

Hi all,

I hope everyone is looking forward to the upcoming cruise. Because we are all converging on the vessel from various places at various times, it will not be possible to arrange a pre-cruise meeting/briefing/training/whatever you want to call it. So I thought I would send out a summary of what we are going to try to do. The following applies mainly to the second and third legs - i.e., after the ship leaves Kodiak on 8 July. My apologies for the length. Feel free to contact me ([rick.jeduc@noaa.gov](mailto:rick.jeduc@noaa.gov), Ph: 858-546-7072) if you have any questions.

## **Overview**

Our main goal here is to find and collect data on right whales. Our primary survey area is a part of the SE Bering (the box) that is bounded by 56-30 and 57-30 N and 162-30 and 166 W. This is where recent sightings have been concentrated, including those from the Miller Freeman cruises and from our own efforts. The good news is that we have found right whales there every July that we have looked. The bad news is that this is a very thin soup. Every two weeks of effort have yielded about 5-6 whales. For example, in 1999, we had two weeks of vessel time in the box and found a total of five whales. Similar totals were achieved for each of the aerial surveys (every year since 1998), except for the one year we flew twice as much and saw twice about as many. Our photo-ID catalog now has 14 individuals. Historically, right whales were also very abundant along Albatross Banks off Kodiak Island, and along the shelf break just W of the Pribilofs. Although almost none have been seen in those areas in recent decades (just one off Kodiak in 1998), we will also do some searching there on each leg.

Because the whales are so few and far between, we have foregone some of our usual line-transect survey methods in order to optimise our chances at detection. In other words, finding whales is more important than estimating how many there are. This is mainly reflected in the tracklines so that effort is concentrated where we think the whales will be, or used to be. There will also be some small changes in day-to-day operations, such as only minor adherence to tracklines, no push to "get back on effort" when we do find whales, less emphasis on independent school size estimates, and likely long periods of "off effort" searching (discussed below). The rarity of right whales will also allow ample time to conduct research on other species. In the past, the "box" was occupied by hundreds of humpback and fin whales, with smaller numbers of minke and killer whales, and a handful of harbor and Dall's porpoise for good measure. Many of these may also be seen in the other areas, as well as possibly some gray whales.

## **Schedule**

Leg 1: Lv Seattle 1 July - arr Kodiak 7 July

Leg 2: Lv Kodiak 8 July - arr Dutch Harbor 3 August

Leg 3: Lv Dutch Harbor 6 August - arr Kodiak 2 September

Upon leaving Kodiak, the ship will survey along Albatross Banks, heading W. We'll then go through one of the passes through the Shumagin Islands and then N through Unimak Pass to the Bering Sea and the "box". After spending much of the leg in the "box", we'll

then head W to the shelf break W of St. Paul Island. We'll work down the shelf break to Dutch Harbor. The third leg will be essentially the same in reverse.

On the second leg, the ship will be working in concert with an aerial team based out of Cold Bay. They will be about a half-hour flight time from the area we normally see right whales (S edge of the box). Whenever right whale sightings and good conditions converge, the plane will be called upon to take high-resolution vertical aerial photographs.

### **Visual ops**

There will be three pair of bigeyes (25x) binoculars mounted on the flying bridge, as well as a number of hand-held binocs. So even if you aren't on watch, you should still be able to look around if you want. There will also be a laptop there for recording data. We'll have six mammal observers on board on each leg. Instead of the usual two teams of three (two people on bigeyes and one data recorder/trackline guarder), we'll have three teams of two. On the basic schedule, each team will work one hour on, two hours off. (reasons: Based on the 1999 cruise, I think it will be cold enough on the flying bridge that one hour is enough. Also, the paucity of small cetaceans makes trackline guarding less important.) This schedule will have to be altered if some of the mammal observers are off doing small boat ops. The days will be very long, although inclement weather (usually in the form of rain and fog) will often shut down visual ops.

Data will be recorded much as we do on our surveys. Each person on the bigeyes scans from dead ahead to 90 degrees off their beam. Effort data and sightings are recorded in the survey program on the laptop. When there is a sighting, the person on the other side will go to the computer and enter in the necessary info. There will be a number of people, including me, who are unfamiliar or only passingly familiar with our data collection program. No worries, it isn't too complicated.

For each observer, we plan to have on board a Mustang coat that they can wear on the flying bridge (no, it's not to keep). Observers should plan to bring sufficient covering for head, hands, legs and feet. Temperatures will range from the 40s to 50s, damp and windy on the flying bridge.

### **Acoustics**

On the 1999 cruise, sonobuoys proved to be a very efficient means of detecting right whales. They were detected up to 20 mi away, and 2-3 times as many whales were heard as were seen, often within a few miles of sighted whales. Unfortunately for us then, most of this could not be pieced together until the post-cruise analyses by Mark MacDonald. Mark also determined that the right whale calls in the "box" underwent a fairly regular change in mode as they progressed through the water. The "box" is in a part of the Bering Sea where the bottom is fairly shallow (35-50 fm) and very flat, so the effect of the bottom on the call mode is fairly regular. I won't pretend to understand it all, but he found that the modes of the call are pretty good predictors of the distance from the call to the sonobuoy. This means that using DIFAR sonobuoys (which give compass direction) to

localize calling whales is potentially pretty easy, not requiring triangulation with multiple buoys. This could be a boon to our detection efficiency.

John Hildebrand of SIO is kindly providing us with acoustic equipment for this cruise. Unfortunately, demand for sonobuoys is higher than supply these days. So we will be somewhat limited in the number we have. To alleviate the shortage, we may have some sonobuoys that have been converted into retrievable ones (they are normally expendable - self-scuttling) and perhaps a hydrophone that can be lowered into the water. Strategically, this means that we will be somewhat stingy with their use during certain times and in certain areas. For example, the probability of right whales being along Albatross Banks and the Bering Sea shelf break is very low, so that not many expendable sonobuoys will be used in those areas. We also will be more conservative on the second leg in order to maximize detection on the third leg for satellite tagging. Furthermore, we may also do a lot of listening at night with the ship hove-to, as this represents our best opportunity for long periods of continuous monitoring (while the ship is underway, sonobuoys are out of radio range after about an hour).

Also on the third leg, we will be retrieving and redeploying a couple autonomous hydrophones. These are anchored hydrophones that were set out in the "box" to record continuously for many months. An acoustic signal will be sent to the unit to trigger the release of its drop weights, allowing the unit to float to the surface. This will happen just before the vessel leaves the "box" on the third leg to head back to the Gulf of Alaska. The acoustician on that leg will refurbish them so that they can be redeployed in the Gulf prior to reaching Kodiak.

### **Small boat ops**

Small boat ops may occur for the purposes of biopsy, ID-photography and, on the third leg, satellite tagging. This will occur when the cruise leader decides that the number and/or species of whales to be sampled makes it worthwhile (and, of course, when the captain decides it is safe). For example, some areas may contain large numbers of humpbacks. Rather than have the ship suspend the search for right whales, a small boat may be launched to photograph and biopsy humpbacks while the ship continues right whale searching. Mustang suits will be provided for those going out in the small boat. The number of people participating in small boat ops will be small - two or three people total on each leg. Don't expect to "get a turn" unless you are one of those designated for biopsy or photography. It would be nice to be more "democratic" and allow everyone to take turns going out, but this greatly reduces our ability to gather data and samples.

ID-photography will concentrate on right whale heads and humpback flukes. All cetaceans are biopsy targets, and tags will be only for right whales. Tagging is on the third leg only.

### **Oceanography**

Our oceanographic sampling will be scaled down from previous cruises. No XBT's will be deployed. There will be a nightly CTD. However, no water sampling for nutrients, chlorophyll, or productivity will be taken. Occasional water samples will be taken only to

calibrate the salinity readings. Given the limited sampling, and the shallow water in the "box", many of these CTDs will be fairly quick. The vessel will also collect thermosalinograph data, bucket temperatures, and acoustic backscatter data from the ship's transducer.

On leg 2 only, we will conduct net tows. In the box, this will consist of nightly bongo tows, which sample plankton of copepod size (right whale chow). Outside of the box, the nightly tow will be a Tucker trawl, which samples larger prey items (euphausiids and up). In areas of feeding right whales or feeding humpback and fin whales, additional tows of the appropriate type may be conducted.

### **Day-to-day activities**

Each morning's visual effort will begin when there is sufficient daylight. Line transect protocol will generally be followed. If a right whale is detected acoustically, even at considerable distance, the ship will divert to the appropriate course. Visual searching and data collection on other species will continue; however, this will be "off effort" effort (in the line transect sense) due to the bias introduced in the ship's search pattern. Upon reaching the right whale(s), biopsy and photos will be taken and, on the third leg, satellite tags will be deployed. After this, the vessel may remain in the vicinity of the whale(s) for up to several hours for additional purposes: 1) to make continuous recordings of whale vocalizations, 2) to wait for and direct the aircraft to the whale to take aerial photographs, and 3) to conduct additional net tows. The latter two activities will likely be during the second leg only. During these times, some effort on the flying bridge will be needed to keep track of the whale(s) visually. If other whales (e.g., humpbacks) are in the area, the small boat may be launched to collect samples and photographs of those.

When right whales have not been detected, data and sample collection of other species will be conducted as much as the situation allows. This may entail brief diversions to biopsy whales from the ship, or may involve launching the small boat to work the other whales while the ship continues searching for right whales.

Visual effort will continue until daylight fades. Depending on the cloud cover, this can be anywhere from 2200 to 2330. After effort ends, the nightly CTD and, on the second leg, nightly net tow will be conducted. If conditions, equipment and personnel allow, the vessel will remain relatively stationary so that acoustic monitoring may continue for much of the nighttime hours.

### **The vessel**

Our group consists of people of diverse backgrounds, including some that have not sailed on NOAA ships before. I won't attempt to review all the rules and guidelines, but will mention a few for the newer folk that are helpful to know ahead of time. Some people like to bring their favorite snacks or beverages for between meals. But the ship is dry; no alcohol allowed. Close-toed shoes only, no sandals except to and from the shower. Berthing is fairly cramped, so I suggest limiting the number of accoutrements that you bring, although things you don't need on board (e.g., backpacks, fishing gear) can usually

be stowed somewhere on board. There will be e-mail, although large files and long messages are discouraged, either coming in or going out. There is also a satellite phone, but the cost is prohibitive unless there is an emergency or you have a lot of money to spend.

Once again, feel free to contact me if you have any questions or suggestions. Looking forward to a fun and successful cruise.

Rick