

Implications of climate change for fisheries: The human dimensions

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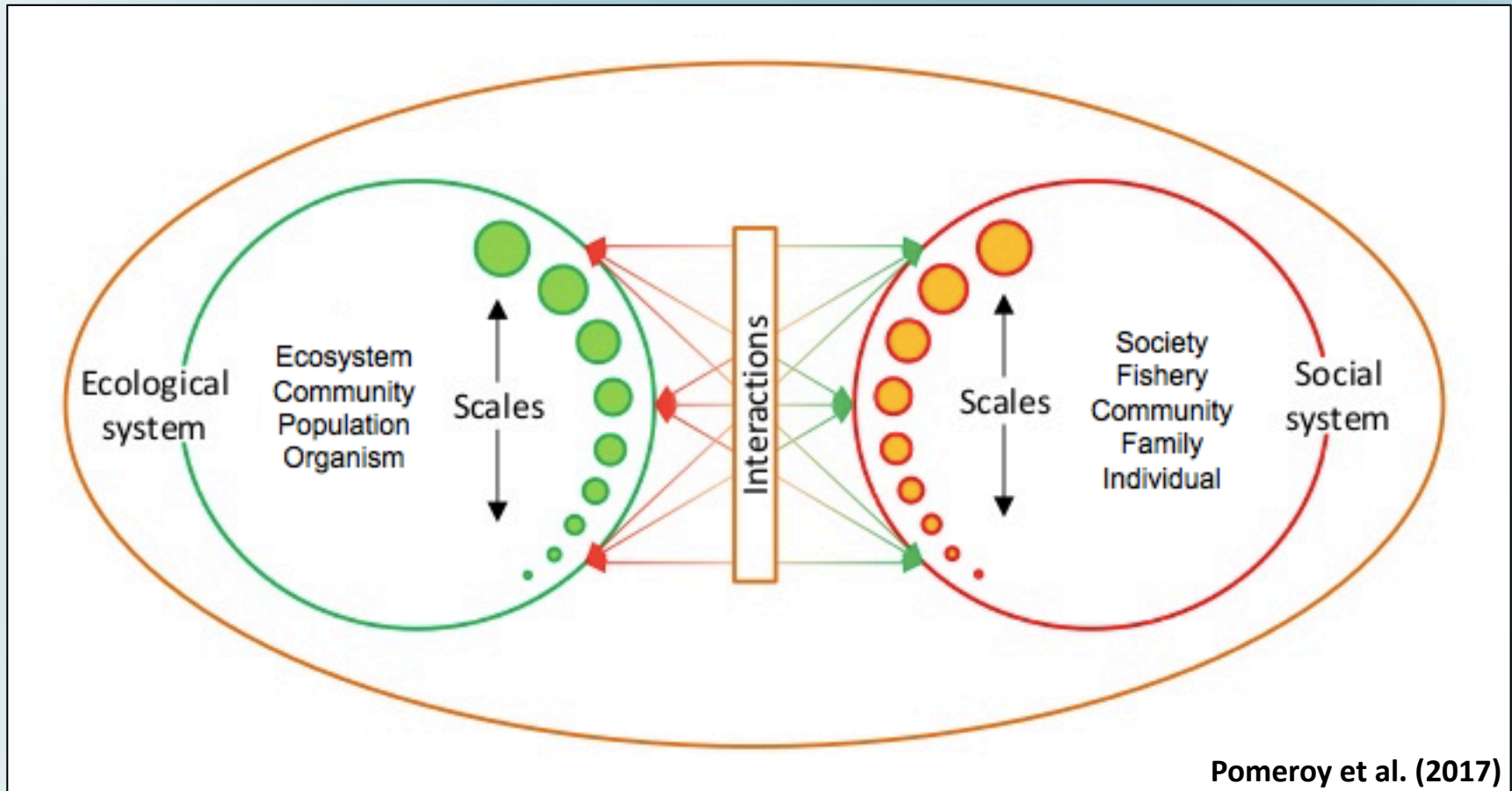
5th Ocean Climate Summit

Monitoring the Pulse of the Ocean

April 18, 2019



Fisheries as integrated social-ecological systems



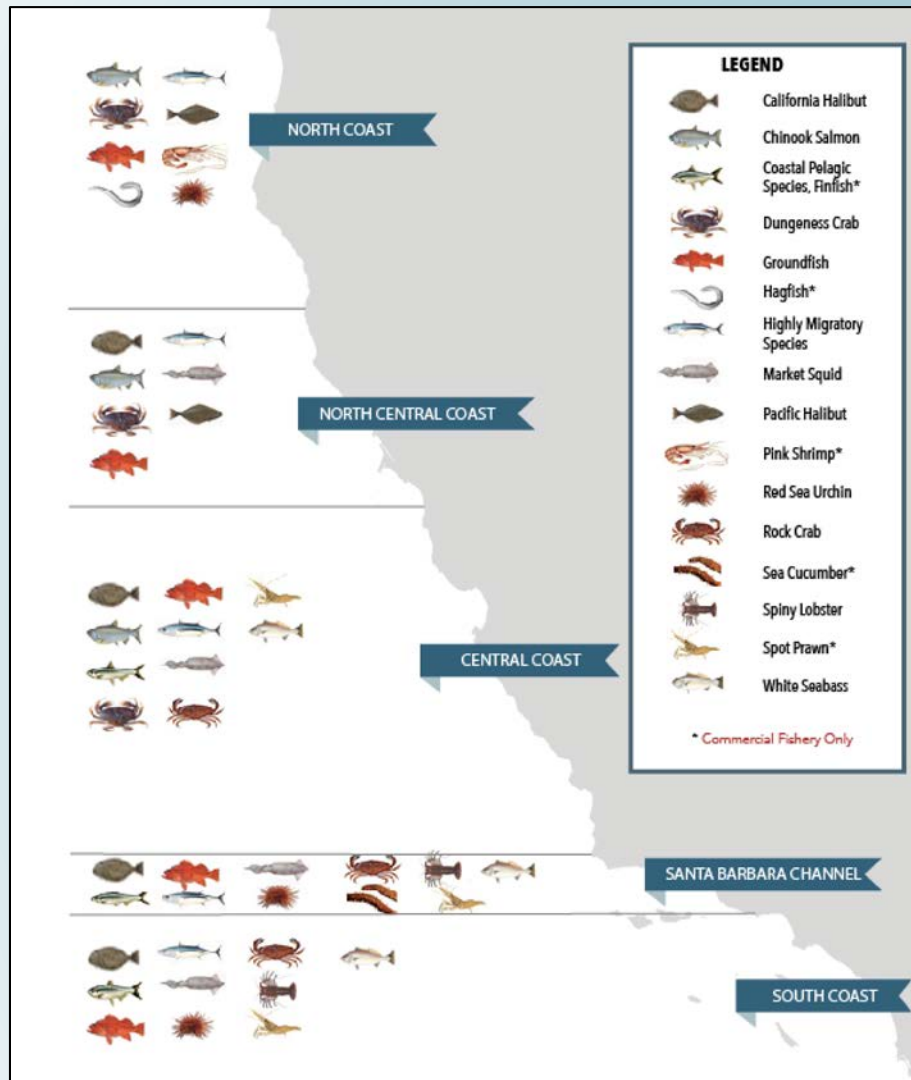
Safe, Sustainable & Secure Seafood Supply



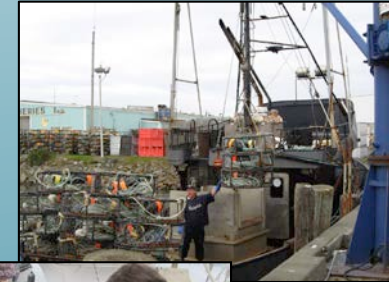
Resilient Coastal Communities & Economies



Diverse fisheries, participants, and communities

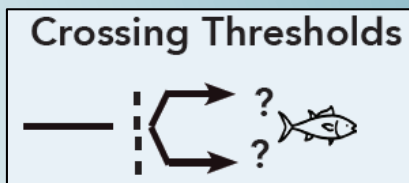
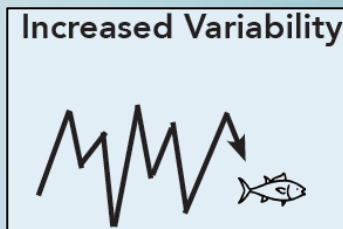
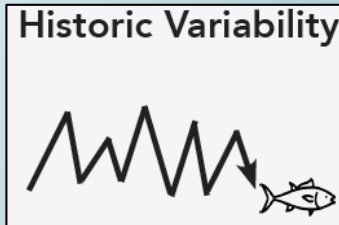


The most common commercially- and recreationally-caught species in each of California's five coastal regions. (Chavez et al. 2017)



Readying California Fisheries for Climate Change

Four climate change scenarios



Responses and impacts

- Ecological impacts
- Potential human responses
- Potential social and economic implications

Vulnerabilities

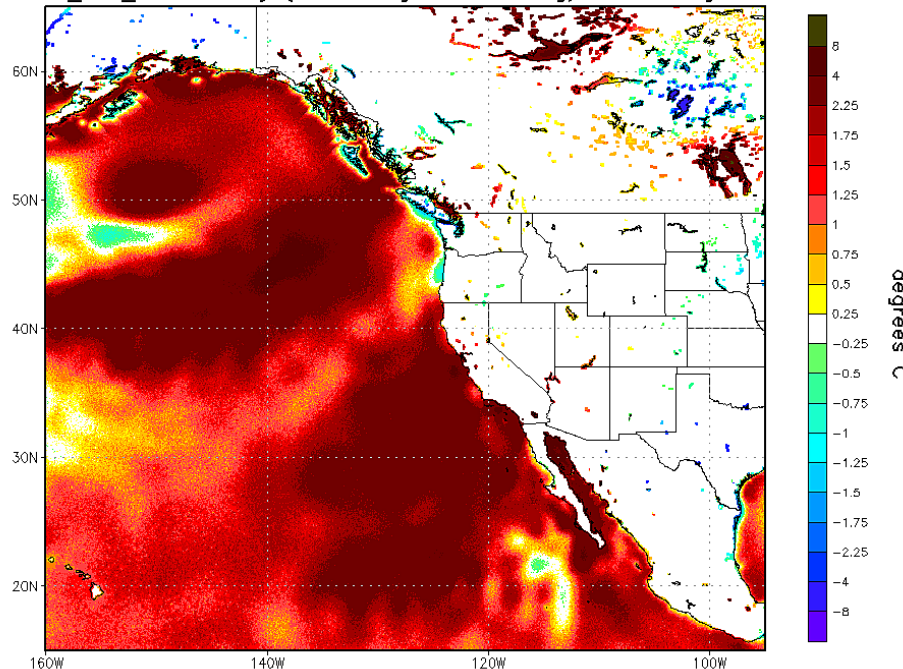
- fish and invertebrates
- fishing communities

US West Coast 2015-16



NOAA/NWS/NCEP/EMC Marine Modeling and Analysis Branch Oper H.R.

RTG_SST_HR Anomaly (0.083 deg X 0.083 deg) for 03 Aug 2015



- Persistent, widespread, harmful algal bloom (HAB)
- Elevated levels of domoic acid (DA) toxins

The First Challenge: Protect Public Health

Health risk: **Serious**

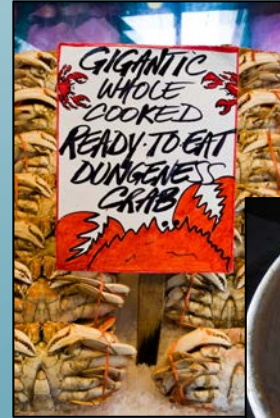
- Amnesic shellfish poisoning (ASP)

Exposure risk: **Highly variable**

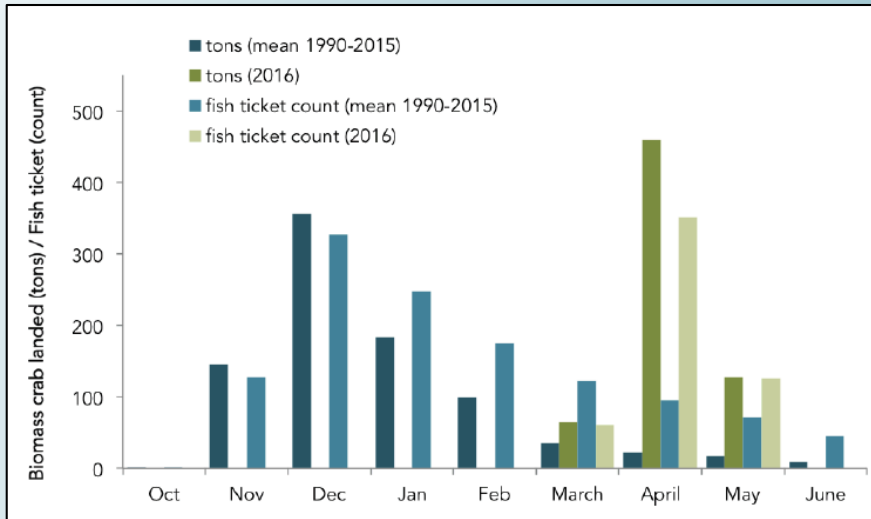
- Timing and geographic distribution
- Among and within species
- Handling, preparation & consumption

Risk management: **Tricky**

- Fishery closures/delayed openers
- Seafood consumption advisories



The Second Challenge: Protect Ecosystem Health



Chavez et al. 2017

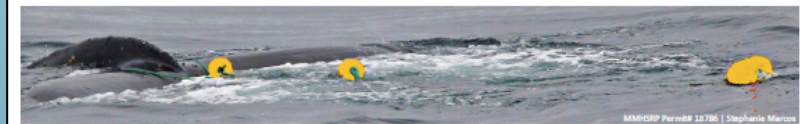


California Dungeness Crab Fishing 2017-18 Best Practices Guide to Minimize Whale Entanglement Risk



Support for Best Practices

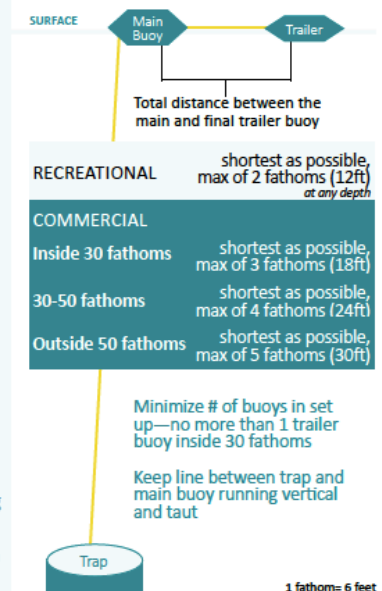
National Marine Fisheries Service (NMFS) has confirmed significant increases in large whale entanglements over the last few years, and specifically in California Dungeness crab fishing gear. This situation threatens the stability of the fishery and coastal fishing communities. In response, a Working Group has developed this Best Practices Guide to highlight voluntary actions believed to be an important step towards reducing whale entanglements.



BEST PRACTICES

- **No excess lines should be floating at the surface.** Floating line should only be between the main buoy and trailer.
- **When changing set location across depths, adjust the length of trap lines by adjusting shots (i.e., measured length of line) to maintain taut vertical lines.**
- **Avoid setting gear in the vicinity of whales** whenever possible.
- **Maintain gear to ensure lines and buoys are in good working condition** and will not break under natural conditions causing gear to become lost or irretrievable. Lost gear contributes to marine debris and increases risk of whale entanglements.
- **All gear should be clearly marked** consistent with applicable regulation. All gear should be maintained so markings are clearly legible to facilitate correct identification of the origins of the gear involved in entanglements.
- **Use the minimum amount of scope** required to compensate for tides, currents and weather. Whales are more likely to become entangled with slack lines, which can potentially create a "floating snare".
- **Remove all fishing gear by the end of the season** when gear is no longer allowed in the water.

BUOY SET-UP BEST PRACTICES



Implications for the fisheries social system



Looking to the future

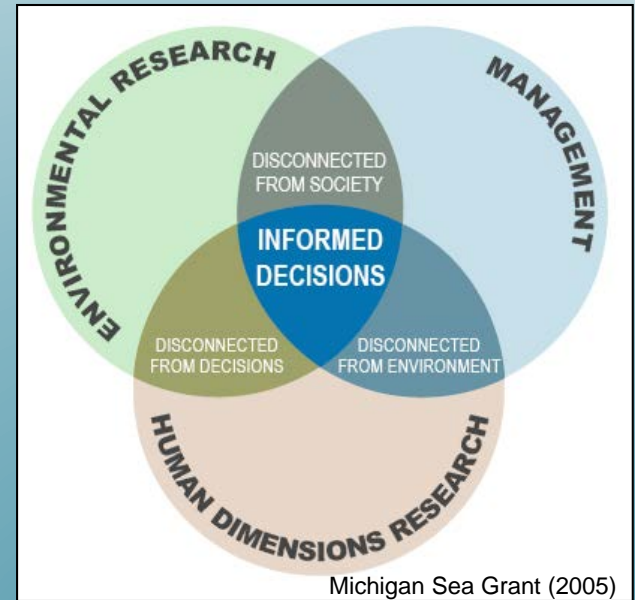
Fisheries are

- complex, dynamic social-ecological systems
- natural resource *and* food systems

Climate change has linked ecological, social, cultural, and economic consequences for fisheries and communities

Better understanding is key to

- avoid unintended consequences
- ensure ecological *and* human health and well-being



Thank you!

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