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Bering Sea Ecosystem Partnership

# FEAST: modeling seasonal patterns in the eastern Bering Sea

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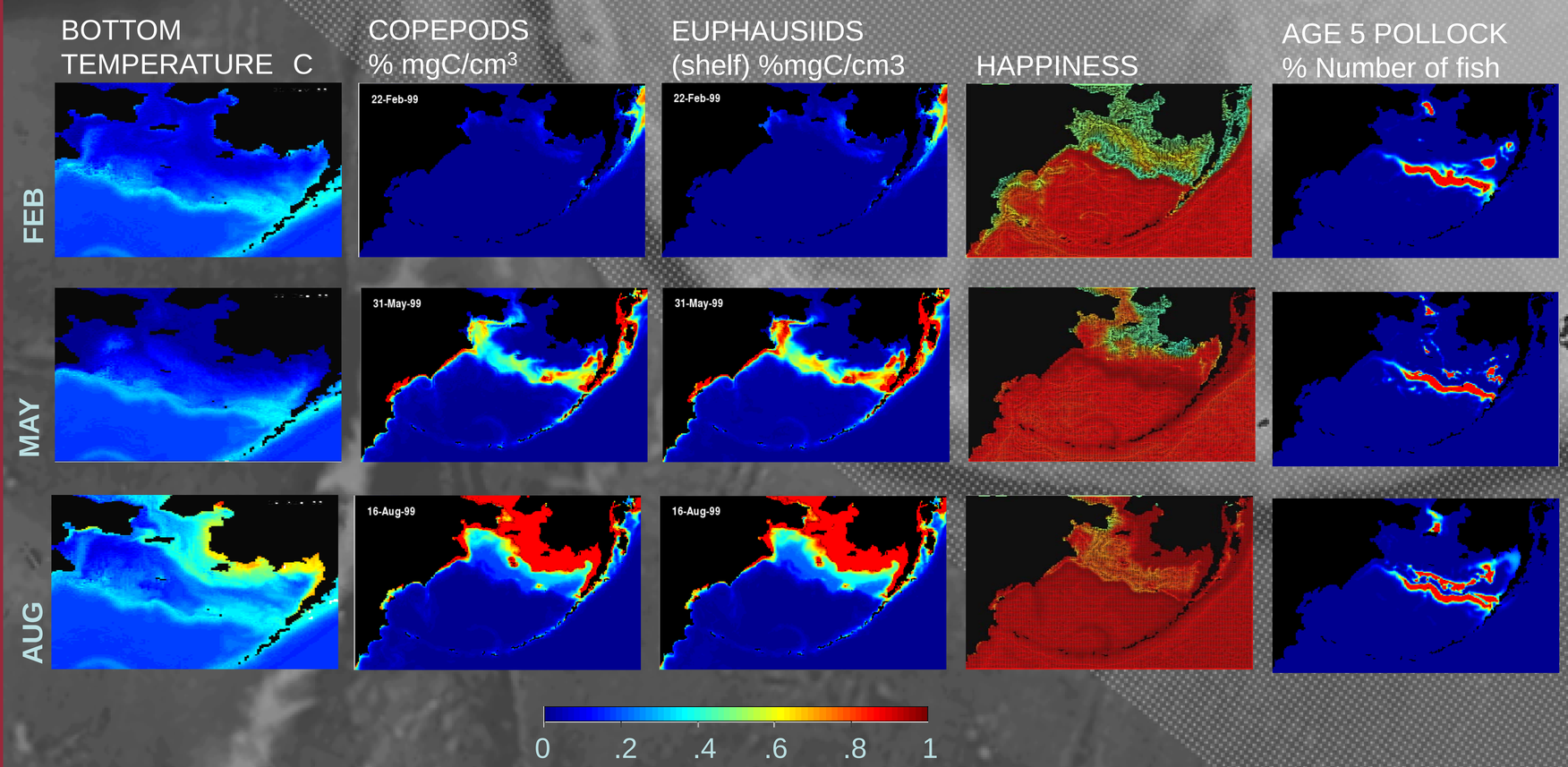
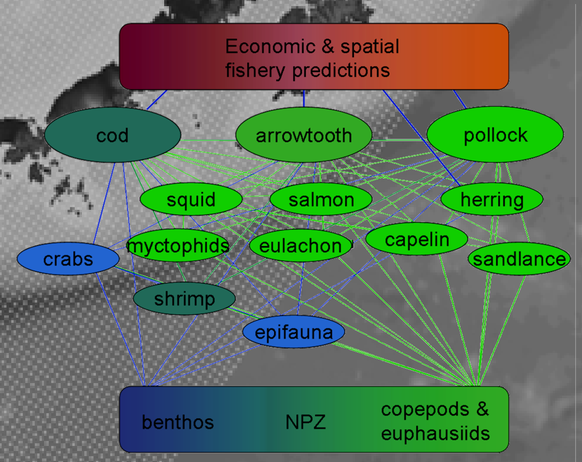
B&W background image:
Large white rectangle shows geographical extent of model.
Each dot on the rectangle represents one 10 km grid.

FEAST (Forage-Euphausiid Abundance in Space and Time) is the multispecies bioenergetics model for forage and predatory fish species of a vertically integrated model that uses ROMS (Regional Ocean Modeling System) for the Northeast Pacific and Bering Sea as a platform. With a spatial resolution of a 10km, the vertical model includes FEAST coupled to an NPZ (Nutrient-Phytoplankton-Zooplankton) and and Economics module. FEAST models 12 fish species (walleye pollock, Pacific cod, arrowtooth flounder, salmon, capelin, herring, eulachon, sandlance and myctophids, squids, shrimp and epifauna) which have a two-way interaction with 5 groups from the NPZ module (small/large copepods, oceanic/shelf euphausiids and benthos). Additionally, temperature and advection from ROMS are used in the bioenergetics and movement components. The operating hypothesis in FEAST is that forage fish and macrozooplankton (*e.g.* euphausiids) are tightly coupled in a two-way interaction, and the dynamics of this interaction under different climate scenarios is a strong structuring element for the ecosystem as a whole. FEAST makes extensive use of data collected by other BSIERP projects, as well as retrospective analysis of historical data. The vertically integrated model serves as the operating model for Strategy Management Evaluation.

FEAST preliminary results: Shown below are the main environmental components guiding pollock movement. A fish moves to where it is "happiest" where happiness is a function of prey density and instant growth (influenced by temperature), avoding cold waters.




FEAST is part of the vertical model of BSIERP, which includes a series of coupled modules: climatological forcing Nick Bond and Muyin Wang, oceanography by Enrique Curchitser, Kate Hedstrom and Al Hermann, Nutrient-Phytoplankton-Zooplankton-Benthos by Georgina Gibson, Economics by Michael Dalton & James Murphy, and Management Strategy Evaluation by Liz Moffit, Jim Ianelli and Andre Punt

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