Utilizing Ecosystem Information to Improve Decision Support for Central California Salmon

Results from Salmon Applied Forecasting, Assessment and Research Initiative (SAFARI)

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How can NASA remote sensing and models be used to augment the decision support system for central California salmon?
Lifecycle and management timing

Current approach predicts adult abundance from jacks (premature returns) of the same cohort

= winter
Successes

1. Building observed relationships between physics and biology
2. Modeling the ocean environment (ROMS-COSINE)
3. Combining these approaches to improve current management models
4. Transition to operations
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Large scale climate variability (ENSO, PDO, NPGO)
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Juvenile salmon rear in a plug of krill located in a relaxed area.


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**Carbon, Silicate, Nitrogen Ecosystem Model**

**CoSiNE, Chai et al. 2002**

**Physical model run over entire Pacific at 12.5 km resolution**
2. Modeling the ocean environment (ROMS-COSINE)

The modeling approach is capable of reproducing the zooplankton climatology demonstrated in empirical studies.
2. Modeling the ocean environment (ROMS-COSINE)

The modeling approach is capable of reproducing the temporal patterns observed in empirical studies.
2. Modeling the ocean environment (ROMS-COSINE)

We can forecast SLH in California outward 4 months (red line) reasonably well; significantly better than autocorrelation (green line). To accomplish this we use the standing correlation between Equatorial Pacific SLH, which is modeled well (blue line), and California SLH.

Sea level captures both local (winds) and remote (ENSO, PDO, NPGO) forcing of the environment.
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With nowcasts of krill and SLH to fall we can extend our predictions to the previous cohort.

**SLH is forecasted**

Current timing: Sibling model SI and harvest rule set
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We maintain a strong relationship with management: Present and explain our models to PFMC and subcommittees periodically.
Next steps and beyond