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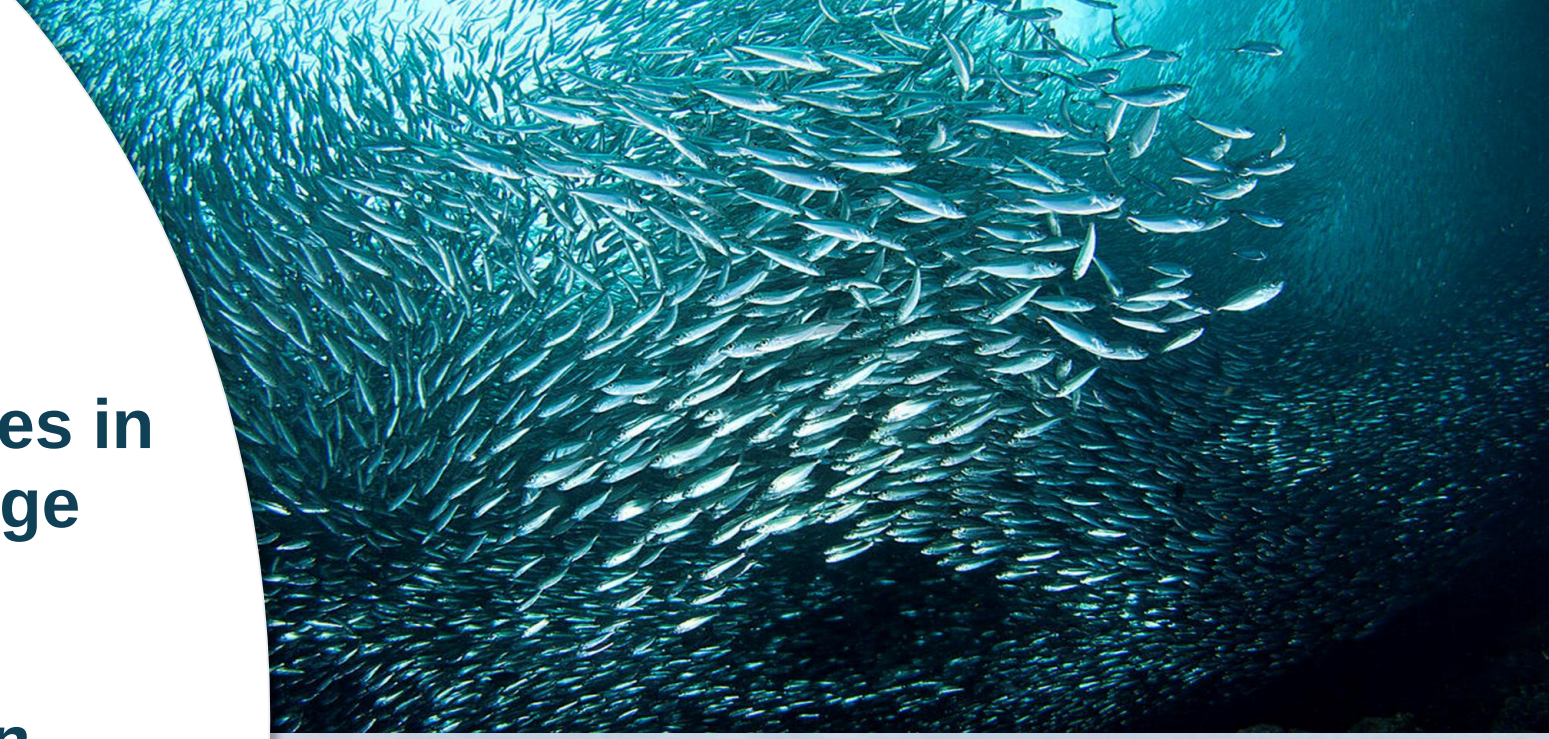
Encontrando soluciones que funcionan



Climate Change and Fisheries in the Humboldt Current Large Marine Ecosystem

Design of an Observation, Prediction and Early Warning System (SAPO)

Erica Cunningham, EDF Oceans

April 13, 2021

Outline

- Climate change and fisheries – what to consider?
- The Humboldt Current- a regional opportunity for climate resilient fisheries at scale
- How we capitalized on that opportunity to design SAPO

Climate change affects the way we manage fisheries… so how should we respond?

Sustainability will remain important, but how do we adapt these practices to climate change – think about sustainability over time in the face of extreme events and decadal shifts?

Almost every fishery is capable of recovery from ecological impacts to some extent. How do we protect these resilience attributes in the system?

Adaptation to climate change requires collective action, innovation and more. How can we achieve these elements at a global, regional and national level to respond at various scales?

Humboldt Current LME:
Ecuador, Chile and Peru – western coast of South America

160 thousand — artisanal fishermen

28 thousand — artisanal fishing vessels

370 thousand — direct and indirect jobs

Our Vision

Achieving sustainable, resilient and better-fishing practices across the whole region for ecological and socio-economic well being

Successfully improve management at the national level, in Chile and Peru, and promote transnational cooperation

Transnational fisheries management in the context of climate change = ensure solutions that work at the scale of the entire ecosystem and equity in the process and in the results

Scientifically studied climate change impacts on Humboldt Current fisheries

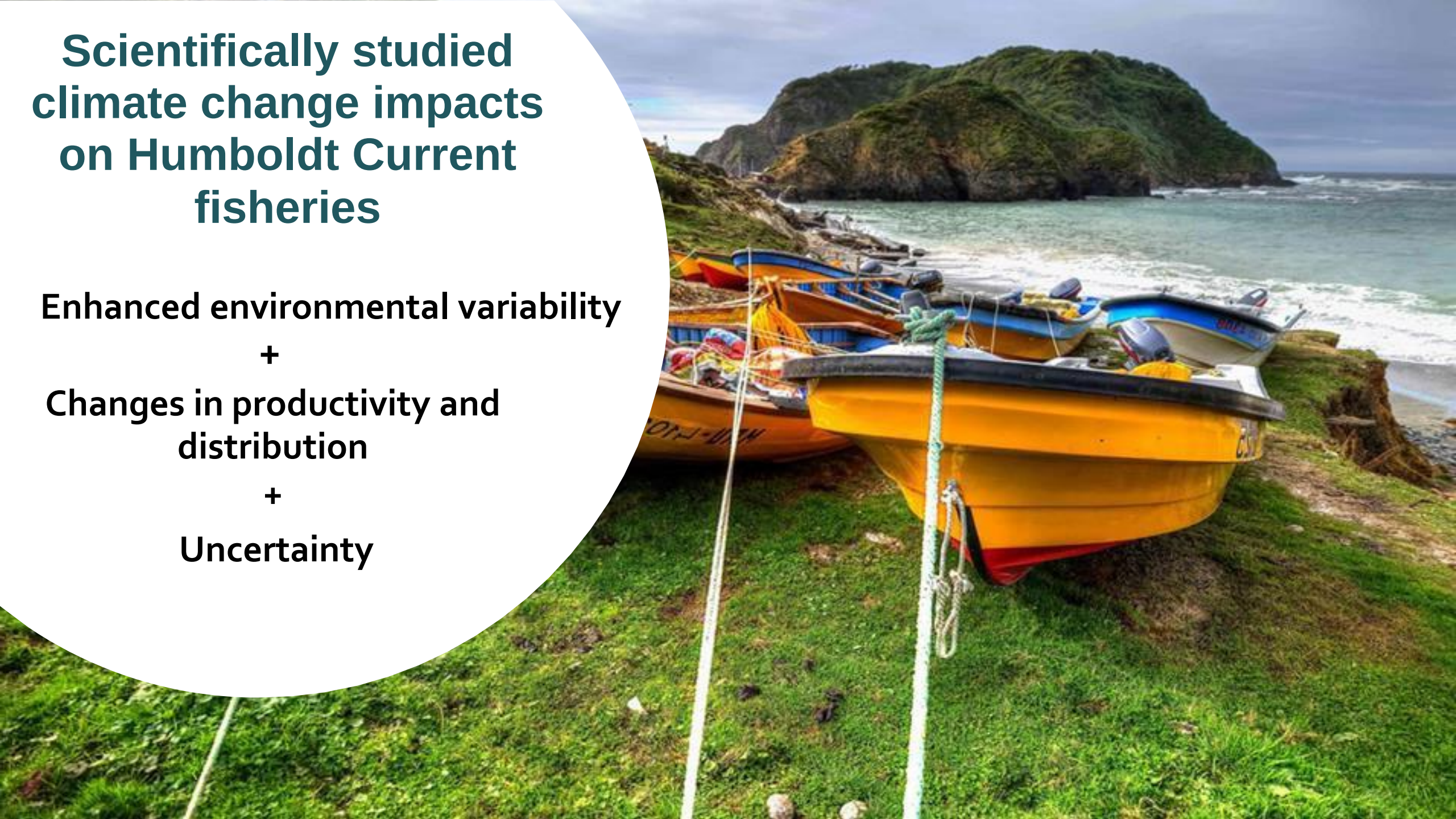
Enhanced environmental variability

+

Changes in productivity and distribution

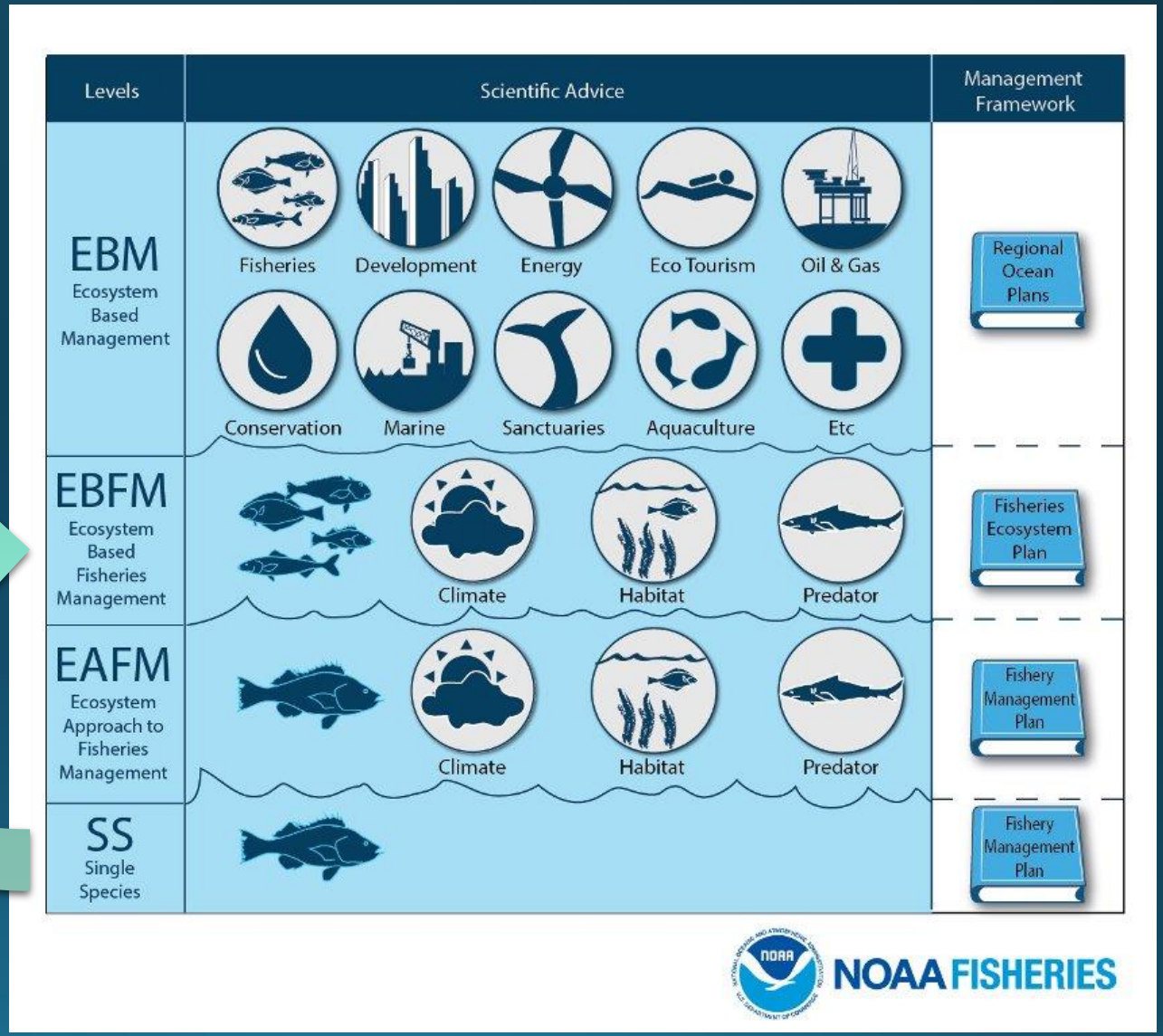
+

Uncertainty



An opportunity for change in fisheries public policy

Demand for tools that move from a single-species status quo to an ecosystem-based approach that is more resilient to the impacts of climate change.



https://www.st.nmfs.noaa.gov/ecosystems/ebfm/ebfm-levels

We then set 2 objectives:

1. <u>In response to environmental variability:</u> improve the speed and accuracy of prediction/warning to have better adaptive fishing management

2. <u>In response to productivity and distribution changes:</u> improving collaboration and international cooperation

A regional approach

Collaborative effort with Chile, Peru and Ecuador to create a trinational roadmap:

1. Led by *science diplomacy*: Agree on fundamental science at the ecosystem level –with collaboration and training throughout the region with key scientific institutes.

2. *Co-design* of an ecosystem-level observation, prediction and early warning (SAPO) system to inform adaptive management - include management agencies.

3. Build off SAPO for *constructive political negotiations*/international agreements that consider the impact of climate change on fisheries, especially transboundary fisheries where equity issues are important.

Progress made to date

Collaboration agreements with the fisheries institutes of Chile (IFOP), Peru (IMARPE) and Ecuador (IPIAP).

Collaboration agreements with IFOP and IMARPE and multilateral funders (UNDP & GEF Humboldt II).

Joint analysis between EDF, IFOP and IMARPE to complement high-resolution models in climate change.

Roadmap to create more resilient to CC impacts.

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Comprehensive and regional

Examples of ocean observation projects that could be integrated into SAPO



GEF-CFI

Humboldt II / PNUD-IFOP-IMARPE

Programa de monitoreo de CPPS

Programa Variabilidad Climática/ IPIAP

Ecosistema Pelágico Costero: Seguimiento PPPP/ IPIAP

Ecosistema Demersal Bentónico: Seguimiento PCM/ IPIAP

Fondo de Adaptación. PRODUCE / IMARPE

Caracterización Pronósticos Eventos Extremos. Fondecyt / BM e IMARPE

Proyecto MAGNET/UPCH

Sistemas de monitoreo e información en: IMARPE, DHN, SENAMHI, IGP y ENFEN

Centro de Datos Oceanográficos y Meteorológicos / COPAS Sur-Austral-CEAZA

Geoportal Oceanográfico-Metereológico Operacional/ PUCV - GEOOS

Chonos/IFOP

Sistema GIS Cambio Climático/IFOP

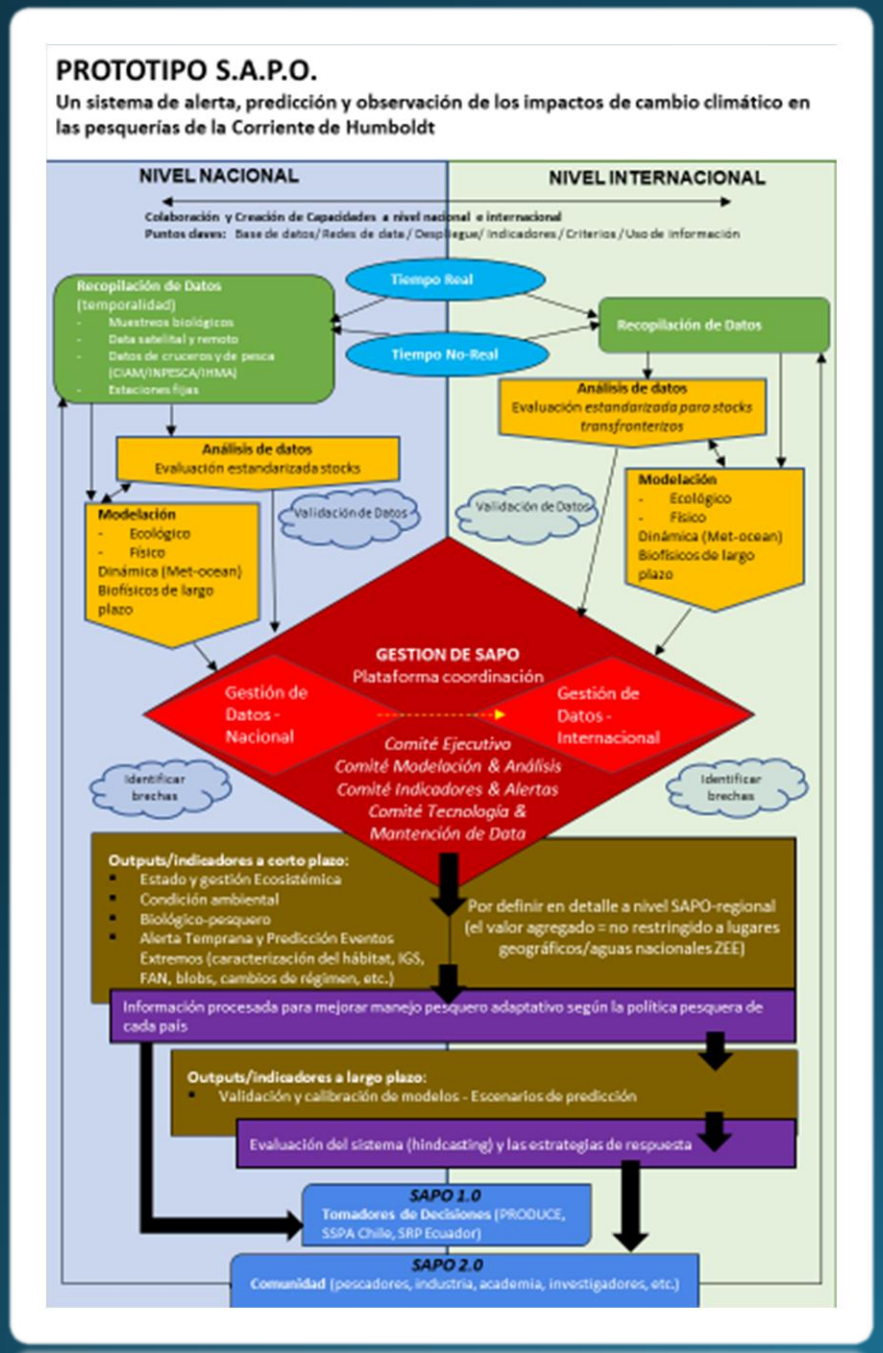
Sistema Integrado de Observación Océano Chileno/ CEAZA

Sistema Integrado de Observación Océano en Región del Biobío/UdeC

The Blue Boat Iniciative/MMA-Fundación Meri

Why is it critical to have an integrated system?

- More holistic analysis – fishing, climate, habitat, trophic chain, etc.
- Transparency of information
- Anticipate changes with more accuracy
- Decision-making for adaptive management is done in a timely manner based on science
- Constantly improve iterative models and adaptive fishing management to hedge against uncertainty



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Examples of how outputs of SAPO will serve public policies and international committments

PERÚ
Ministerio de la Producción

Subsecretaría de Pesca y Acuicultura
Gobierno de Chile

Examples of how SAPO is applying innovation and new technologies

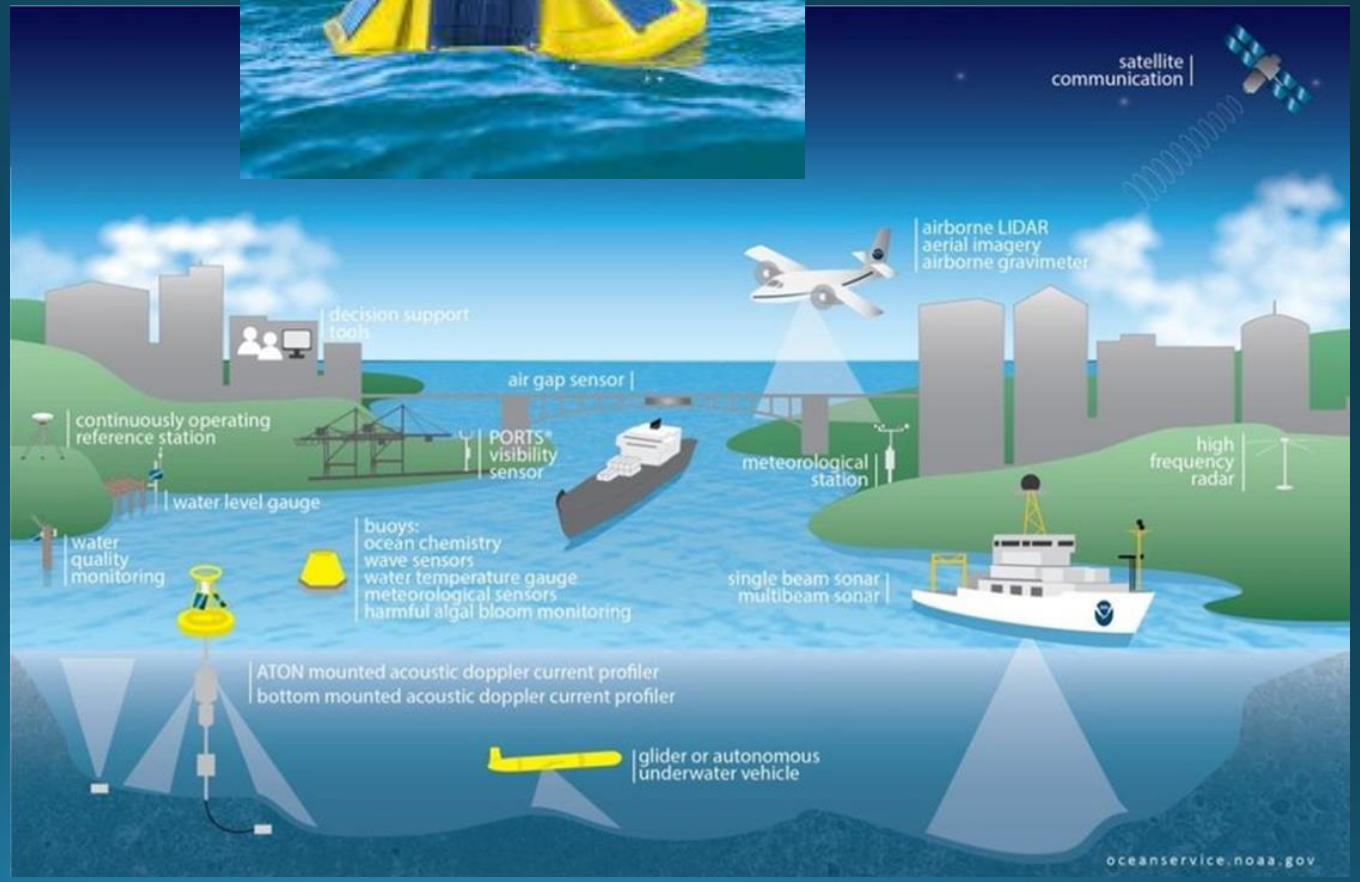
Ocean observation – buoys, wave gliders, sensors for fishing boats and cruise ships

New ecosystem-level prediction models – incorporation of high-resolution models (GFDL model from NOAA)

SAPO website/integrated online system with real-time data visualization at the ecosystem level using an interoperable GIS system

SAPO will provide indicators on impacts of climate change on fisheries for fisheries authorities to incorporate in their decision-making and adaptive management regulations.

Example: SoFar Ocean Buoys



Questions and challenges we still face

- Ensuring sustainable funding via multilaterials for this approach and SAPO as a tool that can continue to improve through an interative process
- Funding for Ecuador where EDF Oceans does not have a program
- Political will under changing administrations in our quest to bridge *science to policy*
- Going from SAPO 1.0 to SAPO 2.0 for improved transparency and equity – putting the tool in the hands of fishers and fishing industry

More fish in the sea,
More fish on the plate and
More prosperous fishing communities

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Erica Cunningham
Ecunningham@edf.org

chile-peru.edf.org