



President’s Corner

Dear MASNA members:

Has it been a year already? It is hard to believe that this year is almost over and while it has been interesting and busy, we still have more to do. Now is not the time to stop and admire the zoanthsids, at least not yet. While it has only been 6 months since I took on this new role, I feel we have accomplished a lot.

We are well underway with our rebranding initiative, which includes a new logo, new look, and new site. There was a large increase in membership this year. Next year we expect that to double.

There are more speakers in our database, new public and breeding forums, and the new “Ask the Expert” forums with direct links to Adam Blundell, Scott Fellman, Steven Pro, Christine Williams, and Matt Pedersen. There are plans in process to add more experts in the near future.

We have officially filed for our 501(c)(3) status, added a new vendor database, business directory, and much, much more.

We are currently focusing on benefits to the membership. Ways we can give back, but at the same time, we must continue to meet our mission statement. I believe we have hit the mark with our new member society program, MASNA Speaks. Stay tuned for announcements about new and exciting benefits for the individual membership. Please keep checking our website for updates.

For the coming year, we are going to continue to work on these programs, fine-tuning and improving along the way. We are striving to improve communications with our members and non-members alike in order to engage the hobbyist. I am looking to each of our members to help with this. We are listening; many of the changes we have made came from your suggestions. So keep them coming. Together we will continue to make MASNA a GREAT organization.

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What Is MASNA?

MASNA is a not-for-profit organization comprised of marine aquarium clubs and individual hobbyists. Our membership encompasses over 5,000 people from Canada, Mexico, and the United States. MASNA’s objectives are to:

- Educate our members with quarterly newsletters, the MACNA conference, and other sanctioned events.
- Assist in forming and promoting the growth of clubs within the hobby.
- Assist in the education of club members to ensure a sustainable future for the marine environment.
- Encourage the ethical growth of the marine aquarium hobby and support captive breeding/propagation.
- Support efforts to eliminate abuses in collecting and transporting marine organisms.

www.masna.org



Steve Allen, MASNA President

By now, I'd be surprised if you didn't realize that the annual Marine Aquarium Conference of North America (MACNA) is just around the corner – September 25-27 in Atlantic City, NJ. There's still time to register if you haven't already. This year's host, the New Jersey Reefers Club (NJRC), has put together a great event. I am sure you will not want to miss it.

Here are a few additional pieces of information you should know:

- The **MASNA Annual Meeting** is from 9:00-10:45 AM, Friday, September 25, 2009. Elections of new MASNA Board

members will be held. Coffee, tea, and a selection of other goodies will be provided.

- **Bonus for current MASNA members:** Friday, September 25, 2009 from 11:00-12:00 Noon – **MACNA Tradeshow Preview!** That's right – if your individual MASNA membership is **current** or you are the official delegate of a **current** MASNA member club – you can enter the tradeshow one hour before any non-member does! The early birds get the choicest corals, clams, and other merchandise!
- If you are attending the MACNA banquet Saturday evening, stay tuned for the announcement of this year's **Website Award** winners and the presentation of the **MASNA Award** – to the person **you** have selected that has made an outstanding contribution to the marine aquarium hobby!

Thinking of renewal – whether you attend the conference or not – every individual member that joins or renews by **midnight, October, 01 2009** will get one entry in a **drawing for two full MACNA XXII registrations!** Each club that renews or joins by that date will get one entry as well – the club decides how to award the two registrations. Corporate Sponsors that renew or join in time also receive one entry. The drawing will be held during the October 2009 MASNA Board meeting.

Sincerely,

**President
Marine Aquarium Societies of North America**



MASNA
Marine Aquarium Societies of North America

Meet Brita Mjos – MASNA’s Inaugural Scholarship Winner

For the past two years, MASNA has been working on the idea of awarding a scholarship to a student working toward a degree in support of MASNA’s goal of ensuring a sustainable future for the marine environment. After an exhaustive review of applications, MASNA is proud to announce that Brita Mjos is the inaugural recipient of the MASNA scholarship. Brita, entering her senior year at Western Washington University, is studying marine ecology and environmental science.

Brita, who grew up in Alaska, spent the summer as an intern with NOAA at the Kodiak Research Laboratory working in the groundfish division. She works with the full-time scientists to evaluate rockfish stocks and life history. She is also designing and conducting research comparing seasonal maturity levels of several commercially valuable rockfish species. This has given her a great opportunity to assess rockfish maturity by operating specialized instruments for histology and microscopy.

With her imminent degree, Brita hopes to educate people about the ocean’s importance to the global ecosystem and to promote responsible use and protection of marine resources.

Brita spent a quarter in southeast Asia helping the United Nations Environment Programme with post-tsunami mangrove surveys and community forest education, and installed a micro-hydroelectrical system in a Thai village.

August 27, 2009

Dear MASNA Scholarship Committee,

I am honored to accept the generous scholarship from you! Thank you! The scholarship will be an immense help with school expenses for my senior year. I am wrapping up a summer internship in Kodiak, Alaska researching rockfish life history.

School begins September 23; I am looking forward to exploring some new subjects as well as delving deeper into the environmental science courses and marine field classes.

I greatly appreciate receiving this scholarship to help me continue my studies. Again, thank you.

Sincerely,
Brita Mjos



Brita Mjos

Brita fished sockeye salmon commercially for two seasons in Alaska. During this time, she gained insight into the politics and policies of fisheries.

Editor’s Note: The MASNA Scholarship Committee chairman, Jon Clements, along with the rest of the MASNA Board of Directors, would like to give our sincerest appreciation to the fine folks at **Doctors Foster and Smith** for their strong commitment and belief of this scholarship program. Without their support and participation, this scholarship would still be on the drawing board.

The Baker's Dozen Reasons for Coming to MACNA XXI in Atlantic City



13. While the dice may be hot for some in Atlantic City, the action will be hotter at MACNA XXI.
12. If you want to relive The Drifters' "Under the Boardwalk," you've come to the right place.
11. Let's see, a riveting reception, a sumptuous banquet, and raffle prizes galore!
10. Was a World War II German U-boat really found 60 miles off the coast of New Jersey?
9. Find out who will win this year's MASNA Award. The winner is sure to be someone you know and respect. No, Captain Nemo is not on the short list of candidates.
8. If you are just a bit hungry on Friday morning, how about stopping by MASNA's annual board meeting for some snacks and stick around to hear the latest MASNA developments?
7. While at MACNA XXI, how about visiting the 25,000-gallon "Fish of the Mid-Atlantic" Atlantic City Aquarium?
6. For MASNA members, how about entrance into the trade show one full hour before non members??
5. Have you ever had questions you wanted to ask reef experts? Well, this is your golden opportunity!
4. Come to Atlantic City and be among the first to receive the latest edition of Anthony Calfo's magazine, *C . . . the Journal of Aquatic Science, Travel and Adventure*. It won't be hard to find; the MACNA program is included in the magazine!
3. How about getting to see first hand some of the most innovative and interesting new products . . . and books . . . in the industry?
2. Get a chance to hear stories from someone who has actually visited the final resting place of the HMS Titanic.
1. And yes, the keystone for MACNA is having the opportunity to listen to 30 outstanding presenters and putting that great knowledge to work!

MASNA Board of Directors

- **President** — Steve Allen (Dallas / Fort Worth Marine Aquarium Society – DFWMAS)
- **Vice President** — Jon Clements (Orlando Reef Caretaker's Association – ORCA)
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- **Past President** — Cheri Phillips (Orlando Reef Caretaker's Association – ORCA)
- **Newsletter Editor** — Del Brashares (Saltwater Enthusiasts Association of St. Louis – SEASL)

One Year Later . . . Making a Difference — by Michael Foote (Atlanta Reef Club)

The Atlanta Reef Club, with over 600 active members, is one of the largest marine aquaria clubs in the southeast, if not the entire United States. Because of the generosity of its members and the insight of its Board of Directors, the Atlanta Reef Club has been able to directly impact its community with a pilot donation: a 75-gallon corner reef aquarium to the Gwinnett Hospital System in Duluth, Georgia. The Glancy Rehabilitation Center is the recipient of this gift. There, they treat patients who have suffered a variety of neurological and orthopedic injuries. Literally, hundreds of people at the Center have already been exposed to our wonderful hobby, by watching the installation, cycling and growth of the tank's inhabitants. Every day, patients, their relatives and friends, as well as the physicians and staff, spend a few moments observing the different animals and fish that have been donated by Atlanta Reef Club members.



The 75-gallon corner reef aquarium donated and set up by the Atlanta Reef Club at the Gwinnett Hospital in Duluth, Georgia

One recent example involves a 51-year-old woman, partially paralyzed by a stroke. She was extremely depressed because of her unfortunate situation and had difficulty getting into a rehabilitation routine. She and her family had spent many summers traveling to exotic locations, including enjoying snorkeling at coral reefs. Even though she didn't know the names of the fish and animals that were being observed, they loved snorkeling and marveled at their natural beauty.

Her husband brings her to the quiet corner of the lobby where the tank is located, and they spend time there

together with her children, building up her spirit, and talking about the future. They have been able to learn about some of the marine life that they had seen while snorkeling and now watch them closely in the aquarium. The serenity and beauty of the donated reef tank allows her to refocus and to resume her therapy with a renewed spirit. She is even looking forward to snorkeling again with the aid of flotation devices. The Physical Therapist has developed activities that incorporate the reef tank into patient therapies, which has made a huge positive impact to these patients' recovery.

By using some of the MACNA XX proceeds, the Atlanta Reef Club membership and its Board of Directors are presenting a second donation: a complete custom-built 120-gallon reef exhibit to the Gwinnett Medical Center, also in Duluth. The Gwinnett Hospital System has agreed to provide the infrastructure necessary for the selected location and upkeep by contracting with a professional aquarium service company to maintain the exhibit. The projected completion date is mid-December, 2009. This particular medical facility served more than 200,000 patients and visitors in 2008. This exhibit will be seen by thousands of people each month since it will also be in the hospital lobby.



The Atlanta Reef Club is honored to bring this fascinating hobby into its community where it can have such positive influences and to continue its motto of "Preservation through Education."

Where Are They Now? Hello, Martin Moe!

Editor's note: For the 15th year in a row, the MASNA Award winner will be announced at MACNA. We're working on a regular feature that highlights recent activities from past MASNA award winners. As is fitting, this article features our very first winner, Martin Moe (1995), who was kind enough to share his passion of restoring the keystone herbivore, *Diadema antillarum*.

Wow! Fourteen years since MACNA VII in 1995 (Louisville). It's hard to believe that it has been that long ago. A lot of water has flowed over the reef since then. We moved back down to the Florida Keys in 1999, to the land of little islands, coral reefs, perpetual summer, a big old house, our own beach, and a lot of work – Paradise!

I had intended to build a small experimental marine fish culture laboratory, do experimental rearing of various species of marine ornamental fish, and go with the flow. It didn't work out quite that way. I became involved with coral reef restoration efforts, particularly efforts to restore the keystone herbivore, *Diadema antillarum*, the long-spined sea urchin of western Atlantic coral reefs back to the reefs. It was this urchin that maintained the ecological balance between coral and macro algae growth and over the ages, allowed corals to build the reefs of the tropical western Atlantic. Since the demise of the *Diadema* (96 to 99% of the entire population) in 1983, they have not been able to return to the reefs in ecologically functional numbers.



Martin Moe collecting juvenile *Diadema* on the rubble zone of Conch Key off the Upper Florida Keys (photo by Ken Nedimyer)

It became obvious that what was needed was a technology to mass culture this urchin so that

reproductively functional populations could be maintained with artificial recruitment on small reef areas to replace non-effective natural recruitment. It was also obvious that mass culture of this urchin was very difficult and that achievement of mass culture would take a very special effort. And so the last four of my golden years of retirement in the Florida Keys has been devoted, like 24/7, to working out the technology for mass culture of *Diadema*. And now in June of 2009, the nut of mass culture of *Diadema*, bringing them from the egg through the 40 to 60 days of the planktonic larval stage has been accomplished.

The following has been accomplished in my little culture lab in the Florida Keys:

- Collection and maintenance of a brood stock of 19 adult *Diadema*, which have been maintained for three years with repeated spawning and minimal mortality.
- Development of a technique for non-invasive spawning of *Diadema*, pretty much on demand, including egg collection and incubation. 15 million good eggs per female have been produced in each of the last two spawnings.
- Development of a technique for maintenance and growth of relatively large volume cultures of micro algae for several months with simple procedures.
- Development of 50-liter culture vessels and techniques that support and grow large numbers of *Diadema* larvae, 1 per ml, about 50,000 per culture vessel over 50-plus days (whatever is necessary) to the point of competency for metamorphosis. These culture vessels provide the patterns of water movement that keep the larvae in suspension while avoiding excessive turbulence that prevents normal growth and development of the larvae. The operation of

the culture vessels is also very adjustable so that the variable requirements of the larvae over the span of culture can be met.

- Discovery of the biological cues that stimulate rudiment development and competency for metamorphosis, and subsequently induce the process of metamorphosis in the larvae. This aspect of the culture process is still highly speculative, more definitive work is needed to identify and quantify the most active biochemical elements, a process beyond my capability, but in general, a workable method seems to have been established.

A method that separates competent larvae with external rudiments and tube feet that are ready to settle from larvae that are still in development is being tested and apparently functions adequately. Successful larvae culture is the major breakthrough of this culture project. At this point,

culture day 50, thousands of larvae are on the cusp of metamorphosis with large rudiments and hundreds are apparently in the early juvenile stage. (I say apparently since once the metamorphosing larvae are in a settlement environment of rocks and algae they cannot be easily observed until they have attained a size of 3 to 5 mm test diameter. However, small representative samples of larvae transforming into early juveniles indicate that metamorphosis to a significant degree is successful in the large settlement tanks.)

The next steps in the development of this technology are to determine the best methods for settlement and early juvenile growth and survival, and to develop methods for “grow out” of the juveniles to the sizes that might be required for restoration purposes. Successful replication of this rearing technique at other locations will also be a part of the next steps.



Martin Moe in his lab on Lower Matecumbe Key working with *Diadema* brood stock
(photo by Matt Wittenrich)

Although there is much to be done before large numbers of reef competent *Diadema* are available, the basic process has now been developed; it is not perfect, there is a lot of room for improvement and refinement in every area, but the essential workable fundamentals have been established.

The reason for my post is simply to alert you that the basics for this technology are being developed and we are encouraged by recent breakthroughs. And if one old, retired marine biologist can do this by himself in a makeshift marine laboratory in a spare room on a very limited budget, well then, it can be done wherever science meets the sea. It

will take a while to figure out how to get this initial work prepared for publication and actually published, but time is of the essence and it is important to begin to think about and plan how large numbers of *Diadema* can be produced and utilized in coral reef research and restoration projects.

So working with *Diadema* and the role of this urchin in coral reef restoration is what I have been doing for the last eight years. There is still a lot to do, but in a year or two I hope be once again working a bit, not as intensely though, with marine fish culture.

Test Your Knowledge — Sample Questions from: *The Marine Aquarists Quiz Book*, by Martin and Barbara Moe, 2000

1. When do stony corals spawn?

- a) Always on the full moon closest to April 1.
- b) Each species spawns on a separate month to avoid larval competition in finding a suitable substrate.
- c) The largest coral heads spawn several days before the smaller ones.
- d) Stony corals in various areas are somehow able to synchronize spawning and all spawn at the same time each year.

2. Why are natural marine refugia a very good concept?

- a) It puts the sump to good use.
- b) It produces food for fish and invertebrates.
- c) It protects a natural adult reproductive stock that will then seed other areas.
- d) It gives our military a chance for some R & R.

3. Geologically speaking, the Great Barrier Reef off Australia is:

- a) a relatively recent development.
- b) an ancient reef formation, one of the earliest.
- c) the same age as all Pacific coral reefs.
- d) a young age to the north and old in the south.

4. Which three organisms are all good examples of zooplankton?

- a) krill, copepods, diatoms
- b) diatoms, dinoflagellates, copepods
- c) larval fish, arrow worm, medusa
- d) phylosome larvae, zoea, sargassum

5. Which of the following invertebrates has been known to catch and eat small fish?

- a) giant clams
- b) brittlestars
- c) feather duster worms
- d) sea fans

6. Where is the “rubble zone” found?

- a) where the grass flats drop to deep water
- b) along the edge of reef formations
- c) right next to Fred’s place
- d) in the rocks under the reef

After you take the quiz, go to page 12 for the answers as they appear in Martin and Barbara’s book! This book was one of the table prizes at the 2007 International Marine Aquarium Conference (IMAC) in Chicago, at which Martin and Barbara gave a fascinating banquet presentation entitled “. . . Back in the Saddle Again . . .”, Chapter 6, the Florida Keys.”

Attack of the *Palythoa* – by Jim Craig, Saltwater Enthusiasts Association of St. Louis

I thought it might be helpful to share a recent experience I had working with *Palythoa* this summer.

On July 14th, I decided to clean these invasive, nuisance polyps off a shelf in a frag tank. They had started growing up on the hard and soft coral frags and stinging them. I was tired of picking them off each frag one by one. So, I took the plexiglass shelf out and scraped it clean of the *Palythoa*. Somehow, I acquired some little cuts in the top of my right hand during my project.



July 15, 2009 — one day after the “attack”

I knew something was different as soon as I was done because the cuts started to itch like mosquito bites — weird. The cuts didn't really show any irritation for about a day. But by the morning of July 16th, I obviously had a well entrenched infection. Judging by the looks of it, I knew the infection was more serious than the ones I sometimes get while working in my tanks. And, my usual treatment of Neosporin was not working. My wife and boss (two different people) had been telling me all day to see a doctor. I thought I would give it just a little longer. Coincidentally, my coral friend Rich Dietz (Mr. Firemouth) stopped by

my house the night of July 17th. When Rich became alarmed, that was enough pressure to drag myself to the emergency room.



July 16, 2009 — two days after the “attack”

I got there about 10:30 PM that night. Then, I got concerned when the ER staff took me in right away. There were plenty of people waiting who were in more pain than me. (In fact, the infections never really hurt.) I explained what had happened and showed them the “Neurotoxin Warning” sidebar on page 182 of Eric Borneman's book *Aquarium Corals*. That was probably the only smart thing I did — thanks Eric! (Eric's sidebar is on page 11.)

The ER staff was worked up with the size and advanced status of infection. They were also quite concerned that it was on my hand. They talked about losing functionality of the hand — and “losing the hand.” By now, my right forearm was starting to ache. They were pretty close to admitting me that night, but didn't. Not sure why. Maybe because I had little pain and no fever — I just don't know. The ER doctor prescribed two antibiotics: levaquin and doxycycline. He told me to go to Barnes-Jewish hospital in St. Louis if my hand didn't improve by the next day.



July 17, 2009 — three days after the “attack”

I took the antibiotics about midnight. They were amazing! The next morning the swelling in my hand was nearly gone, and my arm had stopped hurting. Drugs = good. That day my family doctor referred me to a plastic surgeon to monitor the healing. I saw the plastic surgeon the same day. He took cultures. However, he wasn't very confident that anything would grow since I had already started taking the antibiotic. On a follow-up visit, I learned that no typical strains of bacteria had grown and the culture was negative for a *Vibrio* infection. He also requested a culture for Mycobacterium. Fortunately, the results came back negative on September 17th.



Protospalythoa sp., similar to the species with which Jim had his run in (photo from University of Florida Museum of Natural History website)

By July 31, the sores were nearly healed and I can walk again (okay, just kidding about the walking!). All in all, I was very lucky. I was dumb not to get medical treatment sooner. I am very lucky because the drugs were

INCREDIBLY effective. Still, I wouldn't recommend this stunt. Rest assured, my hands and arms will be fully protected for my next round of *Palythoa* cleaning!



July 30th — 16 days after the “attack”

Besides being careful when you work with *Palythoa*, it wouldn't hurt to make sure you have a current tetanus vaccination. That was something the ER doctor was also very interesting in confirming that I was current.

The more I think about it, the less I think there was any actual bacterial infection. There was never any discharge from the sores and they never hurt. I believe it was the palytoxin that caused the irritation and necrosis of my skin in the center of those sores. The sores left scars that I think will be noticeable for several years.

Editor's note: Jim Craig resides in southern Illinois and has been propagating corals for at least 10 years. He is a fixture at SEASL meetings and donates corals at each meeting for the club's raffles. At SEASL's September 12, 2009 meeting, Jim made a point of demonstrating a number of types of gloves that can be used by aquarists.

Follow-up to “Attack of the Palythoa” – by Eric Borneman, University of Houston

I'd like to add as an aside for Jim Craig and his physician that I think it's important to note that palytoxin has been found in other marine organisms, including dinoflagellates (primarily *Ostreopsis* spp.) which may be the source of the toxin in *Palythoa* – that the palythoids have a symbioses with the microbes. It has also been found in *Radianthus* anemones. It is also a delayed haemolysin, and the "infection" may not wind up being an infection but a delayed type III or IV hypersensitivity reaction helped along by the small cuts Jim obtained allowing, in essence, a drug delivery system for the toxin. However, even the nematocyst venom could produce lesions like this if they enter a break in the skin.

It should also be mentioned for Jim's doctor that certain bacteria, *Vibrio*, *Aeromonas*, can also produce antigenic analogues of palytoxin, so even if the culture was negative, the toxin could have caused the effect and you may never know the cause. It is good that they are healing, and the lesions remind me of many such lesions I have gotten while diving with a similar healing response. I have never found antibiotics to be effective, and the itching sensation is even more reason to suspect that this was the Type II reaction followed by the antibody independent type IV response which would best be treated with anti-inflammatory / antihistamines like corticosteroids or the like rather than antibiotics.

Neurotoxin Warning – by Eric Borneman, University of Houston

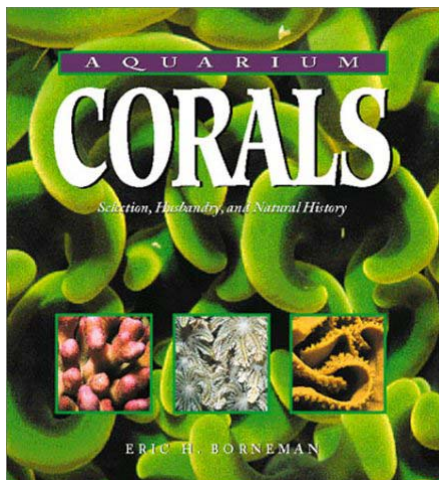
All species of *Palythoa*, and most related zoanthids including the *Protopalythoa* species, produce a chemical called **palytoxin** in their mucus and gonads. **Indigenous Pacific tribes used this neuro-muscular agent to tip spears in order to paralyze prey animals and enemies.** This is a potent toxin and can be deadly to humans. Certain fishes that prey on zoanthids, like filefishes, may even be responsible for bringing palytoxin into the food chain.

The heavy mucus coat of these species must be treated with great respect. It is important to wear hand protection when touching these animals — especially if the handler has any breaks in his or her skin.

An aquarist from Washington once contacted me for the name of a marine medical facility. He had been feeling very ill for several days after handling some *Protopalythoa* polyps and was concerned about the possibility of palytoxin poisoning. I gave him the numbers of several contacts, but felt that if it were palytoxin, he probably wouldn't have been able to communicate with me. As it turns out, he had acquired a *Vibrio* infection, probably from the extensive populations of *Vibrio* that inhabit coral mucus. Another aquarist inadvertently put his fingers in his mouth after handling *Palythoa* polyps. His mouth became numb, and for some time afterward he experienced a metallic aftertaste. He may have been very fortunate to escape with such minor symptoms.

While many aquarists routinely handle corals, including zoanthids, without incident, it is still a very good idea to maintain a safe health protocol when working with these animals. Wearing gloves or making sure that no breaks in the skin are present is a start. Proper hand washing, even using a bactericidal soap (such as Hibiclens), is also a good precaution.

Editor's note: Our sincere thanks to Eric Borneman (2002 MASNA Award winner) for allowing us to include this sidebar from his book *Aquarium Corals: Selection, Husbandry, and Natural History*, 2004. You can bet Jim Craig (see “Attack of the *Palythoa*”) is glad he had a copy of Eric's book to accompany him to the emergency room!



Test Your Knowledge — Answers to Sample Questions (pg 8) from: *The Marine Aquarists Quiz Book*, by Martin and Barbara Moe, 2000

(No fair reading the answers before taking the quiz!)

1. When do stony corals spawn?

d) All large reef building corals in certain areas spawn at the same time each year. On the Great Barrier Reef, spawning occurs at the full moon in November. Off western Australia, it occurs in April. In the Caribbean, spawning occurs in late August and/or September.

2. Why are natural marine refugia a very good concept?

c) The concept of a natural marine refugia is to create reserves of large natural marine areas where no fishing or consumptive uses of any type are allowed. This will protect breeding areas and allow populations of fish and invertebrates to gain maximum reproductive capacity, which will provide continuous seed for populations in other exploited areas. Such refugia may prevent the collapse of heavily exploited fish stocks, such as the cod fisheries off New England.

3. Geologically speaking, the Great Barrier Reef off Australia is:

a) Coral reefs have existed on the northeast continental margin of Australia only for the last two million years, not a long time in the geologic history of the world. This period was characterized by extensive sea level changes causing great erosion of old reefs during exposure and extensive coral growth on old reef beds during emersion.

4. Which three organisms are all good examples of zooplankton?

c) Zooplankton, of course, refers to the organisms that compose the animal part of the plankton. Phytoplankton are planktonic plants. The only group of three that are all animals is c). Diatoms, dinoflagellates, and sargassum are all plants.

5. Which of the following invertebrates has been known to catch and eat small fish?

b) None of these invertebrates are typically considered to be piscivores (fish eaters), but there is one species of brittlestar, *Ophiarachma incrassate*, that commonly feeds on small fish. It lifts its oral disk above the substrate on all five arms creating a sort of table effect. Then, when a small fish goes “under the table” seeking shelter, the brittlestar quickly spirals the oral disk trapping the fish within a helical cylinder of spines.

6. Where is the “rubble zone” found?

b) As one approaches reef formations, the remains of dead corals tossed about by storms form a rocky rubble area between the reefs and the grass or sand bottoms, and this is the rubble zone. Actually, Barney never called his place a zone.



Marine Aquarium Conference of North America (MACNA) – Host Clubs

- I – Marine Aquarium Society of Toronto
- II – Cleveland Saltwater Enthusiasts Association
- III – Windows to the Sea Marine Aquarium Society (New Jersey)
- IV – Florida Marine Aquarium Society
- V – Marine Aquarium Society of Toronto
- VI – Cleveland Saltwater Enthusiasts Association
- VII – Louisville Marine Aquarium Society
- VIII – Kansas City Metro Aquatics Council
- IX – Chicago Marine Aquarium Society
- X – Marine Aquarium Society of Los Angeles
- XI – Louisville Marine Aquarium Society
- XII – MASNA & Florida Marine Aquarium Society
- XIII – MASNA & Chesapeake Marine Aquarium Society
- XIV – Dallas-Fort Worth Marine Aquarium Society
- XV – Louisville Marine Aquarium Society
- XVI – Boston Reefers Society
- XVII – Washington Area Marine Aquarium Society
- XVIII – Marine Aquarium and Reef Society of Houston
- XIX – Pittsburgh Marine Aquarium Society
- XX – Atlanta Reef Club
- XXI – New Jersey Reefers Club (Sep 25-27, 09)**
- XXII – Orlando Reef Caretakers Association**

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Have you ever glanced in your spam filter and found an e-mail sent a month or so ago that you wish you had known about? Well, here's a helpful tip.

According to our Web guru, Steve Allen, add no-reply@masna.org to your e-mail address books. This will help prevent MASNA e-mails from going to your spam folders.

In addition, if you have spam blockers set up, you will need to "white list" the address as well.



Atlantic City . . . Just Who Are Those Shadow Divers?

You'll definitely want to attend the banquet. The speaker will be Richie Kohler, who along with John Chatterton, are prominently featured in Robert Kurson's thrilling book entitled *Shadow Divers: The True Adventure of Two Americans Who Risked Everything to Solve One of the Last Mysteries of World War II*.



Richie Kohler
(photo from the MACNA XXI website)

You've likely seen Kohler and Chatterton as co-hosts of the History Channel series, "Deep Sea Detectives." Kohler has been involved with underwater projects for Paramount Pictures, CBS, PBS, National Geographic, and the Discovery Channel.

The back of the editor's audio book cover (Random House Audio) reads: "But in the fall of 1991, not even these courageous divers were prepared for what they found 230 feet below the surface, in the frigid Atlantic waters 60 miles off the coast of New Jersey: a World War II German U-boat, its ruined interior a macabre wasteland of twisted metal, tangled wires, and human bones – all buried under decades of accumulated sediment."

Kohler has visited famous shipwrecks including the Andrea Doria, the HMHS Britannic, and . . . the RMS Titanic. The trips to the Titanic with Chatterton led to three award-winning documentaries for the History Channel.

Come spend an evening with Richie Kohler and learn how his team answered some of history's intriguing secrets. Then, when you get the opportunity to watch the upcoming 20th Century Fox movie about their discovery of the U-boat off the New Jersey coast, you'll be one up on most of the other viewers.

By all means, don't skip the banquet. See you there!

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Understanding Calcium and Alkalinity: A No-Nonsense Summary for Aquarists — by Anthony Calfo

Editor's note: The following is an extract from the subject article, used courtesy of the author. For the rest of this article, go to www.wetwebmedia.com/calckmar.htm.

The Marble Analogy

Fact: it is only possible to dissolve so many solids into a given volume of water (calcium, carbonates, and everything else). At the risk of oversimplifying the dynamic, imagine a bowl that holds 100 marbles representing the total dissolved solids in seawater in a given system. If red marbles represent calcium, and blue marbles represents carbonates (alkalinity), the bowl can still only hold 100 marbles no matter what mix of color they are.

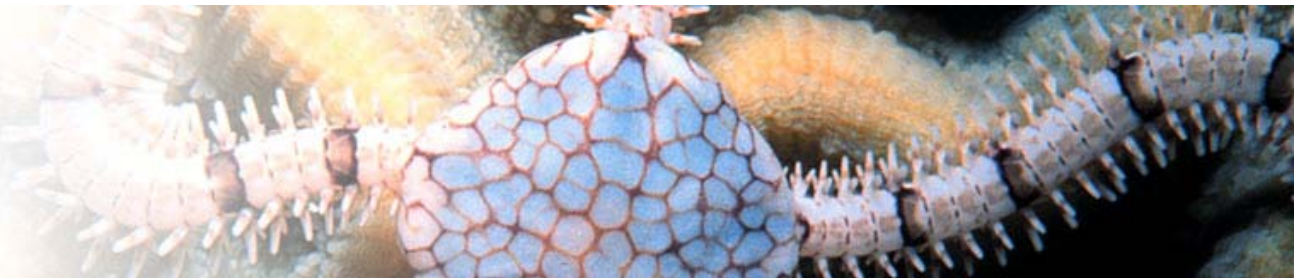
Now, if 70 marbles were the equivalent of 400-ppm calcium and the remaining marbles were blue, the only way to increase calcium would be to displace alkalinity (to remove blue marbles). In troubled systems, the misapplication of calcium supplements (dosing suddenly or to excess) is known to cause a sudden precipitation of carbonates (the alkalinity falls/crashes) that is commonly referred to as a "snowstorm." It is instigated by the influx of a large or rapid amount of calcium entering the system that spikes the pH immediately surrounding carbonate molecules and causes a crystalline precipitation (fallout).

In keeping with our analogy, a "snowstorm" would be like taking another bowl of 100 red marbles (calcium) and trying to pour it into the original bowl of mixed, colored marbles (balanced calcium and alkalinity). The result is the displacement of all blue marbles (carbonates/alkalinity) and the overflow of excess red marbles beyond the 100-marble limit.

The ramifications of this in an aquarium are a crash in water chemistry and water quality that cannot be corrected while the chemical reaction occurs. Dosing more supplements to try to correct the imbalance (or even doing a concurrent water change with hopes of dilution) will only serve to feed the chain reaction. Tragically, the "snowstorm" must be allowed to finish and an aquarium system is traumatized in the process.

To safely avoid dangerous imbalances in the Ca-Alk dynamic, aquarists simply need to avoid pushing either component to an extreme end or both simultaneously high. Instead, think of the relationship as a Hi-Lo situation within the safe ranges. Within the accepted ranges (350-450 ppm Ca and 8-12 dKH Alk), one parameter can be pushed to a high end while the other is allowed to stray toward the middle or lower end.

Any reasonable mix of the two will still provide more than enough of both elements for successful calcification. More importantly, consistent levels of both are far more supportive of growth in calcareous organisms than the inconsistent but high average of either component otherwise. Many aquarists enjoy phenomenal growth in their reef creatures with rather modest Ca and Alk levels. Indeed, consistency with all aspects of aquatic husbandry is more conducive to success than random high points.



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