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December 9, 2008

Dear Earthwatcher,

Re: The Success of Our Inaugural Earthwatch 2008 Season

Our first Earthwatch season was a terrific success and there are many people to thank for this. First, each of the Earthwatch volunteers – you were fabulous. Everyone endured the weather and the uncertainty of traveling to and from St. George with terrific resilience and humor. The dedication to the work was very impressive.

But just as important during this first season was candid feedback on what worked and didn't work as far as every aspect of the project and experience. This, from every group throughout the season, was extremely useful and whenever possible was immediately implemented into our program.

Thanks also to the local ground crew who kept the meals and lodging in excellent shape and to my co-PIs, Karin Holser and Bruce Robson. Karin in particular who, being onsite all season, spent countless hours behind-the-scenes keeping everyone happy. Finally, an especially big thanks to Ryan Kingsbery, our crew leader who's experience with the location and seals really made it work. To the best of my knowledge we will have Ryan again next year – I sure hope so!

Thank you and all the best to everyone involved in our 2008 Northern Fur Seal program!

Sincerely,

A handwritten signature in black ink, appearing to read 'Stephen J. Insley', written in a cursive style.

Stephen J. Insley, Ph.D.



EARTHWATCH INSTITUTE ANNUAL FIELD REPORT

Date completed: February 19, 2009.
Completed by: Stephen J. Insley
Period covered: June-September, 2008
Project title: Alaska Fur Seals

Research report

Objective 1: Conduct Direct Counts of Northern Fur Seal (*Callorhinus ursinus*) Females and Pups

Direct counts of fur seal females and pups were conducted throughout the breeding season by the field assistant accompanied by the volunteers.

Objective 2: Quantify Female and Pup Numbers in each Vibrissae Color Category

The numbers of fur seal females and pups in each vibrissae category (an age category determined by the colour of the fur seal's whiskers) was quantified throughout the field season by the field assistant at the same time as the direct counts.

Objective 3: Optional Participation in Additional St. George Island Research Currently Ongoing.

Volunteers participated in a number of the concurrent research projects throughout the season. While conducting fur seal observations, volunteers were always on the lookout for killer whales and regularly participated in daily surveys via "Big Eye" binoculars. Volunteers were also constantly on the lookout for and recording all sightings of entangled and marked (i.e. tagged or branded) fur seals or Steller sea lions (*Eumetopias jubatus*) for the long term database. More eyes on the rookery (colony of breeding animals) were extremely valuable here. Finally, most volunteers were able to experience first hand some of the other research being conducted in the area, such as the seabird population and foraging ecology work that is ongoing. There was also time for everyone to meet locals and to hike.

Objective 4: Quantify age variation in female maternal behaviors (i.e. experience).

Our prime objective for volunteers during the summer field season was to quantify age variation in female maternal behaviors (i.e. experience). Successfully raising a fur seal pup to weaning involves regularly conducting a suite of complex behaviors including protection, nutritional provisioning, and successfully reuniting with the pup after each foraging trip

(Insley 2000; Insley et al 2003). Experience with age appears to play an important role in many of these behaviors although evidence to date is mostly anecdotal. The population level implications of a shift in female age structure can be substantial. For example, fewer experienced mothers may lead to a decrease in the number of healthy weaned pups that survive to breed. To date, however, there exists little information quantifying experiential factors in pinnipeds (fin footed mammals – seals, walruses, sealions) in general and nothing for northern fur seals.

The first phase of this portion of our study quantified a well chosen suite of behaviors that are essential to pup survival, such as the amount of time spent nursing, frequency of protective behavior, and reunion efficiency. To do this, specific female/pup pairs were observed for predetermined periods. During the focal observation periods, the behaviors of interest were recorded both opportunistically and at set time intervals using a regimented system of scan samples. Focal seals were females representing different age categories, balanced for statistical comparison.

Volunteers were paired and conducted both scan and opportunistic samples of female-pup pairs for two hour blocks of time. We developed a training regime involving video samples that we used in camp prior to the first block of recordings. This worked extremely well. We also developed a database for entering data quickly and efficiently afterwards so datasheets didn't pile up and individual volunteers had a sense of their contribution. In addition, we found that having a set focus while watching the fur seals opened the eyes of the volunteers to see much more detail than if they had attempted to watch in an unstructured manner. Overall, the maternal age and behavior focus turned out to be a total success, for us as scientists as well as the volunteers (from the opinions I experienced). As this was the pilot season, the season goals were to test, refine and perfect our methodology. This was accomplished. These data are not however for comparison and publication. This phase will begin in 2009.

Summary of results

Data, results and trends

The focus of the Alaskan Fur Seals research project is long-term monitoring of population age structure in the northern fur seals (*Callorhinus ursinus*) of the Pribilof Islands in Alaska. For long-lived animals such as marine mammals, understanding the age structure of the population is critical in assessing its future viability and health. Healthy populations have a mix of age groups. Decreases in different age groups have different consequences. For example, lack of recruitment (maturing young animals) in a population results in a gradual increase of the average reproductive age. In the short term, the result may be a slight decrease in the overall population. The delayed response, however, can be an accelerated population decrease and possibly a crash once the depressed numbers of younger animals mature and fail to sufficiently replace the primary breeding age group. Whether or not northern fur seals are currently experiencing age-biased population changes is unknown. If it were known it could shed light on the cause of the decline as well as indicate future population trends.

This past year we collected three main types of data at a breeding colony of northern fur seals. First, we made direct counts of all females and pups at the site in order to establish a baseline of the population and how it changes as the season progresses. Second, we counted the numbers of females and pups in the different age categories in order to quantify how the numbers of seals of different ages varied throughout the season, and more importantly, from year-to-year. Third, we made focal observations of numerous female-pup

pairs in order to compare the quality of maternal care between young and older females – basically asking how important is maternal experience and to place this result into the context of a population with a changing age structure. It is too early in the study to have any clear trends, however, it is clear that the methodology is producing good, reproducible and thus comparable data, and thus is likely to yield valuable results. These sorts of data are exceptionally important right now, a point in time when the population is experiencing substantial declines without a clear understanding why.

Contribution to achieving conservation impacts

The data we are collecting is especially important at this point in time because the northern fur seal population is experiencing substantial declines in the Pribilof Islands and there has yet to be any clear explanation as to the cause. Although excellent long term data exist on population trends, there is very little understanding of population age structure, despite it being clearly important to population health in such a long-lived species. As a result, we expect our data, if collected in a consistent manner over time, to be quite valuable to the conservation managers in determining the most appropriate conservation action for the species.

Significance/ benefits of research

Local

Northern fur seals play an important role in both the culture and subsistence of the local Aleut people of the Pribilof Islands. Understanding what is happening to the local animals and determining if local actions can help in any way is important to locals. In addition, the input provided by EW both directly and indirectly is helpful to the local (strained) economies.

National / Regional

The Pribilof Islands are the most centrally located islands in the Bering Sea region and thus understanding the biological trends, especially among the top trophic species (the predators) in the area, can act as important indicators of the biological health of the region. In addition, the commercial fishery in the Bering Sea is the most valuable of all the US fisheries. Anything that is affecting the fur seals is also likely to be affecting the fishery. Understanding and preparing/mitigating for any such affect is thus of prime economic importance.

International

Northern fur seals, as is the case for many pelagic species in the North Pacific Ocean and Bering Sea, cross international boundaries. The fur seal treaty was one of the first international conservation treaties, signed by the US, Canada, Russia, and Japan. Currently, the single most important potential biological threat that is truly international in scope is climate change. The only way to effectively study climate change is with a wide, necessarily international, perspective. Climate change effects are much more pronounced in the higher latitudes and especially at ecological transition zones. The Pribilof Islands are located at a transition zone, being at the southern most extent of the winter sea ice. Understanding biological impacts in such areas are a priority and thus currently of the utmost importance to monitor.

Communication of results

Digital:

St. George Island Institute website: <http://www.stgeorgeislandinstitute.com/index.html>

Meetings and conferences:

Public discussions on the EW project at local community meetings on St. George Island, August, 2008, and at the Pribilof Island Collaborative meeting held in Anchorage, Jan.18, 2009.

Educational Opportunities

The project involves local communities, students and early career scientists. It helps form a working relationship between researchers and locals and provides direct interaction between students and researchers. Finally, the project provides field experience, analysis experience, and personnel management experience for early career scientists.

Our primary field assistant is a Masters student.

Acknowledgements

Sally and Chris Mercurief, and to all the residents (human and animals) of St. George Island, Alaska.