population, consuming much of the sea's zooplankton, fish eggs, and fish larvae. Commercial fisheries nearly collapsed.
-The European green crab (*Carcinus maenas*) has invaded numerous coastal communities worldwide by a variety of pathways. Green crabs are omnivores, eating mollusks and many other prey items, and have been blamed for the collapse of at least one clam fishery in North America.

One of the primary pathways, or vectors, by which marine alien species are transported is on the hulls or in the ballast tanks of ships, says Jim Carlton, a biologist and invasive species expert with the Maritime Studies Program of Williams College and Mystic Seaport (US). A single ballast tank filled from surrounding waters to stabilize an un-laden ship may contain hundreds of species and millions of individuals, says Carlton. Additional vectors include aquaculture, the aquarium trade, fisheries enhancement, and the use of live bait, among others.

"The most important current strategy in marine bioinvasion management is the reduction and prevention of invasions by focusing on the vectors that now transport and release non-native species," says Carlton. Controlling how ships release ballast water, for example, can be critical to reducing the threat of invasions in waters near ballast-water release sites. In this regard, the International Maritime Organization (IMO) in February 2004 adopted the international Convention for the Control and Management of Ships Ballast Water and Sediments, setting standards for improved ballast water management worldwide (http://globallast.imo.org). The convention regulates where, when, and how to release ballast water, and awaits ratification by 30 nations to take effect.

As indicated by the need for such a convention, the problem of marine invasive species is one that transcends MPA boundaries: alien species, if not deposited directly into an MPA, con still float, swim, or crawl there from outside. To work best, vector management programs should be conducted at regional, national, or international levels. Individual MPAs can help by raising awareness among authorities of the problem and its potential impacts on protected areas, and supporting the adoption of vector management approaches in their region.

MPAs can also play an invaluable role in early detection of regional invasions through their normal monitoring programs. "Adding early detection of invasions to MPA monitoring is key," says Carlton. "The early detection and rapid destruction of an incipient population of an exotic species may be second only to preventing the invasion in the first place." He notes that the public can play a major role in early detection programs by alerting authorities to unfamiliar species of animals and plants. Particularly important, he notes, are those stakeholders who have life-long familiarity with the regional biota.

When a potentially invasive species is discovered inside an MPA, rapid response to eradicate it is key. The longer the wait to respond, the more likely it is that the species will establish itself, making full removal difficult if not impossible. This is particularly the case where the original delivery vector remains in place.

Preventing Invasions: Northwestern Hawaiian Islands, US

In terms of being able to prevent bioinvasions, the ideal MPA would be one that was remote with relatively little vessel traffic. In addition, its primary visitors would be aware of the threats posed by alien species, and would take voluntary steps to avoid introducing them.

This largely describes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, or NWHICRER. Despite the site's proportions-at 341,000 km² in are, it is the world's second largest MPA- the reserve comprises the most remote large scale coral reef ecosystem on the planet, stretching northwestward from the main Hawaiian Islands in the middle of the Pacific Ocean. It has few human residents and no major ports. And its primary visitors –scientists there to study the region's reef ecosystem- have undertaken several measures aimed at ensuring they do not bring unintended visitors with them.

Despite the protections, invasive species remain a big concern to NWHICRER managers, even compared to other problems such as marine debris, which gets trapped by the islands in enormous quantities. "While the impacts of marine debris to Northwestern Hawaiian Islands ecosystems are significant, invasive and introduced species may ultimately pose a more significant threat," says Randy Kosaki, research coordinator for the reserve. "Whereas accumulations of marine debris can be removed and may ultimately be controlled at their sources, introductions of marine alien species are essentially irreversible. Thus prevention of introductions is among our highest priorities in managing anthropogenic impacts."

In these islands, the main potential vector for alien species is the hulls of vessels, says Kosaki. "Of the relatively few vessels that access the Northwestern Hawaiian Islands, research ships are among the most frequent visitors," he says. "Thus, they are likely candidates to serve as vectors." Most ships operated by NOAA are home-ported in the main Hawaiian Islands, at ports with numerous non-native species. Such species could hitch a ride on a ship's hull to the reserve and start up a new colony.

"All NOAA ships accessing the NWHICRER on reserve-sponsored research trips are subject to voluntary hull inspections by trained divers prior to departure," says Kosaki. "This is in part a feasibility study to see whether such regular inspections are practical and cost-effective. If this pilot program is successful, such inspections may be considered as potential regulations for all NOAA ships going to the Northwestern Hawaiian Islands."

In addition, dive gear used in the main Hawaiian Islands by researchers is subject to a 24-hour freshwater soak prior to use in the NWHICRER, and gear is also given a 10 ppm chlorine freshwater immersion between reefs in the reserve. "Such dips should prevent introductions of alien species via dive gear and minimize the probability of research divers becoming vectors for viral pathogens that may underlie some coral disease syndromes," says Kosaki.

Scientists are even working to prevent unnatural transfer of genetic information between reefs in the reserve. "The Northwestern Hawaiian Islands are one of the few large-scale coral reef systems where meta-population models and rates of gene flow between reefs can be studied," says Kosaki. "Researchers on reserve expeditions must release all organisms at the reefs from which they were collected to avoid artificial facilitation of gene flow." Like the other preventive measures, this is voluntary but may be considered as a regulation or permit requirement for the reserve in the future, he says.

Reserve scientists are working with researchers at other institutions to develop technologies for management needs, including invasive species detection. One project underway with the University of Hawaii, for example, is identifying genetic markers for alien species; with that knowledge, inspectors will be able to detect the presence of unwanted alien species from ship hull swab samples prior to the departure for the reserve.

Combating an invasion: Monterey Harbor, US

Eradication of marine invasive species is still a relatively new field; cases of the successful removal of an invasive species are rare, unfortunately. Monterey Bay National Marine Sanctuary (MBNMS), off the US state of California, is working to fight the

invasion of a seaweed species that has colonized a harbor neighboring the MPA, and personnel recognize the challenge they face.

The Asian kelp *Undaria pinnatifida*, more commonly known as wakame, was discovered in Monterey Harbor in August 2001. A highly invasive species that is native to eastern Asia, *Undaria* has been found in New Zealand, Australia, Argentina, the Mediterranean, and the UK over the past 30 years. At the time of the colony's discovery, Monterey Harbor was already host to dozens of documented alien species, although no concerted eradication attempts had yet been made by authorities. But *Undaria* –with its rapid growth and high fecundity, among other characteristics- was particularly viewed as a potential threat to the sanctuary's native kelp forests located nearby. With the invasion localized to the harbor at that point, MBNMS moved to address it and, if possible, eradicate it.

First, researchers determined the extent of the colonization. "Initially several individuals were found, but subsequent searches in late 2001 and early 2002 indicated that *Undaria* was more broadly distributed in the harbor than had originally been thought," says Steve Lonhart, scientist with MBNMS. State and sanctuary officials launched a formal *Undaria* management program in October 2002. It has Involved a team of volunteer divers removing *Undaria* manually from harbor docks and pilings, with research volunteers collecting data on *Undaria* locations. So far it appears that the *Undaria* is keeping pace with the eradication effort. "Given its spread from the center of the harbor to adjacent areas, it is likely that spores are been carried beyond the confines of the harbor," says Lonhart.

He recognizes that eradication of the plant is not possible unless the vector of transmission –vessel hulls in this case- is addressed. "Even if all *Undaria* were removed from Monterey Harbor, there are no mechanisms in place to prevent reintroduction by vessels entering from infected harbors in Southern California," says Lonhart. "Thus eradication is not a viable option. However, management of the population can reduce the rate of spread to the adjacent open coast and to harbors north of Monterey, and this is currently the main objective." It is unknown how *Undaria* will interact with the native kelp, which can grow to 150 feet. Invasive *Undaria* has been observed to grow in thick carpets along the seafloor in New Zealand and Argentina, altering native seaweed communities.

One management option would be to develop a market for the harbor's *Undaria*, which is commercially grown elsewhere in the world and used in miso soup. Lonhart says a local export company determined that samples of the Monterey *Undaria* were suitable for human consumption, but that the amount in the harbor was too low so far to be commercially feasible. The concept of harvesting *Undaria* as food for farmed abalone has also been considered, although it would need to be done in a way to avoid spreading *Undaria* spores in the process.

Considering the likely vector by which *Undaria* arrived, would hull-cleaning programs be an option for the sanctuary, including to prevent introduction additional aliens? Lonhart says that is unlikely. "A program to clean vessels would require o tremendous amount of infrastructure (e.g., a location for inspecting hulls, cleaning them, and managing this information), a significant long-term financial investment, and a program to monitor its success," he says. Unlike NWHICRER, simply too many vessels use Monterey Harbor to make such a program possible, for now. Lonhart hopes that eventually there could be systems to treat vessel hulls with UV light or high pressure, heated water to kill harmful spores and bacteria quickly and efficiently. In the meantime, MBNMS is monitoring *Undaria*'s spread and its eventual interaction with the native kelp.

Monitoring an invasion: Saldanha, South Africa

West Coast National Park (WCNP) on the Atlantic coast of South Africa contains both an internationally recognized wetland (Langebaan Lagoon) and the country's second largest bulk port, Saldanha. Thanks in part to the heavy ship traffic, WCNP is host to more than half of the marine introduced species observed so far in South Africa. One of these, the above-mentioned European green crab (*Carcinus maenas*) appears practically tailor-made to take over the park, says Charlie Griffiths, a biologist at the University of Cape Town. "There is concern it may invade the Saldanha Bay system, which contains large areas of ideal habitat," he says.

that Saldanha Bay and WCNP offer the mollusk-eating crab is wave-protected rocky habitat, the availability of which has been the invader's primary limiting factor in its spread up the South African west coast, says Griffiths. Researchers first discovered a mating pair of the crab in Saldanha Bay in 1990.

Griffiths has begun monitoring the crab and other alien species in the park to set a benchmark on their status; future surveys will compare results to see whether spread has occurred. Unexpectedly, his recent benchmark survey of the green crab found just one dead carapace, despite the presence of suitable habitat and numerous potential food species. He suspects the possibility that a population exists at such low densities that no live specimens could be found –which, again, would be surprising considering at least some individuals were present more than a decade before.

There is no eradication program to explain the absence, says Griffiths. "The authorities do not have an eradication program in place pending this or any other invasion," he says. "It is, I guess, an unfortunate reality that in a country in which 20% of the population are HIV-positive, 40% are unemployed, and 50% lack electricity, invasive marine species are not considered a priority issue."

Despite the lack of green crabs in his survey, Griffiths remains concerned about a potential invasion of WCNP –if not by this species then by another. He says the government could take simple steps that would nonetheless help a great deal in fighting invasions in its marine parks: namely, pairing routine surveys by parks authorities with a list of known global invaders known to occur in similar areas elsewhere. This could allow early detection and, potentially, eradication. "The parks authority is the one permanently on site, running tours, inspecting caches, etc., and thus the one most likely to encounter any invasion," he says. "I suggest arming them with the information."

For more information:

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Steve Lonhart – Steve.Lonhart@noaa.gov
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Web sources of information on invasions :

-Invasive Species Specialist Group of the IUCN Species Survival Commission – www.invasives.org

-IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species
www.iucn.org/themes/ssclpubs/policy/invasivesEng.htm

Source: MPA News. Vol. 6, No 6 Dec 04/Jan 05

IUCN recommends temporary ban on high-seas bottom trawling

IUCN, the World Conservation Union, has called on the United Nations General Assembly in 2005 to place an interim ban on bottom trawling on the high seas until a legally binding management regime is established to conserve deep-sea biodiversity from the impacts of such fishing activity. Furthermore, IUCN recommends that the UN call in 2006 for a similar interim ban in areas covered by regional fisheries management organizations, again until protective management measures are in place.

The IUCN recommendations, made at the World Conservation Congress in Bangkok (Thailand) in November, carry the force of the organization's full membership, consisting of 81 states, 114 government agencies, and 800+ NGOs worldwide.
Although not specified in the trawling-ban recommendations, the eventual management regimes would likely include no-take zones around some of the most vulnerable and still largely unexplored habitats –like seamounts and deep-sea coral communities. "There are vast gaps in knowledge about the biodiversity of the high seas and deep oceans," says Graeme Kelleher, chairman of the High Seas MPA Task Force for the IUCN World Commission on Protected Areas (WCPA). "We must act now to safeguard vital areas and species through high-seas marine protected areas and eliminate destructive fishing practices, or we will lose them."

Bottom trawl fishing is unregulated in extensive areas of the high seas –waters beyond national jurisdiction- and few regional fisheries management bodies have used their jurisdiction to control such fishing to protect sensitive habitats. An exception is the North East Atlantic Fisheries Commission, which agreed in November to close seamounts and part of the

Reykjanes Ridge (near Iceland) to fishing to protect vulnerable habitats (www.neafc.org/news/docs/2004press_release_final.pdf).

Seamounts are among the deep-sea habitats most vulnerable to exploitation. Worldwide there are estimated to be tens of thousands of these undersea mountains, but most have never been mapped, much less explored. Nonetheless, the known ones have become targets for the orange roughy fishery. Heavy exploitation can rapidly deplete a seamount's stock of this valuable but slow-to-reproduce species while also destroying any deep-sea coral and sponge communities present.

Precautionary approach

The UN General Assembly made progress toward an interim ban in November 2004 by calling on states and regional fisheries management organizations to take urgent action to protect vulnerable deep-sea habitats. Notably, it called on them to consider implementing interim bans on a case-by-case basis – that is, protecting one vulnerable area at a time after it has been located and explored by scientists. The UN also established a working group to discuss high-seas conservation and sustainable use, scheduled to meet in February 2006.
Kristina Gjerde, high seas policy advisor to the IUCN Global Marine Programme and coordinator of WPCA High Seas MPA Task Force, says these UN activities indicate a window of opportunity to work toward achieving an effective high-seas governance system. She adds, though, that any attempts to adopt a case-by-case approach to high-seas conservation should be avoided for the risk involved: the sites could be fished out between their time of discovery and establishment of protection. "The IUCN recommendation of an interim ban on all high-seas bottom trawling reflects a more pragmatic and precautionary approach, as we still do not know where all the seamounts and cold-water corals are located," she says.

At the World Conservation Congress, IUCN members also recommended the establishment of representative networks of MPAs on the high seas, and that these networks contribute to a global representative network of MPAs by 2012. The WPCA High Seas MPA Task Force launched a website in November to report on its efforts, at www.highseasconservation.org.

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Source: MPA News. Vol. 6, No 6 Dec 04/Jan 05

Coastal greenbelts as Tsunami lifesavers

According to Friends of the Earth, the amount of devastation from late December's Indian Ocean tsunami was significantly lower in those coastal areas protected by natural barriers such as mangrove forests and coral reefs. So-called "coastal greenbelts" in India, Malaysia and Sri Lanka helped mitigate damage and saved thousands of human lives. The organization says that the protection of such natural buffers serves as the only long-term solution to defending coastal populations against future tidal waves and other threats.

"What we have seen in the tsunami crisis is that the areas that were protected naturally suffered less than those that were more exposed," says Meena Raman, chairperson of Friends of the Earth. In some of the hardest hit areas, especially throughout coastal Thailand, hotels, shrimp farms, highways, housing and commercial developments have supplanted mangrove forests and coral reefs, which could have served as natural buffers, Raman adds.

Meanwhile, Edward Barbier, a University of Wyoming professor who has studied resource problems in developing countries for more than 20 years, points out that explosive economic development since the 1960s has depleted half of Thailand's coastal mangrove forests, which provide a double layer of protection against pounding surf, let alone tsunamis. "Even nature's ecosystem could not have prevented the tsunami," concedes Barbier. "With an event that huge you have to expect great loss, but the question is, could some of it have been reduced?"
Reporting by Roddy Scheer
January 11, 2005

Scientists see hope amid coral doom and gloom

Even though nearly two thirds of coral reefs are now officially endangered, some are bouncing back despite warmer oceans and pollution, giving hope the marine marvels are not completely doomed, scientists said on Friday. In particular, researchers are encouraged by the recovery of coral reefs in remote or well-protected areas from the devastating coral "bleaching" effect of the 1998 El Nino weather phenomenon, during which sea surface temperatures rose well above normal.

Described as a "one in a thousand year event", the bleaching, which killed off vast swathes of reefs across the globe, has not been repeated to anything like the same extent in the past six years. "Recovery should continue provided there are no major climate shifts in the next few decades," scientists said in a summary of the 2004 edition of Status of Coral Reefs of the World, released at the IUCN World Conservation Congress in the Thai capital.
"However, the recovery is not uniform and many reefs virtually destroyed in 1998 are showing minimal signs of recovery," they said. The full report, which says 58 percent of the world's coral reefs are now endangered, is to be made public next month. Humans continue to represent the single biggest threat to coral reefs, some of the most spectacular places on earth populated with some of nature's weirdest and most wonderful creatures.
About 100,000 species living in and around coral reefs have so far been logged, although some scientists believe the real total may top 2 million. In particular, the report cited sedimentation, land-based pollution and over-fishing as the biggest threats to the ecosystems. Conversely, threats from nature seem to be easing off. "Pressures on coral reefs from coral predators such as the crown of thorns starfish and coral disease appear to have stabilized or even reduced," the report said.

Reefs in South and Southeast Asia, where pressures from booming populations are at their most severe, are those struggling hardest to recover. "As long as poverty, population growth and lack of alternative livelihoods keep people dependent on already depleted reef resources, the coral reefs of South Asia will continue to degrade," says Jerker Tamelander of the IUCN's South Asia Regional Marine Programme.

Source: Reuters Ed Cropley - 19 Nov 2004

It's an ill wind

The dust clouds drifting from Africa to the Caribbean have a dangerous secret - bacteria and microbes that leave a trail of disease in their wake. Ian Sample reports "The dust falls in such quantities as to dirty everything on board, and to hurt people's eyes; vessels even have run on shore owing to the obscurity of the atmosphere. It has often fallen on ships when several hundred miles from the coast of Africa, and at points 1,600 miles distant in a north and south direction."

Charles Darwin's note from 1832 suggests the dust clouds that engulfed HMS Beagle as it anchored in St Jago in the Cape de Verde Islands off the African coast were dramatic, if unsettling. But they were by no means freak events. Such clouds - which can be as large as the Spanish mainland - form all year round, as dust is whipped up from the continent's arid savannahs and carried across the north Atlantic to the Caribbean and beyond.

The dust blowing off Africa contributes most of some 2bn tons' worth shunted around the atmosphere each year (the rest originating in Asia, South America, the US and Australia). But while those immediately downwind of the clouds know well the mayhem they can cause, new research is revealing a hitherto unforeseen danger the dust clouds may pose.

Suspicions were raised back in the 1990s when Eugene Shinn, a scientist with the US Geological Survey in St Petersburg, Florida, was reviewing a series of environmental knocks that had hit the Caribbean in previous years. First, the coral reefs had gone into serious decline, then the sea urchins dwindled. Finally, a smattering of disease outbreaks struck the region's marine life. Many scientists believed that for each event, a change in the local environment was to blame. But Shinn thought otherwise. What if there was one cause behind them all?

It was not until later, while looking at some satellite images that Shinn formalized his hypothesis. The images - snapshots of the atmosphere over the Atlantic - showed enormous clouds of dust climbing up to heights of 10km and stretching across the ocean from the Sahara and arid Sahel region in northern Sudan. Shinn suspected something in the dust - bacteria, viruses, fungi or chemicals - was adding a deadly edge to the clouds.

When Shinn publicized his thoughts on a link between African dust and the demise of Caribbean corals, he divided the scientific community. "He got a lot of resistance," says survey colleague and microbiologist Chris Kellogg. "People said the microbes would never make it so far, that they would be destroyed by the ultra-violet (UV) in sunlight on the way."

But Shinn was on to something. In 1996, Garriet Smith, a biologist at the University of South Carolina, was investigating the rapid deaths of Caribbean sea fans. The creatures had died of a disease called aspergillosis, but Smith was stumped because the fungus responsible for the disease, though common in African soils, couldn't thrive in seawater. It wasn't long before an explanation was found. Tests on airborne dust samples collected in the Caribbean were found to contain infectious spores of the fungus. Scientists suspect the spores had been carried on the wind from Africa, before landing on the ocean surface, sinking and infecting the sea fans. Enough had built up on the ocean floor for the disease to spread.

Since then, several outbreaks have been linked to dust clouds. Last year, Kim Ritchie at the Mote marine laboratory in Sarasota, Florida, showed that bacteria in diseased sea urchins matched those carried by African dust clouds and settling in sea water. Earlier this year, scientists blamed a case of septicemia in a loggerhead turtle found off the Canary Islands on *Staphylococcus xylosus*, a bacterium found in dust samples from Mali. And recently, Michelle Monteil, a doctor in St Augustine, Trinidad, discovered that more children were admitted to hospital with asthma immediately after a dust cloud had passed. Perhaps, she says, infectious agents in the dust irritate the lungs of those susceptible to asthma. It could help to explain why the Caribbean has some of the highest rates of asthma in the world.

With so much evidence implicating dust clouds as a health threat, Kellogg and her colleagues decided to carry out an audit on dust, initially that coming out of Africa. Since a single gram of soil can contain upwards of 10,000 bacteria, it was no simple task. "What we really need to get a grip on is what's there, how much is there and how often does it arrive," says Kellogg. "Once we have a sense of that, we can start thinking about what advice should be given."

From air monitoring stations set up in the Virgin Islands, and from samples taken in Africa, Kellogg found that not only were microbes able to travel the thousands of miles from Africa, but that nearly a third of those that survived were known pathogens. In the right circumstances, they could cause disease in plants, livestock or humans, although only humans with a poorly developed or suppressed immune systems were likely to contract infections.

Kellogg says many microbes survive such lengthy trips because they are shaded from the sun's baking UV rays by dust particles above them. "Those at the top of the cloud will fry, but the ones beneath can, and do, survive," she says. Of the microbes Kellogg's team managed to grow from dust samples, many were heavily pigmented, making them bright pink, orange or yellow. "We think the pigments might act as some kind of sunscreen," she says. Because microbes, at around a micron long, are usually much smaller than dust particles, they can also hunker down for the ride. "From a microbe's eye view, there are lots of nooks and crannies you can tuck yourself into."

Kellogg has so far identified at least 170 different bacteria and 76 types of fungus in airborne dust collected on the Virgin Islands. Among them are *Cladosporium* and *Aureobasidium* fungi, which can cause skin and respiratory infections, and several bacillus species that can cause gastrointestinal illnesses and septicemia.

That dust clouds don't leave obvious trails of disease in their wake suggests that the infectious bacteria or other microbes are usually too few to cause significant problems when they settle. But as Kellogg points out, the recent spate of outbreaks linked to dust clouds may indicate that the clouds are becoming larger, or are carrying more microbes than they used to. She may well be right. Since the 1970s, a weather system called the North Atlantic Oscillation has

imposed a high pressure over Africa, exacerbating drought conditions and increasing the amount of dust in the deserts. The weather system also boosts the trade winds, so more dust is whipped up than before. Couple these with the fact that more animals and humans in Africa mean more soil microbes - sewage water often ends up drying out on flood plains - and you have a recipe for more dangerous dust clouds. "That nothing big has happened yet may be just lucky," says Kellogg.

The team's next move is to set up air monitoring stations in other parts of the world, to get an idea of the variety of microbes being carried in dust clouds from Asia and elsewhere. One day, Kellogg hopes scientists will be able to monitor dust clouds as they travel and predict their impact. "If we know a certain type of bacteria is going to arrive, we can think about warning farmers or the health services," she says. "We've yet to find anything to alarm healthy people, but that's always a chance."

Source: The Guardian - December 2, 2004

The World Resources Institute releases the Reefs at Risk in the Caribbean Data CD in English and Spanish.

The products being released reflect the culmination of a two-and-a-half-year collaborative effort involving over twenty organizations working in the wider Caribbean region. The project, which is a component of the International Coral Reef Action Network (ICRAN), is implemented by the World Resources Institute (WRI) in close coordination with the UNEP Caribbean Environment Program. Reefs at Risk in the Caribbean provides a region-wide analysis of human threats to coral reefs and evaluates economic losses likely to result from coral reef degradation. The English language summary of the project was released in September 2004. The products released today are additional compliments to the summary report and provide detailed data on threats to coral reefs across the Caribbean.

All products from the project are available on the project web site - see *reefsatrisk.wri.org*.

In addition to the 80-page English language summary, Reefs at Risk in the Caribbean (in PDF format), now available on the project web site are:

1) The Spanish translation - the 80 page Arrecifes en Peligro en el Caribe (as PDF);
2) Detailed "Country Summaries" of threats to, status of, and protection of coral reefs for 35 countries or territories across the region;
3) Downloadable spatial (GIS) data sets of analysis of threats to coral reefs;
4) Downloadable GIS datasets on watershed boundaries and analysis of land-based sources of pollution;
5) Metadata for all GIS data;
6) Digital maps (in high and low resolution JPEG formats) reflecting coral reef locations and threats to coral reefs for the Caribbean region;
7) Technical notes on the spatial analysis of threats to coral reefs;
8) Technical notes on the Economic Valuation method;
9) Information on a how to acquire the Reefs at Risk in the Caribbean Data CD

Universities, research institutes and non-profit organizations can request the Reefs at Risk in the Caribbean Data CD by sending a request to reefsatrisk@wri.or

Caribbean Journal of Science

Please take a few seconds to read about our journal and the advantages we offer scientists doing research on Caribbean natural history. Contact Dr. Ines Sartre, the Chief Editor if you need additional information or if you would like to receive an examination copy. You can also read about our journal's history (http://caribjsci.org/dec01/37_302-305.pdf) and visit our website (www.caribjsci.org).

The Caribbean Journal of Science publishes formal articles, research notes, book reviews, and essays relevant to Caribbean natural science. Emphasis is on the various branches of zoology, botany, ecology, and geology. We offer authors:

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- Careful editorial review

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I look forward to receiving your next manuscript!

Sincerely,
Ines Sartre
Editor, Caribbean
Journal of Science. www.caribjsci.org

Meetings & Conferences

32nd Scientific Meeting of the Association of Marine Laboratories of the Caribbean, Curacao. June 13-17, 2005.

We are pleased to announce our upcoming scientific meeting of the Association of Marine Laboratories of the Caribbean. The meeting will be centered upon scientific presentations and will include a variety of field trips to enjoy our locale, which this year is the island of Curacao. As in the past, presenters may submit papers of their presentations for publication in the peer-reviewed journal proceedings of the meeting. The meeting will include poster and oral presentations. In keeping with the AMLC purpose of promoting the exchange of scientific and technical information concerning Caribbean marine sciences, topic areas for this scientific meeting will include:

- Coral Reef Ecology
- Diseases of Coral Reef Organisms
- Remote Sensing and GIS in the Wider Caribbean
- Caribbean Oceanography and Coastal Processes
- Pollution and Anthropogenic Issues
- Public Awareness and Education
- Biodiversity, MPAs, and Conservation
- Fisheries and Aquaculture
- General Ecology within Caribbean Marine Sciences
- Monitoring
- Environmental Restoration
- Regional Ecological Connectivity
- Science for Resource Management

The program will also include a NOAA-sponsored session chaired by a NOAA representative, for which we wish to solicit paper submissions. Specifically, the theme will be "Applied Coral Reef Research," with the underlying thesis of research with resource management outcomes or applications. Submissions need not concern research only on Caribbean reefs, but may describe research conducted in other parts of the world with potential application to Caribbean resources.

Under the general theme of Regional Ecological Connectivity, David Wilson and Ivan Nagelkerken also wish to encourage oral presentations, posters and/or paper submissions within three major themes: 1) Larval connectivity between reefs/islands/habitats; 2) Ecological connectivity among habitats by juvenile and adult fishes and invertebrates; 3) Connectivity among habitats with respect to nutrients and other physio-chemical factors. It is their hope that sufficient interest and abstracts will be submitted to develop a full thematic session around Ecological Connectivity. If you regard your submission as appropriate for a Connectivity Session, we suggest that in addition to the normal submission procedure, you copy your submission to David Wilson, who is on the Curacao Meeting Program Committee. His e-mail address is: dwilson@fieldstudies.org.

Other topics will be considered subject to session time limitations. Abstracts must be received by April 1, 2005, and may be in English or Spanish. Abstracts must be submitted in the form described in the attached Abstract Format instructions (or see the website at www.amlc-carib.org). Upon receipt of your abstract, a confirmation will be sent to you. Author guidelines and manuscript submission requirements are posted in the new AMLC website (www.amlc-carib.org).. It will be helpful if you assure that your e-mail address is clearly provided when you submit your abstract.

If using postal service to submit your abstract, include a hard copy and an electronic copy on diskette. If using e-mail, attach your abstract to your message – do not incorporate your abstract in the body of your message – attach it as a Word file.

Steve Piontek
Curacao Sea Aquarium
Bapor Kibra z/n (for courier services) or
PO Box 3102 (for mail)
Curacao, Netherlands Antilles
education@curacao-sea-aquarium.com

Registration

A Registration Form can be found at end of this newsletter. Please note that substantial cost saving may be realized by early (before May 1, 2005) registration. The registration fee covers the initial reception, all meetings, two coffee breaks per day, a book of abstracts, the program, the published meeting proceedings, and a souvenir T-shirt. Tickets to the closing banquet and local field trips will be sold for nominal prices at the registration desk when you arrive. The registration fee includes membership dues for one year, which will be applied to year 2005 dues or to 2006 dues if the registrant has already paid year 2005 dues.

Accommodations

The venue hotel will be the Lions Dive Hotel and Beach Resort. Our special AMLC room rates are U.S. $85.00 for single occupancy, and U.S. $95.00 for double occupancy. These rates include taxes and a buffet breakfast, and are based on our renting a minimum number of rooms. We encourage all attendees to stay at the venue hotel, and we suggest you make your reservations NOW to assure your getting these great special rates. The rooms will be held until May 1, 2005, after May 1 the rooms will be made available to the general public. You will need a credit card to confirm your reservation. To make your hotel reservations, contact:

Sales Manager / Reservations
Lions Dive Hotel and Beach Resort
Bapor Kibra z/n
Curacao, Netherlands Antilles
Tel: 05999-434-8888
Fax: 05999-434-8889
E-mail: c.winklaar@lionsdive.com
Website: www.lionsdive.com

Travel

A valid passport is needed to enter Curacao, and possibly a visa depending upon your country of citizenship. Please check with your travel agent to determine if you need a visa, and if so, secure this visa early. Because shuttle service is not provided by the hotel, we suggest using a taxi. The cost of a taxi from the airport to the Curacao Sea Aquarium / hotel is U.S. $22.

17th Caribbean Geological Conference. July 2005.

The Seventeenth Caribbean Geological Conference will be held in San Juan, Puerto Rico in July 2005 under the auspices of the Department of Geology of the University of Puerto Rico at Mayagüez, Puerto Rico. The Conference is dedicated to the exchange of information on all aspects of Caribbean Geology.

Correspondence

All communications should be addressed to:
Johannes H. Schellekens
General Coordinator
17th Caribbean Geological Conference
Department of Geology, UPRM
PO Box 9017
Mayagüez, Puerto Rico 00681
geolconf@uprm.edu

Papers

1. The subject matter of the papers should relate to some aspect of Caribbean Geosciences.

2. Abstracts of papers may be submitted in English, Spanish or French, but should include an English summary. All abstracts (300 words maximum) should be presented in English and should be submitted before February 28, 2005.

3. It is preferred if abstracts are sent in a digital format as Microsoft Word or Acrobat Reader submitted either by e-mail or diskette.

4. Oral presentations will be of a maximum duration of 20 minutes; five minutes will be allowed for discussion, and a further five minutes between speakers.

5. It is hoped that the Conference will be conducted in a series of symposia devoted to specific themes. Possible topics may be **(but are no way restricted to):**

- Caribbean Stratigraphy and Sedimentology ,
- Paleontology and Palaeoecology
- Igneous Petrology and Vulcanology
- Structural Geology, metamorphism and tectonics
- Accretionary Prisms
- Caribbean Plate Tectonics
- Recent Carbonates
- Hydrocarbons in the Caribbean
- Industrial Minerals Geology
- Metalliferous deposits
- Environmental geology and hydrogeology
- Application of geology to modern cultural problems.
- Hydrogeology; Coastal conservation, etc.
- Seismology
- Karst Geomorphology and Espeleology

Simultaneous sessions may be held depending on the number of papers selected for presentation. Space will be allocated for Poster sessions.

Conference Site and Facilities

The conference will be held at the Caribe Hilton Hotel, which is a resort within the beautiful and historic city of San Juan, Puerto Rico. The hotel is located within 15 minutes of the Luis Muñoz Marin International Airport and was chosen because of its first rate facilities and ample experience hosting large conventions. Modern presentation facilities such as overhead projection, slide projection, computer power point presentation, etc. will be available in each conference room.

Accommodation

A block of rooms has been reserved for participants. Please make reservations directly with the hotel. Remember to identify yourself as a Geological Caribbean Conference attendee to obtain the special conference rate. Reservations must be made by the cut-off date of **June 17, 2005** to be certain to get the conference rate. Standard Room $140 (single or double occupancy.

Caribe Hilton Hotel, http://www.Caribe.Hilton.com
Los Rosales St.
San Jerónimo Ground
San Juan, Puerto Rico 00901
Toll-free: 1 (800) 227-4231
Telephone: 1 (787) 721-0303
Fax: 1 (787) 724-6992

Registration fees* (US dollars)

	Until April 15	After April 15
Participating Members	$195.00	$245.00
Participating Students	$115.00	$170.00

*Registration includes ice breaker, coffee breaks, lunches, welcome reception, programs, book of abstracts, and the final transactions. Refunds of pre-registration fees will be made for cancellations done before May 15, 2005 ($25.00 for administrative costs will be deducted).

Travel

Most major US carriers offer non-stop service to San Juan via their North American hub cities. Canadian travelers can reach San Juan via nonstop service from Toronto on Air Canada. Iberia Airlines offers nonstop service from Europe originating in Madrid. Other European travelers can make convenient connections through several different Caribbean portals, New York, or Miami. South American travelers will usually find Miami to be the most convenient connection. Other international travelers can easily reach San Juan through most major North American airports.

Visas

The U.S. dollar is the local currency and no visas or passports are required to enter Puerto Rico from the United States. Persons traveling from other countries

should check with their travel agents about visa requirements. There are no customs duties on articles bought in Puerto Rico and taken to the U.S. mainland.

Field trips (Tentative)

Pre-Conference and Post-Conference field trips will be available. Possible field trips will be:

- Puerto Rico Quaternary Geology and Paleoseismicity
- Geology of Mona Island
- Geology of Puerto Rico
- Karst of Northern Puerto Rico
- Geology of Northern Virgin Islands\

3rd International Symposium on Deep-Sea Corals (ISDSC). Nov. 28 - Dec. 2, 2005.

We are pleased to announce the 3rd International Symposium on Deep-Sea Corals (ISDSC) will be held November 28-December 2, 2005 in sunny Miami, Florida at the University of Miami Rosenstiel School of Marine and Atmospheric Science (RSMAS) on Virginia Key, an island off the coast of Miami, Florida, USA. Oral presentations will take place in the 250-seat RSMAS Auditorium.

The purpose of the 3rd ISDSC is to facilitate global exchange of the current scientific knowledge of deep-sea corals and associated fauna and to discuss possible statutory means available to conserve and protect deep-sea habitat.

Topics - themes

Theme 1-Taxonomy and Molecular Systematics. Conveners: Stephen Cairns (USA) and Timothy Shank (USA)
Theme 2 - Habitat Mapping, Sampling and Characterization. Conveners: Anthony Graham (Ireland) and Kathy Scanlon (USA)
Theme 3 - Geology: Paleontology and Climate Change. Conveners: André Freiwald (Germany) and Michael Risk (Canada)
Theme 4 - Feeding, Growth and Reproduction. Conveners: Paul Tyler (UK) and Sandra Brooke (USA)
Theme 5 - Biodiversity: Microbial and Invertebrate Association. Conveners: Robert George (USA) and Pål Mortensen (Norway)
Theme 6 - Deep-Sea Coral Reef and Seamount Fish Ecology. Conveners: Anthony Koslow (Australia) and Kenneth Sulak (USA)
Theme 7 - Ecosystem Based Fisheries Management: Deep-Sea Corals/Seamounts. Conveners: Andrew Rosenberg (USA) and Susan Gass (Scotland)
Theme 8 - Conservation and Protection of Deep-Sea Corals. Conveners: Murray Roberts (UK) and Simmon Cripps (WWF)

New Books

The Everglades Handbook: Understanding the Ecosystem – second edition

By Thomas E. Lodge

The second edition of a bestseller, The Everglades Handbook: Understanding the Ecosystem continues to provide a wealth of information on the entire ecosystem of the Everglades. Offering the essentials of what the ecosystem is and how it works, the Handbook benefits those addressing issues such as Everglades restoration, water management, wildlife management, and water quality problems in urban and agricultural planning. With an emphasis on natural history, the text is unified around themes of biogeography and ecosystem functions of the plant and animal communities. It presents current and historical geology, discussions of human impacts, ecosystem degradation, planned restoration, and covers the socioeconomic aspects of the Everglades ecosystem.

Features:
-Provides a wealth of information on the entire ecosystem, from the Kissimmee River drainage through Florida Bay
-Emphasizes the importance of flow in maintaining the Everglades marsh ecosystem
-Includes 90 illustrations, some in full color

For Order Information:
Catalog no. L1614, July 2004, 336 pp.
ISBN: 1-56670-614-9, $49.95

CRC Press
2000 N.W. Corporate Blvd.
Boca Raton, Fl 33431-9868, USA
Phone: 1-800-272-7737
From outside the continental U.S.
1-561-994-0555
Order Online at:
www.crcpress.com

Biology of Sharks and Their Relatives

Edited by Jeffrey C. Carrier, Ph.D., John A. Musick, Ph.D. and Michael R. Heithaus, Ph.D.

Biology of Sharks and Their Relatives brings together the latest information on the phylogeny, physiology, behavior, and ecology of sharks and their relatives, the skates, rays and chimaeras. Written by a "Who's who" lineup in North American elasmobranch research, this single-source review of elasmobranch fishes presents cohesive and integrated coverage of key topics and discusses technological advances used in modern shark research. The text establishes relationships among sharks and their relatives that dominate the Chondrichthyes, describes their varied forms, functions, and physiological processes, and examines issues relevant to managing depleted and threatened fisheries. Each of the 19 chapters includes a comprehensive review of the subject with extensive up-to-date citations. This authoritative book provides a synopsis of the current understanding of elasmobranch fishes while identifying gaps in our knowledge to stimulate further study. Its broad coverage and inclusive nature make this an important resource for marine and conservation biologists, fishery scientists, biological oceanographers, zoologists, ecologists, environmental planners, and students.
Features:
-Discusses topics at the forefront of research for sharks and other elasmobranch fishes
-Presents extensive references to serve as an entry point for further research
-Includes over 200 figures, including 8 full color plates

For Order Information:
Catalog no. 1514, March 2004, 616 pp.
ISBN: 0-8493-1514-x, $99.95

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2000 N.W. Corporate Blvd.
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www.crcpress.com

Toxicology of Marine Mammals

Edited by Joseph G. Vos, Gregory Bossart, Michel Fournier, and Thomas O'Shea

Toxicology of Marine Mammals focuses on the effects of natural and introduced toxicants on organs and systems in marine mammals. It provides overviews on health status and contamination, with subsequent chapters devoted to whales, pinnipeds, dolphins, polar bears, manatees, and sea otters. Internationally renowned researchers assess the mounting evidence for adverse effects on reproduction and the chemically-induced increased susceptibility to death from infectious diseases. The concluding chapter addresses perspectives and issues for the future. This compelling book features research from a vast geographic landscape ranging from the tropics to the Artic, with case studies on intriguing areas of contamination such as the St. Lawrence River and the Baltic Sea. It identifies the severe threats that environmental contaminants pose to the health and future of marine mammals. It also makes an urgent call for legislation to regulate the incessant pollution ravaging our seas and devastating the marine mammal population worldwide. Toxicologists working in marine biology and veterinary medicine, conservation scientists, fisheries scientists, environmental scientists, and wildlife managers will all benefit from this comprehensive resource.
Features:
-Provides an overview of the impact of environmental contaminants on marine mammals
-Examines the methods and difficulties in assessing the health risks to these mammals and in determining the casual relationships between environmental contaminants and specific target organ toxicity
-Investigates strandings and die-offs

For Order Information:
Catalog no. TF1197, 2003, 656 pp.

ISBN: 0-415-23914-1, $149.95

CRC Press
2000 N.W. Corporate Blvd.
Boca Raton, Fl 33431-9868, USA
Phone: 1-800-272-7737
From outside the continental U.S.
1-561-994-0555
Order Online at:
www.crcpress.com

Oceanography and Marine Biology: an Annual Review, volume 42

Edited by R. N. Gibson, John D. M. Gordon, and R. J. A. Atkinson

Ever-increasing interest in oceanography and marine biology and its relevance to global environmental issues creates a demand for authoritative reviews summarizing the results of recent research. Oceanography and Marine Biology: an annual review has answered this demand since its founding by the late Harold Barnes more than 40 years ago. Its objective is an annual consideration of basic areas of marine research, dealing with subjects of special or immediate importance, adding new subjects as they arise. The volumes maintain a unified perspective on the marine science. Physical, chemical, and biological aspects of marine science are dealt with by experts actively engaged in these fields. This essential reference text for researchers and students in all fields of marine science finds a place in libraries of marine stations and institutes, as well as universities. It consistently ranks among the highest in impact factors for the marine biology category of the citation indices compiled by the Institute for Scientific Information. Volume 42 contains analysis on convective chimneys in the Greenland Sea, spawning aggregations of coral reef fishes, exopolymers (EPS) in aquatic systems, the marine insect *Halobates*, and much more.
Features:
-Relates recent marine research to global ecological issues
-Offers recent observations of marine microbial thiotrophic ectosymbioses
-Explores the role of exopolymers (EPS) in aquatic systems
-Investigates the biology, adaptations, distribution, and phylogeny of the marine insect *Halobates*
-Discusses the role of dimethylsulphoxide in the marine biogeochemical cycle of dimethylsulphide
-Contains comprehensive author, systematic, and subject indexes

For Order Information:
Catalog no. 2727, July 2004, 448 pp.
ISBN: 0-8493-2727-X, $169.95

CRC Press
2000 N.W. Corporate Blvd.
Boca Raton, Fl 33431-9868, USA
Phone: 1-800-272-7737
From outside the continental U.S.
1-561-994-0555
Order Online at: www.crcpress.com

Courses

Duke University Marine Lab 2005 Summer Course

The Biology and Conservation of Sea Turtles

Dates: Summer Term II: 11 July - 12 August 2005
Course limit: 15 students (undergraduates, graduate students, professionals).
Application deadline (if applying for Global Fellowship): 15 February 2005.
Application deadline (if applying for Tuition Scholarship): 1 April 2005.
Application deadline (no funding support): 11 June 2005.

Description: BIO125L/ENV 227L. The essential biology of sea turtles (evolution, anatomy, physiology, behavior, life history, population dynamics) and their conservation needs, with an emphasis on the role turtles play in marine ecosystem structure and function. Basic ecological concepts are integrated with related topics including the conservation and management of endangered species, the contributions of technology to the management of migratory marine species, the role of research in national and international law and policy, and the veterinary aspects of conservation. The course includes laboratory and field experience with the

animals and with their habitat requirements. The course is taught by Drs. Karen and Scott Eckert and features invited lectures by a distinguished faculty.

As part of Summer Term's II Integrated Conservation Biology program, a core course BIO 109/ENV 209 (Conservation Biology and Policy) may be taken with The Biology and Conservation of Sea Turtles. The sea turtle course is one of several specialized electives that can be paired with BIO 109/ENV 209. Students are encouraged (but not required) to take both the Conservation Biology and Policy course and a specialized elective. A grant from the Panaphil Foundation allows the Duke Marine Laboratory to offer three tuition scholarships to U.S. citizens (applications due April 1) choosing The Biology and Conservation of Sea Turtles as their specialized elective. This grant also provides three Global Fellowships in Marine Conservation for international students (applications due February 15) choosing Biology and Conservation of Sea Turtles as their specialized elective. The Global Fellowships in Marine Conservation are awarded on a competitive basis to international students, especially those from developing countries, and fully cover travel expenses, room and board, and tuition for both BIO 109/ENV 209 (Conservation Biology and Policy) and The Biology and Conservation of Sea Turtles. Experience the beautiful North Carolina coast! Join students from all over the world in participating in this unique summer session experience. Enrollment is limited, apply early!
For more information:
mL_admissions@env.duke.edu
Helen Nearing - Tel: 252.504.7502.
www.nicholas.duke.edu/marinelab/admissions/forms.html
http://www.env.duke.edu/marinelab/programs/scholarship.html
http://www.nicholas.duke.edu/marinelab/programs/summer2.html

Bermuda Biological Research Station 2005 Summer Courses.

The Bermuda Biological Research Station is offering a series of Summer courses listed below
Coral Reef Ecology
June 5 – 25, 2005

Marine Ecotoxicology
June 5 – 25, 2005

Marine Microbial Ecology
June 26 – July 9, 2005

Behavior of Coral Reef Animals
June 26 – July 23, 2005

Marine Microbial Genomics
July 10 – 16, 2005

Tropical Marine Invertebrates
July 31 – August 27, 2005

Scientific Photography
July 31 – August 20, 2005

Geological and Biological Evolution of Bermuda
Dates to be announced

For more information visit the webpage:
www.bbsr.edu/Education/summercourses/summercourses.html
Online Application Form:
www.bbsr.edu/Education/summercourses/scapp/scapp.html
Scholarship Information:
www.bbsr.edu/Education/summercourses/scholarship/scholarship.html

Spring 2006 graduate-level coral reef ecology course – UNCW.

The University of North Carolina at Wilmington is offering a new spring semester, graduate-level coral reef ecology course (BIO 585 Research methods in Coral Reefs and Adjacent Systems). The course is open to graduate students and upper level seniors that meet all of the course requirements. Details about the course and requirements can be found on my web page (see link below). The field portion of the course is being taught at CARMABI, on the island of Curacao, with the last three weeks of the semester at UNCW
so that students can have access to major equipment not available in the field.

UNCW is now recruiting students for the Spring of 2006. Class size is limited to only 10 students because of the intense one-on-one interactions with instructors. There are partial scholarships avaliable for qualified students that apply by July 1, 2005.

For more information, please contact Dr. Alina Szmant by email (szmanta@uncw.edu) or by telephone (see below) after April 11, 2005

Dr. Alina M. Szmant Coral Reef Research Group
UNCW-Center for Marine Science
5600 Marvin K. Moss Ln
Wilmington NC 28409
Tel: (910)962-2362 & Fax: (910)962-2410
Cell: (910)200-3913
email: szmanta@uncw.edu
Web Page: http://people.uncw.edu/szmanta

Change of Address

MOVING? To ensure that you continue to receive *Caribbean Marine Science*, notification of upcoming AMLC meetings and other AMLC information, please fill out the following change of address form and mail to:

Dr. Laurie Richardson
79 Marina Avenue
Key Largo, FL 33037
richardl@fiu.edu

Name & Title

_____

Institution/Association

_____

_____

Address _____

_____

_____

Telephone _____
FAX _____
E-mail_____
Scientific Interests _____

_____

Dues

Individual membership dues for 2004 are $25.00 due March 31st, 2005 unless you attend the Curacao Scientific Meeting, in which case your meeting registration fee will include membership dues. If you are not planning to attend the Curacao meeting, please do send your dues as discussed here. You may also help AMLC with a donation membership contribution if you wish; the schedule for these is presented below. Student dues are still $5 per year.

The AMLC can accept credit cards payments (Visa, MasterCard or American Express) for AMLC dues. A 5% service charge will be added to credit card payments. Checks must be in U.S. dollars, from U.S. banks (or a U.S. dollars bank draft), made out to "AMLC", and sent to Laurie Richardson.

Name & Title

_____

Institution/Association

_____

New Address _____

_____

Telephone_____
FAX _____
E-mail_____
Scientific interests _____

_____

Membership Options: Student (US$5.00)_____ Regular (US$25.00)____Sponsor(US$30.00)___ Sustaining Member (US$50.00)_____ and Patron (US$100.00)_____.

My check (bank draft) is enclosed for US$_____ OR Please charge US$_____ to my Visa ( ) Mastercard ( ) (Charge will include an additional 5% to cover handling expense)

Card # _____
Expiration Date_____
Cardholder_____
Signature _____

AMLC Background & Goals

The Association of Marine Laboratories of the Caribbean (AMLC) was founded in 1956 by marine researchers with interests in the marine science of the tropical Atlantic and Caribbean. Founded primarily as a scientific organization, the strength of the AMLC lies in the diversity of its member laboratories and the extensive expertise of its membership. Institutional, individual scientist and student memberships are available.

Annual AMLC meetings are hosted by member laboratories which are actively conducting marine research in the Caribbean. The host laboratory arranges for facilities for research presentations, copies of the presented abstracts (the proceedings) and accommodations for participants. The AMLC has no designated official language so researchers are free to make their presentations in their native language.

Caribbean Marine Science, published in English and Spanish, is the biannual newsletter of the AMLC and informs members of AMLC activities, pertinent events, and relevant research.

The purpose of the AMLC is to advance common interest in the marine sciences by:

a. Assisting and initiating cooperative research and education programs
b. Providing for a for exchange of scientific and technical information
c. Fostering personal and official relations among members
d. Publishing the proceedings of scientific meetings and a newsletter

2004-05 AMLC Officers

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Contributions to the AMLC Newsletter:
All members of the AMLC (individual and laboratory) are encouraged to send relevant news items at any time, to the newsletter. Relevant news items include, but are not limited to: new facilities, faculty/staff changes, positions available, research programs and initiatives, publications of general interest, awards, visiting scientist opportunities, and education programs. Submitted items should be sent to the AMLC newsletter office by the end of February for inclusion in the Spring issue, and by the end of September for the Fall issue.

Please send your information and comments to:

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32nd SCIENTIFIC MEETING OF THE ASSOCIATION OF MARINE LABORATORIES OF THE CARIBBEAN CURACAO, JUNE 13-17, 2005

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Mark (X) your registration status:	**Early registration Before May 1, 2005**		**Late registration After May 1, 2005**	
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For information and inquiries, you may contact Mr. Steve Piontek at:

Tel: 0599-9-461-6666 or by E-mail at: education@curacao-sea-aquarium.com

NEW MEMBERSHIP REGISTRATION

TO BE COMPLETED AND SUBMITTED WITH THE REGISTRATION FORM FOR THE 2005 SCIENCE MEETING IN CURACAO

Association of Marine Laboratories of the Caribbean

Thank you for your interest in joining the AMLC. Our membership categories are as follows:

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THANK YOU FOR YOUR SUPPORT OF AMLC!

32nd SCIENTIFIC MEETING OF THE ASSOCIATION OF MARINE LABORATORIES OF THE CARIBBEAN CURACAO, JUNE 13-17, 2005

ABSTRACT – RESUMEN - FORMAT

The abstract should be in the following IBM or compatible format: **Word processor:** MS Word 7- or higher. **Font:** Times-Roman (size 11) - **Margins**: 1.0" all sides. **Title** – All in capital letters; font size 11 in bold. Title should be short (2 lines maximum) and include Order and Family of organisms when needed. Scientific names should be in italics. In the next line, name (s) of author (s) with presenter underlined, a complete, but short, address for the senior author and his/her e-mail. **Text:** Leave one line, and then write the 300 word (maximum), single paragraph text (single space between lines) of the abstract, leave one line and write four keywords for the abstract, the session you want to give your presentation, and if it will be an oral presentation or a poster. Please, let us know if you would like to co-chair a session.

Example:

ECOLOGICAL CHARACTERISTICS OF A NOVEL STRATEGY OF ASEXUAL REPRODUCTION IN CARIBBEAN MASSIVE CORALS.

E.Weil*, A.L. Ortiz, H. Ruiz & M. Schärer.

*Department of Marine Sciences, University of Puerto Rico. P.O. BOX 908, Lajas, PR 00667, USA. eweil@caribe.net

Corals can reproduce asexually by at least five described strategies. Only fragmentation and asexual larvae have been reported for the Caribbean. A novel strategy of asexual reproduction was observed in massive colonies of the genera *Diploria* and *Dendrogyra* in the Caribbean. These species produce asexual buds which develop as soft-tissue outgrowths on the ridges, and deposit a well organized skeleton which is not connected to the parent colony. We have termed these propagules **gemma** (pl. gemmae). Gemmae may stay attached until they get large and heavy and/or surge conditions are strong. Detached, surviving gemmae form "rolling stones" or re-attach to the substrate. Some ecological characteristics were assessed by band transects, counts of number of gemmae per colony, depth distribution, etc., in several coral reef areas across the wider Caribbean. Results indicate that: (1) gemmae are widely distributed from Bermuda to Venezuela, and were restricted to shallow areas (< 5 m); (2) in Puerto Rico, *D. clivosa* had a higher abundance of colonies with gemmae (25.5 %) compared to *D. strigosa* (11.7 %) and *D. labyrinthiformis* (8.7 %); (3) *D. strigosa* and *D. clivosa* had significantly higher average number of gemmae per colony (14.9 and 6.8 respectively) than *D. labyrinthiformis* (1.2); (4) the number and size of gemmae was not related to parent colony size; (5) average size of gemmae was similar between the three species in Puerto Rico, and significantly larger in *D. strigosa* (5.49 mm) compared to Venezuela (3.62 mm). Maximum size was found in D. clivosa (26 mm). This strategy could have evolved as a response to the environmental instability of shallow reef habitats, and may explain the dominance of *Diploria* in these habitats. Further research on the genetic composition of populations of *Diplorias* in shallow reef habitats, and the ecological consequences of this strategy is needed.

Keywords:. Massive scleractinian corals, asexual reproduction, gemmae, Caribbean.
Session: General Caribbean Marine Sciences

Oral Presentation _____ Poster Presentation _____

Willing to chair or co-chair a session _____
Specify subject area of session willing to chair _____