Report of the 12th Meeting of CIRVA

(Comité Internacional para la Recuperación de la Vaquita (International Committee for the Recovery of the Vaquita)

Virtual meetings held on 3, 4 and 12 June 2025

EXECUTIVE SUMMARY

This virtual meeting provided a welcome opportunity for CIRVA to receive information and comment upon the plans and strategies of the new Mexican administration on the conservation of the vaquita and the management of fisheries in the Upper Gulf of California. One key component was examining proposed information behind proposed changes to the 2020 regulatory agreement including the present boundaries.

CIRVA **stressed** that successful resolution from the perspectives of vaquita conservation and sustainable fishing communities required:

(a) co-operation with and compliance by fishing communities to reduce illegal fishing both in terms of gear type and species targeted (primarily the totoaba);
(b) effective and transparent enforcement of measures by authorities;
(c) priority attention to development of efficient vaquita-safe[1] gear (recognising the balance between quality and quantity of products and market rates);
(d) periodic review of regulations, taking into account regular, adequately funded monitoring of vaquita numbers and distribution as well as of fishing activities and compliance/enforcement; and
(e) continued and improved co-operation and building of trust (including joint workshops) amongst local and national authorities, fishing communities and scientists, as they pursue the shared goal of eliminating non-vaquita-safe gear in vaquita habitat.

CIRVA broadly **agrees** that the proposed changes to the revised *large* area (Fig. 1) are justified in the context of the described vaquita sightings/detections, whilst drawing attention to the discussions of compliance, enforcement and co-operation with fishing communities in its report.

CIRVA therefore **recommends** that in addition to the changes in the large area, it is appropriate to consider:

(a) some expansion of the present much smaller Zero Tolerance Area (ZTA), taking into account known recent vaquita distribution and recognizing practical enforcement capabilities; and
(b) identification of an area, with sufficient density of preferred target species, where priority is given to testing and evaluating experimental vaquita-safe gear.

CIRVA **recommends** that to facilitate this approach, a small multidisciplinary working group of appropriate expertise should be formed to advise the government. The small group's work should be supported by information on and mapping of (at the same scale as the vaquita acoustic detections and sightings information) priority fishing areas (legal and, to the extent possible illegal), by gear type(s) used, target species, effort, landings and fishing season.

[1] In this report, the terms "vaquita-safe gear" and the previously commonly used "alternative gear" are synonymous.

The goal is to identify and clearly define an area where all types of gillnets are effectively prohibited, as well as areas where specific gear types are permitted and a suitable area or areas for effective testing of alternative gear. Final governmental decisions on boundaries must take into account compliance and enforcement capabilities and be made in collaboration with fishermen, fisheries authorities, SEMARNAT, CONANP and CIRVA.

CIRVA **emphasizes** the need for periodic review of any agreed boundaries in the light of regular data from a well-designed, funded and ongoing vaquita monitoring programme.

Any long-term solution for both the vaquita and fishing communities requires the development of effective and efficient vaquita-safe gear. CIRVA **recommends** that the Expert Committee on Fishing Technologies (ECOFT) be reactivated and that Pesca ABC serves as the new Secretariat of ECOFT. A meeting of fishing technology experts should be convened before the end of the year. CIRVA **stresses** that without vaquita-safe gear, installation of more concrete blocks with hooks in a wider area appears to be the only approach that can effectively protect vaquitas. CIRVA **commends** the current steps envisaged by the fishery authorities, CONAPESCA and IMIPAS, to test and develop vaquita-safe gear, as well as improve monitoring as part of a more science-based and inclusive management approach.

CIRVA **agrees** that the corvina fishery has the potential to generate considerable income for local communities without further endangering the vaquita *but only if* it is prosecuted properly – e.g. the sole use of active, encircling gillnets.

Real progress depends on building trust and involving fishermen in defining sustainable *and* vaquita-safe fishing strategies that allow for long-term community livelihoods and the long-term survival of vaquitas. CIRVA **commends** the initiative led by CONAPESCA, CONANP, IMIPAS, and other partners that includes direct engagement with fishing communities in San Felipe, El Golfo de Santa Clara, and Puerto Peñasco. A community liaison position—someone who lives in one of the communities who is trusted and consistently engaged—would increase the likelihood of success by facilitating communication among authorities, scientists, fishermen and local communities. CIRVA **recommends** that such a community liaison position be established by SEMARNAT.

CIRVA **stresses** that the continued collaboration and support from all relevant agencies and other entities will be essential to ensure that this momentum leads to real change on the water, both for the sustainability of fisheries *and* the survival of the vaquita.

Finally, CIRVA **strongly supports** the plans for the September 2025 survey and **re-emphasizes** the need for the development of a strategy to ensure regular monitoring of vaquita distribution and abundance to provide a strong scientific basis for vaquita conservation and fishery management actions.

Contents

1. INTRODUCTORY ITEMS

1.1 Welcoming remarks

The Chair opened the session by highlighting that this meeting comes at a timely moment to reflect on recent policy developments, updated conservation strategies and forthcoming vaquita survey plans. Considerable time had passed since the last in-person meeting in San Diego, on March 15, 2024. This was the first CIRVA meeting without the participation of our great friend and CIRVA colleague, Armando Jaramillo-Legorreta (Annex A)

Participants were informed that new documents had been received in advance and that just the day before, additional information had been presented regarding the actions and strategies of the current administration. The Chair emphasized that, in many ways, this was a different kind of CIRVA meeting and expressed hope that the committee would find the documents and other presented information helpful.

1.2 Participants

The list of Participants is provided as Annex B. It includes members of CIRVA, Government representatives and invited participants.

1.3 Chair and rapporteurs

The meeting was Chaired by Rojas-Bracho. Donovan, Reeves, Read and Henry served as rapporteurs.

1.4 Review and adoption of the Agenda

The adopted Agenda is provided as Annex C and the discussion points provided as notes to the Agenda by the Chair informed the broad outlines of this report. The final responsibility for the report lies with the members of CIRVA.

1.5 Documents available

The List of Documents is provided as Annex D.

2. REVIEW OF PROPOSED MODIFICATIONS TO THE 2020 REGULATORY AGREEMENT

The meeting received a document (Paper 1) and presentation providing information and summarising the rationale behind proposed changes by the government and fishing community representatives to the 2020 regulatory agreement, and most specifically to the gillnet exclusion polygon (see Annex F, summary of the National Stakeholders Meeting held on 3 June 2025).

2.1 Analysis and proposals for modification of the Fisheries Agreement

The technical analysis reviewed the Gillnet Exclusion Zone promulgated in the 2020 Fisheries Agreement and proposed several regulatory modifications to it based on operational, biological and enforcement-related considerations. The stated goal was to enhance clarity, enforceability and effectiveness of the regulation while ensuring compatibility with conservation and community needs. The proposals are summarized below.

(a) *Revised gillnet exclusion polygon*: A new exclusion zone of 4,883.87 km² was proposed, based on updated data from CONANP and CONAPESCA, integrated by CONABIO, including acoustic detections (2011–2024), the most recent sighting records from (2015-2024), and fishing effort distribution. The current exclusion zone (shaded in green in Fig. 1) is proposed to be reduced to the area outlined in purple. While reduced in area, the proposed polygon included nearly all areas with recent vaquita detections, excluded southern zones with historically low or no reported vaquita presence, and was

meant to optimize enforcement and reduce unnecessary restrictions in areas where vaquitas had not been reported.

(b) *Recognition of specific fisheries*: The document recommended excluding the curvina golfina fishery from the general gillnet ban, given the absence of bycatch and the distinct active fishing method normally used. This would be subject to strict adherence to NOM-063-PESC-2005 and conservation regulations.

(c) *Updated operational zones*: Proposals included the official recognition of frequently used embarkation and disembarkation points (e.g., Malecón ramp in San Felipe) to reflect on-the-ground realities and improve surveillance logistics.

The proposed revised exclusion zone is illustrated in Fig. 1.

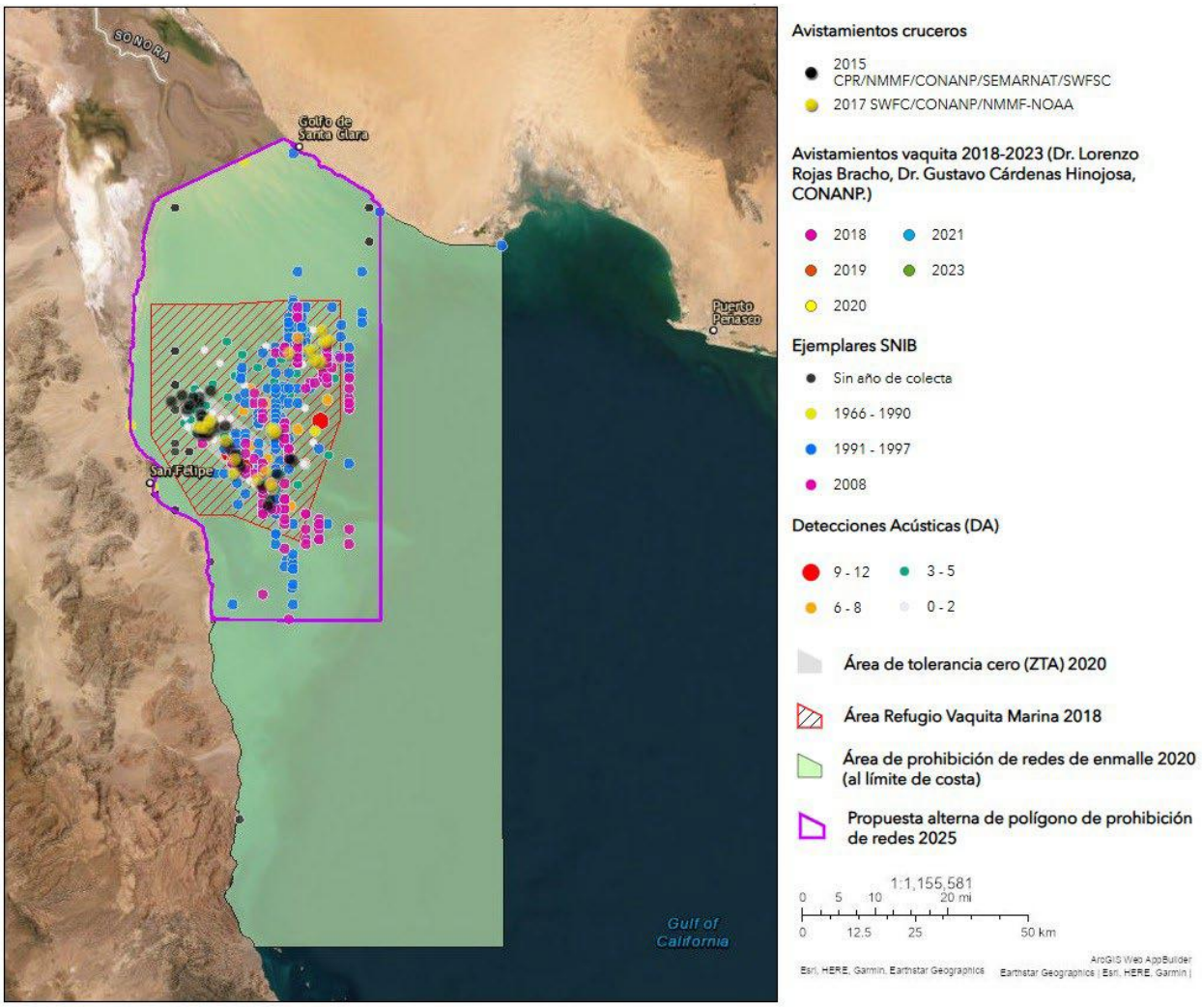

Fig. 1. Information used when considering proposed revisions of the exclusion polygon.

2.2 CIRVA discussion

Before discussing the individual issues highlighted in the notes to the Agenda, CIRVA **stressed** that any comments or recommendations on the boundary proposal *per se* were contingent on the successful discussion and practical resolution (see later agenda items) of several interacting factors including:

(f) co-operation, compliance and buy-in by fishing communities (both co-operatives and individuals) and effective enforcement by authorities, recognising the presence and

drivers of illegal gillnet fishing for both illegal and legal target species, as well as the socio-economic conditions of fishing communities;

(g) improved information on proposed and expected compliance and enforcement including for example: an explanation of the criteria used by authorities, including the navy, for when an intercepted panga might be turned back or occupants detained; consideration of potential on-land measures; and steps to be taken by fishing communities to reduce illegal fishing;

(h) priority attention to actions toward long-term solutions, specifically with respect to vaquita-safe gear that provides satisfactory incomes to fishing communities based on legal target species (recognising the balance between quality and quantity of products and market rates);

(i) periodic review of regulations, taking into account regular, adequately funded monitoring of vaquita numbers and distribution as well as of fishing activities and compliance/enforcement; and

(j) continued and improved co-operation and building of trust (including joint workshops) amongst local and national authorities, fishing communities and scientists, with the objective of reaching a consensus strategy for vaquita recovery (numbers and distribution) including the removal of non-vaquita-safe gear (gillnetting and other entangling gears) from vaquita habitat.

2.3 Conclusions and recommendations

CIRVA broadly **agrees** that the proposed changes to the revised *large* area (Fig. 1) are justified in the context of the described vaquita sightings/detections, whilst noting that in the southern parts of the area little or no gillnet fishing takes place anyway. In broadly concurring with the proposed changes, however, CIRVA refers to its general comments above and specifically draws attention to the discussions of compliance, enforcement and co-operation with fishing communities under Items 4 and 5 below. It is impractical to expect the entire large area to be effectively monitored and any regulations to be fully enforced without considerable (and probably unlikely) increased investment in human and technological resources.

CIRVA therefore **agrees** that in addition to the changes in the large area, it is appropriate to consider:

(c) expansion of the present much smaller Zero Tolerance Area (ZTA), taking into account most of the known recent vaquita distribution and recognizing practical enforcement capabilities; and

(d) identification of an area, with sufficient density of preferred target species, where priority is given to testing and evaluating experimental gear (and see Item 3).

CIRVA **recommends** that to facilitate this approach, a small working group of appropriate expertise should be formed to advise the government (see also Item 4 and Annex G). The small group's work should be supported by information on and mapping of (at the same scale as the vaquita information) priority fishing areas, by gear type(s) used, target species, effort and fishing season. This will allow a comparison of the fishing areas map(s) with map(s) of acoustic and sighting detections. While all efforts should be made to stop the illegal fishery for totoaba, in the event of its continuance, this working group should also seek, to the extent possible, the same information for this illegal fishery. The group should also examine any anomalies in the present information, e.g. with respect to reported large landings of shrimp alongside reports of no pangas present in the relevant areas between February and October (and see Item 4).

The goal is to identify and clearly define (i) an area where all types of gillnets are effectively prohibited, as well as (ii) areas where specific gear types are permitted and (iii) a suitable area or areas for effective testing of vaquita-safe gear. These new delineations should include areas where vaquitas are still detected and exclude zones where their presence has been historically low. Final governmental decisions on boundaries must take into account compliance and enforcement capabilities and be made in collaboration with fishermen, fisheries authorities, SEMARNAT, CONANP and CIRVA.

As with any boundaries based upon information on sightings/detections, CIRVA **emphasizes** (as noted above) the need for periodic review of any agreed boundaries in the light of new data from a well-designed, funded, and ongoing vaquita monitoring programme.

3. VAQUITA-SAFE FISHING GEAR

CIRVA has on many occasions provided advice to the Government on the need for vaquita-safe gear as a long-term solution for conservation of the vaquita and the wellbeing of fishing communities. The current administration appears to have an ambitious strategy to find practicable, durable solutions to the chronic problem of the lack of acceptable alternatives to gillnets for catching finfish and shrimp in the Upper Gulf. This is not the first time that the Mexican Government has set forth such a strategy.[2]

3.1 Previous CIRVA advice concerning vaquita-safe gear

At its second meeting (CIRVA-2) in February 1999, CIRVA recommended that (i) 'research be *started immediately* to develop and test alternate gear types and techniques to replace gillnets' and (ii) 'education and consultation begin immediately among fishers, social scientists and biologists to seek the best alternative to gillnetting.' At its next meeting in January 2004, CIRVA-3 acknowledged the 'economic hardship for fishermen' that an immediate ban on gillnetting would cause but considered such a ban 'the minimum action required' to reduce the possibility of further decline in the vaquita population and to '*allow time for additional developmental work on alternative fishing gear and methods*, as well as socio-economic initiatives.'

CIRVA-4 (February 2012) recommended that artisanal shrimp fishing vessels be converted from using gillnets to using small trawls *immediately* and that additional research be undertaken *immediately* 'to develop vaquita-safe methods to fish for finfish with artisanal vessels.' It was anticipated that the conversion of the entire fishing fleet to vaquita-safe methods would be accomplished 'within the next few years' and that 'spatial management measures' would 'provide access incentives for shrimp fishermen who use small trawls rather than gillnets.' In July 2014, at CIRVA-5, the committee recommended increased efforts 'to introduce alternatives to gillnet fishing in the communities that will be affected by enforcement of the exclusion zone' and that issuance of permits for legal non-gillnet fishing be 'expedited.'

[2] In February 2008, SEMARNAT's Action Program for the Conservation of the Species: Vaquita (*Phocoena sinus*), Comprehensive Strategy for the Sustainable Management of Marine and Coastal Resources in the Upper Gulf of California (PACE-Vaquita) called for the promotion of 'activities designed to reorient production and improve fishing technology … in order to safeguard family incomes.' That 'action program' had many of the same or similar aspirational components as those outlined and described by the current Upper Gulf Intragovernmental Sustainability Group (GIS).

A year later (May 2015), CIRVA-6 noted:

> The gillnet ban will only be successful if fishermen are given the opportunity to develop alternative livelihoods, including continuing to fish with small trawls for shrimp and with other gear and practices that do not pose a threat to vaquitas. The current compensation scheme apparently does not entail the development, testing, and implementation of alternative gear. The two-year emergency closure period provides an excellent opportunity to train and equip fishermen to use small trawls for shrimp and develop and test traps or other vaquita-safe gear to catch finfish. Fishermen should be afforded opportunities to pursue their livelihoods by continuing to fish in ways that do not threaten vaquitas.

CIRVA-6 recommended that (i) 'increased efforts be made to develop and introduce alternatives to gillnet fishing in communities affected by enforcement of the exclusion zone' and (ii) in accordance with Mexican Standard 002 published in June 2013 mandating the stepwise substitution of vaquita-safe gear for shrimp gillnets, the Government of Mexico announced that shrimp gillnets are now permanently banned.'

In December 2015, CIRVA noted that the most pressing need was 'to develop and test alternative fishing gear, to ensure a future for shrimp and finfish fishing in the Upper Gulf.' It recommended that the Government of Mexico 'invest more resources in these trials and elicit the involvement of international expertise in their design and implementation.' Importantly, after reiterating its previous recommendation that the gillnet ban be made permanent, CIRVA emphasized that the existing compensation program should be reformulated to reward fishermen who switch to vaquita-safe gear, rather than compensating them for simply not fishing. It added that the cost of the compensation program could be reduced significantly as soon as the next shrimp season if fishermen were allowed to fish with the small trawl net, which had been 'tested and legally authorized for use in this fishery.'

The December 2015 meeting benefited greatly from a report by Young on a site visit to the UGC by a team representing NMFS, Marine Mammal Commission, and Marine Mammal Center.[3] The team found 'multiple and serious problems in the actual implementation of the fishing gear experiments, all of which are seriously delaying the progress in finding alternative gear.' On that basis, the team proposed three things: (i) increased commitment of concerned agencies in Mexico to 'a transparent, objective, and fully implemented program of research and development of alternatives to gillnet gear'; (ii) establishment of an international review panel that would partner with fishing gear experts from NMFS to review, design, test, and adopt alternative gear; and (iii) establishment of an experimental commercial shrimp trawl fishery for all fishing vessels which possess the experimental trawl prototype (i.e. the small trawl net). Based on Young's report, CIRVA recommended the following conditions for a Finfish Gear Development and Research Program:

(a) INAPESCA in collaboration with the Presidential Commission and CIRVA will establish an international review panel to review the experimental protocol for finfish gear testing, the data from the first year of the experimental protocol, and make recommendations for revisions to the experimental protocol;
(b) Fishermen who participate in the finfish gear development program must adhere to the experimental protocols, refusing to do so will result in the forfeiture of permits or compensation;
(c) Gear modifications can be made to the gear to increase efficiency provided they are documented and the necessary changes are made to the experimental protocol;
(d) The international review panel will review the results of the finfish gear development and research program quarterly and make recommendations for further modifications.

[3] The full report by Young is appended to the December 2015 CIRVA report, as is a Prospectus for Gear Testing Programs prepared by Tim Werner of the Bycatch Consortium, New England Aquarium, Boston, Massachusetts.

3.2 Expert Committee on Fishing Technologies (ECOFT)

Pursuant to the above recommendations, in July 2016, INAPESCA and World Wildlife Fund Mexico jointly convened the Expert Committee on Fishing Technologies (ECOFT) to provide independent and international guidance and oversight on the development of vaquita-safe gear and practices in the UGC. The committee's aim was to facilitate the transition to vaquita-safe gear in place of gillnets, eliminate the risk of vaquita bycatch, support fishing communities, and minimize impacts on the environment. It was initially composed of experts from Mexico, the United States, Canada, Scotland, Denmark, Sweden and Finland.

A May 2018 document submitted to CIRVA-11 called '*Implementation and Development Plan for Transitioning to Vaquita-safe Fishing Gear in the Upper Gulf of California'* was produced by an ECOFT-CIRVA Joint Working Group. That document contains Guidelines for Developing and Implementing Fisheries in the Upper Gulf that were based on a summary of findings from an expert meeting in Mérida in 2016 to identify fishing-gear research priorities for the Upper Gulf that would pose no threat to vaquitas. Unfortunately, little real progress toward the envisioned transition was made between 2018 and 2024.

3.3 Upper Gulf of California Fisheries Workshop for the Promotion of Alternative Fishing Gear and Aquaculture, March 2025

In March 2025, the Upper Gulf of California Fisheries Workshop for the Promotion of Alternative Fishing Gear and Aquaculture was organized in the city of Mexicali, Baja California, with the objective of continuing the dialogues and analyzing the current challenges and opportunities in the development of alternative fishing gear and methods, evaluating production options such as aquaculture and sport fishing, and promoting species conservation in the Upper Gulf of California. During the workshop, several key agreements were reached, including:

(a) Keep the fishing sector and local communities involved in developing solutions and making decisions about alternative fishing and aquaculture.
(b) Create a coordinated work plan among various groups specializing in alternative fisheries, aquaculture, markets, infrastructure, and the development of alternative fishing gear.
(c) Jointly monitor sport fishing under sustainable schemes as an option for productive reconversion.
(d) Seek complementary sources of funding through collaboration with state governments and organizations.
(e) Conduct testing during this season with an alternative net currently available.
(f) Manage the adaptation and improvement of other alternative fishing techniques—such as those designed for shrimp—to evaluate them during the following seasons.

The workshop was attended by representatives of the fishing communities of the Upper Gulf of California—San Felipe, Gulf of Santa Clara, and Puerto Peñasco—as well as various governmental and academic institutions and civil society organizations specializing in environmental and fisheries issues. These included: CONANP and the recently created General Directorate of Conservation and Management of Seas and Coasts of SEMARNAT; the Secretariat of Fisheries and Aquaculture of the State of Baja California; the Secretariat of Agriculture, Hydraulic Resources, Fisheries, and Aquaculture of the State of Sonora; the Center for Scientific Research and Higher Education of Ensenada (CICESE); the UABC; the Aquaculture Institute of the State of Sonora (IAES); and the organizations Pronatura Noroeste and Pesca ABC. To address (i.e. reduce or eliminate) many of the structural (and other) barriers

impeding the transition to 'sustainable' fishing[4], the Mexican administration (and specifically the Upper Gulf of California Intragovernmental Sustainability Group, or GIS) is (i) seeking to improve interagency coordination and collaboration, (ii) carrying out community workshops, (iii) continuing and expanding trials of alternative fishing gears and practices, (iv) supporting the development of greater market access for the fishing communities, (v) re-constituting or re-engaging with the Expert Committee on Fishing Technologies (ECOFT), and (vi) consulting the IUCN Behavior Change Task Force[5].

3.4 New concerns

Sanjurjo reported that PescaABC had taken part in ocean clean-ups by divers retrieving ghost nets and in sea lion disentanglement campaigns at Consag Rocks (inside the Vaquita Refuge). In April 2025, three sea lions that had been caught in nylon gillnets of mesh size 8-10 inches (*redes lenguaderas*), used to capture flatfish (some type of flounder) were disentangled and released. More flatfish nets were found in clean-up campaigns. There are no permits or landing reports for this fishery which has a substantial risk of entangling vaquitas.

3.5 Conclusions and recommendations

CIRVA **welcomes** the willingness of the government to focus on finally achieving a transition to sustainable fishing in the UGC, which means it is prepared to make major investments in vaquita-safe gears and practices based on genuine consultation and collaboration with fishermen and the fishing communities. The committee was particularly impressed by the presentation by Villalobos on the participatory workshops with fishermen from San Felipe and El Golfo de Santa Clara in August 2023. As he pointed out, and as the tables in Annex D demonstrate, the workshops sought not only to identify and describe the regulatory, technical, economic, environmental and social barriers to implementation of alternative approaches, but also to propose concrete solutions incorporating meaningful engagement with the fishing communities.

CIRVA **stresses** the importance of reactivating the Expert Committee on Fishing Technologies (ECOFT) and **welcomes** the notification at its session on 12 June 2025 that the GIS would re-establish ECOFT in the following week. The Secretariat of ECOFT was previously held by WWF-Mexico, represented by Enrique Sanjurjo, who currently serves as Executive Director of Pesca Alternativa de Baja California, A.C. (Pesca ABC). CIRVA **recommends** appointing Pesca ABC as the new Secretariat of ECOFT and **requests** that a meeting of fishing technology experts is convened before the end of the year.

CIRVA **reiterates** the recommendation under Item 2.3 above, with respect to the need to establish a meaningful area or areas for the testing of vaquita-safe gear and see Annex G). Such areas must be designated (and enforced as) closed to gillnetting (any use of gillnets) and other fishing practices that could interfere with trials of vaquita-safe gear. The interference with gear trials, whether deliberate or inadvertent, has plagued previous efforts to test and trial alternatives, and it is very hard to see how any significant progress can be made toward demonstrating effectiveness, practicability, and cost-effectiveness of non-gillnet gear (and

[4] Even though a fishery may be considered 'sustainable' in terms of the targeted population or populations, that is not sufficient. In all vaquita-related contexts where the term 'sustainable' is used, the intended meaning should be consistent with the three principles set out by the Marine Stewardship Council standard (https://www.msc.org/what-we-are-doing/our-approach/what-does-the-blue-msc-label-mean), namely: (i) only fish healthy stocks; (ii) manage the stocks so that they can be fished for the long term; and (iii) minimize the fishery's impact on other species (e.g. the vaquita) and the wider ecosystem.

[5] https://www.conservationbehaviourchange.org/what-we-do

convincing fishermen to use such gear) until a suitable 'proving ground' is available, well used, and monitored to ensure it is clear of 'impediments.' CIRVA **supports** the use of non-threatening (i.e. 'vaquita-safe') fishing gear and methods and the testing of vaquita-safe fishing gear inside the expanded ZTA. Past tests of vaquita-safe gear tended to occur in areas with low densities of preferred target species, resulting in low catches and little support for gear switching. Instead, vaquita-safe gear should be tested in areas and environmental conditions that support high densities of preferred target species.

The ultimate objective is thus to define and implement a set of fishing 'systems' that include more species and seasons to reduce the use of gillnets, rather than trying simply to develop methods that use different gillnet configurations or ways to deploy gillnets that are less prone than passive gillnetting to entangle vaquitas (and other non-target biota). CONAPESCA presented a list of already-permitted non-gillnet commercial fisheries in the Upper Gulf[6]. It was also noted that providing support to post-capture processes for adding value to non-gillnet fisheries might indirectly reduce the use of gillnets.

Although all parties agree that vaquitas should be saved and that communities need to develop sustainable fishing as one of their sources of income, a stark reality is that vaquitas cannot recover if gillnetting is allowed to continue in their range. Ideally, fishing should move toward fishing practices that effectively select for marketable fish. Shared success at both saving vaquitas and providing sustainable fishing livelihoods will involve collaboration amongst stakeholders. CIRVA **stressed** that if the fishermen do not transition away from gillnetting within the vaquita's range, then the use of more concrete blocks with hooks will be needed to save the species. Thus far, installation of the concrete blocks is the only approach that has effectively protected vaquitas, creating a *de facto* sanctuary, as acknowledged by CIRVA at its 11th meeting in March 2024 and in Rojas-Bracho *et al.,* 2024 [7].

CIRVA recognized that the current fishery authorities, CONAPESCA and IMIPAS, are taking steps in the right direction. Their efforts to promote testing and development of vaquita-safe gear, as well as improved monitoring, signal a shift toward a more science-based and inclusive management approach.

4. ENFORCEMENT AND SURVEILLANCE

Despite visible enforcement infrastructure in the Upper Gulf of California—patrols, radar, aerial surveys—the effectiveness of monitoring and enforcement remains limited. A constant over the years has been the extensive and persistent use of illegal gillnets in broad daylight. This is closely linked to the decades-long absence of coordinated work with fishing communities to develop and implement viable vaquita-safe gears (see item 3). As noted by Taylor, over the years authorities have been observed inspecting pangas loaded with gillnets at both launching sites in San Felipe and allowing the launchings to proceed. Similarly, vessels have frequently been observed operating with engines that exceed allowed horsepower, again without consequences. Thus, even when vessels were inspected, blatantly obvious infractions were not being acted upon. This raises the question: What was being verified during these inspections?

[6] also see https://pescaabc.org/en/documentos/ .

[7] https://iucn-csg.org/wp-content/uploads/2024/04/CIRVA-11-Final-Report-6-March.pdf. And Rojas-Bracho, L., Taylor, B., Reeves, R., & Read, A., Barlow, J., Donovan, G., Thomas, P., Gulland, F., Mesnick, S., Brownell, R.L. Jr, Henry, A. and Gerrodette, Tim. (2024). Mexico must save the vaquita from gill nets. *Science*. 385. 504. DOI10.1126/science.adp5382.

Available data contradicts the notion that only permitted gear is being used. Although most fishing permits issued for the region are for small trawl nets (*redes de arrastre*), these are rarely seen in use and have not undergone appropriate technical evaluation and testing. A comparative analysis of official shrimp landing reports supports this concern. The volumes of shrimp declared by pangas from San Felipe, Golfo de Santa Clara, and Mexicali fisheries authority' offices, particularly in 2021, 2022 and 2023, have totaled hundreds of metric tons per year. Such levels of production are not consistent with the limited use of authorized gear and suggest that gillnetting continues to be the main method of capture.

Table 1
Shrimp Landings by Office and Year (kg)

Office	2018	2019	2020	2021	2022	2023	2024
Golfo de Santa Clara	0	0	127,158	266,735	371,936	473,509	485,902
Mexicali*	0	24,669	95,518	243,636	141,987	150,401	73,749
San Felipe	0	130,155	398,517	461,640	340,677	456,535	236,006
Total	0	154,824	621,193	972,011	854,600	1,080,445	795,657

*The Mexicali fisheries office, though based inland, oversees coastal fishing communities in Baja California and along the eastern shore of the Upper Gulf, including several ejidos and fishing camps.

Additional evidence comes from official landing records for finfish and sharks, which also show consistently high volumes throughout the same period. From 2018 to 2023, more than 67,000 metric tons of finfish (*escama*) were reported landed in San Felipe, Golfo de Santa Clara, and Mexicali's Fisheries offices. These figures, like those for shrimp, are difficult to reconcile with the limited use of authorized gear observed in the field.

This discrepancy does not necessarily reflect a lack of commitment by enforcement authorities but rather underscores the limitations of the strategies that have been applied for years. Significant illegal fishing activities have routinely slipped through existing control measures. Strengthening detection and intervention mechanisms is essential to improve the overall effectiveness of enforcement and the survival of the vaquita.

CIRVA **recognizes** the need for practicality in the establishment of areas designed to conserve vaquitas and believes that simplification of the complex set of current regulations would encourage compliance and support more effective enforcement.

Under current regulations, all fishing is prohibited in the ZTA but some fishing activities (e.g. trawling) are allowed in the larger Gillnet Exclusion Zone. As noted earlier, CIRVA **agrees** that the current ZTA should be expanded and a testing area(s) for vaquita-safe gear be established (see the recommendation under Items 2.3 and 3.5). These areas will require enforcement including the ability to be able to discriminate various gear types at sea. It is important to recognize that the eventual ZTA will represent a compromise between full protection of the vaquita population and trust that the implementation of fisheries management efforts will be effective in reducing or eliminating vaquita bycatch. Proposed expansion of the current ZTA at this time will probably not include all historical vaquita habitat and (2) as the vaquita population recovers and grows, larger areas may need to be protected.

There was some discussion of how fishermen would be able to recognize management boundaries of the future ZTA, e.g. by a system of surface buoys or an electronic system using

the GPS capacity of their cell phones? Development of a tailored cell phone app (or use of existing apps) could allow users to determine whether they are inside or outside the boundary of any protected area.

CIRVA **agrees** that the most effective means of enforcing the prohibition on illegal fishing gear, such as the large-mesh gillnets used to capture totoaba, is to conduct enforcement actions on shore. Possession of such gear should continue to be illegal and totoaba nets should be confiscated when encountered by enforcement authorities. In addition, all pangas should be clearly marked. The forthcoming Fishing Code of Conduct being developed with fishing communities and authorities should assist in this regard.

The last topic of discussion under this agenda item was the corvina fishery. This is a fishery that has the potential to generate considerable income for local communities without further endangering the vaquita *but only if* it is prosecuted properly, i.e. exclusively using active encircling gillnets. This is another area where the Fishing Code of Conduct should help.

Concerns were raised about whether the recently developed panga tracking system will be implemented in such a way that it can provide assurance that the only fishing method being used is active encirclement. CIRVA **suggests** that, to improve oversight and accountability, only vessels equipped with this tracking system be eligible to receive permits for curvina fishing with gillnets.

5. COMMUNITY ENGAGEMENT

5.1 Workshops

Zatarain gave a presentation on the work that CONANP has undertaken on community engagement since February 2023. This work has had four major components: (1) the development of alternative fisheries, such as diving for caracol chino and the use of hand lines; (2) community participation in monitoring and restoration, such as training the next generation of vaquita observers, conducting acoustic monitoring, the elimination of ghost nets, and disentanglement of large whales; (3) establishment of an advisory council of experts working with community representatives; and (4) a series of workshops, with the communities of San Felipe and El Golfo de Santa Clara. The goal of this work is to develop a new model of fisheries management in the Upper Gulf that supports the well-being of the fishing communities and leads to conservation of the vaquita. Effective community participation is critical to the development of this model.

Villalobos noted that these workshops have made clear how important it is to create spaces for dialog between communities and scientists. Many fishers still feel that their voices are not being heard and their knowledge is not being incorporated into the formulation of policy. It is critical to create a better dialogue among communities, scientists, managers, and NGOs.

5.2 Conclusions and recommendations.

CIRVA **reiterates** its long-held view that real progress depends on building trust and involving fishermen in defining sustainable *and* vaquita-safe fishing strategies that allow for long-term community livelihoods and the long-term survival of vaquitas. CIRVA also recognizes that achieving this outcome requires not only regulatory and technical measures, but changes in human behavior within fishing communities. Past efforts focused primarily on enforcement and gear substitution have not succeeded in shifting long-standing fishing practices. CIRVA therefore **welcomes** the engagement of experts—such as those from the IUCN CEESP Human

Behaviour Change Group—to help design and implement strategies to improve the likelihood of long-term success.

A community liaison position—a community member who is trusted and consistently engaged—would increase the likelihood of success by facilitating communication among authorities, scientists, fishermen and local communities. CIRVA **recommends** that such a community liaison position be established by SEMARNAT.

As noted earlier, the Mexican administration is now making serious efforts to improve fishery management in the Upper Gulf through coordinated inter-institutional action. CIRVA **commends** the initiative led by CONAPESCA, CONANP, IMIPAS, and other partners that includes direct engagement with fishing communities in San Felipe, El Golfo de Santa Clara, and Puerto Peñasco. Key developments so far (as reported to the meeting by Pliego del Angel; Paper 2) include the following:

- Stakeholder engagement. A series of technical meetings and workshops (Dec 2024–May 2025, and see Annex F) with community members and NGOs (e.g., Pronatura, RISA, PESCA ABC) culminated in the publication of a proposal titled 'Strategies and Actions for Sustainable and Responsible Fishing in the Upper Gulf of California.'
- Alternative gear and market transformation. The emphasis has been on evaluating and scaling-up alternative gear and fishing methods. Collaboration with Consejo Mexicano de Promoción de los Productos Pesqueros y Acuícolas (COMEPESCA), IUCN's Behavioral Change Task Force, and FAO supports a broader transition strategy.
- Next steps: The government is developing a feasibility matrix to compare existing gear types and economic alternatives, aiming to inform a roadmap for sustainable fisheries in the region.

CIRVA **recommends** the continued collaboration and support from all relevant agencies and other entities referred to above. This will be essential to ensure that this momentum leads to real change on the water, both for the sustainability of fisheries, fishing communities *and* the survival of the vaquita.

6. PLANNING AND PRIORITIES FOR THE SEPTEMBER 2025 SURVEY

CIRVA **strongly supports** the plans for the September 2025 survey and **re-emphasizes** the need for the development of a strategy to ensure regular monitoring of vaquita distribution and abundance to provide a strong scientific basis for vaquita conservation and fishery management actions.

7. OTHER ISSUES

Sanjurjo noted the commitment by the Government of Mexico to restore its marine ecosystems at the recent U.N. Oceans Conference in France. He said that a group of experts on artificial reefs could be convened to improve the ecological function of the cement blocks currently used to deter illegal fishing in the ZTA. Taylor responded that vaquitas appear to prefer a smooth, muddy bottom and do not feed on hard bottom or reefs. Vaquitas are generalist predators, but we should consider the types of habitats they prefer. The next survey may provide more information in this regard.

Finally, Omar Vidal noted that most communities currently depend on fishing for their livelihoods in the Upper Gulf, but perhaps alternatives to fishing should be considered to diversify future economic opportunities (e.g. sustainable tourism). It was noted that such diversification would be welcomed and that some initiatives, such as a proposal to create a totoaba mariculture operation in San Felipe, were already underway.

Annex A

In Memoriam – Dr. Armando Jaramillo-Legorreta (1964–2024)

CIRVA honors Dr. Armando Jaramillo-Legorreta, a pioneer in vaquita conservation whose scientific work and personal dedication were instrumental in understanding and protecting this critically endangered species. Over more than two decades, Armando led the development and implementation of acoustic methods to monitor vaquita population trends, overcoming the challenges of studying an elusive species in a complex marine environment.

From his early research in the 1990s to his most recent contributions, his work laid the foundation for the systematic use of acoustic devices (such as C-PODs), documenting the species' decline and informing conservation strategies. His rigorous scientific approach and ability to translate findings into actionable policy played a key role in shaping conservation measures in Mexico.

Armando was a key scientific contributor to CIRVA since its early days. Many of the Committee's recommendations—particularly those regarding population monitoring, the extent and urgency of vaquita decline, and the delineation of protection zones—were based directly on his analyses. During acoustic-visual surveys, he developed an innovative workflow in which acoustic detectors were retrieved each evening and the data analyzed overnight, often delivering detection maps and guidance to the visual team by dawn. This process allowed scientists to adapt survey strategies with remarkable efficiency and spatial focus. His ability to integrate field operations with analytical rigor made him a central figure in CIRVA's scientific foundation.

Beyond his professional achievements—including key publications, his term as president of SOMEMMA, and the design of practical solutions such as entanglement hooks in the Zero Tolerance Area—those who knew him remember his generosity, kindness, and unwavering passion for cetacean protection.

His legacy lives on not only through the data and papers he produced, but also in the inspiration he provided to colleagues, authorities, fishers, and future generations. Armando will be deeply missed by the scientific community and by all who shared in the mission to save the vaquita.

Annex B

List Of Participants

CIRVA Members

Barlow, Jay
Oregon State University,
Hatfield Marine Science Center
2030 SE Marine Science Dr
Newport, Oregon 97365
jaybarlow33@yahoo.com

Brownell, Robert Jr.
Southwest Fisheries Science Center-NOAA
Monterey, CA. USA
robert.brownell@noaa.gov
rlbcetacea@aol.com

Camacho, Victor
Universidad Autónoma de Baja California
Ensenada, BC. Mexico
vcamacho@uabc.edu.mx

Cardenas Hinojosa, Gustavo
CONABIO - CICESE.
Ensenada, BC. México.
gcardenas03@gmail.com

Donovan, Greg
Independent Researcher
Cambridge, UK
corkblue1o@gmail.com

Gerrodette, Tim
Independent Researcher
timothy.gerrodette@gmail.com

Gulland, Frances
US Marine Mammal Commission
Bethesda, MD. USA
francesgulland@gmail.com

Mesnick, Sarah
Southwest Fisheries Science Center-NOAA
La Jolla, CA. USA
Sarah.mesnick@noaa.gov

Read, Andrew
Duke University Marine Laboratory
Beaufort, NC. USA
aread@duke.edu

Reeves, Randall
IUCN SSC Cetacean Specialist Group
Hudson, QC. Canada
rrreeves@okapis.ca

Rojas Bracho, Lorenzo
PNUD/CONANP
Ensenada, BC. Mexico
lrojasbracho@gmail.com

Taylor, Barbara
Cetacean Specialist Group, SSC-IUCN.
San Diego, CA. USA
subspecies.def@gmail.com

Thomas, Peter
US Marine Mammal Commission
Bethesda, Maryland. USA
pthomas@mmc.gov

Urbán, Jorge
Universidad Autónoma de Baja California Sur
La Paz, BCS. Mexico
jurban@uabcs.mx

Vidal, Omar
Asesor ambiental independiente
vidalpomar@gmail.com

Young, Nina M
Friday Harbor, San Juan Island, Washington. USA
ninayoung@seashepherd.org

Expert Attendees

Nieto Garcia, Edwyna
CONANP
Ensenada, BC. México
edwyna.nieto@conanp.gob.mx

Pliego del Ángel, Valder Vladimir
Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT)
valder.pliego@semarnat.gob.mx

Villalobos, Osmar
Arcadia Red Ecosocial, Ensenada, BC., México
osmar.villalobos@uabc.edu.mx

Towns, Valeria
Pronatura Noroeste, Ensenada, BC. Mexico
vtowns@pronatura-noroeste.org

González Zatarain, Domingo de Jesús
Reserva de la Biósfera del Alto Golfo de California y Delta del Río Colorado, CONANP
San Luís Río Colorado, Son. México
jesus.zatarain@conanp.gob.mx

Annex C

Agenda

WEDNESDAY, 04

1. Welcome

- Introduction of participants (if needed)
- Confirm chair and rapporteurs
- Review and adopt the Agenda
- Documents available

2. Review of proposed modifications to the 2020 Regulatory Agreement

- Are the proposed changes to the gillnet exclusion polygon scientifically justified?
- Does the new proposed area maintain protection for all confirmed vaquita sightings and acoustic detections?
- Does the reduction of the exclusion zone align with CIRVA's past recommendations?
- Are the justifications for enforcement feasibility and community cooperation convincing?
- Could this modification strengthen or weaken conservation outcomes?
- Curvina fishery proposal (and sierra).

3. Alternative Fishing Gear

- Is there a noticeable shift in the current strategy compared to previous administrations?
- Are there concrete advances in the design, testing, validation, and adoption of alternative fishing gears?
- Is there a transparent plan with clear milestones for transition to sustainable fishing?
- Structural barriers faced: governance, financing, markets, training, and community trust. To address this, recent efforts include:
    - Improved interagency collaboration.
    - Community workshops.
    - Initial testing of alternative gear and market development.
    - Engagement with ECOFT and the IUCN Behaviour Change Task Force.
- What type of technical data or validation should CIRVA request to make future recommendations?

THURSDAY, 12

4. Enforcement and surveillance

- What is the current effectiveness of enforcement and surveillance efforts (e.g., patrols, aerial support, radar), and what is the status and potential of new technologies (e.g., small-scale vessel tracking systems, drones) under development or consideration? The 2024 survey results suggest that vaquitas may be reoccupying areas where they were previously sighted in past surveys (1993, 1997, 2008 and 2015).
- Acoustic detections were recorded in F-POD and C-POD deployments outside the Refuge. If detections and sightings continue during the September 2025 survey, what surveillance and enforcement strategies should be considered or adapted to respond effectively to this distribution pattern?

- Given that illegal pangas do not use tracking systems, what is the current feasibility of using satellite imagery, either optical or radar-based, to detect and monitor unauthorized fishing activity in the region? Are such tools currently accessible, timely, and reliable enough to support enforcement operations in the Upper Gulf?

5. Community Engagement

- Do recent interactions between fisheries and environmental authorities indicate a shift in governance approach?
- Are dialogue processes with communities substantive and inclusive?
- Are there signs of genuine efforts to address behavioral and socioeconomic drivers of illegal fishing?
- Can CIRVA identify opportunities to support or recommend deeper engagement strategies?

7. Any other business

8. Review of the report

9. Press release/statement

Annex D

List Of Documents

1. Analysis of the agreement regulating fishing in the Upper Gulf of California1 and proposed modifications

2. Towards sustainable fishing in the Upper Gulf of California (SEMARNAT)

3. Surveillance and Enforcement Working Paper

Annex E
Barriers to adopting alternative fishing gears in the Upper Gulf of California

Osmar Villalobos

In August 2023, as part of a consultancy carried out by Pronatura Noroeste and Arcadia Red Ecosocial for FAO and CONANP—within the framework of Mexico's CITES compliance plan—we facilitated a series of participatory workshops with fishers from San Felipe and El Golfo de Santa Clara. Through collective discussions and group exercises, fishers identified key barriers to adopting alternative fishing gears, based on their own perspectives and lived experience. These barriers were grouped into five main categories: regulatory, technical, environmental, economic, and social.

While the analysis covered various fisheries in the region, the shrimp fishery emerged as the area of greatest concern—unsurprisingly, as it the most socially and economically significant. Among the regulatory issues, fishers emphasized the lack of effective enforcement and the contradictory messages from past and current policies. On the technical and economic side, they highlighted operational challenges with gears like the *chango ecológico* and the *suripera*, as well as concerns about fuel use, engine strain, and the absence of a well-developed market to support the transition. Environmental concerns focused on low selectivity and the potential negative impact of these gears on juvenile shrimp and other species. Socially, fishers expressed frustration over not being meaningfully involved in the design, testing, or evaluation of alternative gear options—or, more broadly, in decision-making spaces—which has led to mistrust and resistance.

Importantly, the process did not stop at identifying problems. For each barrier, fishers proposed concrete solutions. Many of their ideas go beyond gear itself, pointing toward the need for broader improvements in fisheries governance, innovation, product value chains, infrastructure, economic diversification, and marine conservation.

The following tables summarize the barriers identified by the fishers for each fishery, as well as their proposed solutions. These results reflect a participatory analysis built from the knowledge and experience of the fishing communities themselves.

Table 1 Barriers in shrimp fishery

REGULATORY BARRIERS	DESCRIPTION	PROPOSED SOLUTIONS
INCONSISTENT PROVISIONS IN THE 2020 AGREEMENT	The 2020 Agreement bans the use of gillnets for shrimp due to the risk of vaquita bycatch, but it is criticized for inconsistent provisions and lack of proper consultation with the fishing sector.	1. Reactivate dialogue tables with the fishing sector to revise the 2020 Agreement, limiting the gillnet exclusion zone exclusively to the Vaquita Refuge Area (ARV). 2. Update fishing permits to authorize the use of a modified gillnet (*línea* net) outside the ARV, while maintaining the use of alternative fishing gears within the ARV. 3. In El Golfo de Santa Clara, an internal agreement was proposed that could result in a Code of Conduct to define fishing
FISHING PERMITS	Fishing permits authorize the use of the RS-INP-MX prototype trawl net for shrimp fishing, which has not proven to be sustainable, while the use of gillnets remains widespread.	
PERCEIVED POLICY CONTRADICTIONS REGARDING GEAR REGULATION	Fishers perceive a policy reversal: trawl nets were once banned in favor of gillnets, and at the time, many fishers committed to stop using trawl nets like the *chango*. Now, gillnets are banned while trawl nets—specifically the *chango ecológico*—are being promoted again.	

U.S. IMPORT BAN	In 2018, the U.S. Court of International Trade banned the import of fishery products caught with gillnets, primarily affecting the shrimp fishery.	gears, respect for the exclusion area, and sustainable fishing practices. 4. Address the long-standing deficiencies in inspection and enforcement capacity, which have weakened regulatory compliance and undermined trust.
TRADE AND DIPLOMATIC SANCTIONS	Non-compliance with the 2020 Agreement could lead to trade and diplomatic sanctions by international bodies, impacting fisheries in the Upper Gulf of California and other regions of the country.	
SUSPENSION OF NEGOTIATIONS TO REVISE THE 2020 AGREEMENT	Negotiations to revise the 2020 Agreement and adjust the Zero Tolerance Zone (ZT0) and the gillnet exclusion area to make it more manageable have been suspended.	
MISTRUST OF REGULATIONS BY THE FISHING SECTOR	The expansion of the ZT0 by 60% and the placement of concrete blocks have generated mistrust among fishers, who feel the government prioritizes external approaches over solutions that involve them.	
GEAR	**TECHNICAL BARRIERS**	**PROPOSED SOLUTIONS**
RS-INP-MX	The RS-INP-MX trawl net is less efficient compared to gillnets. In San Felipe (SF), it is effective at depths of 5 fathoms, and in El Golfo de Santa Clara (GSC) at 16 fathoms. However, its effectiveness is mainly reduced in GSC due to strong currents, depth variations, and rugged bathymetry.	**Develop and use a modified *línea* net with the following features:** • Reduce the number of hanging meshes to between 75 and 100, creating a clearance near the surface to decrease the risk of accidental capture of marine mammals. • Limit the number of bundles per net to between 4 and 6, allowing a maximum of 2 nets per vessel. • Mesh size of 2 3/4', with a thread thickness of 0.30 cm, and upper and lower float lines of 5/16'. • Add pingers (acoustic deterrent devices) to reduce marine mammal bycatch. • Include 16.5' escape windows every 100 meters to improve fishing selectivity. **Conduct trials with the modified nets** (trawl net, suripera net, and longline net) during the fishing season to assess their effectiveness and adjust strategies based on the results. **Install geolocation devices, real-time monitoring systems, and cameras on vessels** to ensure compliance with regulations.
	The net also faces problems due to a mismatch between its size and the engine power of the boats, resulting in higher fuel consumption and engine wear, making it economically unviable.	
	The highest catches occur during the summer months, especially in August, when shrimp are under seasonal closure and are still small in size.	
SURIPERA	In San Felipe, the suripera net faces difficulties due to bathymetric conditions, current dynamics, and weather patterns. It is less effective in deeper areas where shrimp migrate after the first months of the season.	
	The suripera yields lower catch volumes compared to gillnets. Trials conducted in 2020 and 2021 showed an average catch of 2.29 kg per set.	
	In El Golfo de Santa Clara, fishers report that the suripera mainly catches small-sized shrimp and larvae. Modifications such as hydrodynamic trawl doors have only improved efficiency in shallow waters.	
	ECOFT has recommended using lightweight polyethylene (PE) twine instead of monofilament nylon and adjusting the net edges. However, fishers report that the lightweight design remains problematic in deep areas due to currents and depth. Further testing is needed to verify the effectiveness of these modifications.	

ECONOMIC BARRIERS	DESCRIPTION	PROPOSED SOLUTIONS
DECLINE IN SHRIMP PRICES	Shrimp prices have dropped from 350–400 pesos per kilogram to approximately 150 pesos per kilogram due to the embargo imposed since 2018 and commercialization restrictions.	1. Redirect fishers' efforts toward defending the sustainability and value of the product, rather than focusing solely on preserving traditional fishing gear. 2. Create an incentive system to encourage compliance with the gillnet exclusion zone, including tax benefits, preferential credit, and price controls. 3. Request support from the Mexican government to reopen the U.S. market for shrimp. 4. Explore and develop new international markets, such as the live head-on shrimp market in California, with a focus on sustainable fishing practices. 5. Implement strategies to improve the quality and presentation of shrimp, including a certified processing plant to add value to the product. 6. Establish a cooperative-managed company for the purchase and distribution of fuel in the Upper Gulf of California, with the aim of reducing costs.
INCREASE IN PRODUCTION COSTS	Production costs have increased by around 50% due to rising prices of fuel, oil, and fishing gear materials. In El Golfo de Santa Clara, fuel costs up to 4 pesos more per liter compared to the actual market price.	
VALUE OF BROWN SHRIMP VS. BLUE SHRIMP	The RS-INP-MX mainly catches brown shrimp, which has a lower market value than blue shrimp. Catches are usually higher in the summer, when shrimp fishing is closed, and the small size of the shrimp limits its commercial value.	
LOW PROFIT MARGINS	Catches with the RS-INP-MX typically range between 5 and 20 kilograms per trip, with a sale price of around 70 pesos per kilogram due to size. Although an increase in volume and price has been reported with modified nets, not all fishers have access to those markets.	
DISTRIBUTION OF BENEFITS	Profits are distributed with 40% going to the fishers and 60% to the permit holder and boat owner, who covers operational costs such as fishing gear and fuel. The ecological 'chango' net costs 30,000 pesos and requires 4 jugs of fuel, each costing 1,500 pesos.	
ECONOMIC PROBLEMS WITH THE SURIPERA	The suripera net, which costs about 15,000 pesos, has low catch volumes (an average of 2.29 kg per haul) and faces adaptation issues, limiting its ability to generate sufficient income and its overall economic viability.	

ENVIRONMENTAL BARRIERS	DESCRIPTION	PROPOSED SOLUTIONS
IMPACT OF THE CHANGO ECOLÓGICO ON THE SEABED	The *chango ecológico*, designed to reduce vaquita bycatch, impacts the seabed due to dragging and has low selectivity, according to fishers. In 2,528 hauls, it captured 53,764 kg of fauna, of which only 18,347 kg were blue shrimp and 18,347 kg were commercially valuable species (IMIPAS, 2014).	Maintain the use of alternative fishing gear, such as the *chango ecológico* and the *suripera* net, within the Vaquita Refuge Area (ARV) to mitigate vaquita bycatch.
SELECTIVITY OF THE SURIPERA NET	The *suripera* net, although it does not generate bycatch, mainly captures small-sized shrimp, including larvae.	
SELECTIVITY OF THE GILLNET	The gillnet is considered more sustainable due to its higher selectivity in catching commercially sized shrimp, which maximizes economic value and contributes to the sustainability of shrimp populations by avoiding juvenile capture.	

SOCIAL BARRIERS	DESCRIPTION	PROPOSED SOLUTIONS
LIMITED PARTICIPATION IN ALTERNATIVE FISHING GEAR TRIALS	Technical trials of new fishing gear have mostly been carried out by a small group of fishers, which has limited the representativeness of fishing cooperatives and the validation of results in a broader context.	1. Involve a greater number of fishers and cooperatives in fishing gear trials to strengthen the representativeness and legitimacy of the results obtained. 2. Establish a participatory mechanism where fishing cooperatives provide vessels and trained fishers to test the modified nets.
RESTRICTED REPRESENTATIVENESS OF FISHING COOPERATIVES	The limited participation of fishing cooperatives in the evaluation of new gear may compromise how results are interpreted, particularly regarding their broader applicability across different operational contexts.	
INSUFFICIENT INTEGRATION OF THE FISHING SECTOR'S PERSPECTIVES IN DECISION-MAKING	There is a perception among the fishing sector that their input is not adequately incorporated into policy-making processes, which undermines trust and collaboration in the implementation of management and conservation measures.	

Table 2 Barriers in curvina fishery

TYPE	BARRIER	PROPOSED SOLUTIONS
REGULATORY	The 2020 Agreement currently prohibits the use of the encircling net for corvina. However, NOM-063-PESC-2005 authorizes its use. Although the name of this fishing gear has changed, its design and operational characteristics remain the same. The corvina fishery takes place in the Core Zone of the Reserve, where extractive activities are not permitted.	Reactivate dialogue tables with the fishing sector to amend the 2020 Agreement, restricting the hook-and-line exclusion zone exclusively to the Vaquita Refuge Area (ARV). Modify the Reserve's management program to authorize corvina fishing in the core zone.
TECHNICAL	The Mozambique net was ruled out because its dimensions exceed the capacity of boats and engines, which increases operational costs. The 2' multifilament mesh (Expectra) leads to higher bycatch rates and capture of juvenile fish.	The encircling net system with 5 3/4' mesh is ideal for high-quality catches. This system requires only one vessel to operate. The size of the catch corresponds to the minimum legal size.
ECONOMIC	The international market is limited to units that meet the highest quality standards, while in the domestic market prices are very low (between $6.00 and $18.00 pesos). However, the value of corvina swim bladders has remained at $400.00 pesos. Production costs are estimated at $8,000.00 pesos per day. Catch volumes depend on purchase prices, making it difficult to meet quotas.	It is recommended to secure or guarantee the product's price in the national market for regularized fishers through the Guaranteed Prices program. The fishing sector considers it essential to receive a fuel subsidy. Add value to the product through a certified processing plant (La Planta Meraz has this potential and would provide jobs across the supply chain). The Reserve Management Authority could grant a certification label (Collective Seal).
ENVIRONMENTAL	Due to its mesh size, the Mozambique net is not a selective fishing gear.	
SOCIAL	Some fishers use gear with smaller mesh sizes. During the corvina season, additional people and outside fishers become involved.	Competent authorities must carry out more effective inspection and enforcement actions. Emphasis should be placed on detecting fishing gear that does not meet the technical specifications of the authorized gear.

Table 3 Barriers in finfish fishery

TYPE	BARRIERS	PROPOSED SOLUTIONS
TECHNICAL	The physical dimensions of the trawl net exceed the capacity of the available equipment (engines and boats). Few fishers have had the opportunity to test this alternative fishing gear, and trials have only been conducted during the months of February and March. The trawl net is so heavy that it is practically impossible to make more than one tow per workday. Trials conducted in February–March yielded unfavorable results: juvenile rays were caught, as they are the species found on the seafloor. The target species are not found in that zone (bottom, 20–25 meters deep). There were also issues related to weight, as the net retrieved many shells, making it difficult to lift. This fishing gear is heavy, leading to increased fuel consumption and engine wear. An additional environmental barrier is the ocean currents, which increase drag on the gear and further raise fuel use.	**Among the proposed solutions and/or modifications for the suripera trawl net, one suggestion was to increase the size of the net opening.** However, this would not only require modifying the fishing gear itself but also the vessels: installing more powerful engines and adding winches to help lift the nets. However, this implies higher costs and greater investment. **The most viable solution identified was the modified *línea* net**, which includes the following adaptations: • Installation of 'pingers' to deter marine mammals and prevent their entanglement in the fishing gear. • Incorporation of acoustic devices into the *línea* nets, as tested in other countries, to reduce incidental capture of marine mammals. • Limiting the size of the línea nets to six bundles. • Conducting trials throughout the entire finfish fishing season (February–June) to evaluate the performance of the *línea* nets with acoustic devices. • Use of no. 30 thread, which is thin enough to allow non-target species to escape if entangled. • Net mesh sizes: 4' for Gulf croaker (Chano), 5 ¾' for corvina, and 3' or 4' for sierra. • Net deployment times: 1–2 hours for croaker and corvina, and 30 minutes for sierra. **Comparative tests should be carried out with the participation of all cooperatives.** Two vessels from each cooperative could be selected to take turns participating, so that everyone can be confident in the results. These tests should be conducted during the official fishing season and within authorized fishing zones.

TYPE	BARRIERS	PROPOSED SOLUTIONS
ENVIRONMENTAL	Trials with the finfish trawl net have resulted in the capture of manta ray juveniles and pups.	Authorize the use of *línea* nets with acoustic devices (pingers) for the Gulf croaker and sierra fisheries outside the Zero Tolerance Area and the vaquita refuge. Limit the operation time of *línea* nets with acoustic devices for finfish (croaker and sierra) to 45 minutes.
ECONOMIC	The trials have yielded low catch volumes of the target species. Fuel costs have not been included in production cost estimates.	

SOCIAL	Due to its general characteristics (design and functionality) and the high operational costs involved, the fishers are not interested in adopting the finfish trawl net.	It is recommended to involve two small vessels and the most experienced fishers from each cooperative in the practical and comparative trials of the suripera trawl net and the *línea* net with acoustic devices.
REGULATORY	Current regulations do not support research efforts by the fishing sector, in coordination with IMIPAS, to test modifications to the hook-and-line gear aimed at avoiding incidental capture of marine mammals.	Amend the 2020 Agreement to authorize research by the fishing sector, in coordination with IMIPAS, to explore modifications to the *línea* gear aimed at preventing incidental capture of marine mammals.

Annex F

Summary of the National Stakeholders Meeting, June 3, 2025

WELCOME AND INTRODUCTIONS

Valder Pliego and Lorenzo Rojas-Bracho led the meeting attended by some CIRVA members, authorities of the Upper Gulf of California Intragovernmental Sustainability Group (GIS), representatives from the fishing communities of the Upper Gulf of California, and invited organizations.

1. Initial considerations

It was reported that during 2024, the National Commission of Protected Natural Areas (CONANP), with the support of FAO and together with various organizations such as Pronatura Noroeste and Pesca ABC, managed to carry out an important process of dialogue with fishing communities, which allowed the generation of a document with the opinions and proposals from the coastal fishing sector of the Upper Gulf of California. This represents the integration of the visions, needs and realities of fishers, as well as their proposals and possibilities for innovation, with a diversity of information that ranges from technical aspects on the characteristics of alternative fishing gear to proposals to increase value chains in the markets, and approaches to make the regulatory framework more realistic and efficient.

At the beginning of 2025, a workshop coordinated by the Mexican Institute for Research in Sustainable Fisheries and Aquaculture (IMIPAS) was held to follow up on the dialogues with fishing communities and continue evaluating, designing, and testing alternative fishing methods, as well as discussing sustainable aquaculture options for the region. During this period (October 2024 to date), two GIS sessions were also convened; second one with the participation of civil society organizations and representatives of fishing communities. Among other aspects, the meeting addressed proposed modifications to the Agreement regulating fishing in the Upper Gulf of California. An alternative proposal to adapt this instrument was presented. The proposal was well received by the various groups. One of the agreements reached between the government, the fishing sector, and the invited civil society organizations was to convene the International Committee for the Recovery of the Vaquita Marina (CIRVA).

2. Presentation of Regulatory Proposals by SEMARNAT (proposal to modify the 2020 Agreement).

Background and Context

Within the GIS and in agreement with the fishing sector, an analysis was conducted to generate proposals for modifications to the Regulatory Agreement. This analysis was guided by three main objectives:

To improve the effectiveness and enforceability of fisheries regulations in the Upper Gulf of California, ensuring that they align with operational, ecological, and socioeconomic realities on the ground.

To base regulatory adjustments on the strongest available technical and scientific information; and

To consider the perspectives and needs of fishing communities, recognizing their fundamental role in the successful implementation of conservation measures and the importance of ensuring their livelihoods are aligned with the long-term sustainability of the ecosystem.

Boarding and Disembarkation Sites

From an analysis of the embarkation and disembarkation sites considered in the Regulatory Agreement, it was identified that some points represented lack of efficiency. From this, a proposal was generated in which, among other aspects, it is suggested adding San Felipe Malecon as an authorized site given its preference among fishers, removing sites not used (i.e., Lucky Landing, BC), and replacing sites in the Gulf of Santa Clara (El Delfín and Las Cabinas) with a new site "Golfo de Santa Clara".

Gillnet Ban Area (polygon) Revision Objectives

The revisions proposed are to:

(a) Develop a more efficient design, focusing surveillance efforts to make them more effective.
(b) Provide opportunities for fishing under sustainability schemes, without diminishing the level of protection of the vaquita, to coexist with fishing regulations.

The 2020 amendment banned gillnets in an 11,594.28 km^2 polygon in the Upper Gulf of California. A proposal elaborated in 2023-2024 established only the Vaquita Marina Refuge Area polygon (1,842 km2) as a gillnet prohibition area. That proposal, that was never published, would have reduced the area protected by the gillnet ban by 84.11%.

From October 2024, the possibility of modifying the gillnet prohibition zone is being analyzed with the objective of addressing the need to make it a more efficient and effective instrument, and to combine, to the extent possible, fishing restrictions with opportunities for fishing under sustainability schemes, without diminishing the level of protection of the vaquita marina.

This exercise allowed for the identification of a potential area of presence for the species and the zone of greatest concentration of the vaquita marina, which is larger than the polygon of the Vaquita Marina Protection Refuge Area and smaller than the currently valid gillnet prohibition polygon.

Proposed Revision Advantages

Relieving regulatory pressure in areas where vaquitas have not been detected will improve cooperation within fishing communities and encourage compliance as well as alternative gear use.

The proposed revisions should meet CIRVA's objectives and alleviate pressure on fishing communities.

The proposed revision includes a technical analysis with input from fishers. The technical analysis used CONANP's acoustic detections from 2011 to 2024 and visual sightings from 2015 through 2024.

Rational for Proposal

An area with the largest vaquita presence (4,883.87 km2) is larger than the polygon of the Vaquita Marina Protection Refuge, and smaller than the area where gillnets are currently

banned. The revision requests that this area with the largest vaquita presence become the new gillnet ban polygon, a ~58% reduction in the gillnet ban area. Note: Two detections are outside the proposed polygon: one in the town of Puertecitos, 72 km south of San Felipe, with no registered year of collection (coordinates longitude -114.633333 and latitude 30.350000), and another in the municipality of San Luis Río Colorado in 1991, 7 km from Punta Borrascoso (Faro del Borrascoso) and east of the town of Golfo de Santa Clara (coordinates longitude -114.025000 and latitude 31.491667).

The new proposal is evidence-based approach and precautionary. Its objective is effective enforcement in areas where vaquitas are known to occur.

Review of the current ban on curvina golfina fishing using the active land-lock fishing method

The ban on fishing for curvina golfina using the active enclosure method is being considered, given that scientific evidence has shown that this method does not interact with the vaquita marina.

The fishing of the curvina golfina is characterized by a high level of selectivity, since it is directed exclusively at schools of this species (as mentioned in the publication of the Agreement regarding the Fisheries Management Plan for the Curvina Golfina -*Cynoscion othonopterus*- of the northern Gulf of California published in the Official Gazette of the Federation in 2012).

For this species, gillnets with a mesh size of 4 to 5 inches are used. Unlike other fisheries where gillnets are anchored or left drifting, in the curvina golfina fishery the seine is actively operated: fishermen locate the swath of fish and drop the net over the side of the boat, surrounding the school. The net is never left anchored.

2. Fisheries Management and Surveillance

Fishery Management in Upper Gulf

A census of fishing permits showed 1,202 permits were issued to vessels by fishery and gear type. A vessel may be included more than once in this number because it may participate in more than one fishery. The proposal is good for the curvina fishery and, if vaquita are caught, they could be put back alive. The curvina golfina fishery uses nets from the side of the vessel and is very well managed. The results of the Gulf of California croaker fishery were reported, as a representative fishery in the Upper Gulf of California, due to its reproductive behavior and the level of fishery management that has been achieved. In addition, fishing censuses were carried out to determine the true fishing effort.

Satellite Monitoring in Upper Gulf

A small vessel location system (satellite) has been developed for fishing. Systems will be installed in 10 San Felipe vessels in June 2025. Progressively, the system will be expanded to 850 vessels in the Upper Gulf.

The satellite system will reduce monitoring costs by 77%. Coverage will be expanded to all vessels, large and small. The system will comply with national and international agreements and create a long-lasting monitoring system, which is the same number of terminals that have already been acquired.

Captain Carlos Alonso Ruiz Rodríguez, Director of Fisheries Inspection and Surveillance of the Harbor Master's and Maritime Affairs Unit (UNICAPAM) of the Navy, highlighted the existing collaboration between Mexican government agencies, civil society organizations, and the fishing sector.

3. Different Fishing Methods

As per the 2020 Alternative Fishing Gear Regulatory Agreement, Mexico's fisheries have been testing different methods (alternative gear) to reduce bycatch, some more effective than others. It is important to consider volume for sustainable income as a parameter of effectiveness.

Dr. Víctor Manuel Vidal Martínez, Director of the Mexican Institute for Sustainable Fisheries and Aquaculture Research (IMIPAS), presented the vision and recent work on alternative fishing gear: suripera, trawl, line with hooks, deep line with hooks, and traps. He highlighted the importance of generating the possibility of combining different fishing gear to meet the economic needs of the fishing community, such as the prototype "tendal" net, that it's being explored.

Suripera Net

A workshop was held in May 2025 on effectiveness. The Government of Panama requested testing of Mexico's suripera net in Panama, which was successful. IMIPAS is testing additional alternate gear.

Lampara Net

The "lampara" net is being tested with curvina golfina in Santa Clara and San Felipe. The testing includes perfecting the net closures. Hauling the lampara net had issues. The lampara net is used for chano, curvina, crab, snails, rays, and jellyfish fishing.

Tendal Net with Windows

Designed as an active net with windows for fish and turtles to escape. The net is a gillnet. The design is under discussion because modifications are tough. Need to look at economic factors with this net.

4a. Acoustic Monitoring Update

Between 2011 to 2018, there was a strong concentration of acoustic efforts led by Dr. Armando Jaramillo. This effort showed a 45% annual decline in vaquita abundance and the animals seemed to be located in the ZTA.

Between 2019-2021, acoustic effort was reduced because of POD loss.

Between 2021 and 2023, the rate of vaquita declined slowed from 45% to 14% annually. In 2024, the detection rate increased. Vaquita have been detected outside the ZTA.

No systematic acoustic survey effort since 2018. There will be deployments at 60 sites in 2 weeks.

Acoustic released have improved the ability of fishers to recover equipment quickly. Testing in 2024 was not successful; an acoustic release device designed by Sub Sea Sonics was tested in 2025 and works well for recovery. Further, the new F-POD acoustic detector includes programmable release times.

The objective of the 2025 surveys is to create a map of vaquita presence within the vaquita refuge indicating where vaquita spend most of their time (preferred vaquita habitat). The September survey will result in the number of vaquitas.

In May 2025, acoustic monitoring began using two types of PODs (C-PODs and F-PODs). The Upper Gulf of California Biosphere, Pesca ABC, Sea Shepherd Conservation Society (SSCS) were trained by Sub Sea Sonics. The current 2025 acoustic effort includes 32 sites within the ZTA and EA. Eight of the 32 sites have paired C- and F-PODs for comparative testing. SSCS volunteered to assist with deployments.

4b. Visual Survey Efforts

A new visual survey effort will occur in September 2025, in collaboration with CIRVA and fishermen. Because several vaquitas with identifiable markings have not been seen regularly, the 2025 effort will extend outside the ZTA/EA area. The first objective for the visual survey is to obtain an estimate of the minimum number of vaquitas and the minimum number of calves seen using expert elicitation.

The visual survey will use 2 ships to search for vaquitas informed by data from the summer acoustic research that mapped where vaquitas are most likely to be seen. Methods will be similar, using visual and acoustics, to efforts in 2023 and 2024 but using 2 large ships because the more distant areas of the Vaquita Refuge will require ships where scientists can sleep. Each sighting will attempt to obtain photographs and drone footage to help inform scientists on whether calves are present and whether vaquitas seen outside the ZTA are different individuals from those seen inside the ZTA. All photographs will be compared to the Vaquita Individual Identification Catalog to see whether vaquitas that have not been seen inside the ZTA since 2019 have moved outside the ZTA.

Two SSCS vessels will be used to sight, photograph, and acquire drone footage to achieve this objective. Photographs and drone footage will allow a comparison of individuals to animals in the vaquita catalogue and help to determine if calves are present.

The second objective of the visual survey will evaluate the condition of vaquitas. No vaquita has ever been noted in poor condition.

Reports from scientists, photographs, and drone footage will be used to assess whether vaquitas seen are in poor condition. Observers can determine if individuals appear emaciated (e.g., visible ribs) or have skin conditions (e.g., lesions, ulcers).

Open Discussion.

Participants:

The Upper Gulf of California Intragovernmental Sustainability Group (GIS): Ministry of Environment and Natural Resources, including the Vice Ministry of Biodiversity and Environmental Restoration, General Directorate of Wildlife (DGVS), National Commission of Natural Protected Areas (CONANP), Federal Attorney for Environmental Protection (PROFEPA), National Commission for the Knowledge and Use of Biodiversity (CONABIO), the Ministry of the Navy, the Ministry of Agriculture and Rural Development (through the National Commission of Aquaculture and Fisheries –CONAPESCA- and the Mexican Institute for Research in Sustainable Fisheries and Aquaculture –IMIPAS-), among others.

Annex G

Terms Of Reference For A Small Expert Multidisciplinary Working Group To Advise Authorities On The Revision Of Management Zones In The Upper Gulf

Background

CIRVA received a document and presentation providing information and summarizing the rationale behind proposed changes by government and fishing community representatives to the 2020 regulatory agreement, and most specifically to the gillnet exclusion polygon (see Fig. 1). The stated goal was to enhance clarity, enforceability and effectiveness of the regulation while ensuring compatibility with conservation and community needs.

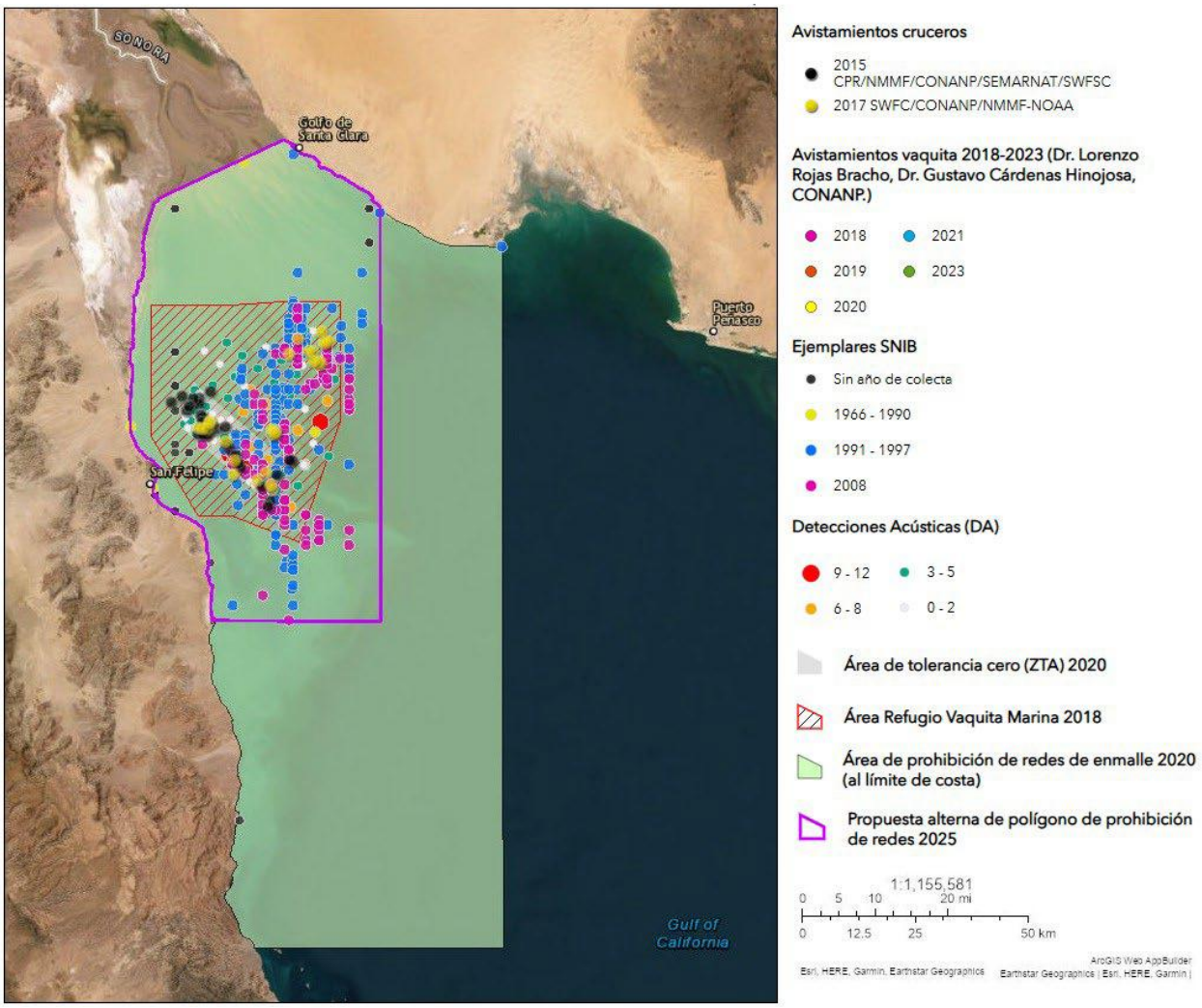

Fig. 1. Information used when considering the revised exclusion polygon.

CIRVA had broadly agreed that the proposed changes to the revised *large* area, the vaquita refuge (Fig. 1 – the original area is the shaded green area) are justified in the context of the described vaquita sightings/detections, whilst noting that in the southern parts of the area little or no gillnet fishing takes place anyway. However, it drew attention *inter alia* to the interacting

factors related to compliance, enforcement and co-operation with fishing communities. It is impractical to expect the entire large area to be effectively monitored and any regulations to be fully enforced without considerable (and probably unlikely) increased investment in human and technological resources.

OBJECTIVES

The objectives are to identify and clearly define with appropriate rationale: (a) an area where gillnets are effectively prohibited (a revised Zero Tolerance Area, RevZTA) and only specific vaquita-safe gear types are permitted.; and (b) an area (or areas) for effective testing and evaluation of vaquita-safe gear with sufficient density of preferred target species. Such testing areas must be designated (and able to be enforced as) closed to gillnetting (any use of gillnets) and other fishing practices that could interfere with trials of alternative gear.

Any proposed boundaries should be as simple as possible taking into account the known most recent vaquita distribution whilst recognizing the needs of the fishing communities and the practicality of enforcement capabilities.

It is understood that periodic review of regulations and boundaries, taking into account regular, adequately funded monitoring of vaquita numbers and distribution as well as of fishing activities and compliance/enforcement is essential.

METHODS

The small multidisciplinary expert group will provide initial advice to the Government of Mexico for discussion with fishermen, fisheries authorities, SEMARNAT, CONANP and CIRVA prior to final decisions being taken. The group will include experts on: the vaquita; fishing operations in the Upper Gulf; development of vaquita-safe gear; socioeconomics of the Upper Gulf including community needs; and compliance and enforcement. The working group will be chaired by Rojas-Bracho and the core members of the group will be: Andy Read, Barb Taylor, Enrique Sanjurjo, Greg Donovan, Gustavo Cárdenas-Hinojosa, Lorenzo Rojas-Bracho and Nina Young. The group may co-opt members if it sees it necessary for some or all of its agenda.

Whilst much of the work may be undertaken virtually, the option of a face-to-face meeting should be retained.

DATA/INFORMATION REQUIRED

Information on and mapping of (at the same scales as the vaquita information on past and present vaquita observations and acoustic detections):

(a) priority fishing areas, by gear type(s) used, target species, effort, catches and fishing season(s)[8];
(b) to the extent possible, the same information for the illegal totoaba fishery[1];
(c) known historic and present vaquita observations and detections[9].

This will allow a comparison of the fishing areas map(s) with map(s) of acoustic and sighting detections.

[8] To be provided by CONAPESCA and/or IMIPAS in consultation with the fishing communities
[9] To be provided by CONANP and Barb Taylor

The group should also examine any anomalies in the present information, e.g. with respect to reported large landings of shrimp alongside reports of no pangas present in the relevant areas between February and October.

Finally, again to the extent possible, information should be provided on compliance and enforcement methods, capabilities and likelihood of success for any proposed areas.

Draft initial Agenda

1. **Welcome and Objectives**
    - Opening remarks and goals of the working group.
2. **Review of Available Data**
    - Vaquita detections (visual and acoustic).
    - Fishing effort maps (latest from CONAPESCA or IMIPAS)*.
    - Current enforcement coverage and challenges.
3. **Initial Discussion**
    - Overlay maps and identify core areas for protection.
    - Identify low-detection, high-conflict areas to consider excluding.
4. **Feasibility and Compliance Considerations**
    - Assess surveillance options, vessel movement patterns, launch sites.
    - Legal/institutional constraints if possible
    - Curvina Fishery
5. **Next Steps**
    - Draft polygon proposal.
    - Assignments for map preparation and documentation.
    - Timeline for completion and presentation to CIRVA and SEMARNAT.

Documents:

Aragón-Noriega EA, Rodríguez-Quiroz G, Cisneros-Mata MA, Ortega-Rubio A. Managing a protected marine area for the conservation of critically endangered vaquita (*Phocoena sinus* Norris, 1958) in the upper Gulf of California. *Int J Sustain Dev World Ecol.* 2010;17(5):410–416.

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Erisman, B. E., Mascareñas-Osorio, I., López-Sagástegui, C., Moreno-Báez, M., Jiménez-Esquivel, V., & Aburto-Oropeza, O. (2015). Comparing two fishing communities in the Upper Gulf of California. Fisheries Research, 167, 254–265. https://doi.org/10.1016/j.fishres.2014.12.011

Rodríguez-Quiroz, G., Cisneros-Mata, M. A., Ortega-Rubio, A., & Aragón-Noriega, E. A. (2010). Managing a protected marine area for the conservation of critically endangered vaquita (*Phocoena sinus* Norris, 1958) in the Upper Gulf of California. *International Journal of Sustainable Development & World Ecology, 17*(5), 410–416.