

Proceedings of the
“Developing Electronic Data Capture Systems in Marine Fisheries” Workshop
February 8, 2016

Presented by the Canada-U.S Technical Subcommittee (TSC)
of the Canada-U.S. Groundfish Committee

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Workshop Organizing Committee:
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I. Introduction

The Technical Subcommittee for the Canada-United States Groundfish Committee (TSC) meets annually to discuss agency activities in groundfish research and management. Member agencies include: Alaska Department of Fish and Game; National Marine Fisheries Service; Department of Fisheries and Oceans, Canada; Washington Department of Fish and Wildlife; Oregon Department of Fish and Wildlife; and California Department of Fish and Wildlife.

At the annual TSC meeting in 2015, a need was identified to share recent advances in technology related to collection methods for fishery-dependent and fishery-independent data. Electronic length boards and tablets were cited as examples of the new tools at work sampling fisheries. Agencies along the west coast have explored and adopted these new technologies for use in the collection of ocean fisheries data. However, implementation can be tricky and time consuming.

Following the 2015 TSC meeting, Alison Whitman (Oregon Department of Fish and Wildlife), Wayne Palsson (National Marine Fisheries Service), Lynne Yamanaka (Department of Fisheries and Oceans, Canada) and Traci Larinto (California Department of Fish and Wildlife) formed a committee to organize this workshop. The Western Groundfish Conference in February 2016 was suggested as an appropriate venue for a workshop. The workshop was held on February 8th, 2016, immediately prior to the start of the Western Groundfish Conference. A total of 38 participants attended the day-long workshop. Workshop participants and their contact information are listed in Appendix A.

II. Acknowledgements

Organizers would like to thank those organizations and individuals that made this workshop possible. Support for the workshop was provided by the Pacific State Marine Fisheries Commission. The venue and AV equipment was provided by the Western Groundfish Conference steering committee.

III. Workshop proceedings

The primary goals of the workshop were to 1) share information and experiences from implementing electronic data-capture systems, and 2) develop a set of core recommendations for present and future work. To this end, two main sections to the workshop were developed. The first section included presentations from multiple agencies and entities. The second section included breakout sessions with smaller working groups to discuss a series of questions. Discussions were reported to the main group, and recommendations were developed based on these discussions. Appendix B includes a workshop agenda.

Presentations were given by 10 individuals from seven agencies/entities and included examples from large scale at-sea surveys, dockside sampling, and electronic monitoring of at-sea fishery discards. Presenters described methods and equipment used or in development, including both Mac and PC based platforms (iPads, tablets and toughbooks), electronic capture of weights and lengths, and voice recognition and bar code technologies to assist with data capture. Many presenters brought their equipment and provided hands-on demonstrations to workshop participants.

Presentations are available on the TSC website: <http://www.psmfc.org/tsc2/>.

IV. Summary of Work Group Discussions

Participants were separated into seven groups, and were given five questions to discuss. A speed format was utilized, so that participants only had a short window of time to discuss each question prior to moving on to the next (< 10 minutes). Results of the smaller discussions were then reported to the entire group. The results from each question are summarized below.

- a. Question 1: What are the top three perceived benefits of an electronic data collection system? Were these benefits realized?

Participants noted that the primary benefits to an electronic data collection system were an increase in efficiency and accuracy. Data is also able to be accessed more quickly (days versus 3 – 6 months), though issues related to data storage, particularly availability of space and specification of particular formats, were noted to be problematic at times. Validations and error checking can be built into systems in order to speed processing time and improve accuracy. Systems are generally user-friendly, and there are significant cost savings when compared to traditional data collection systems, though these are generally not realized immediately. Participants also stated that positive public perception of collection efforts increased following the implementation of electronic data collection systems.

- b. Question 2: What are the top three drawbacks of an electronic data collection system?

There were multiple drawbacks to electronic data collection systems, though participants pointed out that benefits almost always outweighed the drawbacks. Therefore, participants wanted to note that these were simply identified areas to improve upon. A harsh working environment was identified as a primary drawback to electronic systems. There was a general resistance to change, both at an agency level and at the individual level. Retraining was considered a critical component to the implementation of an electronic data collection system, and perceived confidence in the system changes over time.

Participants noted that as the complexity of a system increases, so do system failures, which can be difficult to troubleshoot or fix in the field. System issues in the field are compounded by a loss in survey or staff time, as staff attempts to resolve any issues. A related overall issue is the long-term staff reductions at many agencies, and the loss of those funds on a permanent basis hampers recovery to previous staffing levels. The opportunity to rigorously test systems in the field was considered critical to overall success, as opposed to simply testing in a laboratory setting.

Several work groups noted that security and version control were often difficult issues to deal with. A lack of internal IT staff was cited as an additional and chronic problem, particularly for agency staff, who also need to interact with agency IT support staff. Many noted that significant initial investments were often needed to implement systems, and that many underestimated more long-term costs for system upkeep and necessary replacements.

- c. Question 3: What was the most difficult lesson to learn with the implementation of an electronic data collection system? Were there aspects to implementation that were easier than expected?

The most difficult aspect identified by workshop participants was the documentation of software and user training protocols. It was noted that one of the more difficult aspects to implementation is often more related to people rather than the system. Programs should be designed for the end user of the

data and must be efficient and user-friendly, but it is sometimes difficult to know when programs and/or systems are ready for preliminary feedback from users or field staff. Early errors or system failures could breed early rejections of the system, and so implementation needs to be properly vetted prior to rolling out. The entire data flow should be tested, in addition to the initial data collection format.

Another difficult aspect to implementation included a general resistance to change once the system was in place. Programs and systems are not static entities, but it is often difficult to focus on improving system functionality and that agencies need to keep development people “thinking forward”. It was difficult to recreate or describe issues discovered in the field in order to troubleshoot or work with IT personnel at a later time. Participants noted that screen shots could help with this, and further noted that technology now exists to capture data on paper using picture technology.

There were many aspects to implementation that were easier than expected, but the aspect that was considered easiest by workshop participants was development of “field readiness” of the system. Participants noted that they often underestimate the robustness of systems, and systems can often handle more difficult conditions or situations than initially thought. Getting user buy-in was relatively easy, however, this was found to be much slower at an agency-level. Instruction and training was also relatively easy, and it was noted that a useful tool for instruction was a reference table to look up reasonable sideboards (“sanity checks”) for the data collected. The time required to design an app was noted to be faster than anticipated, because a lot of structure is already in place for a basic app and they can be tailored to the particular data collection situation fairly easily.

- d. Question 4: What are the most appropriate applications for electronic data collection systems? Is there a need for a single, common system?

Workshop participants noted that electronic data collection systems were most appropriate for applications where real time data, or data that could need to be acted upon quickly, is necessary. Applications with high volumes of data and well defined protocols would also be very appropriate for electronic collection systems. Common data types were noted, such as fish lengths or weights. More standardized projects could use i-forms, which was noted to be a flexible platform that could have many fisheries data applications. However, any system that’s modular and flexible would be appropriate. An ongoing working group to continue to disseminate information would be beneficial to many parties.

Most working groups stated that there is no need for a common system, and in fact, members of one group had tried and failed. Many believed that it may be possible, but it would require a great deal of flexibility. Everyone felt that workshops, such as this one, to exchange information were a positive step in the right direction, but as mentioned previously, most participants did not feel that a single system should be goal of these workshops.

A single working group suggested there should be a common system, as many participants are dealing with the same fish stocks across large-geographic scales, and felt that this may be possible with widgets or open source components. Some standardizations, like common species codes, would be simple to implement and could increase efficiency in data-sharing situations. This group noted that without a common system, it’s difficult to assess bias across systems.

- e. Question 5: How should data from electronic data collection devices be stored or handled? For example, should we have common standards?

Workshop participants noted that there should be some common practices across agencies, such as those implemented through the Cloud or other backup systems. Documentation standards, including specific equipment protocols, would be useful in order to share system configurations and data easily. It was noted that standards should be implemented on a metadata level, and standards of a finer scale were not necessary. Detailed protocols that show how the data was collected (e.g. total length collected in centimeters versus millimeters) are necessary.

Security of data was a common discussion point among all working groups. All groups agreed that data should be more easily accessible, but many noted there are challenges associated with striking the right balance between accessibility, to other researchers and agencies but also to the public, and security. Some also pointed out that data needs to be available at different user levels, similar to PacFIN (i.e. raw data provided to researchers versus aggregated or summarized data for the general public). There were some concerns about security and backup data risks with Cloud services. Loss of data was mentioned as a concern, but most simply noted that multiple backup options need to be utilized.

Common standards were discussed, but most agreed that these would be very difficult to implement and maintain over time with so many different data collection systems and configurations. Many participants agreed that it would be better to more thoroughly document how data are collected, initially handled or processed, and other metadata types of information.

V. Final recommendations

Following the working group discussions, all workshop participants worked together to develop a set of core recommendations. These are listed below.

- **Recommend a core working group that convenes regularly.** This group would share developments, software programs, and contact information, and provide a forum for continued exchange of information.
- **Develop a website for users to go to for exchange of information and storage of documents, such as workshop proceedings and summaries.** It was noted that the TSC currently provides a website that would post workshop information.
- **Promote moving forward with electronic data collection systems.** Participants noted that both field and IT staff could promote these systems.
- **Develop a formal forum of exchange of code, or library of systems tested,** in order to document systems that worked well, or where improvements can be made.
- **Requested that funding be more flexible,** because electronic data systems are typically not ready to test immediately. There is a need to conduct strategic planning first, when funding is initially available.
- **Systems should start small to show success before rolling out to other, wider applications or situations**
- **Recommend that the TSC endorse the use of electronic data collection systems,** and additionally, assist with the identification of roadblocks moving forward to all groups/agencies via the working group mentioned in previous recommendations.
- **Reconvene workshop at a later date to continue discussions**

Appendix A: Participant contact information

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Appendix B: Workshop Agenda

Developing Electronic Data-gathering Systems for Marine Fisheries

TSC Workshop at the Western Groundfish Conference
Best Western Inn, Newport OR
February 8, 2016
9 am – 4:30 pm

900 – 915 am	Welcome and Workshop Format <i>Alison Whitman, ODFW</i>
915 – 1000 am	Workshop Speakers <i>Norm Olsen & Daniel Williams, DFO Canada</i> <i>Phillip Weyland, WDFW</i> <i>Allison Vijgen, NOAA</i> <i>Keri Taylor, Archipelago Inc.</i> <i>Dave Colpo, PSMFC</i> <i>Lara Erickson, IPHC</i> <i>Wayne Palsson, NOAA</i> <i>Dayv Lowry, WDFW</i> <i>Victor Simon, NOAA</i>
1000 – 1030 am	Morning Coffee Break
1030 am – 1200 pm	Workshop Speakers cont.
1200 – 1330 pm	Lunch (not provided)
1330 – 1400 pm	Workshop Speakers cont.
1400 - 1500 pm	Work groups <i>Rotation of small groups through a series of questions</i>
1500 – 1530 pm	Afternoon Coffee Break
1530 – 1630 pm	Development of Workshop Recommendations <i>Work groups submit their recommendations for discussion with the main group</i>