



Caribbean Marine Science



June 2010

Official Newsletter of the AMLC Published Spring and Fall

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Association News

From the Editors' desk

Greeting to all our members. Most of our attention during the last months seem to be focused on the environmental tragedy occurring in the Gulf of Mexico. The oil spill has surpassed the Exxon Valdez spill as the largest in history in the US. Coastal areas in the south east US are being affected, benthic communities will probably be affected by the dispersed oil and the oil is expected to reach the coast of Ireland this summer. In our general interest section below you'll find interesting short articles on marine protected areas, the Gulf oil spill and ocean acidification. Notes from our Executive Director, Dr. Paul Sammarco and members of the Executive Board summarize their experience in our recent meeting in Panama, workshops around the Caribbean, and potential activities in which the organization could be developing in the near future.

Claire Morrall, Jorge Cortés and Ernesto Weil, members of the AMLC Executive Board, attended a workshop on coral reef restoration in Jamaica organized by Buky Rinkevich and Judy Mendez. It was an interesting learning experience. During the discussions, we proposed to present to the Board members the possibility for the AMLC to act as the intermediary, or the liaison, to connect people working in coral reef and other coastal restoration programs throughout the Caribbean and to make our web page available as a forum to exchange information and encourage discussions on the topic. Hopefully, if this is approved, it will also help to increase our membership. We also proposed to include a section on coastal marine restoration in the upcoming scientific meeting in Costa Rica. Both of these ideas were well received and people was enthusiastic for the future of these activities in the Caribbean.

The AMLC Executive Board meeting was held at the STRI (Smithsonian Tropical Research Institute) field station in Bocas del Toro, Panamá, hosted by Rachel Collins. During this meeting, Claire Morrall, Bernhard Reigl and Rachel Collins were assigned to a committee which is to focus on small steps that can be taken to increase the publicity and profile of the AMLC and its member labs. The idea is that at the end of the year there will be specific things the lab directors can point to as benefits of belonging to the AMLC.

The first step was to initiate a Facebook page, which is now underway. We have started it with information on the Bocas del Toro Research Station. I would dearly like to include information on all of the member labs eventually, so if you have any interesting web links or information you would like to

see on the page, please e-mail them to me at your earliest convenience so we can post them.

The second step is to produce a short (1-page) lab profile for each member lab. A template and example from the Bocas lab was circulated by Rachel recently. These will be added to the AMLC web page, the facebook page, and most importantly, will be included in the program booklet for the next scientific meeting. This amounts to a free 1-page advertisement for your facility to be distributed to a group of Caribbean scientists. Please follow the template and send your information along with a file of whatever photos you wish to include, we can begin the distribution of the information on the internet.



Acropora palmata in Bocas del Toro, Panamá. Photo by B. Riegl

The deadline for inclusion in the conference program will be the same as the abstract deadline for the meeting. We hope that these steps will raise the profile of the AMLC and the member labs in the region. Please do not hesitate to contact any of us if you have questions or other ideas which we could implement.

Laurie Richardson indicated that “during the usual snorkeling trip to view the reefs in Bocas, we were all thrilled to see big, healthy stands of *Acropora palmata*, and also quite a bit of healthy *A. cervicornis*. Some of us, including me, had never seen such large stands before. I have only been diving wider Caribbean reefs for 20 years. Others in the group, including our Executive Director Paul Sammarco, said they had not seen such stands in decades. There were also lots of sea urchins, including *Diadema antillarum*. I cruised around and the only coral disease I saw was dark spots on four (total) colonies of *Siderastrea siderea* which were clumped together. It was a true delight to see this reef!

From the Executive Director’s desk

I hope this newsletter finds all of you well. This year, we held our annual Executive Board meeting at the Smithsonian Tropical Research Center in Bocas del Toro, Panamá. What a beautiful facility. May I recommend that any of you who have the opportunity to visit this region, please stop by, say hello to Rachel Collin - the Director, and enjoy the facility (www.stri.org).

We covered many items during the meeting. Some highlights follow. Our 2011 Conference is scheduled to be held at the University of Costa Rica from May 23-28, and it is shaping up to be excellent. Its planning was discussed at length. A number of nominations were entertained regarding plenary speakers, and the final candidate will be announced in due course when a decision has been made. We would like to connect with some of our laboratories which have been inactive in recent years. We certainly value the participation of all of our laboratories and institutions, and invite them to remain active in the Association. Together, we can speak with a single voice and create a truly international forum for marine science in the Caribbean. That is one of our core values. Various facets of our website were also discussed. If you visit www.amlc-carib.org, you will find some of David Zawada’s helpful and artistic new updates to the site. We thank him very much for his efforts there. We are now archiving our publications and records, which is important from a historical perspective. We are also endeavoring to make many of the AMLC’s publications publicly available on-line via our website – including all papers published from our Proceedings over the years.

Potential sites for the 2013 Conference were discussed, and these will be finalized at our next meeting. The Proceedings for the 2009 AMLC Conference are in press in *Revista de Biología Tropical*. Among the excellent works that may be found there is a series of papers reporting the results

of the CARICOMP marine research program. In that program, a number of AMLC labs around the Caribbean implemented standardized sampling of the marine environment over a period of 25 yrs to produce directly comparable data. During the meeting, the Board members enjoyed field trips to a beautiful and vibrant offshore island serving as a marine bird rookery and well-developed near-shore coral reef sites. Personally, I have not seen that much *Acropora palmata* in quite some time; (see the Editor's and Laurie Richardson's notes for a description).

I recently attended a workshop in Barbados held by the Association of Caribbean States (ASC) and the Center for Resource Management and Environmental Studies (CERMES, University of the West Indies – Barbados), funded by the Government of Finland. The purpose of the workshop was to functionalize a body called the Caribbean Sea Commission (CSC). This is a group designed to oversee oceanic governance in the Caribbean, including its 43 states. I made a presentation describing the AMLC. One of the things that impressed me the most were the presentations by other scientific institutions, including some of our labs, and the enormous amount of excellent marine science research being conducted in the Caribbean. It is my hope that more of these labs will join or re-join the AMLC. It is also my hope that the AMLC may be able to serve as an objective and unbiased source of scientific information for the Commission as it pursues its mission of oceanic governance in the Caribbean.

The ancient Chinese proverb seems to be coming true: "May you live in interesting times." I think we certainly do. Living in southern Louisiana, I have been subjected to the many effects of the BP Oil Spill in the Gulf of Mexico – an event which has resulted in environmental, social, economic, and political crises – simultaneously. The recent capping of the well is accompanied by great relief. The follow-up and clean-up – at all levels, however, will be long and arduous. Thankfully, the capping has happened prior to the onset of any major hurricanes in the region, which could have confounded the already substantial environmental effects with a potential long-term disaster for the region. I believe this is the beginning of the end of the nightmare.

I look forward to seeing you at the upcoming 2011 AMLC Conference in Costa Rica. It promises to be a great meeting, with great science, networking, field trips, good fellowship, and, of course, an enjoyable time. See you there!

Best Wishes,

Paul W. Sammarco
Executive Director, AMLC
Professor, Louisiana Universities Marine Consortium
(LUMCON)

Future Meetings of the AMLC

Our next Scientific Meeting will be hosted by the University of Costa Rica a 23rd - 28th of May of 2011. Start making your plans to attend this meeting and enjoy the Costa Rican hospitality and countryside. Dr. Jorge Cortés is the new AMLC President and Conference Organizer. Your collaboration organizing this event, even if you do live in Costa Rica, will be appreciated.

AMLC List Server

The purpose of the AMLC list server is to facilitate communication and foster collaboration between and among our members. We hope all AMLC members will take advantage of this service – if you have any news, requests, or questions to distribute to the membership, just send a message to the email address below. On-line discussions among members concerning Caribbean marine issues are encouraged. Don't be shy! The list server address is: members@lists.amlc-carib.org

Only AMLC members in good standing can post to the list. Messages not from a subscribed member will not be accepted. Current AMLC members are automatically subscribed with the list controlled by Dr. Aldo Croquer (croquereef@gmail.com), AMLC's Membership Director. New members are added as they join AMLC.

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, please contribute.

Editors: Ernesto Weil and Isabel Urreiztieta.

General Interest

Marine protected areas: one component of successful ecosystem-based management

This year's meeting of the American Association for the Advancement of Science, which concluded in San Diego, Calif., on February 22, included a pair of themes that many scientists highlighted in their presentations: the importance of biodiversity and the critical need for protected areas in our ocean where such diverse marine life can thrive. Numerous studies have shown the benefits of establishing marine protected areas (MPAs), including no-take marine reserves (in which fishing is prohibited rather than strictly managed). However, a trio of researchers cautions that MPAs are "only part of the solution to protecting and restoring ocean health" and that their effectiveness is maximized when they are deployed as a key element of a collaborative, integrated management approach.



On Manus Island, Papua New Guinea, local fishermen limit themselves to catching fish from a designated marine reserve once a year. Joshua Cinner/ARC Center of Excellence for Coral Reef Studies/Marine Photobank

Writing in a forthcoming edition of the *Proceedings of the National Academy of Sciences (PNAS)*, the researchers, led by Benjamin Halpern of the National Center for Ecological Analysis and Synthesis at the University of California at Santa Barbara, argue that MPAs are particularly effective at addressing ecosystem threats that are primarily specific in nature and localized in area, such as a particular fishery, shoreline modification or energy extraction. However, they become less useful in isolation as the problems become larger in extent or originate from outside the protected area—as is the case with land-based pollution or climate change. Even in the case of a specific management issue, such as a fishery, MPAs are most likely to be useful as a key component of a broader management plan, because they cannot be isolated from many of the activities and impacts occurring outside their boundaries. Thus, write the authors, "MPAs will be most successful at meeting fisheries (or other sector) goals when there is some degree of coordination among the management entities responsible for fisheries, coastal development, run-off and waste water discharge into coastal waters, coastal and offshore oil and gas extraction, wave energy, mariculture, and shipping."

Halpern and colleagues also note that planning of coastal MPAs needs to take into account socio-economic considerations, an observation underscored by another paper slated for publication in *PNAS* by Richard Pollnac of the University of Rhode Island and colleagues.

Pollnac and his co-authors examined the effectiveness of 56 marine reserves in the Philippines, the Caribbean and the Western Indian Ocean, and found that the reserves' success varied partly due to cultural factors. For example, in the Caribbean, the amount of fish in a reserve was generally less in areas of high population density along the coasts, likely due to increased fishing pressure inside or very close to the reserves. However, in the Western Indian Ocean fish levels actually increased with higher population density. Pollnac and colleagues suggest this increase may be the result of fishermen targeting areas outside the reef or perhaps that larger communities are being more vigilant about enforcement.

In general, the researchers found that compliance with reserves was less dependent on enforcement than on complex social dynamics that included community involvement in decisions such as the reserves' establishment and in their ongoing monitoring. Pollnac and colleagues conclude that "multidisciplinary research that examines reserves as parts of linked social-ecological systems ... may help inform better design and management of marine reserves."

Sources: Halpern, B.S., et al. In press. Placing marine protected areas onto the ecosystem-based management seascape. *Proceedings of the National Academy of Sciences*; Pollnac, R., et al. In press. Marine reserves as linked social-ecological systems.

Contact: Benjamin Halpern, National Center for Ecological Analysis and Synthesis. E-mail: halpern@nceas.ucsb.edu; Richard Pollnac, University of Rhode Island. E-mail: pollnacrb@gmail.com.

For Further Information: A special issue of PNAS devoted entirely to coastal and marine spatial planning is available online www.PNAS.org

Marine protected areas give coral reefs a chance to recover

Researchers have found that marine protected areas (MPAs) allow coral reefs to recover from damage caused by overfishing, habitat destruction and pollution, although that recovery may take several years.

Elizabeth Selig and John Bruno, of the University of North Carolina at Chapel Hill, analyzed a global database of 8,534 live coral cover surveys conducted between 1969 and 2006. They compared changes in coral cover—the percentage of the ocean floor covered by living coral—in 310 marine protected areas to those in nearby unprotected areas, looking at 4,456 reefs in 83 countries.

They found that, initially, coral cover continued to decrease after protections were put in place. However, several years later, rates of decline slowed and then stopped. In unprotected areas, in contrast, the declines continued.

In the Caribbean, coral cover declined for about 14 years after protection began—possibly because of the

time fisheries took to rebound—but then stabilized and began to increase. In the Indo-Pacific, cover continued to decline for the first five years after protections were established and then began to improve, eventually reaching growth rates of 2 percent yearly after two decades.

Although Selig and Bruno state that their findings are evidence of the need for more MPAs, they caution that such measures alone cannot protect coral reefs from major disease outbreaks, significant bleaching events or widespread warming. As a consequence, they urge that MPAs should be used as a tool in conjunction with policies to mitigate threats such as climate change.

Source: Selig, E.R., and J.F. Bruno. 2010. A global analysis of the effectiveness of Marine Protected Areas in preventing coral loss. *PLoS One* 5(2): e9278.

Contact: Elizabeth Selig, Conservation International. E-mail: e.selig@conservation.org.

Rising carbon dioxide levels changing ocean chemistry

"The physics and chemistry of adding an acid to the ocean are so well understood, so inexorable, that there cannot be an iota of doubt—gigatons of acid are lowering the pH of the world ocean, humans are totally responsible, and the more carbon dioxide we emit, the worse it's going to get," writes Richard A. Kerr in a recent issue of the journal *Science*.

Kerr points out that as the ocean has absorbed increasing amounts of carbon dioxide, its surface waters have acidified, so that ocean pH is lower now than it has been for 20 million years. In a companion piece, Scott Doney of the Woods Hole Oceanographic Institution writes that the rate of change in ocean pH is "unprecedented, a factor of 30 to 100 times faster than temporal changes in the recent geological past, and the perturbations will last many centuries to millennia." Ocean acidification will likely reduce shell and skeleton growth in many marine species including corals and mollusks; some studies suggest that should levels of atmospheric CO₂ pass a threshold of about 550 parts per million (ppm), coral reefs would begin to erode rather than grow because



Researchers believe that once atmospheric carbon dioxide levels exceed 550 parts per million, ocean acidification will cause coral reefs to erode faster than they can grow. Photo E. Weil.

of acidification and surface ocean warming. Prior to the Industrial Revolution, atmospheric CO₂ levels were approximately 285 ppm; they are presently close to 390 ppm.

However, continues Doney, "some marine species may benefit from higher CO₂ levels. For example, in laboratory experiments some species of phytoplankton, seagrasses and seaweeds exhibited higher levels of photosynthesis in water with elevated CO₂. A deeper understanding of human impacts on ocean biogeochemistry is essential if the scientific community is to provide appropriate and timely information to the public and decision makers on pressing environmental questions," he concludes.

Sources: Doney, S.C. 2010. The growing human footprint on coastal and open-ocean biogeochemistry. *Science* 328 : 1512-17; Kerr, R.A. 2010. Ocean acidification unprecedented, unsettling. *Science* 328: 1500-01.

Contact: Scott C. Doney, Woods Hole Oceanographic Institution. E-mail: sdoney@whoi.edu

Human error blamed for Gulf spill as oil spreads

The Gulf of Mexico oil spill is "a catastrophe that could have been avoided," oil industry officials conceded last week. Speaking at a news conference

on June 23, Nobuo Tanaka, director general of the International Energy Agency, said the accident was the result of "an accumulation of human errors."

Tanaka's comments came as the Flow Rate Technical Group, comprising scientists and engineers from the United States federal government, universities and research institutions, estimated that as much as 60,000 barrels (2.5 million gallons) of oil could be escaping into the Gulf each day, substantially more than BP's initial assertions that the flow rate was between 1,000 and 5,000 barrels daily. By way of comparison, the grounding of the *Exxon Valdez* in Alaska in March 1989, previously the worst oil spill in the United States, released a total of 11 million gallons of oil into the environment.

As estimates of the spill increase, so does its reach. On the same day as Tanaka's press conference, thick pools of oil washed along parts of the shoreline of Florida's Gulf coast, prompting one reporter to observe that "the beach looked like it had been paved with a ribbon of asphalt about six feet wide."

Caribbean nations are also bracing for the spill's possible arrival; Jamaican Prime Minister Bruce Golding, speaking at an environmental forum on June 21, warned that the spreading spill had the potential to threaten the "life blood" of the region, and Cuban officials have said they are "preparing with everything in our power" for the possible arrival of oil along the country's north coast. Modeling by the National Center for Atmospheric Research (NCAR) suggests that the Gulf Stream could ultimately transport the oil into the eastern Atlantic as far as the coast of Ireland.

The oil's spread is apparently being exacerbated by some of the methods being deployed in an attempt to lessen its impact. Federal officials last week confirmed the existence of underwater plumes of tiny oil droplets "consistent with chemically dispersed oil." According to University of South Florida oceanographer Ernst Peebles, because of the controversial use of chemical dispersants, "the oil is more broadly distributed than it would have been, and the oil droplets do have toxic properties. It appears to be creating layers of microscopic oil droplets that are spread throughout the gulf."



Oil from the *Deepwater Horizon* well spreads northeast in this NASA image of the Gulf of Mexico. NASA Goddard Space Flight Center.

Source: SeaWeb's Deepwater Horizon Oil Spill Comprehensive Resource Center.

Ocean warming affecting marine ecosystems

The ocean slows the rate of climate change by absorbing more than a quarter of the carbon dioxide released by the burning of fossil fuels and by storing more than 90 percent of the excess heat accumulating in the climate system. But it does so at a price, Ove Hoegh-Guldberg and John Bruno of the University of Queensland in Australia observe in a recent issue of *Science*.

Hoegh-Guldberg and Bruno write that, as a consequence of the ocean's absorption of carbon dioxide and heat, "the scale and pace of change in the chemical and physical conditions within the world's oceans have set in motion a wide range of biological responses." For example, the distribution, abundance and productivity of phytoplankton communities throughout the world are changing in response to warming, acidifying and stratifying oceans; the annual primary production of the world's oceans has decreased by at least six percent since the early 1980s, with nearly 70 percent of this decline occurring in polar and sub-polar regions.

Meanwhile, rising temperatures in polar regions are reducing sea ice thickness and extent, removing habitat for species from polar bears to penguins and



Rising ocean temperatures imperil marine habitats including Arctic sea ice on which polar bears depend for survival. Kieran Mulvaney

fundamentally altering polar marine ecosystems. Elsewhere, rising sea levels—caused primarily by thermal expansion—imperil coastal habitats such as seagrasses and mangroves. Warming waters are prompting a poleward shift in the distribution of a number of species, resulting in an increase in the number of "invasive" or "exotic" species in marine environments where they have not previously occurred. Such species include pathogens; the authors note that a growing number of studies show a rise in marine diseases.

The authors observe that the opportunity to head off such changes is diminishing, as evidence suggests that there is a growing risk that several thresholds will soon be exceeded. For example, temperatures that exceed 2 degrees Celsius (3.6 degrees Fahrenheit) above pre-industrial temperatures are "very likely to drive an unsustainable frequency of mass coral bleaching and mortality," they write. Researchers have identified similar thresholds for loss of polar sea ice and the melting of the Greenland and West Antarctic Ice Sheets. The Intergovernmental Panel on Climate Change (IPCC) predicts global average temperature increases of between 1.1 and 6.4 degrees Celsius (between 2.0 and 11.5 degrees Fahrenheit) during the 21st century, based on present scenarios of greenhouse gas emissions.

The authors conclude that reducing greenhouse gas emissions should be a priority, "not only because it will reduce the huge costs of adaptation but also because it will reduce the growing risk of pushing our planet into an unknown and highly dangerous state."

Sources: Church, J. 2010. The changing oceans. *Science* 328: 1453; Hoegh-Guldberg, O., and J. Bruno. 2010. The impact of climate change on the world's marine ecosystems. *Science* 328: 1523-1528.

Contact: Ove Hoegh-Guldberg, University of Queensland. E-mail: oveh@uq.edu.au

Aquaculture & Fisheries
ronald.osinga@wur.nl

About the Organizers

Dr. Ronald Osinga is a research scientist at Wageningen University. He has been involved for more than 10 years in the aquaculture of marine invertebrates (corals and sponges) and organised conferences on this topic in 1998 and 2001.

Dr. Jaap Kaandorp (University of Amsterdam) is a leading scientist in the field of "in silico" biology of marine benthic organisms. He published a book about this subject (*The Algorithmic Beauty of Corals, Seaweeds and Sponges*) and organized a series of annual meetings on Bioinformatics in Amsterdam.

About the Venues

Cinemec is a new, modern venue that includes both conference facilities and cinemas. It hosted already several meetings organized by Wageningen University.

Burgers' Zoo is one of the oldest and largest zoos in the Netherlands.

It has a brand new, comfortable conference facility located next to the aquarium section, which holds one of the largest indoor live coral displays in the world.

2nd International Marine Conservation Congress, Making Marine Science Matter

The call for proposals for symposia, workshops, and focus groups is now open for the 2nd International Marine Conservation Congress, Making Marine Science Matter/, which will be held from 14-18 May 2011 at the Victoria Convention Centre, Victoria, British Columbia, Canada. The deadline for proposals is 31 August 2010. You can find the proposal guidelines at <http://www.conbio.org/imcc>.

For additional information contact the program committee at IMCCprogram@gmail.com.

Meetings & Workshops

Larval Biology Symposium

23-27 August, 2010

The next Larval Biology Symposium will be in Wellington, New Zealand, 23-27 August 2010. As part of the conference, Steve Simpson, John Montgomery and Jeff Leis are convening a symposium titled "The influence of larval sensory abilities on dispersal". We would be delighted if you could attend the Conference and present a paper at our symposium. Time slots are likely to be 20 minutes (15 talk + 5 questions).

You can find details of the Conference at:

<http://www.victoria.ac.nz/sbs/research/vucel/larval2010/www/index.htm>

If you are interested, please send an e-mail to Larval2010@vuw.ac.nz requesting that you be put on the mailing list and also cc to one or more of us, or better still, email us separately to give us a tentative title.

European ISRS Meeting: Reefs, Science and Society Dec 13-17, 2010

The next European International Society of Reef Studies "Reefs, Science and Society" will be held in Wageningen, The Netherlands, on December 13-17, 2010.

A second announcement, including a call for abstracts, a conference website and details for registration will be distributed in February 2010.

Contact:

Dr Ronald Osinga
Wageningen University

Course Offerings

NF-POGO Centre of Excellence in Observational Oceanography. Training opportunity

This 10 month program is offered in Bermuda starting in August 2010. Applications are due February 2010. Full details about the program, including a link to the application form, can be found here:

NF- POGO Website

<http://www.bios.edu/education/cofe.html>

The goals of the Nippon Foundation (NF) - Partnership for Observations of the Global Ocean (POGO) Centre of Excellence (C of E) at the Bermuda Institute of Ocean Sciences (BIOS) are to expand world-wide capacity to observe the oceans, to develop human resources in developing countries; to expand international networking in ocean sciences, with an emphasis on training young scientists from developing countries; and to strengthen ocean networking relations between developed and developing countries.

The availability of this Programme is subject to final funding approval by The Nippon Foundation. Please do not hesitate to contact us at this address if you have questions.

Education Department
The Bermuda Institute of Ocean Sciences (BIOS)
17 Biological Lane, Ferry Reach
St George, GE01, Bermuda
tel: 1-441-297-1880 Fax: 1-441-297-2222

Short Course in Taxonomy and Ecology of Caribbean Sponges July 20 – August 2, 2010

The Smithsonian Tropical Research Institute, Bocas Research Station presents a short course in taxonomy and ecology of Caribbean sponges.

Dates: July 20 to August 2, 2010

Location: Bocas Research Station, Bocas del Toro, Panamá. Registration Fee: \$600 (includes room and

board, STRI registration fee, etc.). Some need-based fellowships are available

Instructors: Dr. Cristina Diaz, Museo Marino de Margarita, Venezuela

Dr. Robert Thacker, University of Alabama at Birmingham

Application: Please e-mail your CV, 1 letter of recommendation, and a 1-2 page statement explaining your background and reasons for taking the course, to Rebecca Rissanen at RissanenJ@si.edu before March 1, 2010. Limit 12 students. To be considered for a need-based fellowship, applicants should send a description of their need, their efforts to obtain funding from other available sources, and a travel budget. For more information see http://striweb.si.edu/taxonomy_training/

This course is supported by the National Science Foundation's Assembling the Tree of Life program under Grant No. 0829986 to R. W. Thacker: "PorToL - The Porifera Tree of Life"

Robert W. Thacker, PhD

email: thacker@uab.edu

<http://www.uab.edu/uabbio/thacker.htm>

Perry Institute for Marine Science 2010 Internships

Location: Lee Stocking Island, Exuma, Bahamas

Duration: 2 month minimum

Starting date: Year round

Application deadlines: Spring: February 1 Summer: April 15 Winter: October 1

Open to: All students pursuing or have recently completed a degree in marine science or biology.

Description: Interns will split the time between direct involvement in support of scientific research and operational support of science. Responsibilities will depend largely on the current projects being conducted during each period. Interns will gain firsthand experience with standard field procedures, experimental design, sampling protocol, environmental monitoring techniques, diving and boating, and perhaps most valuable, personal interaction with some of the world's leading marine scientists.

Requirements: Open water SCUBA certified, first aid, CPR and oxygen administration certified, experience operating small vessels (preferred)

To apply: Please visit www.perryinstitute.org for application form and detailed internship descriptions and agreement. Send additional questions to elamarre@perryinstitute.org.

Number of internships awarded each season will vary and are dependent on research demands and funding availability. Internships are non-salaried, however, room and board (shared accommodation) and transportation between LSI and Exuma International Airport (Georgetown, Bahamas) will be provided.

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 it to the address below, or send the information by e-mail to Aldo Croquer at the e-mail address below.

Dr. Aldo Croquer
Department of Biology
University of Newcastle
Newcastle-upon-Tyne, UK
croquereef@gmail.com

Name & Title _____

Institution/Association _____

Address _____

Telephone _____

FAX _____

E-mail _____

Dues

Individual membership dues for 2009- 2010 are \$25.00 due in June 2009 . You can make your payment to Dr . Laurie Richardson (treasurer) or Dr. Aldo Croquer (Membership Director), whom can be contacted by e-mail at:

amlc.membershipdirector@gmail.com or at their personal e-mails in page 16. If you attended the Dominica meeting, your membership fee for the two years (2009- 2010) was included in the registration fee. If you did not attend the meeting, please remit 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 card payments online at www.amlc-carib.org. 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 (address on next page).

Name & Title _____

Institution/Association _____

Billing 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 _____

Billing Address _____

Signature _____

AMLC Background & Goals

The Association of Marine Laboratories of the Caribbean (AMLC) was founded in 1957 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. Institutionally, individual scientist, and student memberships are available.

AMLC's scientific meetings are held biennially and hosted by member laboratories actively conducting marine research in the Caribbean. The host laboratory arranges facilities for research presentations, and logistical arrangements. The AMLC has no designated official language so researchers are free to make their presentations in their native language.

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

The AMLC's mission may be summarized as follows: To advance common interest in the marine sciences related to the wider Caribbean ecosystem by:

- a. Assisting and initiating cooperative research and education programs;
- b. Providing 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;
- e. Cooperating with governments and other relevant organizations; and
- f. Other means that may be desirable.

2010-2011 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 March for inclusion in the Spring-Summer issue, and by the end of October for the Fall-Winter issue.

Caribbean Marine Science is Published by:
Association of Marine Laboratories of the Caribbean
(AMLC)

Editors: Dr. Ernesto Weil and Isabel Weil.

Contributing Editor: Dr. Steve LeGore

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