

*FINAL*

# **2011 Summer Field Science Program Kaktovik, Alaska**

prepared for



**U.S. Fish & Wildlife Service**  
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by

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## **Camp Summary**

The Kaktovik summer science camp was held from August 8-13<sup>th</sup> at the Harold Kaveolook School in the native village of Kaktovik, Alaska. The camp initially was held from 10 AM to 5 PM with a break for lunch, but with the students' urging, the camp was extended by two hours and began at 8 AM on the second day of camp. Cliff Strain of Port Aransas, Texas was the lead teacher for the camp, and he was assisted by Meghan Murphy (USFWS), Carla Stanley (Friends of Alaska's National Wildlife Refuges), and Susan Linn (UTMSI). Dr. James McClelland (UTMSI) and Dr. Kenneth Dunton (UTMSI) shared their research with the students and were involved with various activities throughout the week. Ted Dunton and John Dunton both served as boat captains of the R/V Proteus, which was used for the collection of water samples and biological specimens. Twenty students ranging from ages nine to eighteen participated in the camp.

Multidisciplinary and interactive marine science lessons were conducted using a combination of field, laboratory, and classroom activities. In the field, students were taken out on the R/V Proteus to participate in plankton tows, benthic grabs, trawls, and water sampling (Figure 1). Students also learned how to use seine nets from the shoreline to investigate local fauna (Figure 2). Biota from these trips were brought back to the laboratory for closer inspection using microscopes and used as a basis for classroom activities. Many of these activities emphasized taxonomic classification and marine food web structure. Some of the fish collected during the field trips were also used to make fish prints on t-shirts (Figure 3).

Students explored the anatomy of preserved biological specimens through dissections of preserved sharks, crayfish, perch, squid, and starfish (Figure 4). Following the shark dissection, students gathered in the USFWS bunkhouse to watch the movie, *Jaws*. This movie sparked a

lively discussion that highlighted the myths of shark behavior and the role of sharks in marine ecosystems.

Students were given the opportunity to explore environmental chemistry by assessing local water conditions. Water samples collected on field trips were analyzed for dissolved nutrients (nitrate, phosphate), dissolved oxygen, pH, and salinity using Lamotte Water Monitoring kits. The data generated from these analyses were then used as a basis for discussion of fundamental oceanographic concepts such as nutrient limitation, eutrophication, and ocean acidification.

The Summer Science Camp also included units on coastal erosion and GPS use (Figure 5). Students mapped a section of the bluff face on the northern edge of Barter Island by recording GPS coordinates and entering them into Google Earth. In the classroom, students discussed the use of repeated measurements by GPS and tracking shoreline positions with satellite imagery. To further explore the utility of GPS (and just for fun!) the students were sent out on a geocache hunt. Tokens from the geocaches were redeemable for prizes during a live auction (Figure 6). The students expressed great interest and enthusiasm during the summer camp and are looking forward to next year's activities.

At the conclusion of the Summer Science Camp, we made an explicit effort to connect with the broader Kaktovik community through an Open House held at the USFWS Arctic National Wildlife Refuge bunkhouse. We shared a traditional Inupiat meal with the local community, and the students showed off the fish-print t-shirts they made during the week (Figure 7). After the meal, we presented a PowerPoint slide show with images of camp activities, and one group of students prepared a skit about some of the things they had learned during the camp. While the Open House showcased the Summer Science Camp, it also gave us an opportunity to

learn more about the local culture. The students taught us traditional games and invoked conversations on topics ranging from whaling to family trees.

### **Feedback**

Feedback from all the camp participants was very positive, overall. Camp evaluations were completed by many of the students at the conclusion of camp and will be used to improve the lessons presented at next year's camp (Figures 8&9). Many of the students commented on how the oceanography module presented them with a new perspective on evaluating the ecosystems around them. In particular, the students displayed a profound interest in learning about the mechanisms and rates of erosion on Barter Island. In response to this interest, next year's lesson on coastal erosion will be expanded with a focus on wave energy. The students also enjoyed the water quality tests performed on samples collected from Kaktovik Lagoon, and next year those tests will be expanded to include samples from freshwater inland ponds. Many of the older students commented on the need to split up the camp based on age, with more advanced activities for the older students. This issue will be addressed by using the high school students as camp mentors (see future recommendations). The students enjoyed the hands-on aspect of the camp and loved how they were able to learn outside the confines of a classroom. Much to our satisfaction, all of the students reported a positive experience at oceanography camp and expressed interest in attending the camp in 2012.

### **Future Recommendations**

We hope to hold the summer science camp again during the summer of 2012 with improvements to both the curriculum and organization of the camp. The camp was initially

designed for students in grades 5-8, but we expanded the camp to high school students when we received substantial interest from this age group. . Next year, we hope to engage the high school students by allowing them serve as camp mentors. Each high school student will be assigned 4-6 middle school students on the first day of camp and will serve as mentors for the remainder of the week. We hope that by serving as a mentor, each high school student will not only participate in the camp activities, but they will also develop their leadership skills by helping the younger students.

After the completion of camp, we would like to extend an offer to 2-4 high school students who show strong interest in science to join our “Young Scientist Training Program.” The students who are selected will accompany our research team during sampling trips on the R/V Proteus, where they will learn proper sampling protocol and receive training on sample processing. We plan to offer the selected students a stipend, which they will receive after successful completion of the sampling season. We hope the “Young Scientist Training Program” will afford a few high school students an intimate look into the real workings of a scientific research project.

We want to emphasize more aspects of the scientific method during next year’s camp by having the students keep a detailed field journal of all the activities and sampling trips completed throughout the week. At the end of the week, students will use the observations from their field journals to write and film a short video presenting what they learned about their local ecosystem. We hope to show these films to all interested members of the community at the open house celebration at the conclusion of camp.

Next year, we want to improve our ability to assess student learning outcomes during the week of camp. At the beginning of camp, we will have each student take a quiz in order to gauge

the students' oceanography background. A similar quiz will be given at the conclusion of camp in order to evaluate our ability to effectively convey scientific principles. We will also collect the students' field notebooks to assess their ability to incorporate aspects of the scientific method into their journal entries.

Lastly, we plan to modify next year's curriculum to include new units on plate tectonics, waves, bathymetry and birding. In order to compare data sets from 2011 to those collected in 2012, we do plan to repeat the GPS and water quality field assessments. Fish printing and the geocache hunt will also be repeated, as these lessons were extremely popular with the students. Overall, the Kaktovik Oceanography Camp of 2011 was a great success, and with some modifications to both the curriculum and organization, we believe we can make the camp even better in 2012.

## Figures 1-9.

### Summer Science Camp at Kaktovik, Summer 2011 on Barter Island, Alaska



Figure 1. Students on the R/V Proteus sharing discoveries from a trawl. Photo: Cliff Strain.



Figure 2. Seining along the shoreline of Kaktovik Lagoon. Photo: Carla Stanley.



Figure 3. Students used a combination of fresh specimens and silicone casts to make fish prints on t-shirts. Photo: Carla Stanley.



Figure 4. Students dissecting sharks, crayfish, perch, squid, and starfish (Carla Stanley).



Figure 5. Students hiked the outer coast of Barter Island, using GPS to map the base of the eroding bluff face. Photo: Carla Stanley.



Figure 6. Students participate in a live auction to redeem their tokens from the geocache hunt for various prizes. Photo: Carla Stanley.



Figure 7. Some of the camp participants at the camp open house held in the USFWS bunkhouse. The students are wearing their shirts they created during the fish printing activity. Photo: Carla Stanley.

KP Ahmaguq

Camp Survey

1. What was the most interesting thing you learned from oceanography camp?

That giant anthropods don't actually eat your toes.

AND that freshwater has alot to do with currents.

2. What did you like about camp and why?

I liked the fun way that you guys taught us things. It didn't feel like learning but we know a lot more now than before the camp.

3. What would you change about the camp?

Have it more based on age groups and I would have liked more tests on the water. like pH and temp and all that.

4. If you went to oceanography camp next summer, what activities would you do and what would you like to learn more about?

I think an activity/experiment about erosion would be interesting and fun.

5. How has oceanography camp changed the way you think about your island and the ocean?

It makes me appreciate a lot more and want to change things ~~to~~ to try to slow erosion.

Figure 8. Camp evaluation completed by a high school student.

Camp Survey

1. What was the most interesting thing you learned from oceanography camp?

The Food chain.

2. What did you like about camp and why?

The boat rides and all the activities we did.  
Very hands on! Loved it!

3. What would you change about the camp?

Activities for the age groups. Maybe  
Separate us a little more.

4. If you went to oceanography camp next summer, what activities would you do and what would you like to learn more about?

I would like to have gone to  
the mainland and explore more there,  
to see if erosion is the same as on our  
island.

5. How has oceanography camp changed the way you think about your island and the ocean?

It made me realize how fast we  
are ~~eroding~~ eroding...

Figure 9. Camp evaluation completed by a student at the end of camp.