

# History, Status, and Recommendations regarding the Dungeness Crab Fishermen-Led Whale Survey Program



Credit: Douglas Croft

Report to the Ocean Protection Council by Jenn Humberstone

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## Background

As climate change exacerbates and creates new crises that threaten both people and nature, we need better, faster data for decision making that protects biodiversity and ecosystem resilience. California's fisheries management system is at the frontline of this challenge. The whale entanglement crisis in the California commercial Dungeness crab and other fixed gear fisheries, spurred by the 2014-2015 marine heatwave, is emblematic of the climate change-related fisheries sustainability and ecosystem resilience threats that necessitate an urgent transition to climate ready fisheries management. The state of California and the Ocean Protection Council (OPC) have made significant investments in developing and implementing innovative and adaptive management solutions to protect whales and sea turtles from fishing gear entanglement in an increasingly dynamic ocean environment. These investments have put California at the forefront of addressing this conservation challenge on the West Coast. They also serve as critical demonstrations of climate ready approaches that can be leveraged to transform California into a leader in climate ready fisheries management.

A cornerstone of the state's leadership in reducing fishing gear entanglement risk to whales and sea turtles has been the creation of the Risk Assessment and Mitigation Program (RAMP), a novel dynamic management program to monitor and proactively respond to entanglement risk in near real-time. To operate effectively, this program requires a range of data to assess the risk of co-occurrence of whales and sea turtles and Dungeness crab fishing gear. For the RAMP to serve as an effective, durable management program, it must be supported by a well-designed and sustainable data collection strategy. With the support of the Ocean Protection Council (OPC), The Nature Conservancy (TNC), in partnership with the California Coast Crab Association (CCCA), expanded a multi-year fishermen-led whale survey program to fill data gaps to inform the RAMP.

The fishermen led whale survey program was initiated on the basis of a 2020 DCTF [Recommendation](#) and identification as a priority opportunity by the Dungeness crab Fishing Gear Working Group (WG) Data Project Team. These groups identified data gaps caused by lack of survey coverage in all RAMP zones as a priority challenge in implementation of the RAMP. Given the emphasis of the RAMP program on the presence of whales to determine when management action is needed, data gaps can either result in undue entanglement risk to whales (in cases when management action is not taken and whales are present in larger numbers than expected) or undue economic impact to fisheries (in cases where a management action is taken and entanglement risk not present).

TNC enlisted the support of Strategic Earth and a marine mammal expert consultant, Angela Szesciorka, to gather input from the WG and advisors and design a survey protocol for RAMP Zone 1. TNC and CCCA, with advisory support from Ryan Bartling (California Department of Fish and Wildlife (CDFW)), Karin Forney (National Oceanic and Atmospheric Administration (NOAA) Southwest Fisheries Science Center (SWFSC)), John Calambokidis (Cascadia Research Collective (CRC)) – hereafter referred to as the Advisory Committee- planned and executed a successful pilot survey operation in the fall of 2020.

Since the fall pilot, the survey program was expanded to include Zone 5, providing survey coverage for the northern and southern most RAMP Zones that most often lack coverage by other survey efforts. Surveys have been conducted regularly to inform fall and spring risk assessments during the 2020-2024 fishing seasons, have meaningfully informed Risk Assessment deliberations, and are cited in the [Draft Conservation Plan](#) by CDFW.

## Program Goals

The primary goal of the industry-led survey program is to reduce whale entanglement risk by filling key data gaps to inform the real-time management of entanglement risk in the California commercial Dungeness crab fishery under the newly established RAMP regulations. Specific objectives include:

- Collect data on presence/absence and depth distribution (inshore/offshore) of humpback and blue whales in fishing zones and time periods in which aerial surveys are not possible and/or additional data is needed (November- season opener; March- July/season closure).
- Leverage industry resources and expertise through the incorporation of industry vessels to provide for nimble survey deployment capability across the fishing grounds.
- Test and demonstrate a scalable data collection protocol that allows fishermen, and potentially other ocean community members, to contribute scientifically credible data, collected in a standardized manner across fishing zones.

## Program Model

### *Protocol*

Survey protocol was developed and tested in fall 2020 with input from the WG and its expert advisors. The protocol consists of zigzag transects that cover both inshore and offshore waters to provide comprehensive zone coverage and inshore/offshore distribution. The waypoints have undergone periodic minor revisions, with input from the Advisory Committee, over the course of the pilot to increase efficiency and avoid shallow areas or other obstructions. The Zone 1 survey protocol requires 4 vessel days of effort, with 2 vessels operating out of Crescent City and 2 out of Eureka. The Zone 5 survey protocol requires 2 vessel days.

Datasheets were developed to allow for handwritten entry to ensure the protocol was accessible to both fishermen and observers. The protocol prioritizes counts by species and vessel location, with the option to estimate animal location and specify other information like animal behavior or forage. Data collectors are also instructed to track environmental conditions at every way point and in the case of significant shifts in conditions (e.g., swell, visibility). Datasheets have been updated periodically based on participant feedback to improve on ease of use and consistency.

All aspects of the program have been designed to maximize accessibility and flexibility for both fishermen and independent observers to participate in data collection.

With the support of Cal Poly Humboldt's Marine Mammal Stranding Program, a Google Site was created to house key program information [here](#). Information available on the site includes:

- Waypoints
- Datasheets and survey instructions
- Training materials
- Survey data

## *Roles*

Key roles in the program can be described as:

Program manager: Responsible for managing program funding, liaising with the advisory committee, and overall performance of the program. For most of the pilot period this responsibility was shared between Jenn Humberstone (TNC), Jon Gonzalez (CCCA), and Ben Platt (CCCA).

Data Coordinator: This role is focused on coordinating data collection and management, including timely submission to CDFW. In addition, this role includes coordinating observers and training all data collectors (observers and captains). This role was initially led by Jon Gonzalez (CCCA) with support from the Advisory Committee for training and organizing observers. Over the course of the grant period, Cal Poly Humboldt (Dawn Goley, Emma Levy, and Esteban Vargas) have stepped into support data management. Over the past year CDFW has also enhanced its engagement and support of data management, working with the program to move towards integration into an ArcGIS map interface CDFW is using to visualize its survey data. A working draft detailed description of the data coordinator role can be found [here](#).

Vessel Coordinator: This role is focused on recruiting and organizing captains to conduct surveys. The vessel coordinator partners with the program manager and data coordinator to identify a survey data based on data collection needs, weather conditions, and captain availability. This person also works with the data coordinator to ensure all vessels and data collectors are equipped with adequate training, data collection materials, and instructions. This role has been primarily fulfilled by Mike Cunningham (Zone 1) and Bill Blue (Zone 5), both board members of CCCA. A working draft detailed description of the data coordinator role can be found [here](#).

Survey advisory committee: The role of the advisory committee is to advise survey participants to ensure surveys are designed and conducted with consistency and scientific integrity, provide guidance on training, and to coordinate amongst the various survey efforts. Advisory committee members have included Jon Gonzalez, Jenn Humberstone, Karin Forney, John Calambokidis, Ryan Bartling, Allie Mitchell, Lindsay Caldwell, Dawn Goley.

Financial support: Support for the surveys has been provided by TNC, OPC, and CCCA. In kind and additional financial support has been provided by CCCA, Cascadia Research Collective (CRC), and Cal Poly Humboldt to support data management and observers. Advisory Committee members have also contributed their time and expertise in kind.

## *Key Outcomes*

### *In Numbers*

- 22 Surveys conducted across zones 1 & 5 to inform Risk Assessments under RAMP
- 19 participating fishing vessel captains
- 4 marine mammal researcher advisors engaged in Advisory Committee
- 3 trainings conducted for captains and observers
- 20 observed vessel days with typical coverage of 50%

## *Achievements*

- The multi-year pilot has validated the concept that fishermen can be mobilized quickly to survey key fishing grounds and credibly fill data gaps regarding the presence of whales to inform the RAMP.
- The survey design for the program is the most comprehensive in coverage of the systematic surveys regularly used to inform the RAMP, and data has been well received and trusted by the members of the Working Group in assessment of entanglement risk.
- The fishing industry has enthusiastically supported and engaged in the design and implementation of the program.
- Although the required and feasible level for observer coverage is subject to ongoing discussions with CDFW, engagement of the Advisory Committee and participation of the marine mammal science community as observers and data managers has been extremely positive, with participants reporting mutual learning and with strong retention within both the captain and observer pools.
- Fishermen-led surveys have on numerous occasions provided data on whale presence that served as scouting trips for marine mammal biologists, who were able to plan trips based on knowledge that whales were present.
- Partnership with Cal Poly Humboldt has indicated the value of a regional partnership model with local universities, and a student network has afforded cost effective and mutually beneficial program support for observer coverage and data management.

## *Challenges and Recommended Next Steps*

While the multi-year pilot has achieved its goals and demonstrate the value of this program model, additional efforts and resources are needed to achieve a durable and reliable program model that meets survey requirements under the RAMP.

### *1. Successful Data Integration with CDFW*

Over the course of the 2023-2024 pilot the survey program sought to integrate into an enhanced RAMP data compilation system created by CDFW, which includes an ArcGIS mapping interface created with the goal better integrating and increasing the accessibility of data used to inform the RAMP. With the support of Cal Poly Humboldt and CDFW staff, a spreadsheet system was developed to make the fishermen-led whale survey data simple to upload into the mapping interface. However, the lack of consistent capability amongst fishing captain participants to electronically submit trackline data prevented the integration into the map.

### *Recommended Next Steps*

There are numerous potential practical solutions to this this challenge: vessel location monitoring data that is now required to be available to CDFW could be used to submit tracklines (either via a fisherman or CDFW portal); survey captains or observers could be provided with handheld GPS units; or captains or data collectors could download and use a native app such as GAIA that can record and share tracklines.

An alternative solution would be to transition to use of a digital data collection tool that would collect both trackline and survey data. A tool such as Survey123 could alleviate pain points and streamline the data submission process and allow for the submission of trackline data and successful integration of fishermen-led survey data into CDFW's mapping interface. An appropriate next step may be to trial use

of a digital data collection tool on a subset of surveys, including trialing use by both captains and observers. This will require selection of a survey platform with adequate account permissions and ability to transmit data for upload into ArcGIS, and the design of an online survey tool that mirrors the current handwritten data collection protocol.

### *2. Establish a Target and Plan for Observer Coverage:*

A key priority over the course of the pilot has been to test the feasibility of observer coverage. CDFW has not agreed to support inclusion of surveys for evaluation of quantitative RAMP triggers without 100% observer coverage, and surveys have therefore most often been considered as a ‘management consideration’, or secondary data source. In practice, survey data has provided clear value in filling data gaps and informing Risk Assessments deliberations and management action outcomes regardless of observer coverage or classification as a management consideration. However, the perception that the surveys are devalued because of mistrust in fishermen is a source of frustration amongst participants, who are concerned that surveys will not achieve their intended goal of avoiding a ‘no data’ scenario under RAMP (and associated required management actions). Participants are open to some observer coverage but question the practicality and necessity of the 100% requirement, noting a requirement for 100% coverage will come at a tradeoff for feasibility, flexibility, and cost.

### *Recommended Next Steps*

CDFW and the Advisory Committee may consider reconvening to evaluate learnings to date and determine a path forward for observer coverage. Through the operation of the pilot, there is now multi-year data on the feasibility and options for observers. We ultimately learned that a local partnership is most effective, as CDFW staff have not been consistently available, nor have participants of other survey programs that support the RAMP with surveys up and down the coast. We have learned that consistent partial coverage may be achievable, but 100% coverage has only been achieved twice. Ultimately, determining an acceptable or target level of observer coverage requires weighing concerns over bias with flexibility, cost-effectiveness, and the fishing industry’s goal to qualify surveys as a RAMP trigger.

### *3. Program Roles and Funding:*

Survey operations lack a durable funding source. Survey participants are grateful for the OPC’s responsiveness to the DCTF request for bridge funding for the program, and to the financial and in-kind support of the Advisory Committee organizations. The DCTF and survey leaders have further advocated for a state appropriation for multi-year funding but have not been successful to date.

Relatedly, survey program management has been provided largely through in-kind contributions by TNC, CCCA, and more recently Cal Poly Humboldt. While administering the program is relatively simple, roles for program management and data and vessel coordination must be formalized and paid at a reasonable rate to support a durable program.

### *Recommended Next Steps*

Collaboration with Cal Poly Humboldt has demonstrated the value of tying coordination of observers, training, and data management together. Moving forward, there is an opportunity to continue deepening that partnership, and potentially to engage additional local partners in other areas of survey operation. Ultimately, identification of a long-term funding source will be critical to support these roles in addition to the surveys themselves.

The following have been identified as the most promising sources of funding:

- Community-level funding: Examples include local cable committee funds or local grants. These are likely small scale in nature, but funds acquired by CCCA from a cable committee have allowed the organization to provide stipends to observers.
- Cooperative Research Funding: There is a [NOAA Cooperative Research Program](#) as well as potential for integration of the fishermen led whale survey program into other university or non-profit led marine mammal research programs. It may be feasible to acquire funds dedicated to surveys for the RAMP, or there may be an opportunity to fund a broader research project that addresses multiple objectives through cooperative engagement between fishermen and researchers.
- State Funds: A state funded appropriation could be used to support multi-year operation of the survey program as part of a durable data collection program in support of an Incidental Take Permit for the California commercial Dungeness crab fishery.



Appendix 1: Draft Multi-Year Budget

<b>Expense Type</b>	<b>1 year</b>	<b>3 year</b>	<b>Notes</b>
Project Administration	\$45,000/year	\$135,000	Covers a program manager, 2 vessel coordinators and 1 data coordinator.  This includes funding for one in person training a year estimated at \$15,000.
Vessel reimbursements	\$90,000 / year	\$270,000	\$2,500 per vessel day, with 6 vessel days needed to cover both zones 1 and 5. Assumes 3 surveys for fall and spring in both zones. These funds could also be used to extend the survey coverage
Survey Equipment	\$10,000	\$10,000	One time purchases, including cameras and ipads to transition to digital data collection
Observers	\$28,800	\$86,400	Assuming \$800/day/observer for professional observer coverage. Arrangements with Cal Poly Humboldt have allowed for coverage at ~\$300/day. Assume any coverage must be paid as CDFW has not been able to provide staff for observation.
<b>Total</b>	<b>\$173,800</b>	<b>\$501,400</b>	