

ICES
CIEM

PICES-ICES WG53/WGSPF meeting (May 2026)

Activity 10: Social-ecological analysis

Activity leaders: **Isaac Kaplan**, Sun Peng, Jaclyn Cleary, Nadine Heck, and Mary Gasalla

Questions (focus) within the activity:

This is a cross-cutting group considering social-ecological analyses of small pelagic species (SPF) and fisheries. Topics of interest include quantitative bioeconomic modeling in various forms, comprising end-to-end modeling and vulnerability and risk assessments utilizing stakeholder generated data. Specifically, one new area of interest focuses on incorporation of Traditional Ecological Knowledge and Objectives from indigenous communities or stakeholders. Another possible area of interest would be to investigate options for modeling fleet behavior for transboundary stocks and, in particular, how to evaluate options for international management and cooperation. Game theory models may be one avenue for this, coupled to new understanding of fish spatial distributions, and projections of how these may change in the coming decades. **Activity members are also interested in studies of human community vulnerability, adaptation of small-scale pelagic fisheries to multiple stressors**, and further integration with the ICES Human Dimensions Steering Group.

Activity 10: Social-ecological analysis

Theme 1 : *Human dimensions, communities, and wellbeing, especially related to Small Pelagic Fish (SPF).*

Foci: *1) Food security/availability, 2) Adaptation of small-scale pelagic fisheries to multiple stressors, 3) Indigenous/traditional knowledge and objectives*

Literature and Starting Points:

- Paterson, B., Isaacs, M., Hara, M., Jarre, A., & Moloney, C. L. (2010). Transdisciplinary co-operation for an ecosystem approach to fisheries: a case study from the South African sardine fishery. *Marine Policy*, 34(4), 782-794.
- Kim, S. (2010). Fisheries development in northeastern Asia in conjunction with changes in climate and social systems. *Marine Policy*, 34(4), 803-809.
- [SPF 2022 Lisbon symposium, Session 7](#). Advancing Social-ecological Analyses and Sustainable Policies for Human Communities Dependent on SPF (Bahri, Gasalla, Makino, Peck, Ojea, Gutierrez)
- [ECCWO 2023 Symposium](#)
 - [Session 9](#): Transitioning from Vulnerable to Resilient and Viable Fisheries Social-Ecological Systems (Maltby, Alves, Eurich, Nayak, Mills, Mukherjee)
 - [Session 16](#): Emerging challenges in socio-ecological systems brought about by climate-related ecosystem changes and how to equitably manage them (Seary, Frawley, Quezada, Selim)



Activity 10: Social-ecological analysis

Theme 2: *Transboundary management issues and game theory, especially small pelagics:*

Proposal: *Conduct a review paper of modeling methods that can be used to “stress test” international management of shifting transboundary small pelagic fish stocks.*

Relevant literature:

- Cisneros-Montemayor, A. M., Ishimura, G., Munro, G. R., & Sumaila, U. R. (2020). Ecosystem-based management can contribute to cooperation in transboundary fisheries: the case of pacific sardine. *Fisheries Research*, 221, 105401.
- Sumaila, U. R., Palacios-Abrantes, J., & Cheung, W. W. (2020). Climate change, shifting threat points, and the management of transboundary fish stocks. *Ecology & Society*, 25(4).
- Bjørndal, T., & Munro, G. R. (2021). A game theoretic perspective on the management of shared North Sea fishery resources: pre and post Brexit. *Marine Policy*, 132, 104669.



Activity progress: meetings

- Sept 25, 2025: Meeting with *Reimagining Food Systems – Small Fish and Climate Change component (RFS-SFCC) and allied projects.*
 - 21 participants
 - Topics around flow of small pelagic fish to inland markets, small scale fisheries, equity, responses to boom/bust, and political ecology of small scale fishery access in W Africa, India, and African lakes.
 - Relevant to SPF Symposium presentations by Sarre, Balde, Tanstad and many others.

- January 12th Activity 10 meeting, then email exchanges

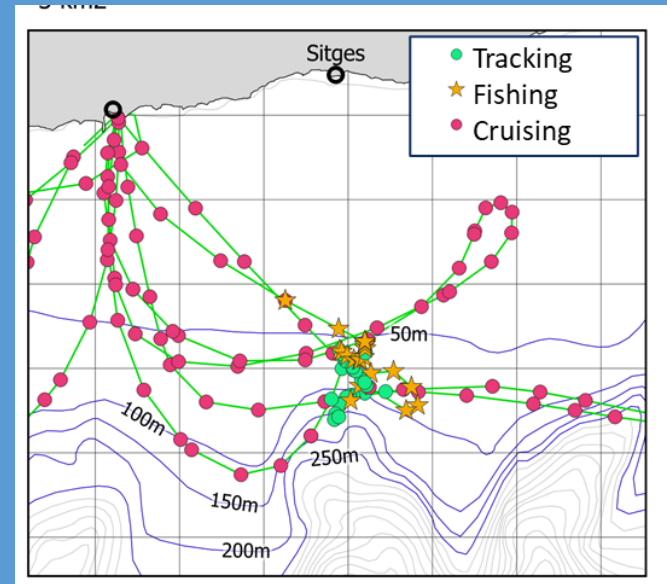
- Trying to recruiting student via Univ de Concepcion (Chile),
 - FishSet spatial discrete choice model for SPF, fit to Global Fish Watch data and species distribution models (US, Chile,). Maybe using new ICES logbook database?)
 - **Theme 2:** Transboundary management issues and game theory, especially small pelagics



Activity progress: meetings

- Hosted Session 9 at SPF Symposium
 - 11 talks, 2 posters, 1 Collaborative Serious Game for ecosystem-based management
 - 7 countries, 8 talks by Early Career Ocean Professionals!
 - Topics including fisher behavior from models and interviews, machine learning for classifying vessel operation types, Blue economy, fisher switching and diversification, MPA design, data quality (slipping, discards, self-reporting)
- Code repositories
 - Quezada: <https://github.com/fquezadae/Impact-of-Environmental-Variability-on-Harvest>
 - Sala-Coromina et al: <https://zenodo.org/records/18466426>
 - <https://prioritizr.net/>
 - Collaborative Serious Game

Machine learning methods for classifying purse seine vessel operations. Sala-Coromina et al. 2026, *Fish and Fisheries*.



Some relevant topics from SPF Symposium



- “Distal drivers” of SPF fishing: demographics, boat technology, whatsapp
- FAO guidelines on social responsibility and Decent Work
- Blue economy and equity: include indigenous knowledge, or adjust models, or explicitly model equity.
- SPF in 2050
 - Set SPF in the broader employment and labor landscape
 - Evaluate need for increased cooperative strategies, for transboundary SPF stocks (Environment changes)
 - Consider future scenarios with and without political collaboration



One path forward: Support PICES 2026 Session:

- **Session 6 – PICES Annual Meeting, October 2026**

Using ecosystem-scale information and machine-learning modeling approaches to understand climate change impacts on transboundary species in the North Pacific

Focusing on transboundary Pacific saury + chub mackerel, translate bio models to relevant economic outcomes?

Convenors:

- Dr Peng Sun, Dr Dongwha Sohn, Dr Kathryn Berry, Dr Caitlin Allen Akselrud, Dr Justin Suca



Activity progress: discussion

Points for discussion of the activity

- **Supporting session 6**, PICES Annual Meeting in October
- **Where does it go?** Tracing flow of small pelagics within and among nations (W Africa, California, + other nations)
- **Why share?** Evaluate future performance of transboundary SPF stocks with and without international collaboration (Modeling 2+ case studies)
- **Who benefits?** Including equity in ecosystem models following Bossier and Cisneros 2025 (Modeling 2+ case studies)

