# Final Public Webinar Meeting Summary

## Scientific Review of Red Abalone Survey and Density Estimation Methods

*Tuesday, May 20th, 3:00 PM - 4:00 PM*

### Overview

To incorporate the best scientific information into management decisions, California Department of Fish and Wildlife (CDFW) requested that California Ocean Science Trust coordinate an independent review of the survey design and methods used to estimate densities of red abalone (Haliotis rufescens) in northern California. Ocean Science Trust is a non-profit organization dedicated to advancing a constructive role for science in decision making. To conduct the scientific and technical review for CDFW, Ocean Science Trust convened a Science Advisory Committee (SAC), and designed, then implemented, a review process in alignment with the CDFW Science Institute Procedural Guidelines for Ad Hoc Independent Scientific Advisory Committees.

This is a summary of the public webinar held on May 20, 2014 (3-4p PST), in which the final draft results of the scientific review were presented. The purpose of this webinar was to provide an overview of the SAC's final conclusions and offer the public an opportunity to engage directly with the SAC about the recommendations. The SAC will finalize the report following this briefing. Questions and comments raised by members of the public are captured in this summary. You can access the review documents, meeting agenda, and view the webinar here.

### Meeting Attendance

**Science Advisory Committee (SAC):** M. Carr, K. Nielsen, P. Raimondi, and S. Schroeter

**California Ocean Science Trust:** M. O'Donnell (moderator), E. Knight, H. Carter, and E. Robinson

**Members of the Public:** 16

### 3:00 PM Welcome and Introduction

*M. O'Donnell, Senior Scientist, California Ocean Science Trust*

M. O'Donnell welcomed everyone to the meeting and introduced the members of the SAC. He discussed Ocean Science Trust's role in the scientific review of survey and density estimation methods for red abalone, the scope of the review, a description of the overall review process, a meeting agenda, and guidelines for public participation. He acknowledged the collaboration and hard work of the SAC and CDFW during the review process. He introduced the members of the SAC, including SAC Chair, Mark Carr. Two page CVs of all SAC members can be found here.

### 3:05 PM Presentation of Draft Review Outcomes

*M. Carr, Professor, UC Santa Cruz, Chair, SAC*

M. Carr presented an overview of the final report from the scientific and technical review. This included:

- A recap of the initial webinar in which CDFW presented their sampling design, methods, and

analyses:

- ◊ Dive surveys conducted at 8 index sites.
- ◊ Randomly selected transects.
- ◊ 3 years to complete a survey cycle.
- ◊ Calculate average density from all transects.
- ◊ Focused on changes through time series and the statistical power to detect these changes.

- A summary of the management outlined in the Abalone Recovery Management Plan (ARMP):
  - ◊ Management decisions based upon average density from surveys relative to a threshold density.
  - ◊ Statistical analyses not determined in the ARMP.
  - ◊ Critical to understand how abalone density data are generated so as to identify best analyses.
- Use of Threshold-based Analyses:
  - ◊ Comparing average density to management triggers ignores variability in the field estimates. The SAC recommends using Cumulative Probability Functions (CPFs) as the most appropriate analysis to determine whether observed abalone densities are above or below a management threshold.
  - ◊ Analysis of Variance of time series is a useful statistical tool to detect changes at index sites through time, but these analyses have assumptions that are not met when using transects as replicates.
- The importance of understanding that measuring density at index sites does not provide information outside of the 8 index sites, even though the management decisions pertain to the entire region.

**Recommended analysis to strengthen the current survey design:**

- Cumulative Probability Functions:
  - ◊ Generate a curve using estimates from the field (site as replicate), and is centered on the abalone density trigger.
  - ◊ Increasing the number of sites can increase confidence relative to threshold values.
  - ◊ CPFs explicitly lay out the degree of certainty or uncertainty around density estimates. Requires managers to specify an acceptable level of risk.
- Means with Associated Confidence Intervals:
  - ◊ Can track changes in the density of abalone at index sites through time, and make predictions. This depends on the frequency at which data are collected; higher temporal resolution necessary to make more timely management decisions.
  - ◊ Incorporate environmental information (e.g., climate, habitat) to help explain the state of index populations.

**Considerations for informing future management:**

The SAC identified potential improvements that go beyond statistical and sampling questions. Though it is outside the scope of the review, the intention is for this to inform future discussions as CDFW and the Fish and Game Commission move towards long-term management of red abalone.

- Improving Use of Existing Density Metric:
  - ◊ More rapid tracking.
  - ◊ Including habitat data to explain dynamics at index sites.
  - ◊ Codify statistical analysis in the ARMP.
  - ◊ Revisit the sustainable fishery density to take into account more data, or be more biologically significant.
  - ◊ Modify current density survey design for more statistically powerful approach.
- Moving beyond a Density Metric:
  - ◊ Transition to tracking the population through measurements of size structure.
  - ◊ Explore alternative scientifically-based management techniques.
- Additional collaboration with external scientists.
- Make density data publicly available.

### 3:35 PM Public Question & Answer Period

Following the SAC's presentation of the review results, the public was invited to provide questions and comments for the SAC to consider in finalizing the review.

**Bill Bernard**

- Thank to CDFW for asking for this review. Thanks to M. O'Donnell and the SAC. What are short-term recommendations for management practices until the Fishery Management Plan (FMP) process is completed?
- M. Carr: For the short term, one recommendation is to use these analyses the SAC demonstrated. CDFW and others can start running these analyses immediately to start exploring the current data and how this analytical approach can be incorporated into the FMP.
- B. Bernard: Thanks to the SAC for recognizing that surveys do not represent abalone populations beyond index sites. Important to note that the fishery extends up to the Oregon border so the fishery is not only where the majority of fishing takes place.
- M. Carr: There is a tradeoff with the amount of data that can be collected beyond density and the amount of time and money available. The question of whether to distribute resources evenly, or focus on index sites can be reconsidered in part of the long-term plan.
- P. Raimondi: CDFW needs some way to guide the regional management, so for better or worse, they cannot sample everywhere. There will be a subset of sites used to make management decisions, but perhaps there might be ways to be more representative of the whole region.

- B. Bernard: What about abalone characteristics that differ by region?
- P. Raimondi: E.g., In Australia, they use the size structure of abalone to predict the next generation. CDFW is already collecting this information, and may be able to incorporate these data.
- K. Neilsen: Index sites were selected to be "canaries in the coal mine", so as to manage by precaution and pick most sensitive sites. Perhaps CDFW should think about this again in a revision of the ARMP, but the selection of the sites was intentional.

**Chris Voss**

- Thanks to the SAC for their work.
- Speaking to this notion of precaution, how do MPAs provide a new way to measure abalone?
- The SAC's recommendations are valuable for informing how we choose to pursue a less expensive way to manage the fishery, given that we are moving into an FMP process. Capturing size structure of catch may be of value too. There are new data streams that can be made available for management and incorporated into the decision making process as we move ahead.
- As a commercial diver, has struggled with how density has been calculated and how to use density to make decisions. It is costly to use ARMP as it is to reopen a fishery or to adequately assess the fishery. The SAC analyses points out some of the weaknesses of the ARMP and it will take more to reduce or eliminate these weaknesses.
- M. Carr: Incorporation of MPAs into a management plan, particularly in the use of stock assessments, is one of the key foci of CDFW, the academic community, and fishermen. You've touched on an issue that is key right now, and exciting. Secondly, in monitoring the MPA system, also faced with how to do this and do this cost effectively. Giving a lot of thought on how to design methods with fishery-dependent data. Rather than entirely abandoning surveys, how can they be more cost-effective, not just for fisheries management but also for conservation?

**Jim Martin**

- How can recreational divers help out with the surveys and increase the number and frequency?
- M. Carr: In trying to explore cost effectiveness of these surveys, want to consider how to engage citizen scientists, get the recreational sector involved, and to collect data of a sufficient quality to really inform decision making. These questions are going into designing sustainable monitoring that is directly applicable for fisheries management.

**Craig Schuman**

- Thanks to the members of SAC, and Ocean Science Trust; got a lot out of the review and looking forward to seeing how to implement these recommendations to improve management of our abalone resource.
- Thanks to the stakeholders for tracking the process.
- Recognize CDFW staff for the work they have put in through the review.

**4:00 PM Wrap Up & Next Steps**

*M. O'Donnell, Senior Scientist, California Ocean Science Trust*

At the conclusion of the meeting, M. O'Donnell went over the next steps in the review process, and when materials will be released. If you would like to be added to a list serve to receive a final update on the abalone review, submit your email address to abalone@calost.org. The final report will be available mid June 2014.