

Saving the vaquita: Are we doing all we can? Workshop Report Summary

Thomas A. Jefferson (Editor)¹

¹¡VIVA Vaquita!, 13037 Yerba Valley Way, Lakeside, CA 92040 USA

Abstract

This report identifies highlights from a November 2011 workshop, held in association with the Biennial Conference on the Biology of Marine Mammals in Tampa, FL, USA. The goal of this workshop was to explore ways for marine mammal specialists to help save what is one of the world's most endangered marine mammal species, the vaquita (*Phocoena sinus*). The report provides an overview of the background presentations that reviewed conservation efforts to date, the status of the species and research progress on the vaquita, as well as public education initiatives. Highlights from the afternoon sessions, which were focused around small-group discussions, are provided. This workshop set the foundation for a "Vaquita Task Force," which will use some of the concepts tabled and discussed at the workshop to advance conservation of the vaquita. Ideas developed during the workshop might also be used to inform conservation of other endangered species and populations of marine mammals.

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Introduction

One species of cetacean the baiji, *Lipotes vexillifer* has recently gone extinct and there is another species teetering on the edge - the vaquita, *Phocoena sinus* (5, 8, 11), shown in Figure 1. Several other species and populations of marine mammals are nearly there, or will likely reach this point in our lifetimes. The majority of marine mammal biologists work mostly with species that are relatively abundant, and they do not spend much of their time doing public awareness/education work related to endangered species. The question is: are we doing all we can as marine mammal specialists to help prevent future marine mammal extinctions?

A workshop was held on 27 November 2011 from 830 AM – 430 PM at the Tampa Bay Convention Center, Tampa, FL, USA. The workshop leaders were Thomas A. Jefferson and Lorenzo Rojas-Bracho and the workshop was sponsored by ¡VIVA Vaquita! (a collaborative effort of Cetos Research Organization, the American Cetacean Society, and Save the Whales). The goal of this workshop was to explore ways to better use

our skills, knowledge, and resources as marine mammal specialists to help save what may be the world's most endangered species of marine mammal, the vaquita. The workshop had relevance to other endangered species and populations of marine mammals as well.

There were several background presentations in the morning (Table 1), and the afternoon sessions were focused around small-group discussions. The main goal was to develop a "Vaquita Task Force" to push forward various initiatives aimed at using our special abilities as marine mammal specialists to avoid following the tragic precedent of the baiji and help save the vaquita.

The ideas presented in this report represent a mix of thoughts from many different people and many were not supported by all those who attended the workshop. The text of this report is simply a summary of what was discussed and the report should not be seen as reflecting the views or opinions of any particular person or organization, including ¡VIVA Vaquita!



Figure 1 - A rare photograph of a live vaquita at sea. Photo by Thomas A. Jefferson under permit (Oficio No. DR/488/08) from the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT), within a natural protected area subject to special management and decreed as such by the Mexican Government.



Time	Speaker	Topic
0830	T. Jefferson/ L. Rojas-Bracho	Welcome/introduction to workshop
0850	R. Reeves	How the vaquita has been and is viewed from an international perspective
0920	J. Wang	Humpback dolphins in Taiwan – Teetering On the edge
0940	B. Taylor & R. Pitman	Wither baiji - whither vaquita?
1000	<i>COFFEE BREAK</i>	
1030	J. Barlow, A. Jaramillo, B. Taylor, L. Rojas-Bracho & N. Tregenza	The status of the vaquita in 2011
1100	L. Rojas-Bracho & D. Avila	The Mexican Government’s Vaquita Recovery Strategy
1140	T. Jefferson	US-based vaquita conservation efforts and ¡VIVA Vaquita!

Table 1: Initial presentations by experts providing background information on vaquita issues.

Morning Background Talks

The morning session was designed to provide all the workshop participants (Table 2) with the appropriate background information on the vaquita issue, and to get people ‘on the same page’ for the afternoon discussions. After a welcome and description of logistics by the workshop coordinators, there were six background talks (Figure 2).

First, Randall Reeves provided an introduction and history of vaquita conservation efforts from an international perspective, with emphasis on the various roles of the International Whaling Commission (IWC) and the International Union for the Conservation of Nature and Natural Resources (IUCN) involvement (8). Next John Wang told the story of the small population of Indo-Pacific humpback dolphins (*Sousa chinensis*) found along the west coast of Taiwan. This recently discovered population faces many threats, and the successes and failures of conservation efforts directed towards it were very instructive to the vaquita situation (12). Barb Taylor (standing in for an injured Bob Pitman) presented a comparison of recent research efforts towards assessing the population status of the now-extinct baiji with those directed toward the vaquita,

and drew some interesting parallels and contrasts (11).

After a short coffee break, Jay Barlow and Barb Taylor summarized what we know of the current status of the vaquita population, including results of the 2008 line transect survey that suggests that only about 200 vaquitas remain, and that they have been declining at about 8% per year since the late 1990s (2, 3). Lorenzo



Figure 2 - Workshop presentations in the morning sessions providing needed background for afternoon discussions.

Name	Affiliation
Attard, Marie	University of New South Wales
Barlow, Jay	NOAA
Braulik, Gill	University of St. Andrews
Cubero-Pardo, Priscilla	Independent
Dransfield, Andrea	Independent
Forney, Karin	NOAA
Glim, Diane	ACS Monterey Bay
Iversen, Maria	Danish Institute for Study Abroad
Jefferson, Tom	VIVA Vaquita
Keiper, Carol A.	Oikonos Ecosystem Knowledge
Kieckhefer, Tom	Save the Whales
Knowlton, Amy	New England Aquarium
Kofternow, Lynette	ACS
Kutz, Dida	ACS Monterey Bay
Martin, Molly	University of South Florida
McIntyre, Diana	ACS Los Angeles
McWeeny, Bill	Independent
Mesnick, Sarah	NOAA
Pawliczka, Iwona	WWF Poland
Reeves, Randy	Okapi Wildlife Associates
Risch, Denise	Independent
Rojas-Bracho, Lorenzo	Mexican National Institute of Ecology
Samaran, Flore	Independent
Santostasi, Nina	Independent
Silber, Greg	NOAA
Sin, Shadow	Ocean Park Conservation Foundation
Taylor, Barb	NOAA
Thomas, Peter	Marine Mammal Commission
Tregenza, Nick	Chelonia Ltd.
Valentine, Kim	ACS San Diego
Wang, John	FormosaCetus
Wittnich, Carin	Oceanographic Environmental Research Society
Wright, Andrew	Aarhus University (Denmark)
Wu, Yen-Chieh	Independent
Young, Nina	NOAA

Table 2: Participants and their affiliations as provided.

Rojas-Bracho then described the Mexican Government's conservation plan for the vaquita and the progress that had been made in recent years (10). This included a

summary of promising efforts to develop an acoustic monitoring system for establishing population trends (9). Finally, Tom Jefferson gave a short history of US-based vaquita conservation efforts, and described the recent work of ¡VIVA Vaquita! (5,6). These presentations and discussions set the stage for the working groups as follows (Figure 3).



Figure 3 - Workshop participants discussing the future of the vaquita, and making recommendations on how conservation efforts can proceed more effectively.

Working Group No. 1 - Investigation of Remaining Scientific Uncertainties and Coordinating NGOs and Scientists (Leader: B. Taylor)

The group first developed a list of topics where scientific uncertainties remain. Given time constraints, the group was able to have substantive discussions only on scientific uncertainties and did not spend appreciable time discussing the issue of coordinating scientists and NGOs.

Effect of the Colorado River on vaquita abundance and health.

There have been frequent claims over the past several decades that the nutrient reduction from lack of flow from the Colorado River has caused the decline of vaquitas or at least that it continues to compromise the ability of vaquitas to recover. The group reviewed the two lines of argument made by proponents of this position: 1) the productivity in the northern Gulf has declined as a result of the lack of flow from the Colorado River and this has directly affected the



survival and reproduction of vaquitas and 2) the loss of flow from the Colorado River will soon result in the loss of critical habitat for vaquitas (presumably referring to the need for continued sediment input to maintain the benthos). Both of these lines of argument point to an outcome that would mean vaquitas are at risk of either starving or failing to reproduce because of insufficient food. The evidence given by proponents is that the periodic pulses of freshwater flow from the Colorado River that still occur result in corresponding increases in catches of shrimp and perhaps other species. However, there have been no observations of malnourished vaquitas, and vaquita calves are often observed (6), so it does not appear that there is a problem with either body condition or reproductive performance. Vaquita distribution is limited to the portion of the Gulf that overlies the Colorado River delta and to the muddy waters resulting from tidal currents (Figure 4).

Productivity in the northern Gulf remains high and, as mentioned, no emaciated vaquitas have been seen. The question, then, is whether the silt deposited on the bottom will disappear any time soon (i.e. not just over geologic time). The working group agreed that it would be useful to document the depth of the silt substrate in the delta and to estimate the rate of annual loss of that substrate, in order to address concerns about the medium and long-term viability of the vaquita's habitat.

In general, the group felt that the Rojas-Bracho and Taylor (7) paper had largely addressed concerns about the effects of Colorado River damming on vaquitas and their habitat, but it was concluded that it would be useful to revisit this issue with new information on the loss rate of sediments. This is planned for 2012 (4).

Empirical estimate of bycatch.

The primary source of data for estimating vaquita bycatch rates is a one-year study that relied mostly on interviews with fishermen in El Golfo de Santa Clara (1). Participants agreed that such an interview process could not work again now that fishermen have become aware of the implications of such research and the fact that it has led to management decisions contrary to their interests (e.g. forced reductions in fishing effort in order to eliminate vaquita bycatch (4)). After lengthy discussion of other methods, including the use of video cameras, independent boats that would observe

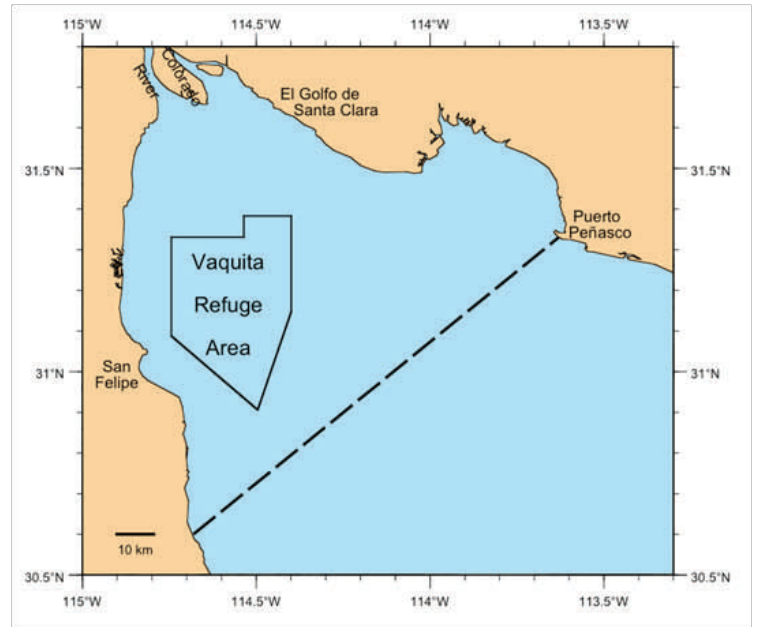


Figure 4 - Map of the northern Gulf of California showing the current known vaquita range (area to the north and west of the dashed line) and the Vaquita Refuge area (area inside the solid line) established by the Mexican government. This Refuge is a natural protected area subject to special management regulations.

fishermen pulling their nets, and placement of observers on pangas, it was agreed that none of these methods was feasible and that uncertainties surrounding bycatch rates would remain.

Population size and trend.

It was agreed that recent papers by Gerrodette et al. (3) and Gerrodette and Rojas-Bracho (2) give good estimates of status and trends and the remaining uncertainties that result from poor precision in the shallow water area are unlikely to be resolved soon.

Monitoring shallow water areas (actually all areas outside the Refuge)/fishing effort quantification.

These subjects are presented together because they are strongly connected. Currently there is no monitoring of vaquitas outside the Vaquita Refuge and participants agreed that population monitoring results would be strengthened by expansion into outside areas (9). However, before deploying passive acoustic equipment for such monitoring, further characterization and quantification of seasonal fishing effort are needed. This is because the acoustic devices are often lost to/removed by fishing gear (both gillnets and trawling nets). An

experiment with dummy C-PODs would help quantify the predicted loss in different areas. For areas with unacceptably high predicted loss, it might be possible (as an alternative) to estimate vaquita density using a towed acoustic array. However, here too, more experimental data are needed to determine the motor type and vessel speed that would allow vaquita detection using an acoustic array. It was suggested that with the new knowledge gained from the passive acoustic monitoring grid within the Vaquita Refuge, experiments could be designed in high-density areas to assess best motor type and speed.

Life history. Because so few carcasses become available, little progress has been made recently in estimating birth or death rates, age at first reproduction, or calving interval. Photographic identification of individual vaquitas (Figures 5, 6) may make it possible to improve estimates of these and other life history parameters somewhat, but participants recognized that it would take a great deal of field effort to obtain sufficiently large samples (6).



Figure 5 - Dorsal fins of two vaquitas. Their similar appearance makes individual identification difficult. However, if there are unique marks or damaged dorsal fins, individual identification has been shown to be possible with this species. Photo by Thomas A. Jefferson under permit (Oficio No. DR/488/08) from the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT), within a natural protected area subject to special management and decreed as such by the Mexican Government.



Figure 6 - Two vaquitas surfacing next to a vessel in the northern Gulf of California, October 2008. Photo taken by Thomas A. Jefferson under permit (Oficio No. DR/488/08) from the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT), within a natural protected area subject to special management and decreed as such by the Mexican Government.

Seasonal distribution. Some data on seasonal movements and distribution of vaquitas should come from the C-PODs mounted on the Vaquita Refuge boundary buoys. Sadly, however, coverage will be sparse. Also, it is anticipated that no data will be obtained from areas outside the Refuge. The lack of such data makes it difficult to consider season/area closures as a means of managing fisheries.

Working Group No. 2 - Moving the Gillnet Removal Plan Forward and Developing Alternative Livelihoods (Leader: N. Young)

The group first identified the issues that appear to be inhibiting the gillnet removal plan and the development of alternative livelihoods for fishermen and others involved in the gillnet fishery industry in the northern Gulf. Then, a series of recommendations was developed.

Issues Identified

It was recognized that it is difficult to move vaquita conservation forward with the conservation mandate split between Mexican fisheries and environment ministries. We need to know where within the government of Mexico the ultimate responsibility lies for vaquita conservation. The group did not know of

a plan for fabricating alternative gear, relinquishing gillnets, and purchasing and distributing alternative gear. Would production be limited by the availability of materials, the time required for fabrication, or other factors? It was noted that economic studies have been undertaken that highlight the socio-economic effects of changing the fisheries and the economics of the fishing villages. Reports of these studies should be made more readily available.

Tourism as an alternative is questionable in light of today's economic situation. Individuals involved in the vaquita conservation effort should, to the extent possible, live in the fishing villages to gain the trust of the communities. There is a need for a dedicated local contact person, a 'vaquita czar' (this should be a Mexican national). Incentives should be created for fishermen to take the lead and develop and undertake conservation efforts. After some discussion, the following information needs were identified:

- 1) Make available the reports by fisheries economists so that they can be used in the search for economic alternatives, gear-switching strategies, etc. (and translate into English, if necessary).
- 2) Develop a better understanding of the life history of shrimp in the northern Gulf.
- 3) Develop mechanisms to compile, and periodically update, in one place, a description of the efforts within the government and "on-the-ground" to conserve vaquitas.

Recommendations

Illegal fishing should be stopped. Groups should continue to urge Mexico to:

- a) Increase enforcement capacity and effort in order to eliminate illegal fishing.
- b) Strictly enforce its permitting and gillnet requirements.
- c) Take steps to ensure that any buy-out results in clear and lasting reductions in fishing effort with entangling gear.

Ban gillnets in the Upper Gulf of California by 2015. In the interim, a program should be developed to do the following:

- a) Urge Mexico to continue to reduce gillnet fishing effort.
- b) Establish fishing industry liaisons (possibly through

Center for Study of Deserts and Oceans, CEDO) to live in the fishing villages and gain the trust of the community. This is necessary to obtain better estimates of bycatch and to help with the transition toward using alternative fishing gear.

- c) Complete the efforts by gear specialists to conduct larger-scale studies testing alternative gear for use in the shrimp fishery.
- d) Develop a distribution strategy for transitioning new alternative gear into the fishery (including a strategy to ensure that the gear is actually used properly).
- e) Consider financial incentives to establish the capability to manufacture alternative gear in Mexico.

Government Actions. The US government should:

- a) Insist that bilateral discussions with Mexico include representatives from the fisheries and environment ministries.
- b) Develop a clear understanding of the agencies and levels of authority that are responsible for implementing the Vaquita Action Plan.

Other recommendations:

- a) Update the management plan for the biosphere reserve and consider expanding the reserve boundaries to encompass the entire range of the vaquita.
- b) To be successful, vaquita conservation efforts need to be sustained and continuous over the long term.

Working Group No. 3 - Making the Vaquita a Household Name and Becoming Vaquita-Safe: Markets in the USA (Leader: A. Wright)

The group examined the issues of increasing public awareness of the vaquita and its plight, and how economic markets for seafood products that result in vaquita mortality might be affected.

Vaquita-safe Markets:

The group considered possible ways to foster vaquita-safe markets, but did not come to consensus on the issue. Vaquita-safe certifications may be needed, but would require better name recognition of the species and public support. Legislation modeled after US laws on importation of dolphin- (and turtle-) safe seafood would be useful (the trouble with this is the time required to pass legislation and implement free trade agreements).



Although it could be problematic tracking products from nets to markets, this would be worthwhile. Letters from the Society for Marine Mammalogy (and/or other scientific societies) may help in the above efforts.

Vaquita Name Recognition:

In order to elevate the status of the vaquita, there is a need for a campaign using innovative, new methods. Exhibits at aquariums and zoos with life-sized vaquita models could be quite effective. It might be possible to use the polydactyl characteristic of the vaquita (it has six finger bones instead of the usual five) to elevate the species' profile. There is a need to mass-produce education tools, like posters, fact sheets, and kids' gear (e.g., coloring books in Spanish and English).

Schools could plan a vaquita theme day (or week). It may be useful to have some sort of computer game (online/flash/etc.) and/or phone app. Awareness efforts should include natural history, travel, and diving magazines. The use of celebrity spokespeople (especially Mexican nationals) would be very helpful to get the word out to a large number of people. A dedicated person/team will be needed to coordinate the work described above.

Summary

Where Do We Go from Here?

Although it only scratched the surface, the workshop was deemed successful by most. It provided a good forum to update interested parties and seek agreement on what needs to be done to prevent the extinction of the vaquita. The limited time for discussions meant that little more than laundry lists of issues and recommendations could be developed at the workshop. Although consensus was not reached on all issues discussed, and attitudes about some issues varied, overall the workshop participants largely worked together harmoniously and effectively to address potential solutions.

¡VIVA Vaquita! will take the next steps by reviewing the workshop recommendations and working to implement a subset of those that are considered feasible (considering limited resources and available funding), starting in 2012. The people who attended the workshop (as well as others who registered but were unable to

attend) will be viewed as a preliminary "Vaquita Task Force" and we expect to call on many of the participants in the coming months and years to help us, by using their particular sets of skills, resources, and connections. Working together with such a diverse group of passionate people, we are even more optimistic than before that, despite the dire population status of the vaquita, it is not too late and the species can still be saved.

Acknowledgements

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