

## VAQUITA EXPEDITION 2008

**CHIEF SCIENTISTS:**

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**CRUISE LEADER:**

BARBARA TAYLOR

**SURVEY**

**COORDINATOR:**

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**SCIENTISTS (A-Z):**

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ANNA HALL  
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**COLLABORATORS:**

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**VISITING SCIENTIST:**

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**VESSEL:**

THE COMMAND &  
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SHIP DAVID  
STARR JORDAN

### INTERNATIONAL ACOUSTIC EXPERT PHASE

6-15 OCTOBER 2008

BARBARA TAYLOR



Beyond the acoustic expertise on the Koipai (Armando Jaramillo), the Vaquita Express (Shannon Rankin and René Swift) and the NOAA Ship *David Starr Jordan* (Jay Barlow), we invited the inventors of the primary acoustic devices being used to join the Vaquita Expedition. Jonathan Gordon (Sea Mammal Research Unit, University of St. Andrews, United Kingdom) is an expert in the equipment used for the past decade on the Koipai called the “Porpoise Box” and the newer incarnation being towed from the Vaquita Express called “Rainbow Click”. Tomonari (Tom) Akamatsu (Fisheries Research Agency, Japan) is the inventor of the A-tag and brings with him his student Satoko Kimura. Nick Tregenza, an independent researcher from the United Kingdom is the inventor of two commercially available porpoise detectors called the T-POD and the C-POD.

The initial week was spent getting all the equipment running smoothly and doing acoustic tests. Both the Koipai and Vaquita Express were used to test the performance of the devices to detect simulated porpoise clicks (a system created by Jay Barlow). All devices detected the clicks but some detected clicks farther than others. The NOAA Ship *David Starr Jordan* (hereafter called the *Jordan*) arrived on October 10 near sunset. Additional marine mammal observers also arrived from San Diego. The full visual observation team is: Barbara Taylor, Jay Barlow, Robert Pitman,



*Acoustician Tom Akamatsu at work on the A-Tag before the buoy launch.*



*Acoustician Nick Tregenza watches the launch of the buoy which carries his C-POD and T-POD, along with the A-tag.*

Ernesto Vázquez (all from the 1997 vaquita survey), Cornelia Oedekoven (lead mammal observer), Dawn Breese (early vaquita surveys), and Anna Hall from Canada who is an expert on harbor and Dall's porpoise. Sarah Mesnick joins as oceanographer and Lorenzo Rojas-Bracho is the Mexican chief scientist for Vaquita Expedition 2008.

October 11 and 12 proved too windy for vaquita observations for either of the other two vessels to leave the harbor. Nevertheless, the detectors dangling from the side of the *Jordan* are working away. The ability to detect vaquita acoustically in winds from zero to over 20 mph allows monitoring over a greater period of time than visual surveys, which are not only limited to winds less than 15 mph but of course cannot be conducted in the dark! Much to our surprise, Nick's C-POD detected a vaquita just after 2pm in the afternoon on October 12<sup>th</sup> only 3 miles from San Felipe (and outside the area protected from net fishing).

The winds died late in the day and we seized the opportunity to move to the area of highest vaquita density, according to previous acoustic work from the Koipai. There we made a perfect launch of buoy #1 on which all three detectors (A-tag, C-POD and T-POD) are attached during a stunning sunset launch. Many thanks to the officers and crew of the *Jordan* for flawless operation.

The next two days proved a test for the new buoy with sustained winds over 40 knots for much of the time. The *Jordan*, which was initially anchored just under a mile from the buoy, had to move into shallower waters because she was dragging anchor in the fierce winds. We finally found the limit for acoustic methods to detect vaquita. The extremely high winds combined with very large tidal fluctuations made the sea a virtual blender of sound with popping bubbles and hissing sand. The term "acoustic Beaufort" is coined. The traditional Beaufort scale is an indication of wind speed and therefore the scale is a relative index of how well we can see animals. Beaufort zero is perfectly calm and is perfect for seeing vaquita. We lose the ability to see the 7" high vaquita dorsal fin when winds reach about 15 miles per hour.



*Sunset launch of the buoy carrying the acoustic tags.*



*High winds and high seas create a cacophony of sound in the ocean, testing the limits of the acoustic gear.*

Acousticians don't have a Beaufort scale, but different types of noise can also limit the ability of acoustic devices to detect the clicks of vaquita. The northern Gulf has been giving our acousticians quite a sample of how noisy it can be with stormy weather and amazing biological noise produced by snapping shrimp.

Although much of the data recorded was the noise of the tempest, a group of bottlenose dolphins swam by and were detected by both the C-POD and A-tag. Although these dolphins produced very high frequency sounds in the same range that vaquita produce, they also produce lower frequency sounds, which vaquita do not. Our encounter nicely demonstrated the difference between these devices: the C-POD gives presence/absence data while the A-TAG, with its two hydrophones, gives directional data allowing the minimum number of animals and their directional behavior to be "seen". In this case, we saw 5 animals from the ship and the A-tag had acoustic tracks suggesting between 3 and 5 animals that approached and dove down two separate times.

The bad weather has kept our acoustic team apart with some on the *Jordan* and others trapped in San Felipe as unwilling land-lubbers. Developing a new monitoring system would benefit greatly from brainstorming with all the experts once they've experienced the acoustic challenges of the northern Gulf. So, for their final day, we load chief scientists and visiting acousticians into the panga, which is on loan to the Koipai from José Compoy, the head of the Biosphere Reserve. Our visitors get one last taste of what the northern Gulf can throw at you (literally) as the winds pick up to 30 miles per hour on our journey to San Felipe. My glasses actually have salt crystals on their lenses when we dock.

We spent the day in scientific discussions both presenting what each have learned about how their acoustic device works and consider experimental design for the duration of the cruise to maximize the data we gather to design a long-term acoustic monitoring system. Each of these outside experts is providing

their instruments and expertise at almost no cost because they recognize how critical the situation is for this beautiful creature.

Everyone is willing to contribute whatever they can to provide the best information possible to the government of Mexico for this unprecedented effort to manage small scale fisheries to allow co-existence with a rare species found only in the small area in a remote corner of the globe.