

Synthesis Report

Harmonizing U.S. West Coast Ecosystem Reports *The CalCOFI State of the California Current Ecosystem Report (SOTCC) & California Current Integrated Ecosystem Assessment Ecosystem Status Report (CCIEA ESR) Workshop* June 2023

Background/Overview

On June 28-29, 2023, the [CCIEA/CalCOFI Harmonizing U.S. West Coast Ecosystem Reports Workshop](#) took place at the Southwest Fisheries Science Center in La Jolla, CA. The event was held in person, with a hybrid option available for remote participation. The workshop was hosted by CalCOFI and The California Current Integrated Ecosystem Assessment (CCIEA), bringing together their respective teams and stakeholders to collaborate on the shared objectives.

The workshop brought together about 40 experts from the CalCOFI State of the California Current Ecosystem Report (SOTCC) and the California Current Integrated Ecosystem Assessment Ecosystem Status Report (CCIEA ESR) including the current/potential data contributors, data analysts, and researchers, to share the history, drivers and objectives of each report; align their data collection and analysis processes; and leave with a shared data flow, timeline, and plan for harmonization of the two reports. Jointly these efforts contributed to a shared, holistic overall understanding of the California Current. The workshop consisted of a series of presentations and group discussions.



Workshop Goal

The workshop goal was to harmonize and align the data streams that support the CalCOFI State of the California Current Ecosystem Report (SOTCC), the California Current Integrated Ecosystem Assessment Ecosystem Status Report (CCIEA ESR), and other supporting research.

Workshop Objectives

1. Determine the audience and scope for both reports
2. Create an integrated timeline for report production
3. Create a shared vision of data flow
4. Identify partners/resources/support
5. Develop recommendations

Deliverables

1. **Overview table** of the State of the California Current Ecosystem Report & California Current Integrated Ecosystem Assessment Ecosystem Status Report (*Figure 1*)
2. **Integrated timeline** of the CalCOFI State of the California Current Ecosystem Report & California Current Integrated Ecosystem Assessment Ecosystem Status Report (*Figure 2*)
3. **Requirements/considerations** document for the shared data flow (*Figure 3*)
4. **Shared data flow diagram** (*Figure 4*)
5. **Recommendations to operationalize the shared data flow** (Box 2 and Recommendations & Action items section)

Agenda & Participants

See Appendix 1

Detailed Workshop Overview

Day 1: Overview of the Ecosystem Reports

Opening & Overview of the workshop

The meeting began with a warm welcome from Noelle Bowlin and Erin Satterthwaite, setting the tone for a productive and collaborative discussion (see shared workshop guidelines Box 1).

Andrew Leising followed with an overview presentation on the goals and deliverables of the workshop. Leising's main message was clear: let's streamline the data contribution process and reduce duplication of effort. The goal is to create a system where data contributors only need to be asked for data once, making the data integration process more efficient and effective. He noted, however, that accomplishing this would require careful consideration of the tone and scope of both reports, along with ensuring a logistically feasible and complimentary production timeline.

Box 1. Workshop guidelines

- Be mindful and open to the diversity of perspectives & viewpoints of our group
- Be present, actively listen & participate (written/verbally/listening/synthesizing)
- Share your experiences & knowledge
- Make space & take space – we want to hear from everyone
- Keep input constructive to the workshop's goals & objectives
- Signal when we are going off track & feel free to write items in the "Seed Bank" for another time
- Ask for clarification when needed
- Look for ways to improve our process
- Have fun!

Overview of Ecosystem Reports

Overviews of the ecosystem reports including both the SOTCC and the CCIEA ESR were provided, with subsequent discussions fine tuning the details of each. Key characteristics of each report include unique value, goal, theme, audience, types of information, where & when it's published, and the author process (Figure 1).

For example, the presentation on the CalCOFI State of the California Current Ecosystem Report highlighted significant changes over the years. The role of the Scripps Institution of Oceanography (SIO) in preparing the report has decreased as more NOAA staff have taken on lead authorship. The number of contributing authors and institutions has increased over time.

Notably, there were two periods when new data streams came online, coinciding with the 1997/1998 and 2004/2005 El Nino events. The report's format transitioned from a large, comprehensive document to a more concise and thematic approach, starting in 2013. The focus is now on how the local California Current Ecosystem responds to global processes and changes.

During the discussion, participants emphasized the importance of maintaining long time series and a larger repository of information accessible online. The tension between making data readily available and ensuring proper curation was discussed, with suggestions to link CalCOFI data to the CCIEA website. The desire to maintain the report as a citable, peer-reviewed journal was voiced.

Peer review comments have highlighted the need for a clear theme and storyline in the report. There were suggestions to consider both a journal article and a NOAA Tech Memo, with the latter serving to collate supplemental material. The process of developing the SOTCC theme each year is informal, with the lead author considering the basin-scale physics and biological components to come up with a compelling theme.

Overall, the discussions revolved around the need for data synthesis, storytelling, and effective communication to enhance the impact and accessibility of the reports. The evolution of the CalCOFI report reflects the growing collaboration and integration of data streams over time.

	CCIEA ESR	SOTCC
Unique value	Broad range of ecosystem indicators relevant to management	Citable journal article. Can provide greater interpretation/discussion in some areas
Goal/Why	Support Ecosystem Based Management	Scientific Interest
Theme	Status and trends of ecosystem indicators	Ecosystem response to climate variability & change with a yearly theme that emerges
Audience/Who	PFMC and community members	Researchers (West Coast, EBUs/international)
Types of information	Physical, chemical, biological, [some] social (some data preliminary)	Physical, chemical, biological (data more finalized)
Where published	PFMC briefing book <i>Note: NOAA Technical memos have been published from these reports in the past (2017-21)</i>	Frontiers in Marine Science (Original Research Article)
When published / frequency	Annually (Feb)	Annually (Late spring- May/June) <i>option to skip a maximum of a year depending on capacity</i>
Author process	Co-leads with senior & mentored lead	Lead & co-lead that ideally rotate every 2 years <i>The lead and co-lead are staggered in service such that as the lead transitions out, the co-lead becomes lead, and a new co-lead is brought on (with explicit consideration of increased involvement of early career scientists)</i>

Figure 1. Overview of the key aspects of both ecosystem reports, the CCIEA ESR and the SOTCC.

Data providers perspective

Overview

A few data providers that contribute regularly to the ecosystem reports provided a short overview of the data they provide as well as their perspectives on contributing data to the ecosystem reports.

Bill Sydeman from the Farallon Institute provides data from their cruise reports for key species. They develop a storyline for the SOTCC, often using one survey with multi-panel figures contrasting trends in different species. They plan to share three indicators in the future: MOCI for physical data, northern anchovy biomass, and seabird productivity.

Eric Bjorkstedt from the Trinidad Head Line (THL) & Humboldt Partnership contributes krill data as the core indicator for SOTCC and CCIEA. They also consider other potential indicators like krill assemblage, copepod assemblage, and larval fish assemblage. Providing data benefits the core justification of the THL, demonstrates its value, and motivates related research. They face challenges with a small budget, remote location, staff continuity, and balancing data collection and processing.

Sam Zeman from Newport Head Line (NHL) shared that they have conducted biweekly surveys for 26 years. They appreciate the CCIEA data uploader and interactions with authors and editors. They are interested in a shared data repository and seek guidance on additional data contributions and report timing.

Reasons data providers contribute to the ecosystem reports

- Demonstrating the program's value: Integrated observations showcase the program's importance and contributions to scientific understanding.
- Inspiring related research: Data and findings motivate further research and investigations.
- Attracting collaborations: Getting data and results out can foster collaboration with other research institutions and scientists.
- Providing contextual data: Data aids in understanding climate responses across the broader ecosystem.
- Producing valuable reference publications: Research results become important references for various audiences.

- Desire for data usefulness & addressing different audiences: Reports cater to the needs of diverse stakeholders. Data is valuable for decision-making and engaging with stakeholders. Contributors are dedicated to ensuring data's usefulness in research and practical applications.

What makes it easy to contribute data

Data providers find it easy to contribute data to the reports, and there is overlap between reports and other data requests. They are willing to be more involved when time and energy permit. The CCIEA data uploader and interactions with authors and editors are appreciated. They suggest a shared data repository as a one-stop-shop for both reports and streamlining the addition of new data. Annual discussions of ecosystem updates and clear communication about data usage are valued. Data suppliers can make the reports easier to compile by recording who downloads the data and fostering a broad collaborative spirit.

Challenges of contributing data

The pinch points or challenges identified included time, resources, and support, which can be overwhelming. Personnel and labor issues are also a concern, especially related to data management and processing. Funding, time constraints, and data still stored in jars and vials contribute to the challenges. Burnout, lack of opportunity to contribute, and receiving multiple requests for information are other issues. Inconsistent data streams, difficulties in sharing confidential information, and outdated data management systems also pose challenges. There is a need for more expertise in certain areas and finding a balance between continuity, consistency, coverage, and cost. Balancing sample collection, processing, and analysis is another challenge. Overall, while challenges for SOTCC/CCIEA are minimal, logistical and support challenges are more substantial in the broader context.

Solutions to the challenges of providing data

- Automation: Implementing a script-based system for data curation, summary, and publishing enables automatic report updates using common libraries and tools like Quarto with R/Python and Github.

- Standardized Data Requests: Ensuring data requests are made in similar formats with consistent interpretation and upload requirements facilitates data sharing and analysis.
- Fine and Low-Resolution Data: Fine-resolution data can be shared and included in analyses with sufficient notice, while lower-resolution/summarized data is more easily shared.
- Data Pipeline: Developing a data pipeline makes data accessible for downscaled use in other spatial management domains, such as related to National Marine Sanctuaries, BOEM wind call areas, or State MPAs.
- Funding and Collaboration: Funding opportunities are sought to contribute to the reports, and collaboration is sought to modernize report creation and develop custom-tailored indicators based on research.
- Staffing and Leadership: Hiring personnel to support report creation and rotating leadership to reduce burnout are important considerations.
- Enhanced Data Integration: Improving the process for incorporating data into the reports and facilitating single, shared data submissions or automated grabs from data repositories like ERDDAP is essential.
- Collaborative Synthesis: Group contributions and collaborative synthesis of data can enhance the reporting process and lead to greater operational coherence between reports.

Timeline of reports

During the discussion, participants explored the timeline of the reports, specifically focusing on the CalCOFI SOTCC and its alignment with the CCIEA ESR timelines. One participant described how the CalCOFI SOTCC used to be scheduled from March to December, but with the transition to Frontiers in Marine Science, the timeline has shifted, and the report now gets published in June.

There was a proposal to bring the CalCOFI SOTCC in line with the ESR timeline, which begins with an "Around the Horn" meeting in August where participants provide their take on the system's recent happenings. In September, the ESR leads discuss potential themes that may have emerged. From October to December, they wait for data to come in and then write the ESR sections in the order the data arrives. By February, they have the first draft ready for internal review.

The idea of having the CalCOFI SOTCC follow the ESR timeline gained support. The participants agreed that it would reduce duplication of effort and ensure that the data request processes are similar for both reports. The ESR timeline could work well for CalCOFI, and they could even have CalCOFI-specific data calls for indices not included in the ESR.

To facilitate this alignment, the ESR draft could be ready by January, allowing enough time to identify potential themes for the CalCOFI SOTCC. Depending on the theme, a suitable lead author could be chosen, which would also prevent overlapping requests for data. Additionally, participants suggested having expert teams provide monthly updates at CCIEA meetings to enhance collaboration and information sharing.

Participants also discussed the timing of the CalCOFI conference and how it could be used as a platform to present an almost finished SOTCC report. By having the CalCOFI meeting in May it could leave enough time to gather additional information and ideas that could be incorporated into the final report. This would allow for an iterative process and more cohesive reports.

Regarding figures in the reports, some concerns were raised about consistency. The ESR figures remain the same over time, while the CalCOFI SOTCC figures change as the team recreates them. Consistency is desired for supplementary material in the SOTCC. The idea of having several articles in *Frontiers*, like a special issue, when warranted, was also discussed, reminiscent of the former CalCOFI Journal's approach.

Overall, the participants agreed on the benefits of aligning the timelines, reducing duplication of effort, and fostering better collaboration between the reports. They shared ideas to streamline data collection, analysis, and reporting, aiming for more efficient and cohesive reports in the future. Participants came to an integrated, shared timeline for the two reports (Figure 2).

Report	Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
CCIEA/SOTCC	Data year	X	X	X	X	X	X	X	X	X	X	X	X							
SOTCC	Pick SOTCC new authors at annual meeting & discuss at annual CalCOFI meeting					X														
CCIEA/SOTCC	Round the horn: presentations with anyone who wants to talk about their data							X												
CCIEA/SOTCC	CCIEA Narrative group theme discussion								X											
CCIEA/SOTCC	Initial Data call to get data in by Dec									X										
CCIEA/SOTCC	Final data call												X							
CCIEA ESR	Report writing											X	X							
CCIEA ESR	Final data call												X							
CCIEA ESR	CCIEA Themes lead discussion											X	X							
CCIEA ESR	CCIEA Themes group discussion (last theme chance)											X	X							
CCIEA ESR	1st draft											X	X							
CCIEA ESR	Submit final to PFMC												X							
CCIEA ESR	Council meeting final ESR presentation*													X						
SOTCC	Round the horn 2: SOTCC Narrative Discussion														X					
SOTCC	CalCOFI specific data call initial													X						
SOTCC	Manuscript writing													X	X	X	X			
SOTCC	CalCOFI meeting to present finished SOTCC & and discuss horizon for coming year													X	X	X	X			
SOTCC	Manuscript submitted													X	X	X	X			
SOTCC	What worked/debrief meeting for SOTCC																			X

Figure 2. Integrated timeline for the CCIEA ESR and the SOTCC reports.

Closing

During the closing session for the day, participants agreed upon the continuation of the annual CalCOFI SOTCC report, with the option to skip a year if necessary. They acknowledged that the guiding theme, "Ecosystem Response to Climate Variability," provides a good overarching focus for the SOTCC report.

The discussion then shifted to the process of selecting lead authors for future reports. One suggestion was to hold a session during the CalCOFI conference to identify the next year's lead author. It was proposed to train a more junior person, such as a postdoc or early-career researcher, each year, allowing them to take on the lead author role in the following year. This approach would offer career development opportunities, access to other leads along the coast, and serve as a networking tool.

To attract more lead authors, participants suggested spreading the word about the support network available to them, including the monthly CCIEA meetings.

The idea of having two staggered lead authors (a lead author and a vice-lead author) was also raised to share the workload, provide continuity, and facilitate institutional knowledge transfer.

The discussion then revolved around how to attract potential lead authors. It was noted that some newer members of the community may not be familiar with the

selection process, and there was a need to clarify that NOAA personnel were not the only eligible lead authors. In the past, SIO PIs from relevant departments took turns leading the report, but the dynamics have changed since then. To engage SIO grad students and researchers from relevant labs, a hybrid approach was suggested, with an idea in mind to solicit authors based on the report's focus in a given year, as well as more openly soliciting interest. It was also proposed to explore postdoctoral opportunities related to ecosystem management and collaborate with FTEs at other agencies.

The conversation concluded with an emphasis on the significant commitment required for the lead author role and the importance of having support from agencies and institutions to undertake such responsibilities. The closing discussion highlighted the importance of continuing collaboration and fostering a strong network of contributors for future reports.

Day 2: Envisioning a shared data flow

Opening & Day 1 Recap

During the recap of Day 1, significant progress was made in shaping the vision for data sharing across ecosystem reports. The participants decided that the SOTCC report would be published as a peer-reviewed article and would be released annually, with the option to skip a year if necessary. The target audience for the SOTCC was defined, comprising scientists, with the CCIEA ESR consisting of practitioner/managers and representatives from the Pacific Fishery Management Council (PFMC). However, the scope of the SOTCC report was left somewhat open, allowing the lead author and the ecosystem to influence the thematic focus each year.

In terms of content, it was determined that the SOTCC report would consist of a main section and a supplementary section. The form of the supplement was discussed, ranging from a technical memo to an online repository. Additionally, the possibility of using the Ecosystem Status Reports (ESR) as a supplement was explored.

The process of selecting a lead author for the SOTCC was carefully considered, and the idea of having a mentor for the lead author to ensure a seamless transition between reports gained approval. The group expressed a desire to attract new researchers such as through advertising the opportunity for contribution and to

increase SIO students' participation in the report-writing process, fostering greater collaboration and engagement.

The handling of unused time series data emerged as an important topic, prompting suggestions to address this during the data discussion. Some participants highlighted the existence of one-off time series data that could be valuable but currently remain unused, leading to the idea of revisiting data contributors' concerns through a survey.

Data flow & requirements

During the meeting, several presentations were made to discuss the data flow and requirements for the SOTCC and the CCIEA ESR. Ed Weber emphasized the straightforward but primitive process of acquiring data for the report, which involves emailing data contributors until the required data is received. However, the focus of the meeting was on the internal data flow, particularly regarding core data going back to at least 1951, such as CTD and bottle hydro data and zooplankton data being sent to SIO, and ichthyoplankton data going to NMFS. The net tows and bottle casts were clarified as not being a 1:1 match in space, and Ben Best highlighted his work on the interface to streamline data accessibility. Marina Frants, Ed Weber, and Ben Best explained the improved CalCOFI data server that is under development, involving the use of Google Cloud Platform, virtual machines, Docker containers with relational databases, and R code to process various data types. Although the CalCOFI data is a subset of the data that feeds into the SOTCC, it was presented as an example of a data workflow. Challenges with older data being messy were mentioned, and relationships between data tables were described in a hierarchical manner.

Lynn de Witt and Nick Tolimieri discussed the workflow for the CCIEA ESR, highlighting the compilation and integration of data from numerous scientists within a limited timeframe. The requirement for "Tidy" data (standardized column names and self-contained CSV files) was emphasized, making data accessible through ERDDAP and benefiting data providers by eliminating the need for email communication. The ESR workflow uses Rmarkdown to scrape data from websites, download data, and generate figures in a standardized way. The convenience of using "Tidy" data for this process was highlighted, leading to rendering reports in various formats, including Word and PDF.

Regarding SOTCC and CCIEA ESR, it was acknowledged that both reports deal with derived data, but the ESR focuses on indices relevant for management, while the SOTCC is a new and unique journal article. The idea of leveraging the ESR process for data shared between reports was discussed, with the plan to use standardized plots and supplement the SOTCC with live data while maintaining the data's availability.

During the discussion, questions were raised about standardized data requirements and how to communicate them to data providers. It was noted that early decisions by CCIEA played a role in establishing these standards, but automation helped reinforce adherence to them. The participants came together around a shared initial set of data requirements (Figure 3), a shared data flow (Figure 4), and immediate next steps (Box 2) for the ecosystem reports.

<i>Requirements</i>	CCIEA ESR	SOTCC
Data types	Mainly indices/ derived datasets	Useful raw and other derived data sets
Pipeline	Already has good pipeline set up	Can build off of CCIEA ESR pipeline and see what isn't included Can work to support raw → analyzed data part of the pipeline
Data	Strict data requirements (vetted by Science and Statistical Committee (SSC) , sometimes also Ecosystem Working Group)	More open to different data types (but generally want long time series (e.g., >5+ years))
Data status	Develop an inventory of datasets contributed	
Code (reproducibility)	Common code library- github link	Common repository
Metadata	Include & need document that describes metadata requirements (metadata profile for ERDDAP, IEA Uploader; EML and other metadata standards depending on data type); generate programmatically)	

Figure 3. Initial dataflow requirements for the CCIEA ESR and the SOTCC.

CCIEA ESR & SOTCC shared data flow

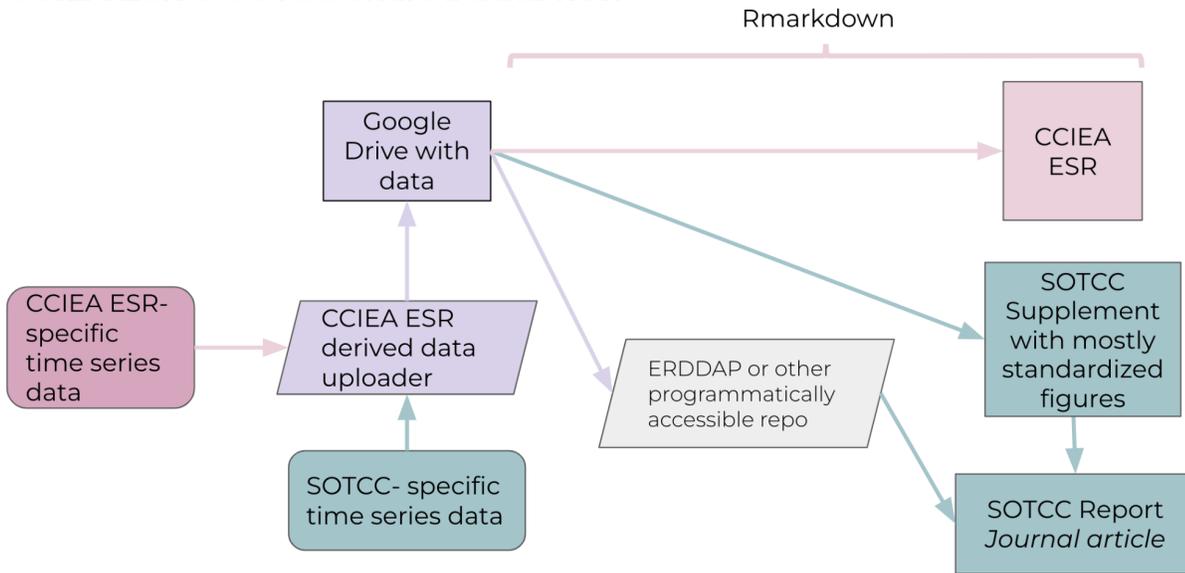


Figure 4. Initial vision of a shared workflow for the CCIEA ESR and the SOTCC. Operationalizing the integrated data system

During the discussion on operationalizing the integrated data system, broad recommendations were made to enhance data management and integration for the reports. The focus was on understanding the needs of data providers and what information is most relevant for the reports. It was suggested to talk to each data provider to identify signals in their data and make a case for the inclusion of their data.

The participants highlighted the importance of including non-time series information, such as marine heat waves, and finding ways to create time series from relevant data. The SOTCC was viewed as being more effective if it could utilize data from the CCIEA ESR and the integration of data from both reports was discussed.

Box 2. Data flow next steps

1. Inventory of CCIEA ESR & SOTCC datasets
2. Identify & start with overlapping data sets (CCIEA ESR and SOTCC)
3. Work out entry of time series that are in SOTCC but not CCIEA ESR
4. Deal with non-time-series contributions manually for now
5. Ultimately, work to get datasets online and programmatically accessible

Regarding data availability, options were considered to publish data with a DOI from a GitHub repository on platforms like Zenodo to ensure reproducibility and transparency. It was proposed to have the data available on the CCIEA website as well, beyond just reporting to the Pacific Fishery Management Council (PFMC).

The discussion also touched upon resourcing, support, and partnerships needed for the integrated data system. Participants recognized the value of having a dedicated person working across all data streams to ensure smooth integration. Collaborative efforts involving more people were acknowledged, but it was noted that this could lead to slower progress.

Ideas to support integration across reports included having graduate students help with specific writing sections, providing more programmatic support for report production, and automating figures to lighten the load for authors. The need for a better backbone support personnel for the SOTCC and increased funding opportunities for eco-informatics work were also emphasized. Participants expressed the importance of raising awareness and discussing data integration efforts. Funding opportunities for open data science and management work were explored, including NSF POSES, NCEAS, BOEM, Facebook, Bill & Melinda Gates Foundation, and partnerships with fellowships, interns, and students such as through the Environmental Data Initiative (EDI).

Other products & future vision

During the discussion, participants explored various ideas for other products and future visions related to the ecosystem reports and data dissemination. They emphasized the importance of making the information from the ecosystem reports accessible to a broader audience and considered working with communication experts for better outreach. Real-time narratives on the IEA website, with engaging examples like HABS and dolphins, were proposed to keep the public informed about the California Current. Short summaries for the public with links to detailed data were also suggested. The group discussed involving communication experts in meetings to identify themes for public interest. Collaboration with the California Department of Fish and Wildlife (CDFW) for data contribution was considered, along with collaboration for educational initiatives for K-12 students. The importance of networking with glider experts and addressing climate change in future reports was highlighted. Potential funding opportunities for modeling and analysis projects were

mentioned. Overall, the participants expressed a desire for enhanced communication, educational outreach, and wide data dissemination, while maintaining robust data management practices.

Closing & Discussion of Deliverables

During the discussion, participants identified several key deliverables that would enhance the effectiveness of the integrated data system, improve collaboration between the State of the California Current (SOTCC) and the Ecosystem Status Reports (ESR) teams, and increase the visibility and impact of the SOTCC report within the research community and beyond.

One of the main deliverables is the creation of requirements/considerations documents. These documents will outline specific needs and expectations from data providers, such as details about the data, necessary columns, and the source data. This will ensure a clear understanding of what data is required for both the SOTCC and the CCIEA ESR and facilitate smooth data integration.

Another important deliverable is the shared data flow document. This document will identify the next steps in the data integration process, the current status of data, where the data reside, and the code necessary for analysis. It will help coordinate data sharing and ensure that the two reports are aligned in terms of data utilization.

To improve efficiency and consistency, the participants emphasized the need to develop a common code library for the ESR. The ultimate goal is to have a button that can pull data from either report, streamlining the analysis process.

Communication and coordination between the SOTCC and ESR teams were also highlighted as crucial. Additional meetings during the reporting seasons will allow the groups to share information, be aware of new data streams, and ensure the reports are coordinated and complementary. The lead authors of the SOTCC will also participate in weekly small group meetings with the ESR writing team. To enhance the reach and accessibility of the SOTCC report, the participants suggested creating an elevator pitch-type message or summary that defines the report to the community. This will help convey the report's purpose and significance to a broader audience and encourage more researchers to contribute. Furthermore, the participants proposed creating highlights or an executive summary for the SOTCC, similar to what the ESR

already does. This content can be presented in visually appealing formats, such as infographics, to effectively convey key findings and insights from the report.

Overall, the identified deliverables aim to streamline the data integration and reporting process, promote effective communication and collaboration, and make the reports more accessible and impactful within the research community and beyond.

Recommendations & Action items

1. Create opportunities for collaborative meetings between SOTCC & CCIEA ESR to align reports

- 1.1 Broaden IEA monthly meetings to include SOTCC folks which can help for all contributors to understand the context of data
- 1.2 Include specific SOTCC & CCIEA ESR meetings during the reporting season/writing time
- 1.3 CCIEA ESR leads & SOTCC leads meetings

2. Follow shared timeline (Figure 2) & data flow (Figure 4) for integration/iteration

3. Conduct data inventory of datasets/streams that are part of (or could be part of) each report

- 3.1 Conduct & update data inventory for CCIEA, SOTCC, and those datasets not included in either to assess flow of each datastream
- 3.2 Document the overlap in parameters between long-term observing programs along W. Coast

4. Conduct a survey of data providers to understand needs and priorities (e.g., one stop submission, usage, serving issues, publication goals). This will help with refining data pathways & understanding of readiness

5. Enhance collaboration across reports, long term observing programs, data science programs, and other related organizations

- 5.1 Continue to enhance camaraderie, integration, collaboration among CalCOFI collaborative programs, SOTCC contributors, CCIEA ESR contributors, and other relevant long term ocean observing/monitoring programs
- 5.2 Collaborate with data science programs (e.g., MEDS program, EDI, UCSB project), such as through capstone projects

- 5.3 Collaborate with entities working on similar efforts (e.g., CASG, SCCOOS (IOOS), National Marine Sanctuaries (NMS), PMEL Data division)
- 6. Request that data providers provide link to raw data (ideally hosted online); code to generate summarized data; summarized data; and graphics** to make process more transparent
 - 6.1 Operationalize broader data flow & support in getting the derived and/or raw/unsummarized data openly available; code available for how the derived data was generated; with 'guard rails' for appropriate use (e.g., time/spatial resolution)
 - 7. Continue to work toward automation of report content** (e.g., shared code, reusable functions, figures)
 - 8. Provide training & professional development related to data serving and management**, which could either be sharing existing opportunities or generating new trainings, if necessary.
 - 9. Explore funding opportunities related to data management & data science training**
 - Develop a funding profile for the SOTCC to solicit additional funding
 - 10. Develop future collaborative workshops**, modeled after this workshop, for further process and workflow development
 - 11. Collaboratively generate a data science terminology document**/list of data/information definitions (summarized, non-summarized/raw, figures, tables, derived data, etc.)
 - 12. Develop a short 'elevator pitch for the SOTCC** that is included in each SOTCC
 - 12.1 Ask if Frontiers editor should provide a short description for reviewers?
 - 12.2 In the beginning of each article describe what is in the SOTCC to help readers understand what it is.
 - 13. Create a highlights/graphic for the SOTCC** (similar to the CCIEA ESR (visual summary))

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Volunteers & Support : Michaela Alksne, Nastassia Patin, Zack Gold, Ben Best, Lynn deWitt, Jenn Brown, Rachael Blake, & SWFSC technicians,

Speakers & Participants: see Appendix 1

Recommended Citation

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Appendix 1. Agenda & Participant list

CalCOFI & CCIEA Workshop 2023

Participant Agenda

Harmonizing U.S. West Coast Ecosystem Reports: CalCOFI State of the California Current Report & California Current Integrated Ecosystem Assessment Ecosystem Status Report Workshop

June 28-29, 2023

Hybrid: SWFSC Pacific Room & on zoom

San Diego, CA, USA

Call information included in calendar invite or email

Overview

The California Current Ecosystem is a unique and vital ecosystem that supports a wide range of marine life, from microscopic phytoplankton to large mammals, and coastal communities. In order to better understand the annual health of this ecosystem, two separate reports have been compiled, the CalCOFI State of the California Current Ecosystem Report (CalCOFI SOTCC) and the California Current Integrated Ecosystem Assessment Ecosystem Status Report (CCIEA ESR), each offering a comprehensive analysis of its status and trends and done in collaboration and parallel, but intended for different audiences and published in different venues. However, the data contributors/sources are often similar and much of the pipeline of information from data contribution to analysis could be more aligned and integrated.

This workshop aims to bring together experts from both reports including the current/potential data contributors, data analysts, and researchers, to share the history, drivers and objectives of each report; align their data collection and analysis processes; and leave with a shared dataflow, timeline, and plan for harmonization of the data that supports both reports. Jointly these efforts contribute to a shared, holistic overall understanding of the California Current. The workshop will consist of a series of presentations and group discussions.

Purpose/Goal

Harmonization and alignment of data workflows that support the CalCOFI State of the California Current Ecosystem Report (CalCOFI SOTCC) and the California Current Integrated Ecosystem Assessment Ecosystem Status Report (CCIEA ESR).

Deliverables:

Overview of the CalCOFI State of the California Current Ecosystem Report & California Current Integrated Ecosystem Assessment Ecosystem Status Report (document & graphic)

Integrated timeline of the CalCOFI State of the California Current Ecosystem Report & California Current Integrated Ecosystem Assessment Ecosystem Status Report

Requirements/considerations document for the shared data flow

Shared data flow diagram

Document of recommendations to operationalize the shared data flow

List of resources & Ideas for proposals to support this work

List of other products/future visions

Equipment needed

All participants are asked to bring a computer to the sessions since the event will be hybrid

Documents

Workshop Google drive:

https://drive.google.com/drive/folders/1jPU5o3SVNH2_M3mEtXhAcGC9n-GZ5xth

Planning Committee

Noelle Bowlin, Andrew Thompson, Ed Weber, Andrew Leising, Greg Williams, Rasmus Swalethorp, Elliott Hazen, Toby Garfield, Steven Bograd, Chris Harvey, Brice Semmens, Julia Coates, Briana Brady, Jameal Samhuri, Nick Tolimieri, and Erin Satterthwaite

Participant Agenda

<p style="text-align: center;">Day 1: Overview of the Ecosystem Reports <i>June 28th, 2023</i></p>		
<p><i>Questions/goal:</i> Understand the context/history of each report & the requirements of the data system we want to develop</p> <p><i>Deliverables for the day:</i> Overview of reports & integrated timeline of both reports (#1 & 2 above)</p>		
<p>8:30am - 9:00am <i>Registration table:</i> Nastassia Patin <i>Runner:</i> Andrew Thompson</p>	<p>Registration & check in</p>	<p>How to connect to WiFi here</p>
<p>9:00am - 9:30am <i>Speakers:</i> Andrew Leising, Erin Satterthwaite, Noelle Bowlin <i>Facilitator/Timekeeper:</i> Noelle Bowlin <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Ben Best</p>	<p>Welcome & goals of the meeting <i>Objective:</i> Participants understand the reason behind the workshop & the goals of the meeting <i>Presentation(s)/Activities:</i> Welcome [Noelle Bowlin & Erin Satterthwaite] - 5 mins Overview presentation [Andrew Leising] - 10 mins Q & A [Noelle Bowlin] - 5 mins Introductions from workshop participants [Noelle Bowlin] - 10 minutes</p>	<p><i>Important links:</i> Share your input here (Brainstorm document)</p>

	Total time: 30 minutes	
<p>9:30am - 10:25am <i>Speakers:</i> Andrew Thompson & Andrew Leising <i>Facilitator/Timekeeper:</i> Rasmus Swalethorp <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Ben Best</p>	<p>Ecosystem Reports: Presentations <i>Objective:</i> Participants understand the background of the two reports <i>Presentation(s)/Activities:</i> CalCOFI State of the California Current Ecosystem Report [Andrew Thompson]- 15 minutes CCIEA presentation [Andrew Leising] - 15 minutes Q & A [Rasmus Swalethorp] - 25 minutes Total time: 55 minutes</p>	
<p>10:25am - 10:50am <i>Helpers:</i> Michaela Alksne & SWFSC folks</p>	Break	

<p>10:50am - 11:30am <i>Discussion lead/Timekeeper:</i> Ed Weber <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Ben Best</p>	<p>Overview of the Ecosystem Reports: Discussion <i>Objective:</i> Discuss ecosystem reports & agree on direction for reports <i>Presentation(s)/Activities:</i> Introduction [Ed Weber] - 5 minutes Report discussion [Ed Weber] - 30 minutes Synthesize discussion [Ed Weber] - 5 minutes <i>Deliverable:</i> Overview of the CalCOFI State of the California Current Ecosystem Report & California Current Integrated Ecosystem Assessment Ecosystem Status Report (document & graphic) Total time: 40 minutes</p>	<p><i>Important links:</i> Ecosystem Report input here</p>
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<p>11:30am - 12:30pm <i>Speakers:</i> Bill Sydeman, Eric Bjorkstedt, & Sam Zeman <i>Facilitators/ Discussion leads/Timekeepers:</i> Rasmus Swalethorp & Elliott Hazen <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Ben Best</p>	<p>Overview of the Ecosystem Reports – Data providers: Presentation & Discussions <i>Objective:</i> Showcase and discuss who contributes to the reports, why, and what may facilitate (or hinder) contributions. Engage data providers in sharing their experiences in the process of providing data & information. <i>Presentation(s)/Activities:</i></p> <ul style="list-style-type: none"> Opening [Rasmus Swalethorp]- 5 minutes Perspectives talks - 20 minutes <ul style="list-style-type: none"> Bill Sydeman - 5 - 6 minutes Eric Bjorkstedt - 5 - 6 minutes Sam Zeman - 5 - 6 minutes Discussion [Rasmus Swalethorp & Elliott Hazen] - 20 minutes Synthesis of discussion [Rasmus Swalethorp] - 5 minutes Closing & California Sea Grant 50th Anniversary remarks [Erin Satterthwaite & Shauna Oh]- 5 mins 	<p><i>Important links:</i> Share your input here (Brainstorm document)</p>
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	Total time: 60 minutes	
12:30pm - 1:30pm <i>Helpers:</i> Jenn Brown & SWFSC folks	Lunch: California Sea Grant 50th Anniversary Celebration	
1:30pm - 2:05pm <i>Speakers:</i> Andrew Leising & Noelle Bowlin <i>Facilitators/Timekeepers:</i> Andrew Leising & Noelle Bowlin <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Zack Gold	Timeline of the reports: Presentations <i>Objective:</i> Understand the timeline of the two reports <i>Presentation(s)/Activities:</i> Opening on timeline & overview [Andrew Leising] - 10 minutes Integrated presentation on timeline of integrated CCIEA ESR & CalCOFI SOTCC [Andrew Leising & Noelle Bowlin] - 15 minutes Q & A [Andrew Leising] - 5 minutes Closing [Noelle Bowlin] - 5 minutes Total time: 35 minutes	

<p>2:05pm - 3:00pm <i>Discussion leads/Timekeepers:</i> Andrew Leising & Noelle Bowlin <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Elliott Hazen <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Zack Gold</p>	<p>Timeline of the reports: Discussion <i>Objective:</i> Develop a shared timeline for the two reports <i>Presentation(s)/Activities:</i> Introduce the activity [Noelle Bowlin] - 5 minutes Collaboratively work on a shared timeline [Andrew Leising & Noelle Bowlin]- 35 minutes Review & discuss final timeline [Andrew Leising] - 15 minutes <i>Deliverable:</i> An integrated timeline for the reports Total time: 55 minutes</p>	<p><i>Important links:</i> Share your input here (Brainstorm document)</p>
<p>2:45pm - 3:00pm <i>Helpers:</i> Michaela Alksne & SWFSC folks</p>	<p>Break</p>	
<p>3:00pm - 3:30pm <i>Discussion leads:</i> Ed Weber & Andy Leising <i>Facilitator/Timekeeper:</i> Noelle Bowlin <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Elliott Hazen <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Zack Gold</p>	<p>Overview of deliverables & closing Recap & finalize deliverables for the day [Noelle Bowlin] Overview doc & graphic [Ed Weber] Timeline [Andy Leising] Overview of Day 2- walk through agenda & ask for</p>	<p><i>Important links:</i> Share your input here (Brainstorm document)</p>

	input [Noelle Bowlin] Thank you & Closing [Noelle Bowlin & Erin Satterthwaite] Total time: 60 minutes	
6:45pm - 8:00pm	No-host dinner @ Brocktown Villa, La Jolla <i>Please let Erin know by June 23rd if you want to join</i>	

Day 2: Envisioning a shared data flow <i>June 29th, 2023</i> <i>Questions/goal: How do we develop a data flow/process that can support both reports?</i> <i>Outcomes: Requirements of the shared data flow & a conceptual diagram of the shared data flow</i>		
8:30am - 9:00am <i>Registration table: Michaela Alksne Runner: Ed Weber</i>	Registration & check in	
9:00am - 9:10am <i>Facilitator/Timekeeper: Andrew Leising Virtual liaison (in person): Noelle Bowlin Virtual liaison (online): Zack Gold Notetaker 1: Julia Coates Notetaker 2: Zack Gold</i>	Welcome & overview of the day <i>Objective: Recap Day 1 & introduce the vision/goals of Day 2 Presentation(s)/Activities:</i> Opening presentation [Andrew Leising]- 5 mins Q & A [Andrew Leising] - 5 mins Total time: 10 minutes	Interactive Documents here

<p>9:10am - 10:15am <i>Speakers:</i> Marina Frants, Ben Best, Ed Weber, Lynn DeWitt, Nick Tolimieri <i>Facilitator/Timekeeper:</i> Rasmus Swalethorp <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Zack Gold</p>	<p>Data Flow: Presentations <i>Objective:</i> Participants understand the current data flow/pipeline of the two reports, the improvements, and our vision for the future <i>Presentation(s)/Activities:</i> State of the California Current/CalCOFI data flow joint presentation [Marina Frants & Ben Best & Ed Weber] - 20 minutes CCIEA data flow joint presentation [Lynn deWitt & Nick Tolimieri] - 20 minutes Q & A [Rasmus Swalethorp] - 20 minutes Total time: 60 minutes</p>	
<p>10:30am - 10:45am <i>Helpers:</i> Nastassia Patin & SWFSC folks</p>	<p>Break</p>	
<p>10:45am - 11:15am <i>Facilitators/Timekeepers:</i> Andrew Thompson & Elliott Hazen <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Zack Gold</p>	<p>Data flow – Requirements: Discussion <i>Objective:</i> Discuss data flow for ecosystem reports <i>Presentation(s)/Activities:</i> Open with the goals of the session [Andrew Thompson] - 5 minutes Discuss the requirements/ the integrated vision for the data flow [Andrew Thompson & Elliott Hazen & Lynn deWitt] - 25 minutes Synthesize discussion [Elliott Hazen] - 5 minutes <i>Deliverable:</i> A document detailing the requirements/considerations of the integrated data flow/system Total time: 30 minutes</p>	<p>Interactive Documents here</p>

<p>11:15am - 12:00pm <i>Discussion leads/Timekeepers:</i> Rasmus Swalethorp & Andrew Leising <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Zack Gold</p>	<p>Data flow – Toward a shared framework: Discussion <i>Objective:</i> Develop a shared data flow framework for the two reports <i>Presentation(s)/Activities:</i> Review the strawman data flow for the two reports [Andrew Leising] - 5 minutes Collaboratively work on the strawman data flow [Rasmus Swalethorp & Andrew Leising] - 25 minutes Discuss the strawman [Rasmus Swalethorp] - 10 minutes Edit the strawman based on discussion [Rasmus Swalethorp] - 10 minutes Final review & discussion [Andrew Leising]- 10 minutes <i>Deliverable:</i> A conceptual diagram/framework of a shared data flow Total time: 60 minutes</p>	<p>Interactive Documents here</p>
<p>12:00pm - 12:45pm <i>Discussion lead/Timekeeper:</i> Toby Garfield <i>Virtual liaison (in person):</i> Noelle Bowlin <i>Virtual liaison (online):</i> Zack Gold <i>Notetaker 1:</i> Julia Coates <i>Notetaker 2:</i> Zack Gold</p>	<p>How to operationalize the integrated data system – Broad Recommendations: Discussion <i>Objective:</i> Discuss what is needed to operationalize/implement the vision of an integrated system & recommendations to achieve the vision <i>Presentation(s)/Activities:</i> Opening - recap our vision of a data flow [Toby Garfield]- 10 minutes Discussion [Toby Garfield] - 30 minutes Closing [Toby Garfield] - 5 minutes</p>	<p>Interactive Documents here</p>

	<p><i>Deliverable:</i> Document of recommendations of what needs to happen for the data flow/timeline to be a reality</p> <p style="text-align: right;">Total time: 45 minutes</p>	
<p>12:45pm - 1:45pm <i>Helpers:</i> Jenn Brown & SWFSC folks</p>	<p>Lunch Question to ponder during lunch: <i>What else is needed to implement this shared data flow?</i></p>	
<p>1:45pm - 2:30pm <i>Discussion lead/timekeeper:</i> Noelle Bowlin <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Elliott Hazen <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Ben Best</p>	<p>How to operationalize the integrated data system – Resourcing, Support, & Partnerships: Discussion <i>Objective:</i> Understand what resources could support the vision of an integrated system <i>Presentation(s)/Activities:</i> Opening - Recap vision of a shared data flow [Noelle Bowlin]- 5 minutes Discussion [Noelle Bowlin] - 35 minutes Closing [Noelle Bowlin] - 5 minutes</p> <p><i>Deliverables:</i> List of resources (e.g., RFPs, people, etc.)</p> <p style="text-align: right;">Total time: 45 minutes</p>	<p>Interactive Documents here</p>
<p>2:30pm - 3:00pm <i>Helpers:</i> Nastassia Patin & SWFSC folks</p>	<p>Break</p>	

<p>3:00pm - 3:35pm <i>Discussion leads:</i> Andrew Thompson, Elliott Hazen, Rasmus Swalethorp, and Toby Garfield <i>Facilitator/Timekeeper:</i> Andrew Thompson <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Elliott Hazen <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Ben Best</p>	<p>Overview of deliverables: Discussion <i>Objective:</i> Come to final agreement on deliverables and outcomes from Day 2 & who would like to help with each <i>Presentation(s)/Activities:</i> Recap & finalize deliverables for the day & include names of people interested in supporting to further develop each [Andrew Thompson] - 5 minutes Requirements/considerations documents [Andrew Thompson & Elliott Hazen] - 10 minutes Shared data flow [Rasmus Swalethorp] - 10 minutes Recommendations document [Toby Garfield] - 10 minutes Total time: 35 minutes</p>	<p>Interactive Documents here</p>
<p>3:35pm - 4:15pm <i>Facilitator/Timekeeper:</i> Noelle Bowlin <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Elliott Hazen <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Ben Best</p>	<p>Other products & future visions: Discussion <i>Objective:</i> Discuss other visions and aspirations related to ecosystem reports <i>Presentation(s)/Activities:</i> Opening/goals of session [Noelle Bowlin]- 5 minutes Discussion [Noelle Bowlin]- 30 minutes Closing [Noelle Bowlin]- 5 minutes Total time: 40 minutes</p>	<p>Interactive Documents here</p>

<p>4:15pm - 4:30pm <i>Facilitator/Timekeeper:</i> Noelle Bowlin <i>Virtual liaison (in person):</i> Lynn deWitt <i>Virtual liaison (online):</i> Elliott Hazen <i>Notetaker 1:</i> Briana Brady <i>Notetaker 2:</i> Ben Best</p>	<p>Closing [Noelle Bowlin] Total time: 15 minutes</p>	

Participants

in person or online	First Name	Last name	Institution	Long-term observing program
in person	Michaela	Alksne	Scripps Institution of Oceanography	California Cooperative Oceanographic Fisheries Investigation (CalCOFI)
in person	Ben	Best	EcoQuants; CalCOFI	CalCOFI data and visualization support
in person	Eric	Bjorkstedt	NOAA Southwest Fisheries Science Center	Trinidad Head Line
in person	Noelle	Bowlin	NOAA Southwest Fisheries Science Center	CalCOFI
in person	Jennifer	Brown	ECOS Consulting NOAA Channel Islands and Monterey Bay National Marine Sanctuaries	
in person	Lynn	deWitt	Southwest Fisheries Science Center/Environmental Research Division	
in person	Marina	Frants	Scripps Institution of Oceanography	California Cooperative Fisheries Investigation
in person	Toby	Garfield	SWFSC	ESR

in person	Jaime	Jahneke	Point Blue Conservation Science	Farallon Island Program (Point Blue's SEFI seabird population, productivity and diet long term data) and Applied California Current Ecosystem Studies (ACCESS; physical, chemical, biological monitoring off central California)
in person	Andrew	Leising	SWFSC	CalCOFI
in person	Megan	Medina	Southern California Coastal Ocean Observing System	Southern California Coastal Ocean Observing System
in person	Danielle	Muller	UC San Diego, Scripps Institution of Oceanography	Southern California Coastal Ocean Observing System
in person	Nastassia	Patin	Scripps Institution of Oceanography	CalCOFI
in person	Erin	Satterthwaite	California Sea Grant, SIO/UCSD	CalCOFI
in person	Rasmus	Swalethorp	SIO	CalCOFI
in person	Andrew	Thompson	SWFSC	CalCOFI
in person	Jayden	Tumiwa	Scripps Institution of Oceanography	
in person	Ed	Weber	NOAA SWFSC	CalCOFI
online	Anna	Bolm	Oregon State University	Newport Hydrographic Line & Northern California Current Ecosystem Survey
online	Briana	Brady	CDFW	
online	Ian	Brunjes	Southern California Coastal Ocean Observing System	SCCOOS
online	Melissa	Carter	University of California, San Diego; Scripps Institution of Oceanography	Shore Stations Program & SCCOOS HABMAP & SCCOOS Automated Shore Stations
online	Katie	Cieri	California Ocean Protection Council	
online	Julia	Coates	California Department of Fish and Wildlife	CDFW Marine Landings Data System

online	John	Field	SWFSC/NMFS	Rockfish Recruitment and Ecosystem Assessment Survey
online	Zachary	Gold	NOAA PMEL	West Coast Ocean Acidification Cruise
online	Tom	Good	NWFSC	
online	Chris	Harvey	NOAA Fisheries Northwest Fisheries Science Center	
online	Elliott	Hazen	SWFSC	
online	Brian	Hoover	Farallon Institute	
online	Kym	Jacobson	NOAA Fisheries, Northwest Fisheries Science Center	Newport Hydrographic Line and NWFSC Juvenile Salmon and Ocean Ecology Survey
online	Nate	Mantua	NMFS SWFSC	
online	Stephanie	Oakes	NMFS	
online	Rachael	Orben	Oregon State University	Yaquina Head Seabird Monitoring
online	Jameal	Samhuri	NOAA Northwest Fisheries Science Center	OCNMS Kelp Forest Surveys
online	Isaac	Schroeder	UCSC	
online	William	Sydeman	Farallon Institute	CalCOFI, RREAS, Alcatraz Seabirds
online	Brendan	Sylvander	NOAA Northwest Fisheries Science Center	
online	Nick	Tolimieri	NOAA / NWFSC	CCIEA - ESR
online	Greg	Williams	NOAA/NWFSC	
online	Samantha	Zeman	Oregon State University, CIMERS	Newport Hydrographic Line

