Our World-Underwater Scholarship Society and American Academy of Underwater Science Summer 2010 Internship Report

Mykle Hoban, August/September 2010

I have long had a passion for the sea and in recent years diving has become equally as important to me, both recreationally and as a potential research tool. Through my interest in underwater research, I became familiar with the American Academy of Underwater Science and the role it plays in facilitating diving for science (on which more in a bit). Finding myself in the transition period between the community college I had attended and the university I am transferring to, I was eager for opportunities within my chosen field of marine science. I discovered the Our World-Underwater Scholarship Society through a Google search for "research diving internship". Seeing that OW-USS was offering an internship in conjunction with the AAUS, I knew that I had found what I was looking for.

Although the internship was one of several for which I applied in the summer of 2010, it certainly topped the list of my most preferred. Upon

receiving the call telling me I had been selected, I wasted no time in accepting. I was initially uncertain of where the internship was to be hosted, (the OW-USS website did not specify beyond "one of several AAUS member sites") but I was pleased and excited to learn that the site was Scripps Institution of Oceanography and that I would be working with Scripps' diving safety officer (and president of the AAUS) Christian McDonald. After fortuitously finding free housing and finishing out my academic year, I headed south for San Diego.

The American Academy of Underwater Science was established to provide a clear working area for research diving. Until the mid 80's, scientific diving had generally been lumped administratively with commercial diving. In practice, the two bear little similarity beyond the fact that neither are recreational in nature. Armed with an understanding of how research diving differed from the commercial realm as well as the very good safety record of scientific diving, the AAUS was able to negotiate an OSHA exemption for scientific diving. This exemption places diving conducted for scientific research outside the purview of commercial diving regulations and gives administrative oversight to the institution itself. The exemption is contingent on the existence of an established diving safety manual and a diving control board to oversee scientific diving operations, training, and incident management.

As this was the first year that AAUS and the Scholarship Society had offered this particular internship, the format was somewhat open-ended. The only aspect that was set in stone was that it would

commence with the Scripps scientific diving course. This course, which is the basis for scientific diving courses across the country, (Scripps was the first research institution to establish a scientific diving program and is the oldest continuous non-military diving program of any kind) trains divers in skills and practices necessary to safely and successfully conduct research underwater. Taught by Christian McDonald and his assistant Rich Walsh, it began early on Saturday, June 12th, and continued at a breakneck pace every day for the following two weeks.

Part One: The Scientific Diving Class

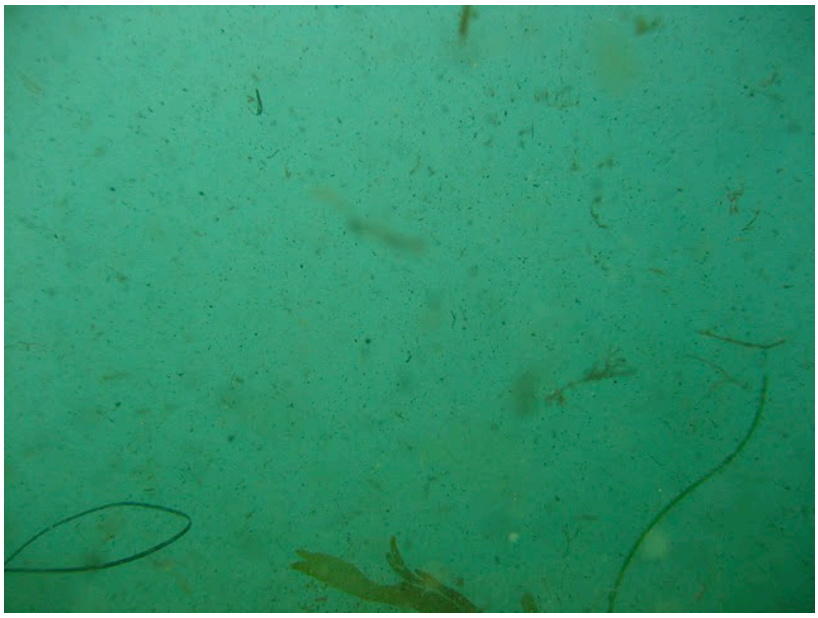
The first order of business was the swim test. The diving program at Scripps rightfully recognizes that diving is a physically demanding activity and that people who will potentially be doing it in remote locations far from potential aid ought to be in proper shape to handle it. The pool segment of the swim test consists of a 400-yard swim in less than 12 minutes, a 25-yard underwater swim, and 10-minute tread water. I was a little nervous about the test as it had been a somewhat sedentary winter and I hadn't had much time to prepare, but I passed with minutes to spare. As it turned out, this class was one of the first in some time in which all the students passed the swim test on their first try. The remaining test was the ocean swim: from the beach to the end

of the Scripps pier (roughly 1000 feet), a free dive to the bottom (25-30 feet), and back to the beach. Again, all passed without difficulty.

With the swim test behind us, we were able to get down to business. The first few days in the pool were spent rehashing basic skin diving and scuba skills and outlining the goals of the course and of scientific diving in general. Throughout the first week of the scientific diving class, days were usually broken into pool sessions in the morning and ocean dives in the afternoon, with occasional lectures thrown in throughout the day. During our final pool session at the end of the first week, all of our equipment was taken from us, attached together randomly and sunk to the bottom of the pool. We were then required, as a group, to retrieve it, sort the pieces to their rightful owners, and re-don our gear. After the first week, all our dives were ocean dives.

The scuba rescue course is a major portion of the scientific diver training, so pool sessions were strongly focused on rescue skills and scenarios. Ocean dives, conducted mostly off the Scripps pier in La Jolla, consisted of further practice of the skills learned in the pool. It's one thing to tow an (acting) unconscious diver across a pool, and another thing entirely to "rescue" them in cold water and tow them 100 yards through swell and chop only to have to drag them up a ladder. One powerful lesson I learned (in addition to the valuable rescue skills) was that people are heavy, period. The difficulty (not to mention long odds) of successfully rescuing a diver in the ocean is a powerful incentive to do everything in one's power never to have to.

In addition to rescues and basic skills, there were some more advanced skills as well as tasks related specifically to underwater research. We practiced with lift bags, transect tapes, and honed our ability to successfully navigate underwater (facilitated by the lousy visibility off the end of the pier – see the picture below). We were introduced to search patterns and techniques for finding things on the seafloor. In the classroom, we covered diving physics and physiology as well as dive medicine. We also discussed mixed gas and nitrox diving.



I have noticed there is a tendency amongst dive instructors to display a sort of irrational exuberance, a kind of summer camp counselor mentality. I was impressed, throughout the scientific diving class, with Rich and Christian's professionalism and aplomb. This is not to say they weren't interesting and engaging as instructors, just that they weren't going out of their way to seem "wacky" or exciting. In addition to top-notch instructors, I think everyone was pleased with how well we as students got along with one another. Everybody seemed to mesh very well and was able to work together successfully. While this is easy to take for granted as it is happening, it can make all the difference in how enjoyable and productive a class can be.

Part Two: After the Class

The first week following the scientific diving class was a dramatic shift of pace. There is a lot to fit into two weeks, and it was obvious to me that once the class was done, Rich and Christian needed a bit of time to wind down. I did no diving during that week, nor did I leave the dive locker much, but by no means was I bored. In that period, I learned about and worked on dive equipment.

I've always been mechanically minded and have liked being able to fix things and take them apart. There's a common idea, based partially on reality and partially promulgated by the dive gear manufacturers that by working on your own equipment you are taking your life in your hands (and that this is something you should not do). While this is an understandable concern (and potentially true depending on one's mechanical aptitude), regulators are not particularly mysterious or complicated and a certain level of basic understanding and skill more

than qualifies a person to fix their own gear. I began by rebuilding some of the older regulators in the Scripps dive locker (used primarily to inflate lift bags and run air tools). I soon progressed to working on the gear used as loaners for the dive class as well as personal gear belonging to researchers at Scripps. There is something very elegant in the design of a scuba regulator. The parts are not, as mentioned before, especially complicated, but they work together in an intricate way to perform a specific (and vitally important) task. I am grateful for the opportunity to have been able to learn from both Rich and various manufacturers how to repair and maintain this equipment.

As time went on, I was given the opportunity to assist various researchers in the field. Faculty and graduate students at Scripps have research sites all over the world, but many are local to San Diego, an easy boat ride from the Scripps pier or Mission Bay marina. These sites and their subjects are as varied as the disciplines represented at Scripps itself. Some of the disciplines in which I was able to participate during my time there include kelp ecology and biological oceanography, physical oceanography, ocean chemistry, and marine natural product research.

There was one project in particular that I spent quite a bit of time on, mainly out of personal interest, but also because of the sheer amount of diving it afforded. This project is the long term monitoring of kelp forest ecology in the Point Loma kelp forest. The study is part of the Paul Dayton lab at Scripps and has been ongoing in its current form since 1971. It looks at recruitment in both kelps (primarily the giant kelp

Macrocystis pyrifera) and benthic macroinvertebrates (urchins, in this case). The kelp forests of the California coast are home to many commercially and ecologically important species and this project seeks to understand natural fluctuations in the ecosystem as well as reactions to human introduced changes (e.g. sewage outfall, pollution, ocean warming, etc.). My role in this project consisted of conducting field surveys with the two staff researchers for the project. The most common survey was part of the urchin recruitment study. A typical day consisted of dives at two or three sites, varying in depths between around 25 to 65 feet. On each dive, we sought to collect 100 each of two species of urchin: *Strongylocentrotus franciscanus* (frans) and *S. purpuratus* (purps). After hauling our goodie bags full of urchins on board the boat, we would measure each individual and record that data in a table, which was later processed statistically and used to understand urchin recruitment in the kelp forest.

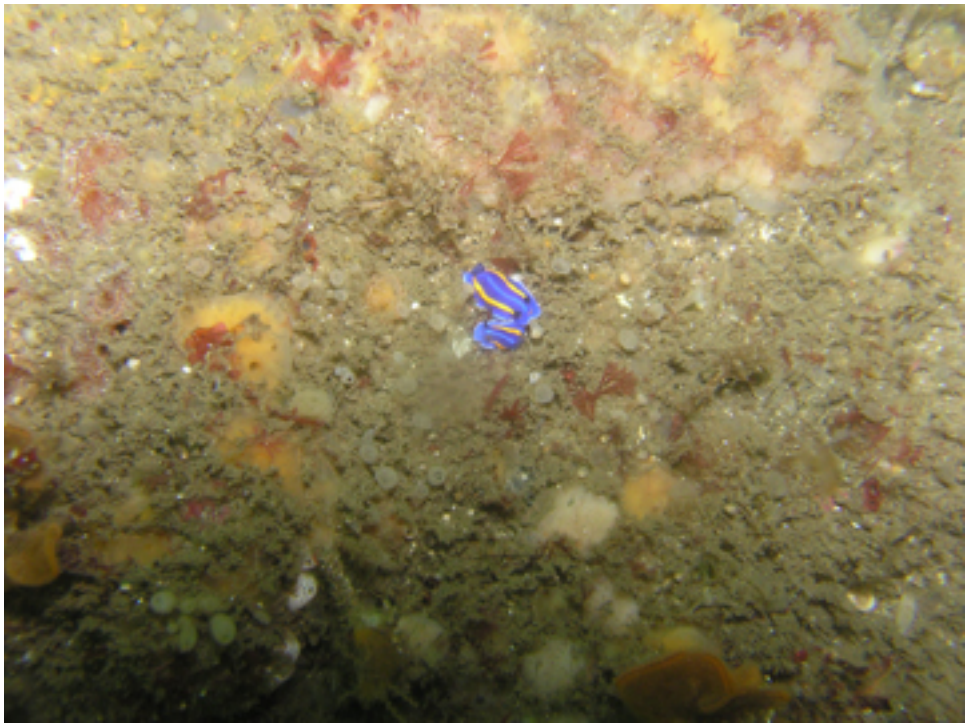
In addition to the urchin surveys, we also spent several dives counting and measuring kelp density and recruitment. These dives were conducted along permanently laid transect lines and involved tracking the number of new kelp stipes as well as noting any that had gone missing. One diver usually focused on the *Macrocystis* kelps while another would count the algal understory. I had a great time working on this project with the lab's two staff researchers Kristin Riser and Ryan Darrow. It was good to be able to make a lasting contribution to a project as many of the other dives I did tended to be "one-offs," helping collect specific data or specimens for projects that I wasn't otherwise involved with.

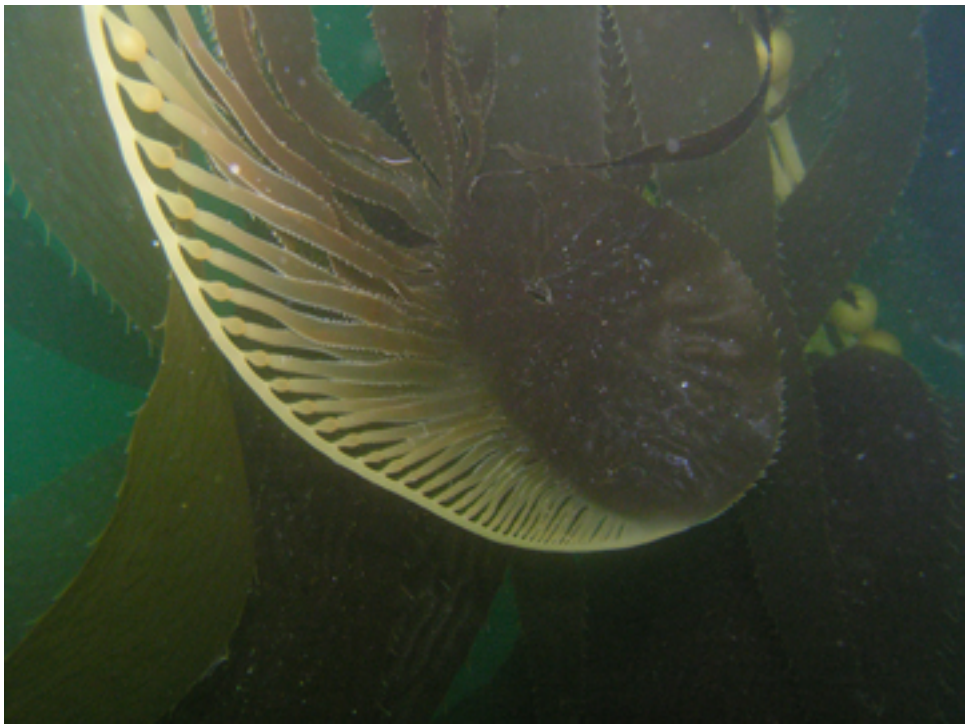
When I wasn't out diving with Kristin and Ryan there were tasks around the dive locker to keep me busy, from filling tanks to rebuilding regulators. There were also many other opportunities to dive with other Scripps' researchers and staff members. I was impressed with the breadth of the scientific diving program and the relative smoothness with which it appeared to be managed. It is a large program encompassing many different people, locations, and differences in equipment and skill level, and there seemed to be little to no problem with its day-to-day operation. All the divers and researchers I worked with spoke highly of Rich and Christian and the hard work they do to make the program function smoothly.

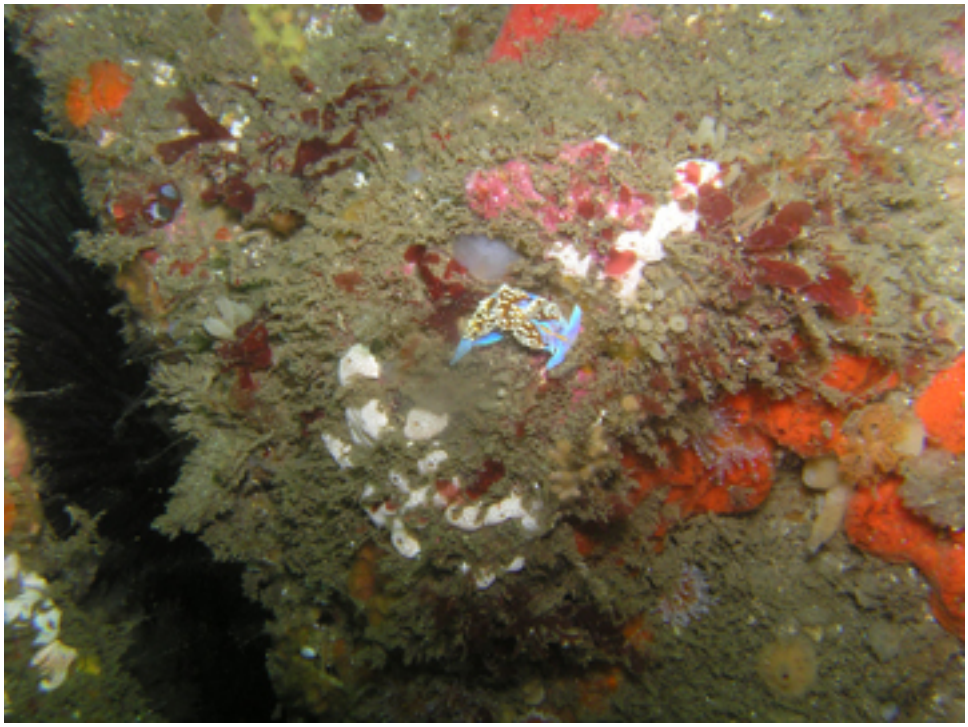
Due to housing constraints and the looming fact of having to find housing in and move my life to Santa Cruz, my internship at SIO ended toward the latter half of August. Despite a slightly shorter time than I

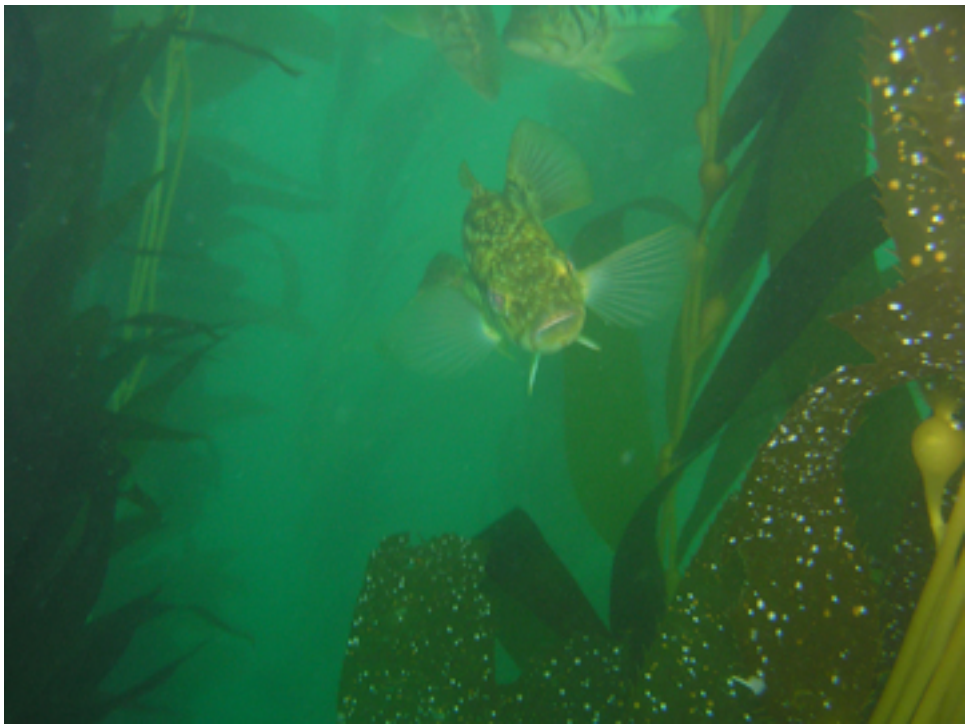
had initially expected, I think that I gained and learned an extraordinary amount this summer. Scripps is a very diverse and dynamic research institution and I was able to involve myself in an interesting array of projects, and make some good personal connections within the research community. Additionally, Christian's knowledge and experience has proven a very valuable resource. I believe that the first SIO/AAUS internship was a resounding success and my only regret is that I may miss out on all the great ways it gets better over the years. That said, I don't think they've seen the last of me in San Diego.

Some selected photos follow:









Acknowledgments

There were many people I met and worked with who made my experience at Scripps Institution of Oceanography worthwhile. Of those, I would specifically like to thank Christian McDonald and the AAUS for hosting the internship and Rich Walsh for being the guy who actually worked with me day to day and taught me most of the new things I learned while I was there. Ryan Darrow and Kristin Riser of the Dayton lab deserve hearty thanks for allowing me to spend so much time on their boat getting urchin goo and spines all over the place. I'd also like to thank the SIO specimen collector, Phil Zerofski. At the Scholarship Society, I want to thank George Wozencraft, Martha Sanders, and Roberta Flanders.