CSI: Coral Reef Workshop  
October 21-24, 2006 – Cozumel, Mexico

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While the name of this workshop often inspires rolling eyes and shaking heads because of the reference to the popular series of TV shows, The Ocean Foundation was very fortunate to secure a spot at this small, pioneering event. The workshop was an experiment in the newly emerging field of underwater investigation and forensics. It was designed to test whether these skills and ideas can be taught and advanced in a classroom setting. Bringing together a diverse set of two-dozen participants representing over twenty countries, the workshop was led by a team of some of the top marine resource managers, forensic scientists and technical scuba divers on the planet.

The theme of the workshop was really one of compromise: how can one collect evidence of anthropogenic events in an underwater environment in a way that (1) does no further damage to the impacted reef (2) will be credible enough to support a conviction in court and (3) does not jeopardize the safety of the divers conducting the investigation. The result was an intense, profound and exhausting four days that combined classroom lectures on underwater investigations and evidence collection, team exercises to role-play different scenarios and practice using all of the equipment, and a half-dozen dives in the Cozumel National Marine Park to gain experience doing reef surveys and assessments of impact zones. While the field of underwater forensics is still just emerging, this workshop provided a vital sharing of ideas and experiences, and generated a lot of excitement amongst resource managers and enforcement officials. Below are excerpts from my daily journal entries while I attended the workshop, as well as some photos taken by various attendees and instructors.

Saturday, October 21, 2006

Today was devoted to an introduction to CSI practices, brought to us by Ken Goddard, arguably the world’s foremost wildlife forensic scientist, and an introduction to coral reef investigations by Dave Gulko, a marine biologist and resource manager with
decades of experience investigating anthropogenic events on Hawaii’s coral reefs. There are a lot of discrepancies between the two fields, which is really the point behind this workshop; it’s not as much about certifying us in these practices as it is about trying to figure out what works and what doesn’t. This is the first time anything like this has ever been attempted, and everything we are learning is purely theoretical. For me, that’s great, as I won’t be using this stuff to prosecute or make arrests, but instead to make grant-making decisions and assessments of resources. Regardless, this is all cutting edge stuff, and it’s cool to know that we are essentially pioneering a field that doesn’t yet exist.

We were also given a two-hour introduction to using cutting-edge diver propulsion vehicles (DPVs) that have been developed specifically for use in underwater research and investigations. Like the workshop as whole, this is all very new and untested stuff, as the DPVs are still in the prototype phase, and are not yet available to the general public. While I must admit that I don’t know much about DPVs, I have been told that these are the finest pieces of technology of this type available today, and the training on them that we are receiving usually costs hundreds of dollars per person. Andrew Georgitis, the president of Dive Extras, and Ben McGeever, the chief engineer of the company, are here to personally teach us how to use these things and tell us more about the technology they are developing.

The CSI prototype DPVs are specially fitted with camcorders and other technology that is quite compelling; they intend to ultimately have the scooters track depth, temperature, dive time, GPS location and other information, and they are also working on doing a heads-up display so that the information is projected into the corner of the diver’s mask—making traditional dive computers obsolete, amongst other things. It’s worth noting that Andrew is one of the top technical scuba divers in the world, with records in multiple countries for deepest and longest cave and wreck dives, not to mention over twenty years experience teaching advanced technical diving in all corners of the world. Ben is an aerospace engineer who still does consulting for the likes of Boeing and Airbus, when he’s not fabricating custom DPVs in his garage. These are very experienced guys who have an absolutely amazing product that appears to make virtually all other DPVs on the market seems like toys. It’s the only DPV out there that uses state of the art aerospace technology in the batteries, motor, prop, and clutch, as well as the digital technology they are integrating into the heads-up display and data collection.

Andrew giving my team some last minute scootering tips before our first chance to use them in the water.
Sunday, October 22, 2006

This morning we did our introductory dive, where some of the dive masters with this workshop made sure that everyone had the basic skills in scuba needed for safely working in a technical environment. Considering over half the people in the workshop are dive masters themselves, this was probably frustrating for some, but the organizers need to ensure that they are not putting someone into a situation where they might get hurt. After we did the skills check, we went out to a simple staged crime scene (conch poaching) and watched a demonstration underwater CSI investigation where we were tasked with recording how many things we could observe and identify that were done incorrectly—fins stirring up sediment, moving shells around before photos of the scene were taken, incorrectly deploying marking buoys and such.

After lunch we were split into three CSI teams, which we would remain in for the duration of the workshop. The teams were truly international, which made the experience that much more meaningful; my team of seven had individuals from Indonesia, Thailand, the Philippines, Turks and Caicos, India, and Great Britain—and of course myself from the US. As would be the routine each day, this afternoon the three teams rotated through three different exercises. My team first got to spend some hands-on time with the DPVs, though only with snorkel gear in the bay right by the hotel. This was a load of fun, as these little scooters really pull—in the correct conditions, one can go a few miles underwater on a single tank of air. Also, even with just holding your breath and skin diving, it was quite easy to travel relatively deep and far underwater, as you can always just point the scooter straight up and surface almost instantly when you are hurting for air. Clearly these are very useful tools, but they are also just fun to get some time playing around on.

For the second exercise, we were back on land, where we pretended to do a basic habitat and impact assessment on a bleached reef, though for our purposes the bleached reef was a sidewalk running through a patch of grass. We divided our team up into specialized roles, deployed buoys at key sites, tracked the various sites on GPS units, and took detailed notes on the “impacted corals” and the surrounding habitats. It was a little difficult to get into the role-play of the exercise considering we were still dripping wet and tingling with excitement from ripping around the bay on the DPVs, but it was a valuable primer nonetheless.
The third exercise was much simpler; our group just sat in the shade with Dave while he showed us some of the equipment he has developed for doing assessments and investigations underwater. Dave is an extremely innovative and clever guy, and he’s had to invent a lot of his own equipment. He works for the Hawaii Department of Aquatic Resources, and he does a lot of assessments after spills, ship groundings, wrecks, sinkings, bleaching events, poachings, and other anthropogenic events on the reefs in Hawaii. Even when there is a commercially available product that could do the job, Dave almost always has a way to make a superior custom version of the product by himself, often for just a fraction of the price. Most of this stuff I probably won’t ever need to purchase or build for my work, but I think it’s great that he’s thinking about the people who are here from developing countries, as they won’t always have the money to buy hundreds and thousands of dollars worth of gadgets. The only pricey piece of gear that he thinks everyone needs to buy is an underwater digital camera, and he suggested a few inexpensive and reliable models.

After dinner, Dave played Santa Claus and gifted us with all sorts of neat little freebies that we can take with us and use in the future. We made large custom dive slates that can hold full-sized underwater paper (such as waterproof incident report forms) and that would probably have cost us 50 bucks at a dive shop, but we each made our own for the equivalent of a few dollars, and we get to take them with us. He also gave us tons of evidence bags, markers, flagging tape, jars, containers, flags, seals and other things for collecting, marking and securing evidence. I took a few of each thing to bring home as examples, but I tried to not be greedy so that those people who really will be using this stuff all the time (and who might not have access to much in the way of financial resources) could really stock up and get the supplies they needed. At the end of the night every last flag, sticker, jar and evidence bag was snatched up, and some of the resource managers from the far sides of the globe walked out of the room with their arms full of swag and huge smiles on their faces, knowing they would put all of it to good use.

Members of the local community came out to observe the workshop activities, for both the on-land and in-water exercises.
Monday, October 23, 2006

Today was another long day, but we spent most of it in the field, which meant that at least we were in the water, logging bottom time, instead of sitting in the classroom. We spent the day divided up into our three teams, running through three different scenarios. My team started by doing the shore scenario, which was a mock fish kill where dead fish (bought from the store) were placed on the beach to simulate discards or dropped fish from a poaching event—we were even dropped off in the water offshore and made to snorkel to the beach, to simulate this occurring at a remote location where one had to swim in all of the necessary investigative gear. The second scenario had us doing an impact assessment on a reef that was actually hit by a cruise ship last year, and this involved us diving down, marking and photographing specific impacts on the reef, and deploying surface buoys to signal to a snorkeling team that was tracking all of our movements and logging our locations with GPS equipment (apparently underwater GPS is still a ways off). The third scenario had us doing a pre-assessment where we used the DPVs to scout around the reef, marking and photographing the edges of the impacted area, and again deploying buoys to signal the snorkel team with the GPS. Clearly in a real-world scenario we would do a pre-assessment before we did an impact assessment, but that’s just the order that my group rotated through the scenarios.

While the scenarios were good practical experience and were relatively well managed, the overall logistics were somewhat problematic, as there were three different teams that were each on three different boats, but there where specific instructors with specific equipment managing each scenario, and it wasn’t always clear what we were supposed to be doing next. However, having a little down time lounging on a dive boat in the
tropics isn’t much to complain about, even if it did rain a little.

Tuesday, October 24, 2006

Today we did three more dives, with all three teams again rotating through different activities. However, the process was significantly streamlined today, and the logistics were much better organized. Each team did two Rapid Ecological Assessments of a coral reef, with each team member playing different roles on each dive. While the actual process of doing these REAs is relatively complex and doesn’t need to be explained in detail here, the basics involve laying down transect lines and having a fish team and a benthic team go through and do counts of specimens, classifying each according to size and family (in a real world scenario, everything would of course be classified by species, but not every participant knows every local species by name, so family or classification was good enough for training purposes). These were somewhat rigorous exercises, as one is having to deal with laying down lines, maintaining proximity to your safety buoy and dive team in the steady Cozumel currents, and conducting all of your normal scuba diving awareness, all while attempting to count, measure, and classify organisms. It’s good that we essentially did this same exercise twice, as the repetition really helped with the learning process; while some of the more experienced biologists had done this sort of thing many times before, others were quite inexperienced divers and had some real challenges with the multi-tasking underwater aspects of the simulations.

For the third dive, we did a roaming fish count without the transect lines and other equipment, as a way of understanding why the more complex process is used. However, this was in fact a compromise due to circumstances, as we were supposed to do Ecological Risk Assessments, but the instructor for the ERA portion of the workshop contracted a slight case of flesh-eating bacteria right before the workshop and was unable to attend. In reality, this...
third dive quickly became known as the “fun dive”, as it was the only dive of the workshop where we didn’t have to descend with tons of extra bulky gear, and we could just relax and enjoy the reef—after the other exercises, just having to count and classify fish seemed like a vacation. That night we had a brief lecture on collecting digital and physical evidence and maintaining chain of custody, which is clearly very important stuff but is only truly relevant to those who are marine resource trustees or law enforcement officers (if you are not one of those things, then you can not legally collect or handle evidence for prosecution). Dave wrapped things up a little early, in time for us to have a brief reception and get to know the other participants outside of our CSI teams. The workshop has been a great experience, but it’s been absolutely exhausting, and people really needed to just unwind and relax tonight. Of course, we have more work to do in the morning, but it is going to be pretty light in comparison to the intensity of the last couple of days.

Wednesday, October 25, 2006

Today was a very special day, and one I will not soon forget. In the morning all of the workshop participants got together for a few hours to do evaluations and to give Dave and Ken suggestions for where they should go from here in developing this course, and the field of underwater forensics more broadly. After finally getting a chance to party together a little bit the night before, people were much more relaxed and jovial than they had been for the last few days. We were also given a number of CDs and DVDs that were packed with digital versions of the course materials, additional materials that Dave never had a chance to print out for us, tons of photos that the observers and dive masters had taken while we were doing our underwater exercises, as well as a silly little video that the Dive Extras guys had put together for us.
from the video taken by the CSI scooters. We were also each given a certificate that was signed by all the instructors that said we had completed 40 hours of training in Coral Reef CSI (I swear by my count it was closer to 60…). For me the certificate is really just a souvenir, but for some people here this is a very important document for them to show their agencies and employers back in their home countries.

After we broke for the last time and people began to depart for the airport, the day went from pleasant to spectacular. Wednesday afternoon and Thursday morning had been set aside as optional for those people who wanted to get more experience on the DPVs, not to mention some fun diving time after the rigors of our course work. As DPVs are illegal in the Cozumel Reefs National Marine Park, we had originally intended to do our dives outside the park, and we were expecting to pay some money to a local tour operator for these dives. However, in an exceptional show of grace and generosity, the park officials who were part of our workshop gave us special permission to use the DPVs inside the park for these few days, and what’s more they even lent us the use of one of these boats, complete with crew and tanks, so that we wouldn’t have to pay for anything.

I truly felt blessed to be able to be a member of these very special dives, as I’m now one of only a dozen or so people on the planet who will probably ever have this experience. It was an absolute blast as our group rocketed along the reef wall at 80 feet, with intense coral growth to our right and nothing but the deep blue abyss to our left. In two dives we were able to cover 6 dive sites, meaning we saw over three times as much reef as the average diver would have without the scooters. In addition, our DPVs gave us abilities other divers simply couldn’t match, such as fighting against Cozumel’s famously strong currents along the reef wall to investigate some overhangs, or tracking a 5-foot nurse shark as it made its way through the corals (normally you are lucky to see a shark for a few seconds, but our DPVs let us keep up with it for a matter of minutes—from a respectful distance of course). In both of our dives we traveled well over a mile and a half underwater, which is just unheard of in recreational single-tank dives.

To add icing to what was already the best dive experience of my (albeit short) diving career, while we were on our surface interval, a pod of 6 dolphin happened by, 4 adults with two juveniles. With the permission of our captain—a marine park official—we grabbed our snorkeling gear and DPVs and leapt into the water to get a rare chance to scooter along with one of nature’s most charismatic creations. The dolphin stopped for a few moments to check us out as we used the power of the DPVs to do 30 to 40
foot skin dives, but even with the scooters we had little hope of keeping up with them once they chose to continue on their way. At the end of the afternoon, I couldn’t thank the marine park’s boat crew enough for taking us out, as words just can’t do the experience justice.

Closing Thoughts

In the months since the workshop, a number of email dialogues have started between the various attendees. Of particular note, people have begun to plan regional CSI: Coral Reef workshops as a next step, in the hopes of eventually establishing fully trained and equipped regional CSI: Coral Reef teams that can be called into action in response to large-scale events like spills and groundings. Though the first of these regional workshops probably won’t happen for at least another year, it has been an exciting process to be a part of, and I look forward to seeing how things develop. These workshops can help marine resource managers to share ideas, learn from each other and acquire new skills for use in the field. As enforcement is one of the biggest challenges to ensuring that resources really are protected, these workshops represent an enormous opportunity to empower managers and scientists in key regions around the world.

The enormity of the global threats faced by our coral reefs cannot be understated, and it is experienced, motivated and inspired groups of people like these who serve as one of the few remaining lines of defense for these precious resources. The Ocean Foundation will of course continue to support and expand innovative projects like these that help to preserve our remaining coral reefs, as well as all of the other vital marine species and ecosystems that comprise the splendor of our blue planet.