NOAA Technical Memorandum NMFS-NE-309

Fisheries Information System (FIS) Stakeholder Engagement Workshops report: stakeholder input on data fields for an on-demand fishing geolocation cloud database

US DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts
August 2023

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Editorial Notes

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Citation: Galvez B, Matzen E, Khan C, Milliken H, Goebel J, Good C. 2023. Fisheries Information System (FIS) Stakeholder Engagement Workshops report: stakeholder input on data fields for an on-demand fishing geolocation cloud database. US Dept Commer Northeast Fish Sci Cent Tech Memo 309.

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EXECUTIVE SUMMARY

The purpose of the NOAA Fisheries Information Systems (FIS) funded workshops was to educate stakeholders regarding the current state of on-demand fishing technology, geolocation solutions for cloud interoperability and associated cloud databases, and to gain insight into what data fields should be collected to replace the function of a traditional buoy, including both required and optional data fields. A standardized list of questions was presented during each workshop, and responses and discussions were documented. These insights will be used to inform the requirements of any future on-demand geolocation database that is managed by NOAA. From April 2022 to April 2023, we organized and held 6 workshops with 6 stakeholder groups, and held discussions with 4 mobile gear captains, 1 gillnet vessel captain, 2 mobile gear fleet managers, and 2 recreational fishing organization representatives. The stakeholder groups included federal and state government agencies made up of the NOAA Office of Law Enforcement (OLE), as well as state fisheries managers and enforcement personnel from Rhode Island, Massachusetts, New Hampshire, and Maine.

1. INTRODUCTION AND PURPOSE

North Atlantic right whales (*Eubalaena glacialis)* are critically endangered large whales found along the east coast of the United States and Canada. Though the species has benefited from protections since 1935, the population has been slow to recover from whaling primarily due to entanglement in fishing gear and vessel strikes. Conservation efforts have included fishing gear modifications, closed and restricted areas, movement of shipping lanes, and mariner outreach. Despite these efforts, the North Atlantic right whale is currently in decline with the most recent published estimate of right whale population size in 2020 at 338 whales (95% confidence interval: 325-350).

The National Marine Fisheries Service (NMFS) is required by the Marine Mammal Protection Act (MMPA) to reduce mortality and serious injury incidental to commercial fishing to below a stock's potential biological removal (PBR) level. The MMPA defines PBR as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population" (MMPA 1972). PBR for the North Atlantic right whale population is 0.7 whales per year in the most recently published stock assessment report. Between 2010 and 2022, there has not been one year where observed mortality and serious injury of right whales was below a PBR of 0.7. Moreover, total estimated mortality is higher than observed mortality. In order to reduce serious injuries and mortalities of right whales in U.S. commercial fishing gear to below PBR, U.S. fisheries need to reduce total coastwide entanglement risk by 89-94% compared to pre-2021 levels. An amendment to the Atlantic Large Whale Take Reduction Plan implemented in 2021 reduced entanglement risk in the Northeast lobster and Jonah crab (*Cancer borealis*) fisheries by approximately 48%, but more risk reduction is still needed. In the 2023 Consolidated Appropriations Act, Division JJ determined that the 2021 regulation "shall be deemed sufficient to ensure that the continued Federal and State authorizations of the American lobster and Jonah crab fisheries are in full compliance with the MMPA…" until December 31, 2028 (Consolidated…2022), putting on hold any additional regulations to the lobster/Jonah crab fisheries for 5 years. Regulations are currently being developed for the coastwide gillnet and other trap/pot fisheries that contribute to entanglement risk, and they are expected to be developed for the lobster/Jonah crab fisheries for implementation in 2029. On-demand fishing (also known as ropeless or buoyless fishing) is a promising solution to achieve these goals and help the species to recover while supporting the iconic lobster fishery.

On-demand fishing technology is a system that allows fishermen to remove the persistent surface buoys and vertical lines attached to their pots/traps on the seafloor by replacing them with an acoustic release device that releases/triggers a stowed rope and buoy, a buoyant rope spool, or a lift bag. All on-demand fishing systems are made up of four basic components: 1) the transducer on the vessel, 2) the transceiver on the release unit, 3) the release mechanism, and 4) a graphical user interface on a tablet or mobile app. The transducer sends a coded signal to the transceiver on the unit; the transceiver receives the signal, triggering the release mechanism and may send a message back (some do not) to the transducer that tells the operator the release was triggered. The tablet or mobile app allows the user to trigger the acoustic release device and chart its position.

Acoustic release systems have been proven to work reliably in several applications. The next development step needed to incorporate this technology into fisheries is to develop visualization systems so other fishermen can "see" the gear when no buoys are present. Without a set of interoperability standards, on-demand gear developers have forged ahead with proprietary databases and apps that lack open standards for data collection and/or virtual gear marking. This

disconnect leaves fishermen, governmental organizations, and other stakeholders without the ability to manage and view virtual buoy positions from every manufacturer in one common platform. While integration of gear location data between manufacturers is progressing with the EarthRanger pilot program with the Allen Institute for Artificial Intelligence, there is a need for the government to introduce a standard set of data fields for on-demand systems which will be required by every manufacturer to collect and disseminate in an approved format. Recognizing that multiple stakeholder groups will be affected by on-demand fishing practices (i.e., removing the surface buoy), it is prudent to involve all relevant parties in discussions regarding data collection, data sharing, and user access permissions in order to build a framework around the common goal of replacing a traditional surface buoy with a virtual one.

In 2021, the NOAA Northeast Fisheries Science Center (NEFSC) Gear Research Team received grant funding from the NOAA Fisheries Information System (FIS) to initiate the development of a geolocation cloud database to support on-demand fishing. This program is a state/regional/federal partnership which fosters collaboration and funds innovative projects to improve and streamline the collection of fisheries-dependent data, mainly via electronic means.

The overarching goal of the project is to develop an electronic reporting system that will provide near-real-time locations of fixed fishing gear to support on-demand fishing for relevant stakeholders/partners, and to reduce gear conflict. The first objective of the project was to host several workshops with regional and federal management and enforcement agencies, and industry representatives. The purpose of the workshops were to: 1) educate stakeholders on the current state of on-demand technologies and 2) collect stakeholder input on data fields for a geolocation database for on-demand fishing (both required and optional). The bulk of this report focuses on those data fields identified throughout this process.

2. OBJECTIVES

The primary objectives of the workshops were to:

1. Educate participants on the state of on-demand fishing technology to increase awareness and clarify misconceptions about the gear, and
2. Engage with state fisheries management and enforcement agencies, as well as industry stakeholders, to discuss and identify which types of data should be collected and displayed by a geolocation cloud database for buoyless fishing. This includes:

    a. Identifying and categorizing data fields for an on-demand gear geolocation database as either required or optional (“nice to have”), and
    b. Developing a final list of required data fields for different user groups (i.e., law enforcement, industry, and managers).

3. METHODS

3.1 Workshop planning and delivery

3.1.1 Fisheries management agencies and industry associations

Each workshop consisted of a panel of NEFSC, Greater Atlantic Regional Fisheries Office (GARFO), and Office of Protected Resources (OPR) staff, and a representative from the

EarthRanger team. These panelists were chosen because of their expertise and ability to clarify anticipated questions regarding any future geolocation database efforts for on-demand fishing.

Invitation letters and a 1-page project description were sent to state fisheries management and associated enforcement agencies from Rhode Island, Massachusetts, New Hampshire, and Maine. Workshop materials were also sent to the NOAA Office of Law Enforcement (OLE), the Atlantic Offshore Lobstermen's Association (AOLA), the Massachusetts Lobstermen's Association, and the Maine Lobstermen's Association. A standardized list of questions was also circulated to allow for ample time for participants to think about their responses prior to the meeting.

Recognizing that many of the invitees were unfamiliar with the details surrounding on-demand fishing gear technologies, each workshop consisted of a considerable educational component followed by a Q&A component. It should be noted that open dialogue was highly encouraged throughout the workshop.

To reach our objectives, we adhered to a 5-step process:

- Step 1: Discuss the project priorities and provide an overview of FIS.
- Step 2: Share the state of the technology and discuss where the development is headed.
- Step 3: Provide background on the EarthRanger system and database progress.
- Step 4: Discuss the data fields currently collected by on-demand gear users.
- Step 5: Hold a Q&A session intended to record participants' input on both data requirements and optional data fields pertaining to a geolocation database. Table 1 shows the list of the standardized questions.

3.1.2 Individual interviews with non-fixed gear industry members

At the January 2023 New England Fisheries Management Council meeting, the NEFSC Gear Research Team presented an overview of the on-demand fishing trials occurring in areas closed to vertical lines. While the intended audience was the mobile fleet, which was recognized as the only industry that could experience gear conflict with on-demand gear during the closed area trials, the presentation was also intended to encourage industry input into what data fields they view as necessary, as well as what they believe should be the minimum acceptable viewing distance of a virtual buoy in a future virtual gear marking system.

After the presentation, the response we received from industry members was limited. In addition, due to their uncertain schedules, we had difficulties in planning workshops with multiple fishermen representing differing interests (i.e., mobile gear, gillnet, and recreational). Therefore, all meetings with non-fixed gear industry members were completed on an as-available basis via phone or in-person, and were limited to 2 basic inquiries:

1. What information do you need to go along with a virtual buoy?
2. How far away do you need to be able to see a virtual buoy on a display/chartplotter?

3.2 Scoring the required and optional buoyless geolocation database fields

Prior to scoring the identified data fields for each question, the responses to each question were recorded and consolidated into like responses. For example, if one group stated that the name of the harvester would be required, and another group stated that the permit number would be required, then these 2 responses would be treated as a single requirement (such as "vessel identifier") due to the similarity between them.

An individual matrix was created for both lists (required and optional) from each stakeholder group's responses to the interview questions. Broken down by question, we calculated the percentage of stakeholder groups who identified the same data fields. Using the example above, if all groups identified "permit number" as being required, that data field was given a score of 100%.

3.2.1 Stakeholder groups vs. individual interviews

Because of the different lines of inquiry and information delivery method (i.e., workshop vs. direct interviews), the data fields were scored separately for each group, as noted in section 4.

4. OUTCOMES

Based on the responses to the prescribed questions, each identified data field was scored as a percentage of stakeholder groups who identified the same data fields. Appendix 1 includes summaries of the data fields identified by 50% or more of the stakeholder groups or interviewees. In cases when no data field reached the 50% mark, those that reached the 33% mark are reported instead. All identified data fields that received a score lower than 33% are included in Appendix 3A and 3B. The questions posed to the individual interviewees and their responses are listed in Appendix 2.

5. DISCUSSION

The workshops and interviews with various stakeholder groups yielded valuable insights into the data requirements for a geolocation cloud database for on-demand/buoyless fishing. The identified data fields and their respective scores provide a foundation for developing a standardized approach to data collection and dissemination requirements for on-demand fishing. However, several important discussion points and next steps should be considered to further refine the database requirements and ensure successful implementation:

1. *Collaboration and stakeholder engagement*: It is evident from the workshops and interviews that involving all relevant parties is key to the successful implementation of on-demand fishing. Continued collaboration among state fisheries management and enforcement agencies, the fishing industry, and other key groups is necessary to address concerns, share information, and collectively work toward the common goal of replacing traditional surface buoys with virtual ones.
2. *Data field requirements*: The identified data fields from the workshops and interviews provide a starting point for developing the geolocation database. Stakeholders should continue discussions to prioritize the identified

requirements and determine the most essential data fields for inclusion in the database. Input from all stakeholders—including state management and enforcement agencies, industry representatives, and relevant user groups—should be considered during this process.

3. *Access and permissions*: The issue of data access and permissions within the EarthRanger pilot cloud database (or any future database) is critical. Stakeholders have identified the need for different levels of access based on their roles and responsibilities. This includes carefully defining the access levels and permissions to ensure that the right information is available to the appropriate stakeholders while also respecting privacy and confidentiality requirements. Continued discussions and collaboration with relevant agencies and organizations will be necessary to establish clear guidelines and protocols for data sharing and access.
4. *Pilot programs and testing*: Before implementing the geolocation cloud database on a broader scale, pilot programs and testing—such as the EarthRanger pilot—should be conducted to validate their effectiveness, reliability, and compatibility with existing systems. These pilot programs should involve representatives from different stakeholder groups to gather feedback, identify potential challenges, and further refine the database and associated technologies.

Overall, the workshops and interviews to identify the data requirements for a geolocation cloud database have provided valuable insights into the needs and priorities of all those involved in the development of the complete on-demand fishing system. Our findings highlight the importance of collaboration, standardization, and ongoing engagement among stakeholders to ensure the successful implementation of buoyless fishing practices. The results of these workshops suggest that clear guidelines for access and permissions should be established, balancing the need for information sharing with privacy and confidentiality requirements. Many have expressed that the development of a standardized geolocation cloud database for buoyless fishing is needed to push on-demand fishing forward. It is the hope of the authors that this report can contribute to the successful development of this system.

ACKNOWLEDGMENTS

The authors would like to thank all of the participants and interviewees who took part in the valuable discussions during the workshops and interviews; we would not be where we are today without your participation. We would also like to thank the EarthRanger team for their participation in the workshops, especially Jes Lefcourt and Victor Lujan for their contributions. We recognize that continued collaboration is vital to the success of this project and greatly appreciate the time and effort that our key partners and stakeholders have contributed to the important discussions surrounding the use and implementation of on-demand fishing gear.

TABLE

Table 1. The list of interview questions posed to the workshop participants.

Topic	Question
Required information to accompany a virtual buoy	If there was no surface buoy, what information do you need?
Identifying stakeholders needing access to virtual buoys	Considering your answers to the previous question, which stakeholder groups need access to the information you just identified?
Scientific data to inform management	Now that you have described what is essential, and considering the technology that we just shared with you, what additional data would benefit your programs? Think about this in terms of optimizing the fishery irrespective of entanglement issues.
Buoyless geolocation database sharing/access permissions	What levels of permissions would you recommend be placed on the EarthRanger cloud database? In other words, who gets access to what information?
Accuracy of gear positions	Do you think surface GPS marking would provide sufficient resolution/accuracy or would you need an exact position from the seafloor? If the latter, how often would you need the position updated?
Desired add-ons to the EarthRanger web display (or future web display)	What sort of information would you like access to via a buoyless database dashboard such as the EarthRanger system? For example, CPUE by area, temperature by area over time, etc.
Additional questions	Are there any questions for us with regards to the geolocation database or anything else that we discussed today?

REFERENCES CITED

Baumgartner M, Baumwell L, Baker E, Brillant S. 2021. Workshop on Buoyless Fishing Gear Location Marking Methods: Report on Stakeholder Engagement Meetings, August 2021. Sponsored by the Ropeless Consortium.

Cooper K and Shester G. 2023. Pathway to pop-up fishing gear: a roadmap to authorizing pop-up fishing gear in the California Dungeness crab fishery. Washington (DC): Oceana. 34 p.

Consolidated Appropriations Act of 2023, Pub. L. No. 117-328, 136 Stat. 4459 (Dec. 29, 2022).

[MMPA] Marine Mammal Protection Act of 1972, S. 3, USC 1632 (Oct. 21, 1972).

[NEFSC] Northeast Fisheries Science Center. 2023. 2022 US Atlantic and Gulf of Mexico marine mammal stock assessments. US Dept Commer Northeast Fish Sci Cent Tech Memo 304. 262 p.

Oppenheim NG. 2022. Assessing the feasibility of on-demand gear in New England lobster fisheries. Brunswick (ME): Homarus Strategies. 94 p.

APPENDIX 1. DATABASE FIELD SCORES BY INTERVIEW QUESTION FOR STAKEHOLDER GROUPS

1. If there was no surface buoy, what information do you need?

Requirement	*Percentage*	*Notes*
Deploy location	100	
Unique vessel identifier	100	Includes ownership information - specific type of information to be determined
Date/time unit set	67	
Trap count per trawl	50	

2. Considering your answers to the previous question, which stakeholder groups need access to the information you just identified?

Requirement	*Percentage*	*Notes*
Enforcement (Joint Enforcement Agreement and US Coast Guard)	100	Location for gear awareness (no viewing distance limit)
Mobile fishermen	83	1. Management and enforcement perspective: gear marks only 2. Atlantic Offshore Lobstermen's Association perspective: gear marks, vessel name, 7 nautical mile (nm) viewing distance
Other fishermen (commercial/charter/ recreational)	67	Access to all information identified in question 1 except unique vessel identifier/ownership information

3. Now that you have described what is essential, and considering the technology that we just shared with you, what additional data would benefit your programs?

*Optional**	*Percentage*	*Notes*
Trap count per trawl	33	
eVTR tracking and trip tracking integration	33	Reducing reporting duplication is essential - consolidating storage of the data so that a single application can meet multiple regulatory data points (coordinate with ACCSP)

Oceanographic data	33

*Note: No data fields from this question were identified by more than 2 out of the 6 (33%) stakeholder groups.

4. Do you think surface GPS marking would provide sufficient resolution/accuracy or would you need an exact position from the seafloor? If the latter, how often would you need the position updated?

Is GPS Sufficient?	***Percentage***
Yes	100*
No	0
Optional	***Percentage***
Actual position (for industry)	83

*Note: While 100% of respondents stated that the GPS marking of on-demand gear is sufficient for their operations and/or programs, it should be noted that 83% of the respondents also stated that an actual position on the ocean floor would be preferred.

5. What levels of permissions would you recommend be placed on the EarthRanger cloud database? In other words, who gets access to what information?

Identified User Group Requiring EarthRanger Data Access	***Percentage***	***Notes***
All commercial fishing vessels	100	Enforcement/Management perspective: 1. Can only see their own data but can share with anybody they want; 2. Can only see gear marks within 5 nm of user's position Atlantic Offshore Lobstermen's Association perspective: 1. 7.5 mi distance (for mobile gear) maybe less for fixed gear; includes boat name, permit #, fishery type (lobster, gillnet, etc)
Managers and enforcement have access to varying levels of PII	83	User restrictions on who the data is shared with - need to know basis. Depends on current confidential access of each state/federal management/enforcement division
Other nearby vessels (non-commercial fishing)	67	Can only see gear marks within 5 nm, no other information
Dredging operations	50	Can only see gear marks within 5 nm
Research surveys	50	Can only see gear marks within 5 nm

6. What sort of information would you like access to via a buoyless database dashboard such as the EarthRanger system? For example, CPUE by area, temperature by area over time, etc.

*Optional**	*Percentage*
Filter by permit number	33
Filter by management area (federal and state)	33
Oceanographic data	33

*Note: No data fields from this question were identified by more than 2 out of the 6 (33%) stakeholder groups.

APPENDIX 2. DATABASE FIELD SCORES BY INTERVIEW QUESTION FOR INDIVIDUAL INTERVIEWEES

1. What information do you need to go along with a virtual buoy?

Requirement	*Percentage*
Deploy location	100
Unique vessel identifier	67

2. How far away do you need to be able to see a virtual buoy on a display/chart plotter?

*Requirement**	*Percentage*
1 mile minimum viewing distance	44
5 mile minimum viewing distance	44

*Note: No data fields from this question were identified by more than 4 out of the 9 (44%) individual interviewees.

APPENDIX 3. FULL LIST OF RESPONSES OF REQUIRED AND OPTIONAL DATA FIELDS

A. Fisheries management agencies and industry associations

1. If there was no surface buoy, what information do you need?

Requirement	***Percentage***	***Notes***
Deploy location	100	
Unique vessel identifier	100	Includes ownership information - specific type of information to be determined
Date/time unit set	67	
Trap count per trawl	50	
Which end is buoyless	33	For hybrid trawls
Gear type	17	
Vent size	17	
Integration with VTR, vessel tracking	17	
Type of system	17	Lift bag, stowed rope, etc
Way to mark the gear pulled for enforcement	17	
7 miles for fixed gear (when moving gear)	17	Justification: can see high flyers on radar out to 6 miles on a calm day
Optional	***Percentage***	***Notes***
ACCSP has access to location data	17	For effort analysis

2. Considering your answers to the previous question, which stakeholder groups need access to the information you just identified?

Requirement	***Percentage***	***Notes***
Enforcement (1) (Joint Enforcement Agreement and US Coast Guard)	100	Location for gear awareness (no viewing distance limit)
Mobile fishermen	83	1. Management and enforcement perspective: gear marks only 1. Atlantic Offshore Lobstermen's Association perspective: gear marks, vessel name, 7 mile viewing distance
Other fishermen (1)	67	Access to all information identified in question 1 except unique vessel identifier/ownership information
Scientific surveys	33	Location for gear awareness
Contract vessels	33	
Division level access	17	Location for gear awareness
Enforcement (2)	17	Atlantic Offshore Lobstermen's Association perspective: duplicate what's out there now and let the rest happen naturally - management/enforcement should work through regulatory process of sharing the information
Other fishermen (2)	17	Should see name at certain distance - set different viewing radii for different data fields
Optional	***Percentage***	***Notes***
ACCSP	17	Location data for effort analysis
Concerns about wind developers and other entities having access to this information	17	
Confidentiality rules need to be drafted	17	

3. Now that you have described what is essential, and considering the technology that we just shared with you, what additional data would benefit your programs? Think about this in terms of optimizing the fishery irrespective of entanglement issues.

Optional	*Percentage*	*Notes*
Trap count per trawl	33	
eVTR tracking and trip tracking integration	33	Reducing reporting duplication essential - consolidating storage of the data so that a single application can meet multiple regulatory data points (coordinate with ACCSP)
Oceanographic data	33	
Comment box to take notes on the database GUI	17	
Application for storing data that can be collected on the mobile platform	17	
Date/time stamp for release/recovery	17	
Updated positions based on crowdsourced data alerted to owner	17	
Track lines within earth ranger	17	
Linking ID to permit #	17	
Sub area ID	17	
Share other sources of data within ER database	17	Environmental data collected elsewhere can be uploaded to provide finer resolution
Automation/RFID - remove button push	17	
Filter by fisherman ID	17	
License numbers	17	
Hull number	17	
State registration number	17	
Any additional data other than necessary data should not be sent when on satellite wifi - too expensive	17	

4. Do you think surface GPS marking would provide sufficient resolution/accuracy or would you need an exact position from the seafloor? If the latter, how often would you need the position updated?

Requirement	*Percentage*	*Notes*
GPS works	100	For management
GPS is fine	17	But surface marking is probably not sufficient
Automated surface locations better than fishermen marked locations	17	
GiGo beacons in development along with vessel tracking - going to ACCSP	17	
Seafloor position better	17	
Optional	***Percentage***	***Notes***
Actual position	83	For industry
Updated positions as frequent as possible	33	

5. What levels of permissions would you recommend be placed on the EarthRanger cloud database? In other words, who gets access to what information?

Requirement	*Percentage*	*Notes*
All commercial fishing vessels	100	Enforcement/Management perspective: 1. Can only see their own data but can share with anybody they want; 2. Can only see gear marks within 5 nm of user's position Atlantic Offshore Lobstermen's Association perspective: 1. 7.5 mi distance (for mobile gear) maybe less for fixed gear - includes boat name, permit #, fishery type (lobster, gillnet, etc)
Managers and enforcement have access to varying levels of PII	83	User restrictions on who the data is shared with - need to know basis. Depends on current confidential access of each state/federal management/enforcement division
Other nearby vessels (non-commercial fishing)	67	Can only see gear marks within 5 nm, no other information
Dredging operations	50	Can only see gear marks within 5 nm

Research surveys	50	Can only see gear marks within 5 nm
Other stakeholders	17	Can see the date, lat/long, time
NGOs	17	Can only see gear marks - required for derelict trap removal
JEA partners (states)	17	Date, time, coordinates
Multiple permit holders	17	Might have more visibility with more permits - unfair advantage?
Enforcement/managers adhere to current data sharing regulations	17	Confidentiality standards that all the state and federal agencies have to adhere to - can't release data unless it's aggregated - need a broader discussion when the time comes
Fishing survey vessels	17	Can see same info as commercial fishing vessels
Wind survey vessels	17	AOLA: Typically captains of these vessels are fishing captains, so need to limit their access based on the trip they are declaring - more thought into this needs to happen
Mobile gear	17	Ping rate for VMS - this will need to be figured out - if ping rate too slow, conflict between ropeless and mobile gear would be unenforceable/unaccountable for liability/insurance claims
Optional	***Percentage***	***Optional***
Aquaculture	17	Aquaculture

6. What sort of information would you like access to via a buoyless database dashboard such as the EarthRanger system? For example, CPUE by area, temperature by area over time, etc.

Optional	***Percentage***	***Notes***
Filter by permit number	33	
Filter by management area (federal and state)	33	
Oceanographic data	33	
Filter by date	17	
Filter by vessel name	17	
Ability to validate data collected	17	Do we have infrastructure to process additional data
Reducing input from fishermen can yield more	17	Less human error

accurate info		
Available on the water	17	Have all data in one place integrated into one system
Integrate eVTR and vessel tracking data as much as possible	17	
Add one-end ropeless marking into this	17	

B. Individual interviewees

1. What information do you need to go along with a virtual buoy?

Requirement	*Percentage*
Deploy location	100
Vessel identifier	67
Gear type	33

2. How far away do you need to be able to see a virtual buoy on a display/chart plotter?

Requirement	*Percentage*
1 mile minimum viewing distance	44
5 mile viewing distance	44
2.5 mile minimum viewing distance	11

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