

Our World-Underwater Scholarship Society / American Academy of Underwater Sciences  
2012 Internship Report

Annie Thomson

The 2012 AAUS-OWUSS internship was hosted at Shannon Point Marine Center (SPMC) of Western Washington University. SPMC is located in Anacortes, WA, the gateway to the San Juan Archipelago, a productive, dynamic and temperate marine environment. During this two month internship from July to August I was provided the opportunity to develop my underwater research skills. I was able to continue my diving education by utilizing the AAUS training modules, associated coursework, and in-water training; and apply this newly developed skill set by assisting with the ongoing dive projects taking place at the Marine Center.

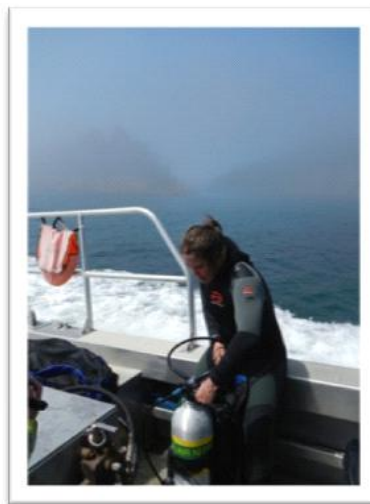
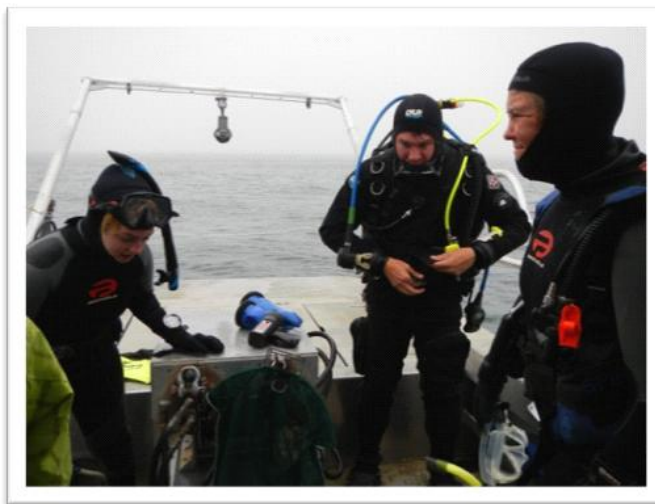
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**AAUS History, standards and continuation of diving education**

My mentor and diving safety officer (DSO) was Capt. Nathan T. Schwarck, M.S. Nate personally spent the first several weeks of the internship training Anne Benolkin, a Research Experience for Undergraduates (REU) intern and myself. Anne was my primary dive buddy for the summer, and together we went through the AAUS training modules and associated coursework. The internship also provided opportunity for training in the Divers Alert Network (DAN) diving first aid for professional divers, emergency oxygen, first aid, CPR, and neurological exam courses. We also reviewed the PADI advanced course, and completed the PADI rescue diver and NITROX courses. We learned about high pressure cylinder safety and the logistics of diving from the Shannon Point dive locker. This training was complemented by a twenty-three page final exam. Understanding the AAUS history and regulations helped facilitate the development of an awareness of the safety precautions necessary for conducting scientific diving.

## **In water training**

The Rescue diver course allowed Anne and me to apply our newly acquired skills and knowledge of first aid and the use of emergency oxygen to rescue scenarios in both the pool and open water. Rescuing unconscious and panicked divers on the surface and underwater while wearing all the gear necessary for diving in Puget Sound was not an easy task. By taking the time to practice these skills in open water, Anne and I became very proficient in the use of our new gear, and our watermanship skills and overall confidence vastly improved. Also while redoing the advanced training dives we became more familiar with the local environment and with the process of conducting dives from the Shannon Point shore and research vessels.



## Application of AAUS skills and knowledge to SPMC Dive projects

### Pinto abalone (*Haliotis kamtschatkana*) restoration project

The Washington State pinto abalone population was severely overfished by sport fisherman starting in the early 1900's, causing abalone to diminish from the coastline. The abalone fishery was closed in 1994 and it was later determined that the pinto abalone population would not recover without human intervention. Abalone are broadcast spawners, making reproduction success difficult in low densities due to the "Allee effect". In 2009, nursery raised abalone were out planted at various sites around the San Juan Archipelago. The goal of the project is to reintroduce adult aggregations back into a coastal habitat with densities high enough to insure successful reproduction. Dr. Paul Dinnel, a marine scientist at SPMC and Anne Benolkin's advisor, provided oversight on our abalone restoration efforts. Working with Anne on this project provided much of the scientific diving experience for my internship. During our dives we collected data, such as tag number, tag color and individual size measurements. These data are used to assess growth rates and densities of abalone on site. Abalone are cryptic mollusks and consequently repetitive surveys are necessary to determine accurate counts at the out plant locations. Dives were concentrated on two out of the six out plant sites located around the San Juan Islands to achieve repetition. After each site was surveyed four times, densities of 0.5 and 0.88 abalone/m<sup>2</sup> were calculated at the out plant sites. These values are above the estimated target density (0.15 abalone/m<sup>2</sup>) to facilitate successful spawning.



### Native Olympia oyster restoration

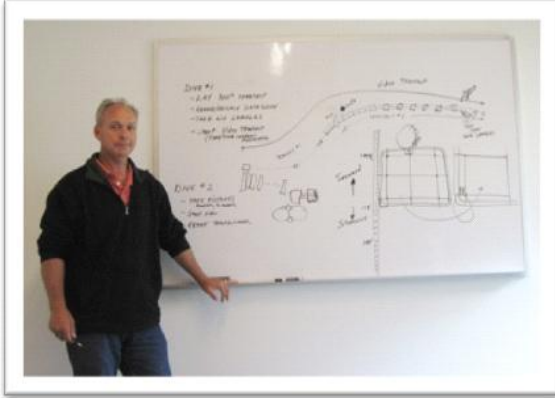
Dr. Dinnel was also working on native oyster restoration this summer. Anne and I had the opportunity to help out with this project. Native Olympia oysters (*Ostrea conchaphila*) were once indigenous to Washington waters, but the population has declined severely, and in many locations the Pacific oyster (a nonnative species) now dominates. In 2002, native oyster seed were introduced to a site in Fidalgo Bay in an effort to reestablish native oyster beds. The oysters were seeded along a former railroad trestle which crosses the bay. This trestle now serves as a well used path and is connected to the local inter-urban trail system. We conducted

low tides surveys to count native oysters and also to look at substrate characteristics of the surrounding areas. The purpose of the survey work was to understand how native oysters have spread by natural reproduction from the original seeding site. The trestle pilings cut across the bay and were used as a reference point for gathering data about where native oysters were present. The project assumed the native oysters present along the trestle outside of the seeding site are from successful spawn of the original seeds. There was genetic evidence that the native oysters in Fidalgo Bay were not related to the seeded oysters of the study. Dr. Dinnel provided an opportunity to dive in Fidalgo Bay to search for the speculated population of oysters. These dives helped develop my experience diving in very poor visibility (less than a half foot) as Fidalgo Bay is an estuary consisting mostly of muddy substrate.

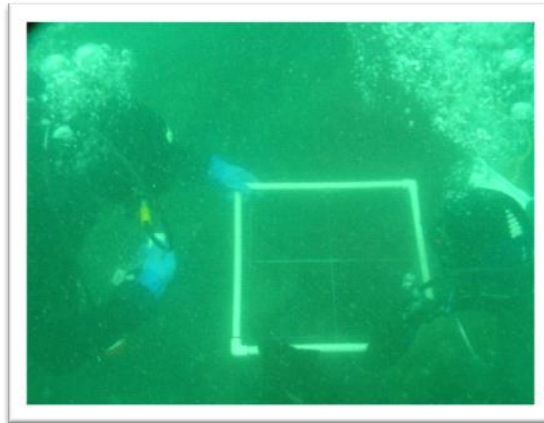


### **Sea water intake surveys and Department of Ecology monitoring**

SPMC has a sea water intake system consisting of piping and intake strainers approximately 600 feet off the beach in front of the lab. The tidal land is leased from the Washington State Department of Natural Resources (WDNR). As part of the agreement for recent subtidal improvements to this system, SPMC is now obligated to carry out surveys on the intake system twice a year. WDNR then uses this information to monitor the impact the system has on the surrounding environment. It took several dives to set up, survey, and tear down the transect lines. We placed 600ft of transect tape from shore along the intake system and connected the tape to the system with shackles. On the second dive, quadrat survey pictures were shot with an underwater camera, and high definition video taken while swimming the entire length of the system. It took an additional dive to recover the transect tape. The survey work provided experience with underwater photography and videography. While working on this project I had the opportunity to learn about underwater equipment housing maintenance and also gain understanding of the basic principles for shooting usable photos and video underwater. Good buoyancy control and tediously slow and steady movements were keys to success.

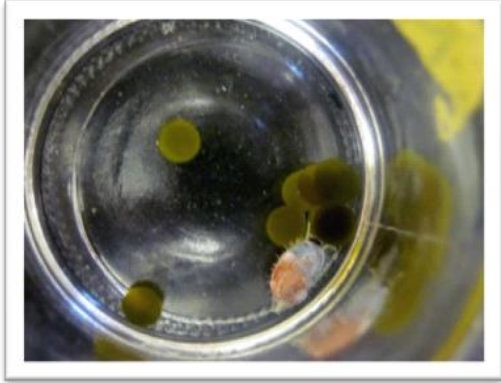


While laying the survey tape a new CTD was replaced and water quality samples were obtained at the end of the intake. The old CTD was untied from the intake and the new CTD was secured to the intake with bungee cords, line, and a safety chain. This instrument is used for long term monitoring by the Department of Ecology. It is currently sampling temperature, salinity and dissolved oxygen, and is part of a larger network of instruments monitoring water quality parameters in the Salish Sea.



### **Additional opportunity for involvement in the marine sciences**

SPMC provided many opportunities to continue my education and involvement in the marine sciences. I had the opportunity to routinely help out with Anne's lab work for her lab based abalone weaning project. This work included preparing macro algae for juvenile abalone and measuring feeding rates every week. Work also included the collection and care of the macro algae used in the abalone weaning experiments.



Dr. Dinnel provided opportunity for non-diving related field work in native oyster restoration and provided non-diving related field work experience. Work included identifying native oysters and the substrate characteristics of Fidalgo Bay at low tide.



### **Exploring Career Paths**

During the summer I became familiar with Nate's duties as DSO. Part of Nate's job at SPMC is to facilitate safe diving. Planning around the environment is a big contributing factor to safe diving and Nate taught us about the importance of tidal planning in the San Juan's. Even with this planning we learned that the currents often don't correspond to predications due to local variations including back eddies. This variability helped us become more conscious of the environment around us and also more flexible divers. After our AAUS and SPMC training Anne and I conducted our own pre-dive plans, dive safety checks, and learned how to develop an emergency action plan. With this training, Anne and I learned to balance confidence in our skills while respecting the dynamic waters we were diving in. Developing this balance in divers seems to be a big part of being a successful DSO.



We also us learned about annual visual tank inspection and a few things about repairing, maintaining and assembling gear. In an activity that is so gear dependent, learning these skills helped me develop a little bit of self-sufficiency as a diver. Nate also provided the opportunity to help teach a discover SCUBA class for the REU interns. This took place in a confined environment at the local Anacortes pool and gave insight to the skill level needed for teaching SCUBA.

SMPC also offered many opportunities to explore career paths in the marine sciences. SPMC offers “lunch with faculty” every Friday to the summer interns. It was helpful to meet with many scientists to hear about topics ranging from marine microbiology to coral reef ecology and also hear about how scientist got to where they are today.

### **What is next for me...|?**

After the internship ended at SPMC I was fortunate to help out with the University of Washington scientific diver course at Friday Harbor Labs. Some of my duties during this course included acting as an extra victim during rescue scenarios, and helping out as an extra buddy and observer for the in training student teams. I also helped as a boat tender and assisted with other diving needs during the course.



This AAUS/OWUSS internship prompted me to think about my career goals as I approach my last quarter as an undergraduate at University of Washington. This summer I enjoyed the

underwater teamwork and creativity that contributes to achieving a greater research goal. In the future, possibly in graduate school, I would like to design and test my own scientific hypothesis utilizing scientific diving. This fall, my last quarter at University of Washington, I will again be at Friday Harbor Labs participating in the Pelagic Ecosystem Apprenticeship. This 12 week course offers an opportunity to refine the research process, explore possibilities of future research interest, and hopefully also gain additional dive experiences as a volunteer diver.



I am very thankful to WWU, AAUS, OWUSS and Nate Schwarck for making this internship a possibility and providing these learning opportunities.

