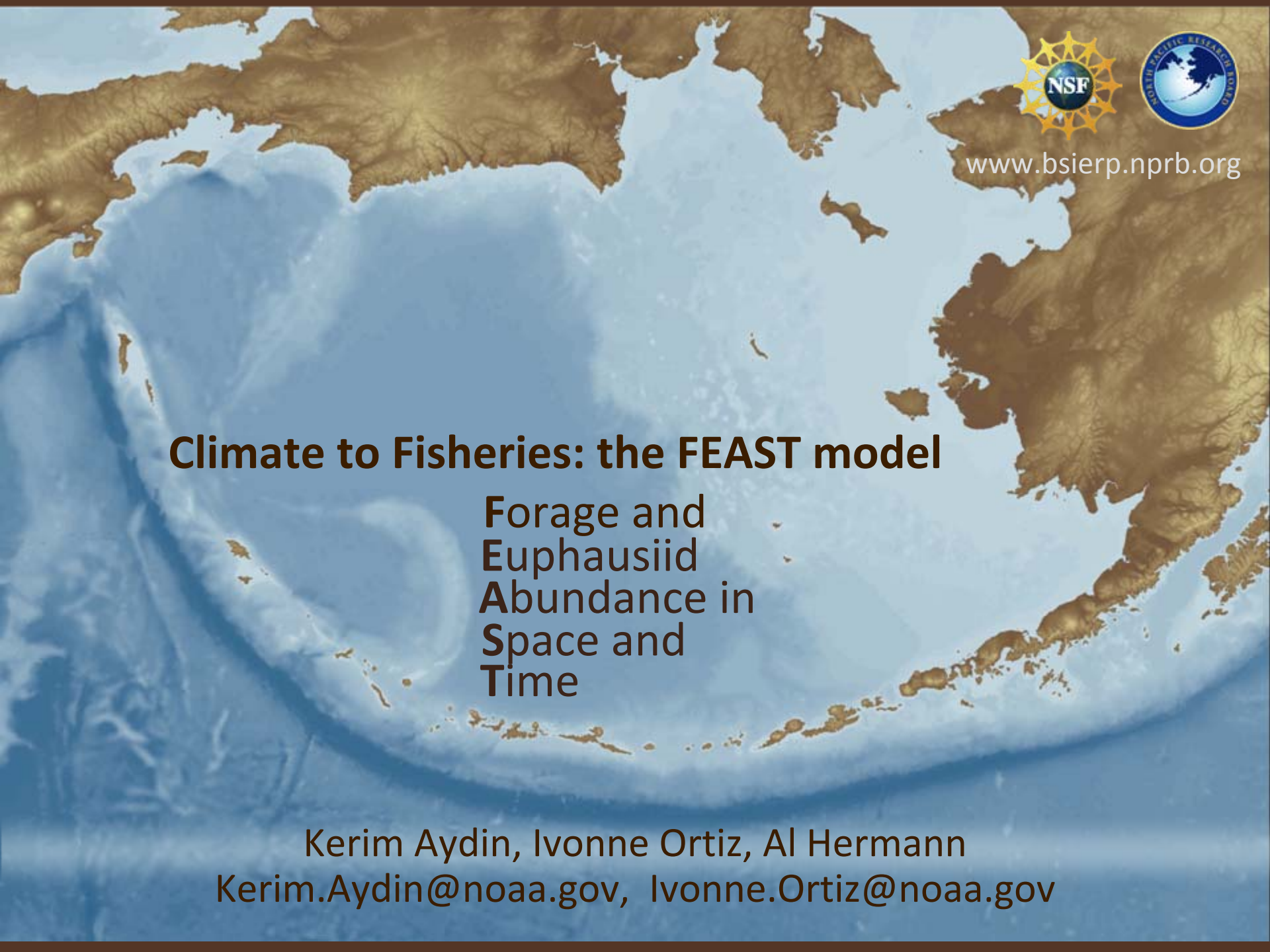

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Climate to Fisheries: the FEAST model

Forage and
Euphausiid
Abundance in
Space and
Time

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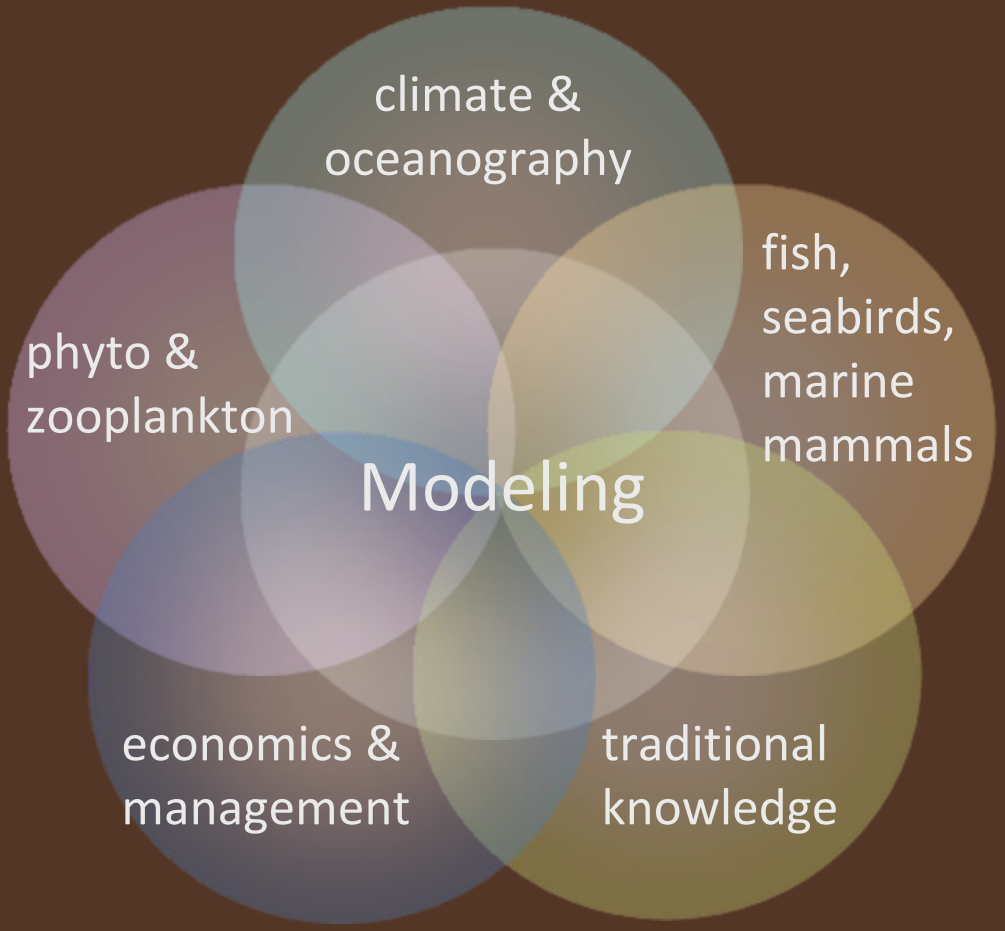
The Bering Sea Project

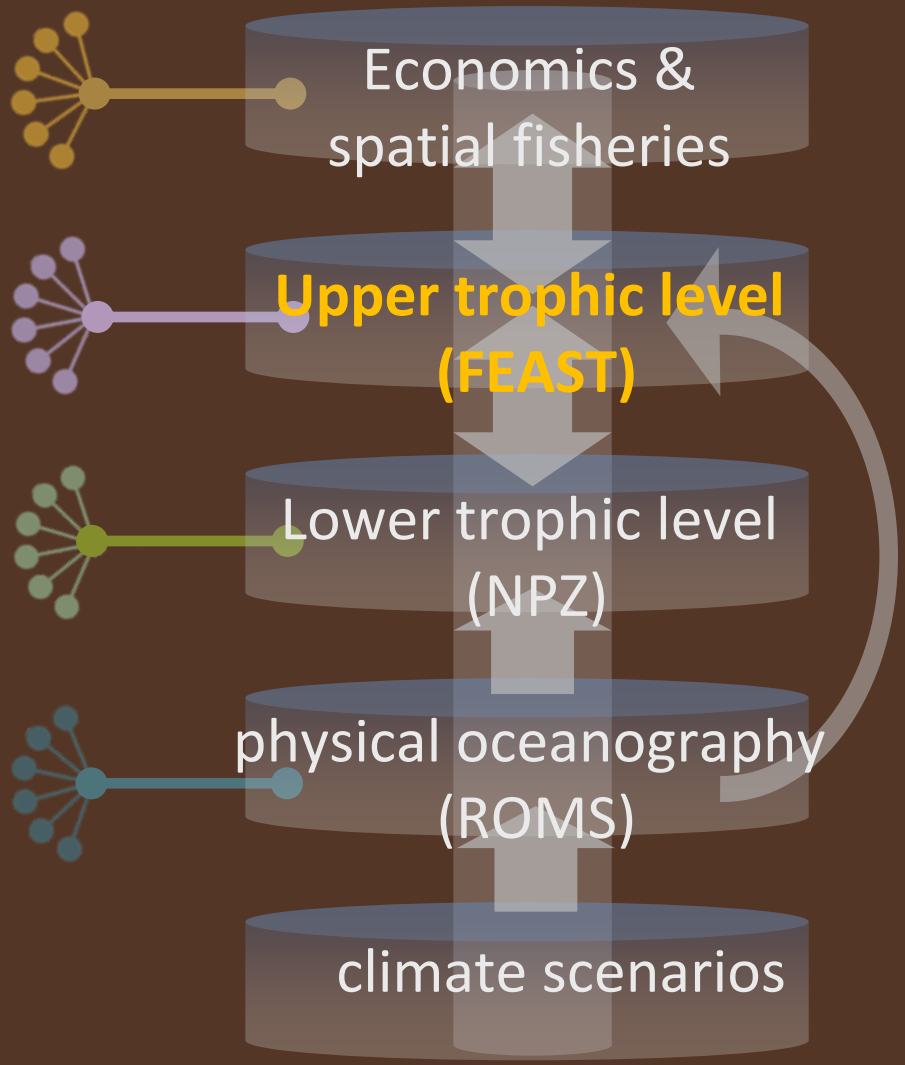
BEST/BSIERP Research Program

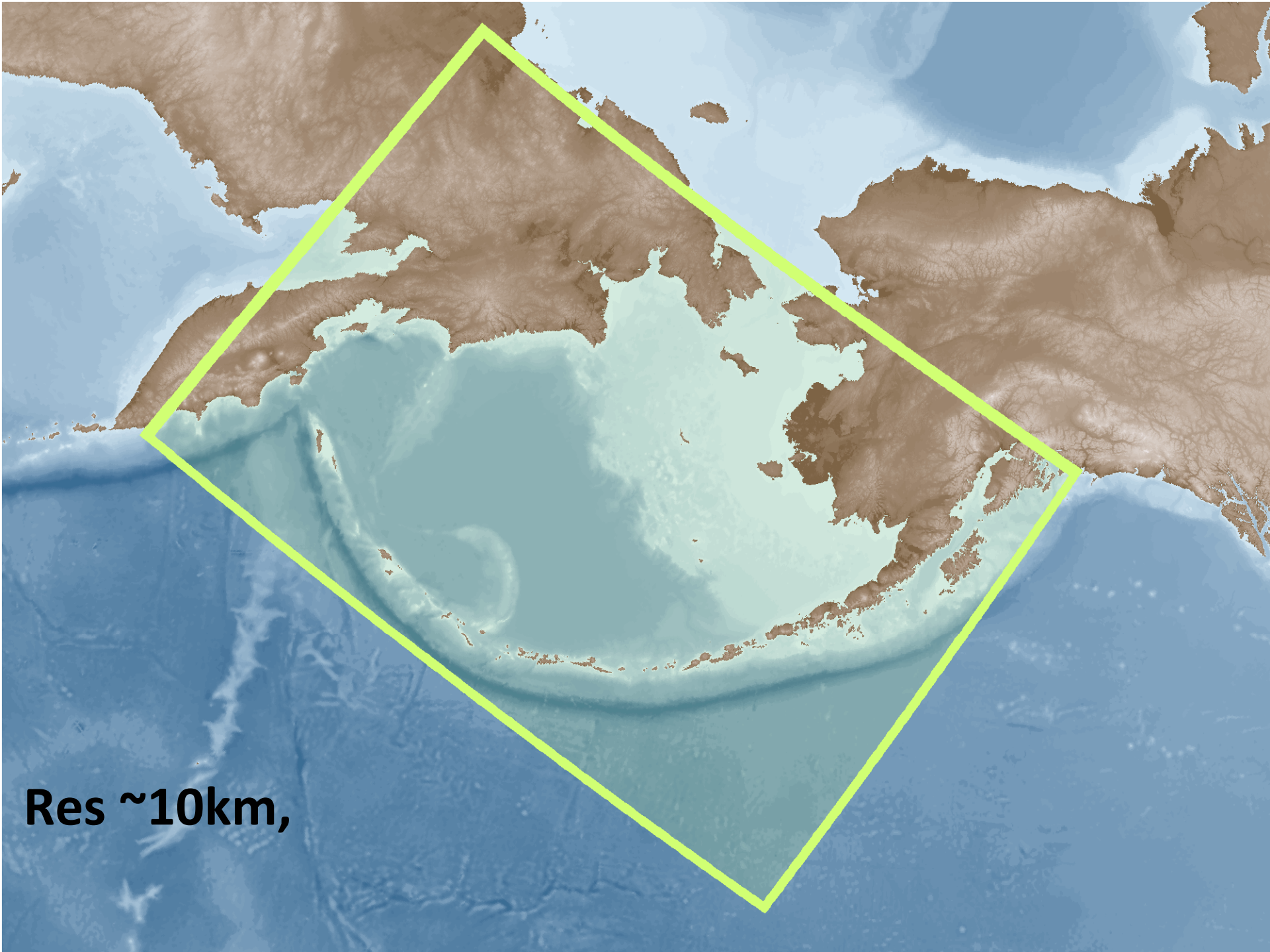


- 2007-2012
- 52 million USD
- ~35 linked projects
- 100+ researchers
- Joint field & modeling projects

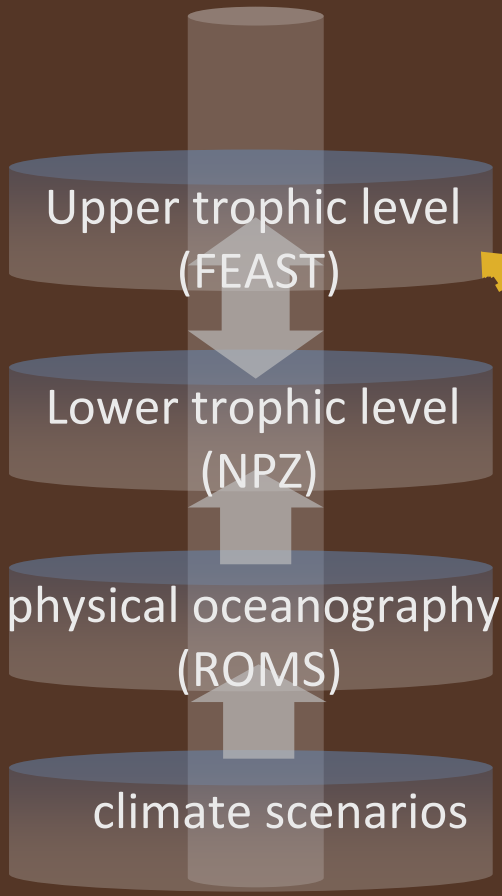
The Bering Sea Project

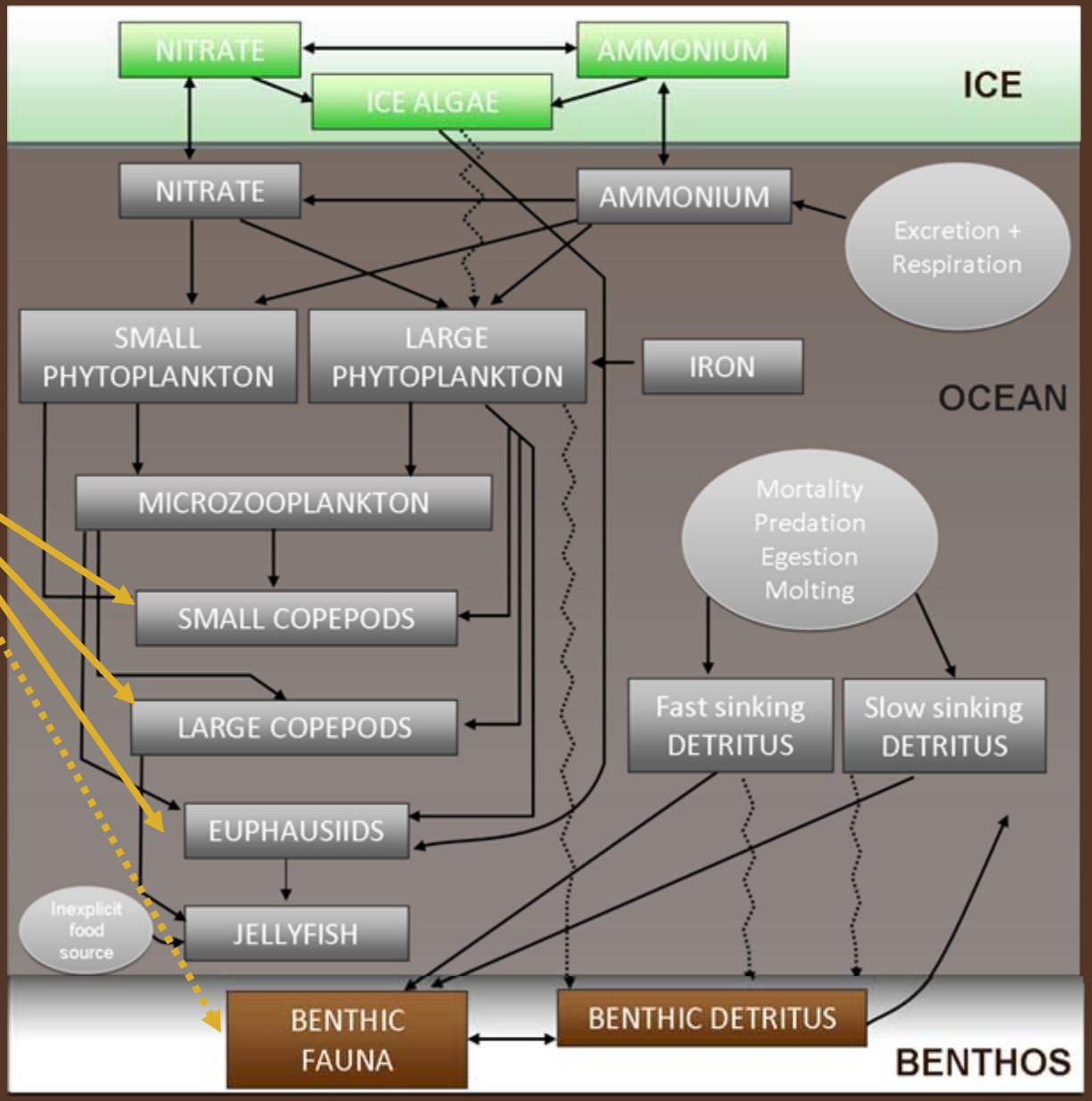
BEST/BSIERP Research Program



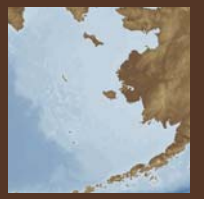

Res ~10km,

Zooplankton module (NPZ-D)





FEAST – 10km^2 Bering Grid



11 ages/ 15 lengths
high detail

15 lengths
medium detail

biomass pools
low detail

NPZ

cod

arrowtooth

pollock

salmon

herring

myctophid

capelin

squids

eulachon

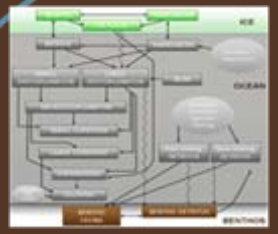
sandlance

crabs

shrimp

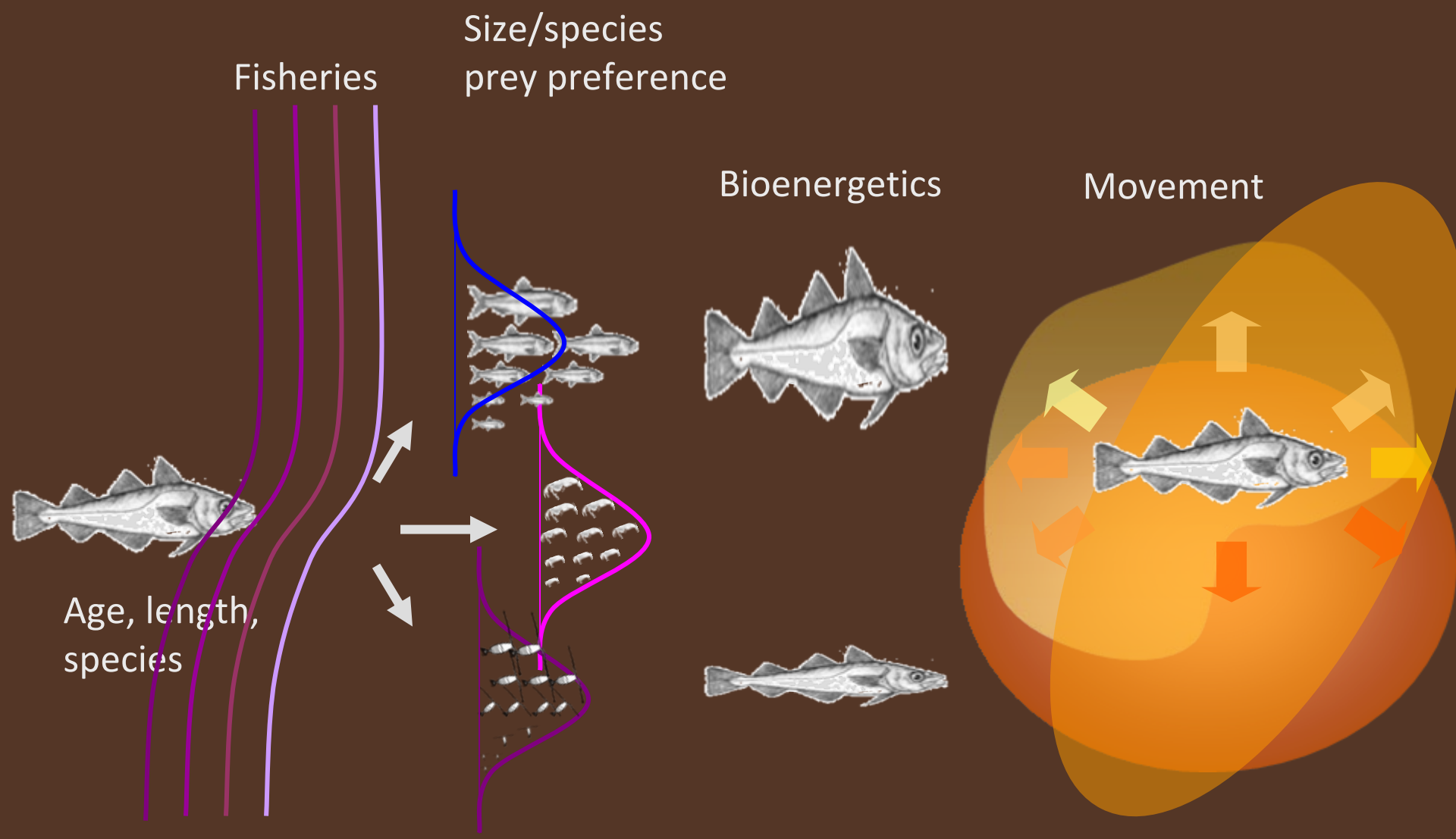
epifauna

benthos

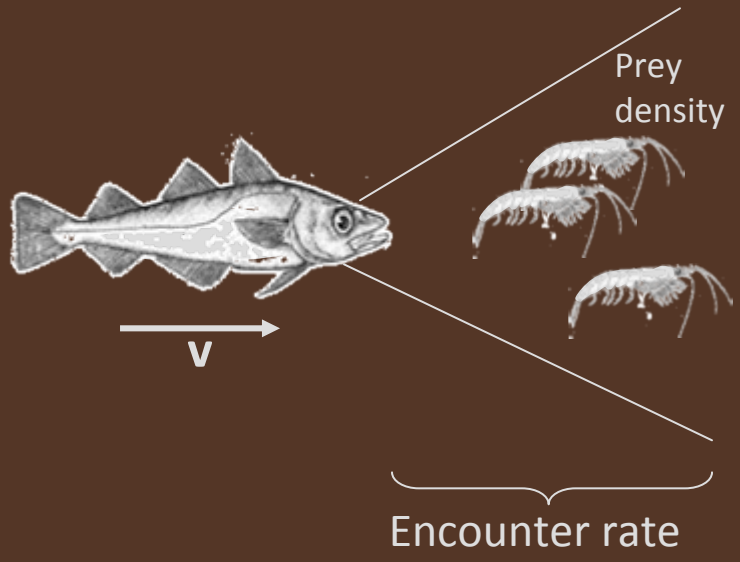


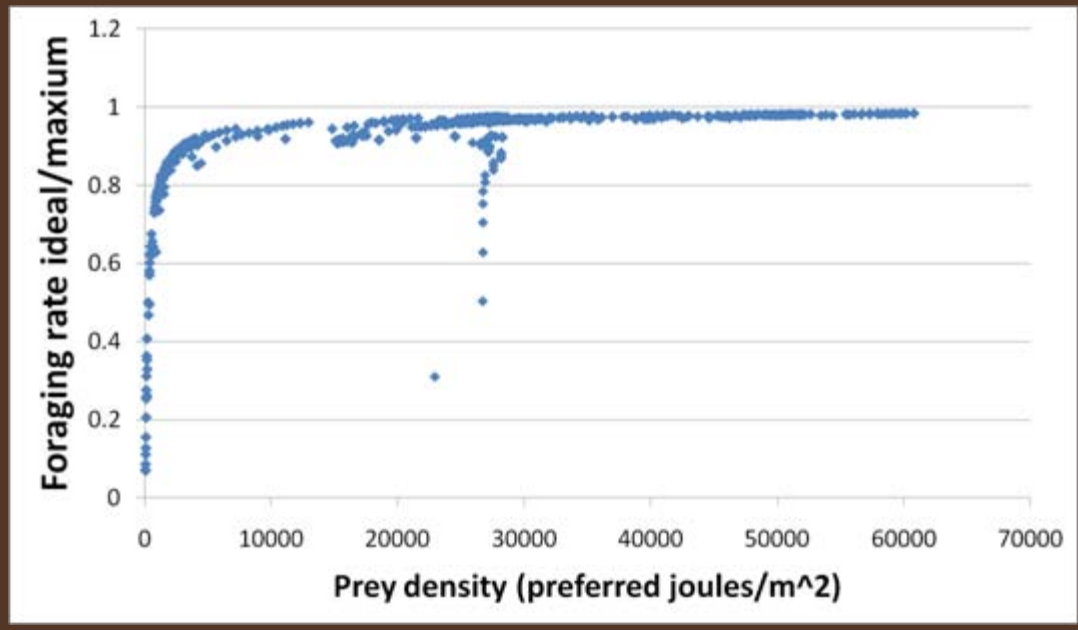
copepods &
euphausiids

FEAST


Fisheries
Size/species
prey preference
Bioenergetics
Movement
Age, length,
species

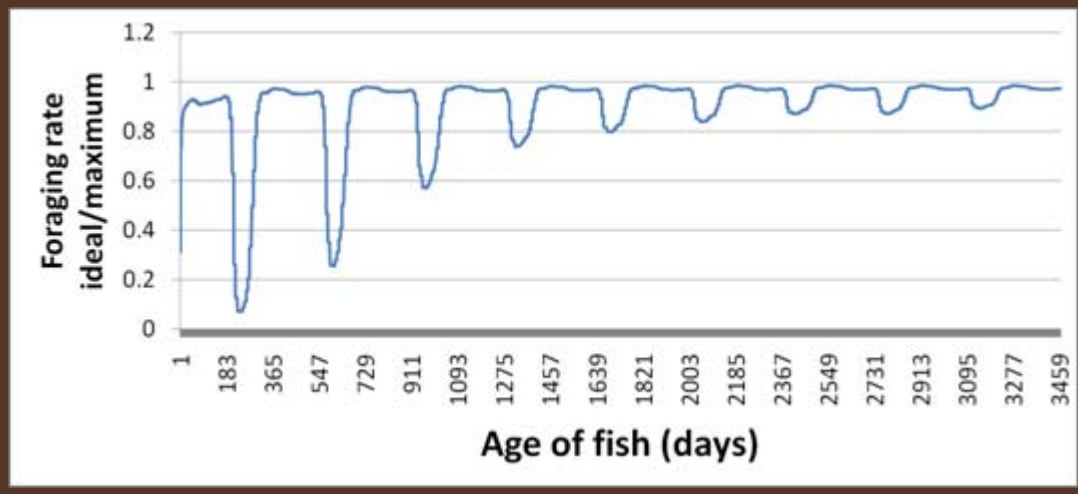
Linking foraging and bioenergetics into functional responses





Useful consumption (joules) = **f(V,T,L)**

Respiration (joules) = $A_v \mathbf{V}^{Bv} * \mathbf{f_r(T)}$



Diet fitting by region

Prey Type (proportion in diet)
by pollock body length (0-80cm)

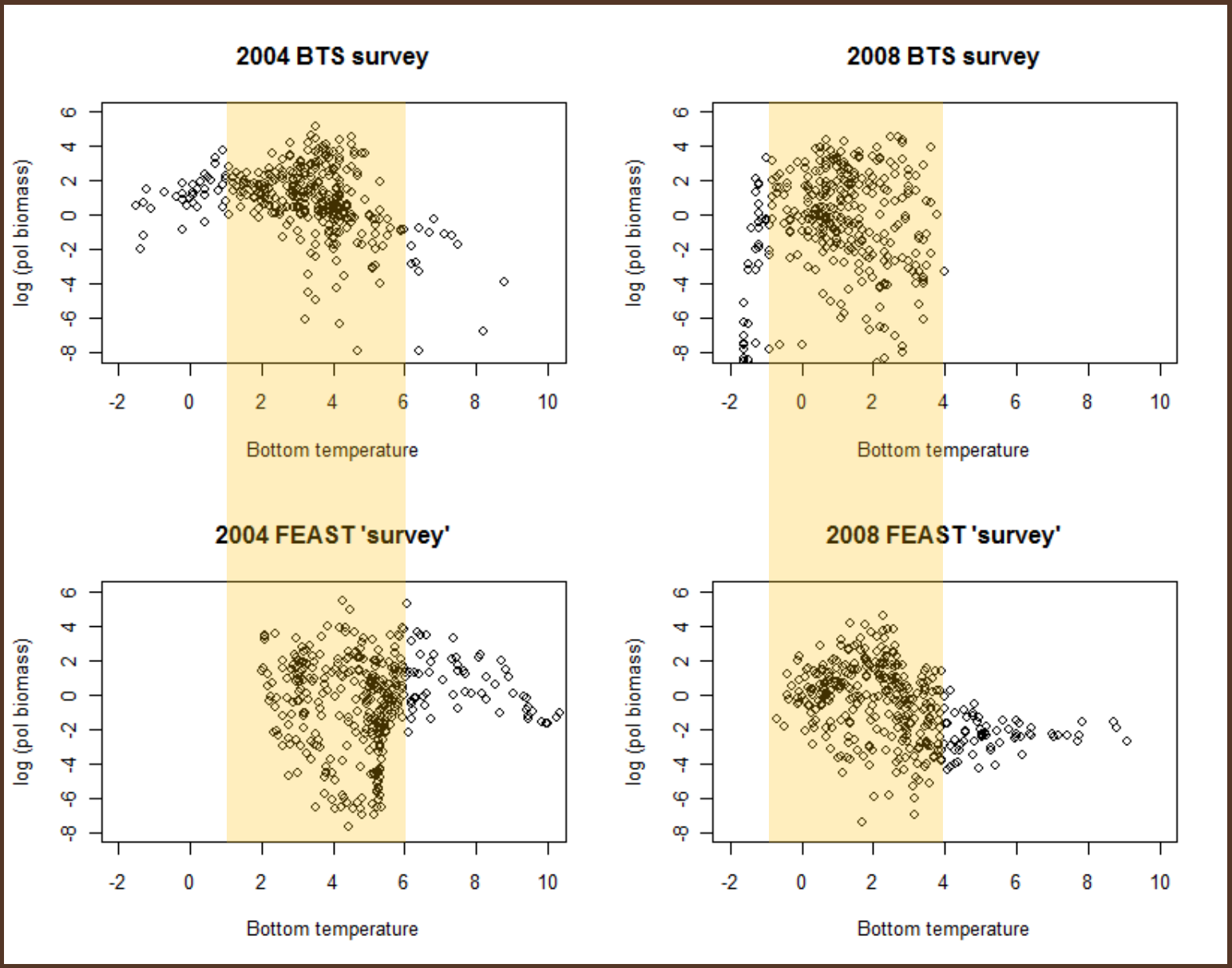
region

POL wk 26 (Jun-Aug)	COP (1)	EUP (1)	INF (0.4)	POL (1)	OTHZOOP (1)
1					
2					
3					
4					
5					
6					
7					
8					
9					

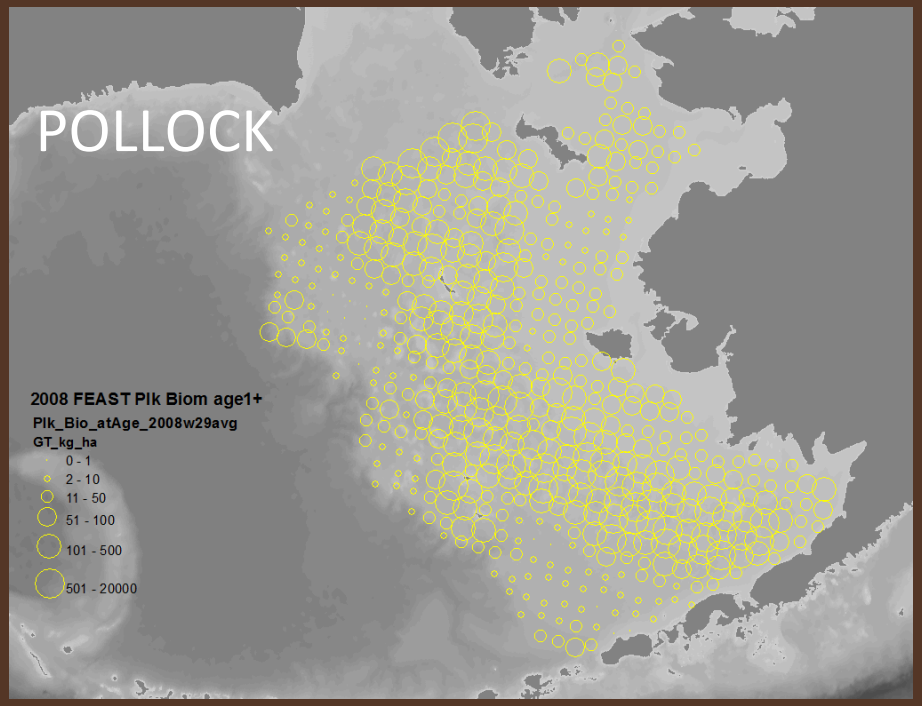
3 size classes of copepod in model summed for fitting

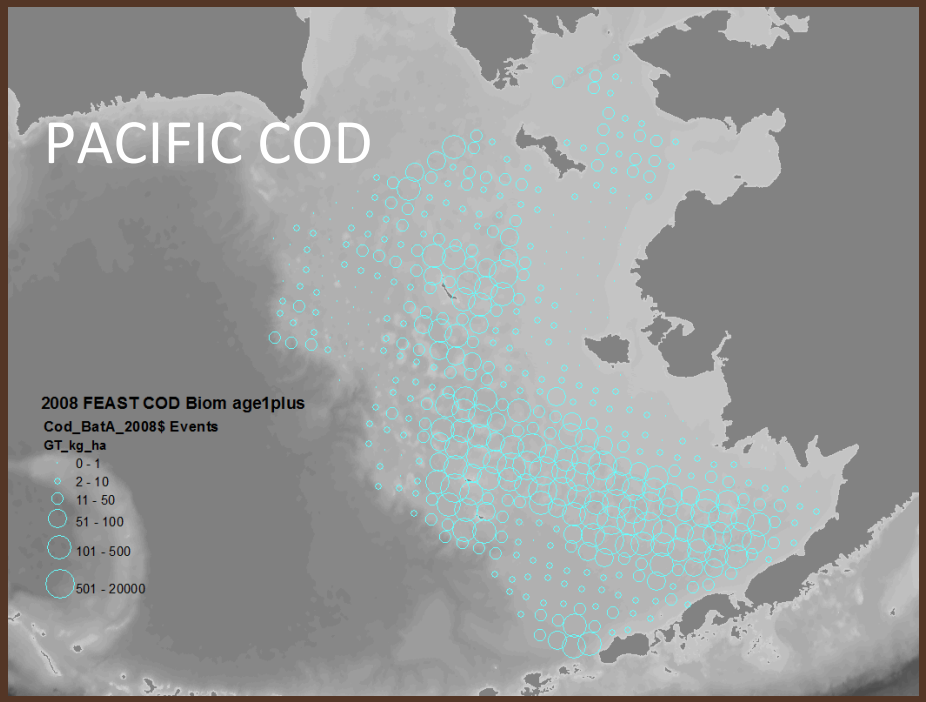
amphipods, shrimp

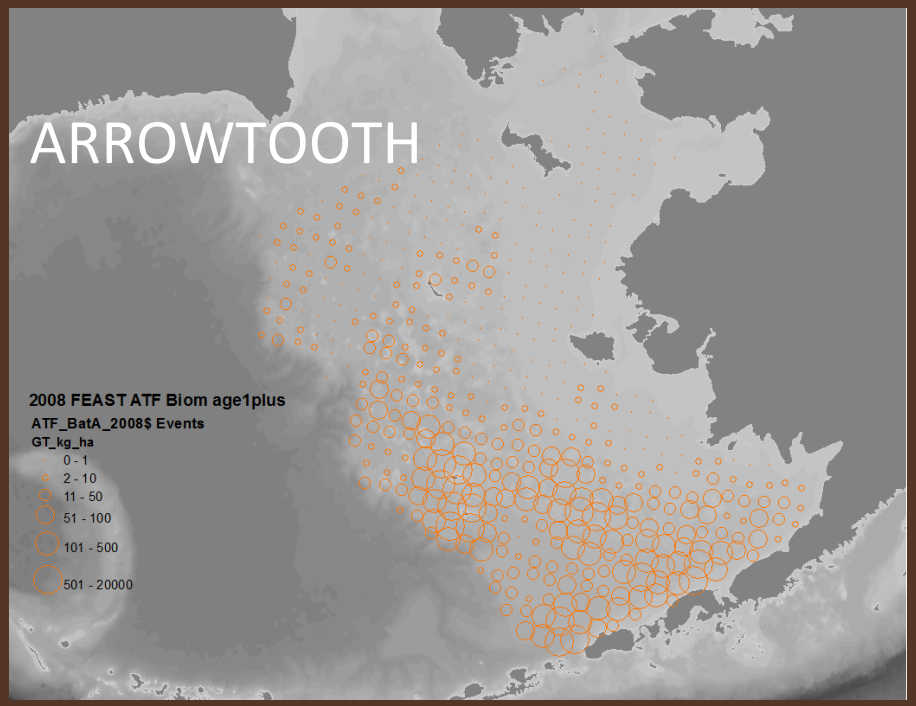
stomachs sampled
by pollock length by region


2004 BTS survey
2008 BTS survey
2004 FEAST 'survey'
2008 FEAST 'survey'
log (pol biomass)
Bottom temperature
-8
-6
-4
-2
0
2
4
6
-2
0
2
4
6
8
10

FEAST Fish Biomass Distributions July 2008

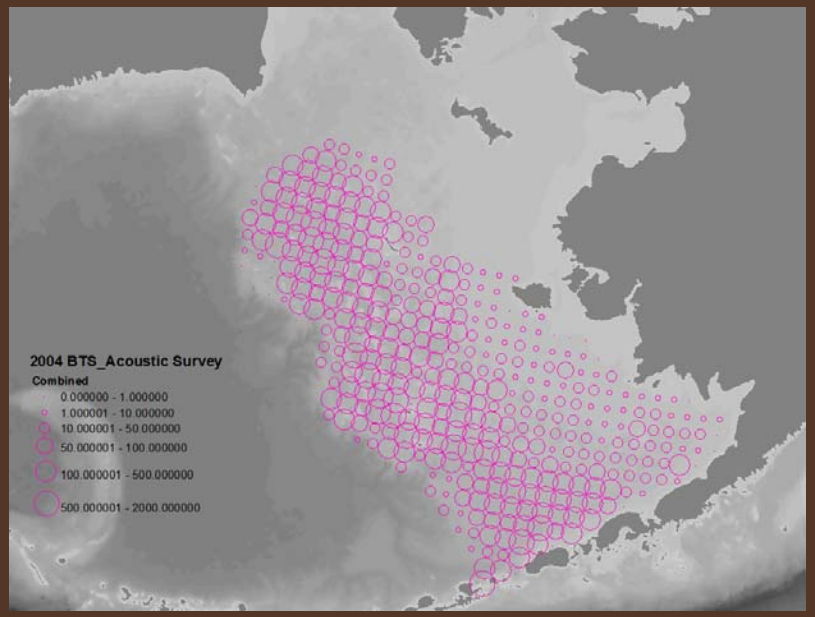


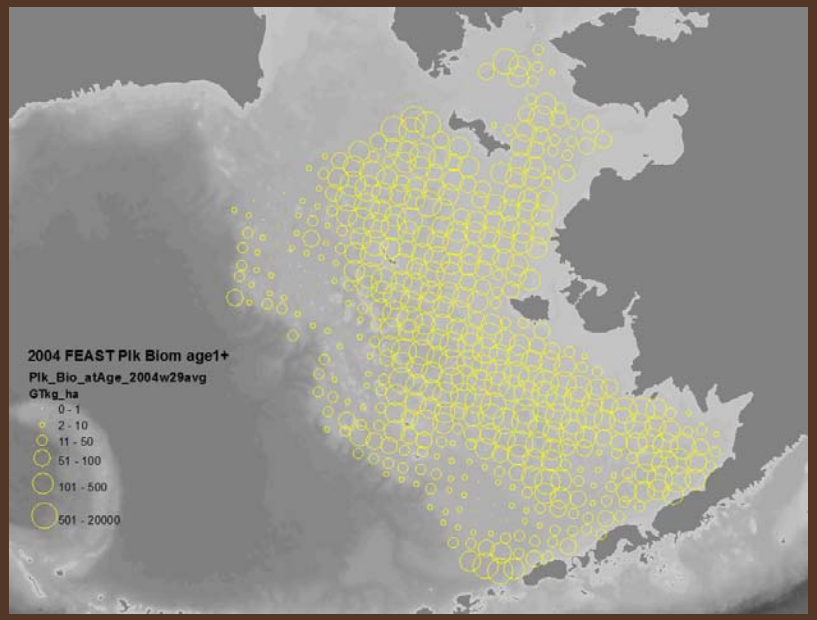




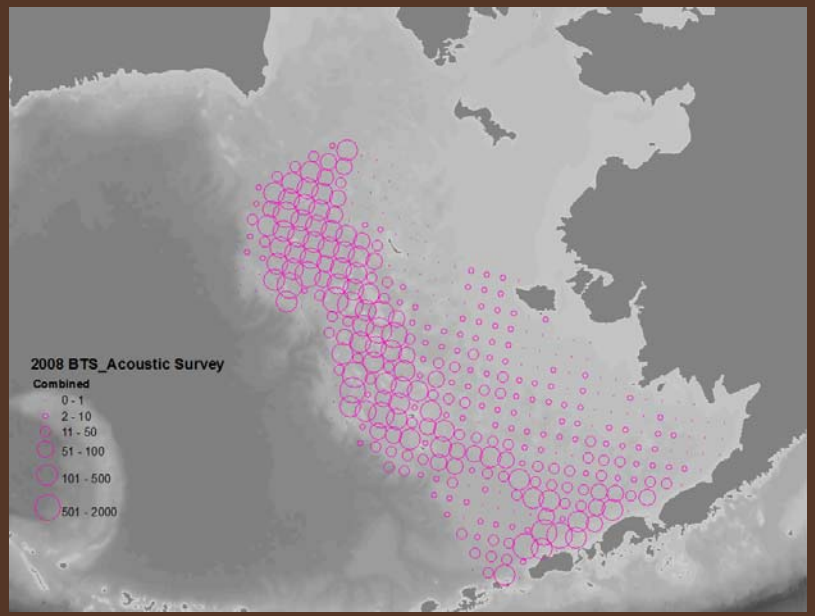
Combined BTS+Acoustic survey vs FEAST

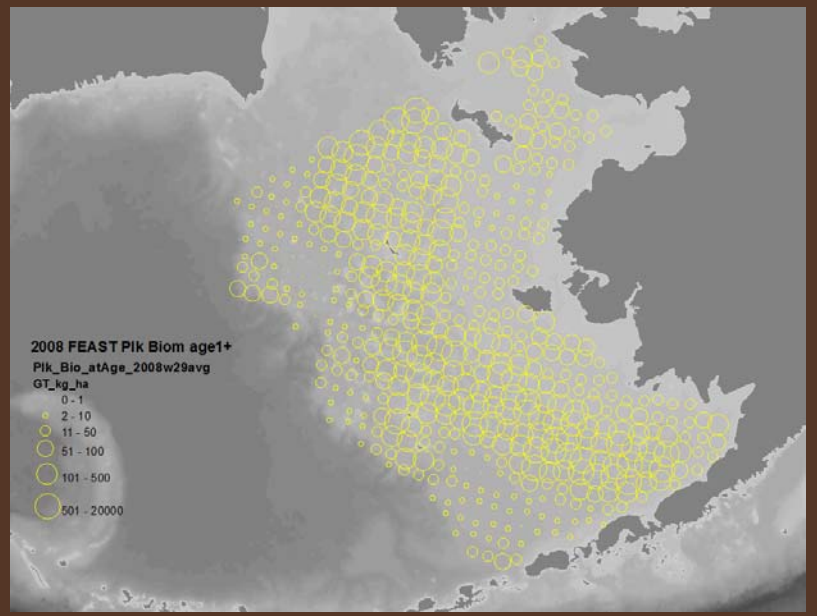
2004

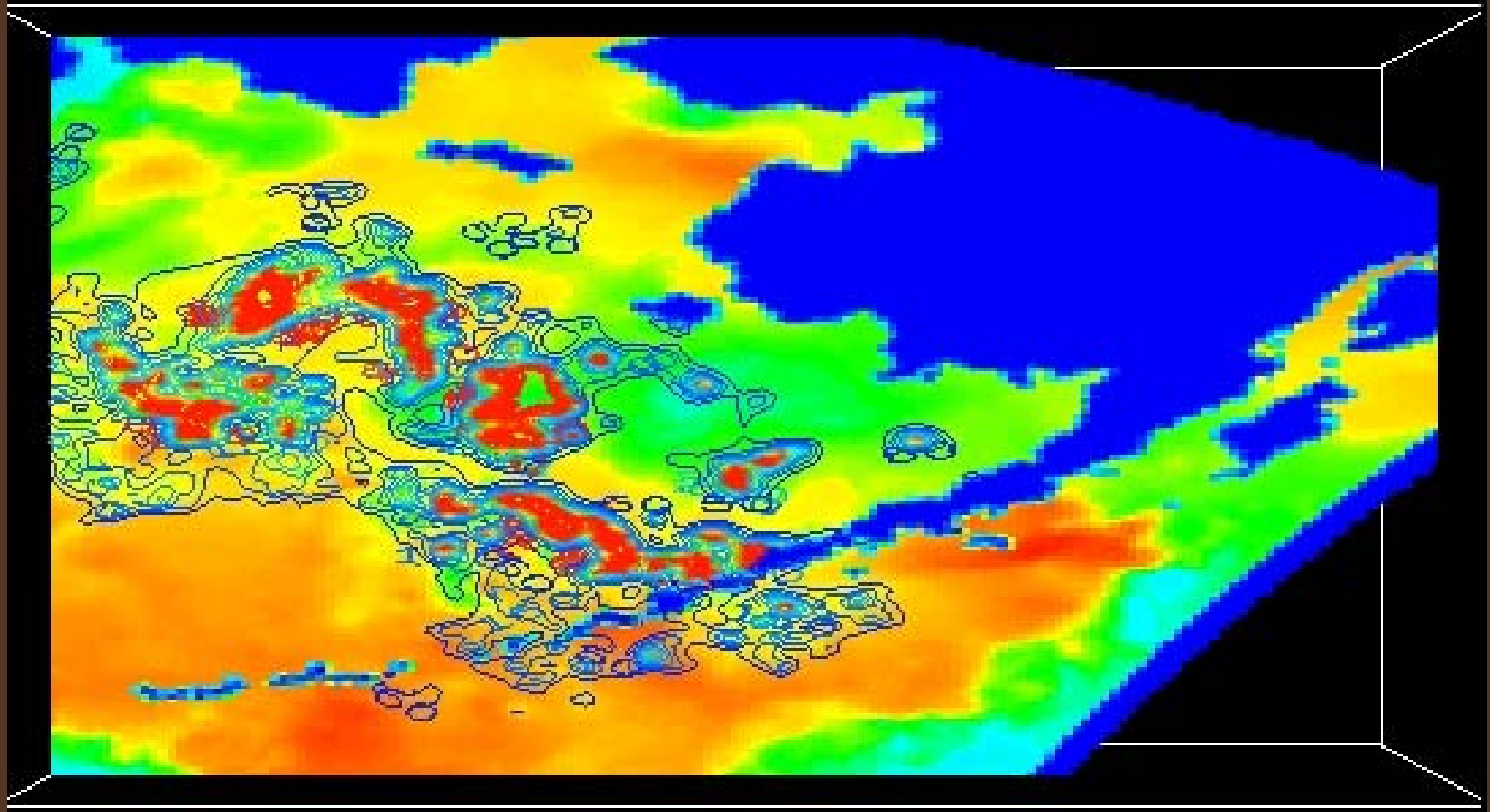




2008






zaop300m_04_latlon - Color-Shaded Plan View 2004-01-04 12:00:00Z
pallock_biomass_age_05_latlon - Contour Plan View 2004-01-04 12:00:00Z
altitude - Topography
altitude - Topography

Vertical modeling group

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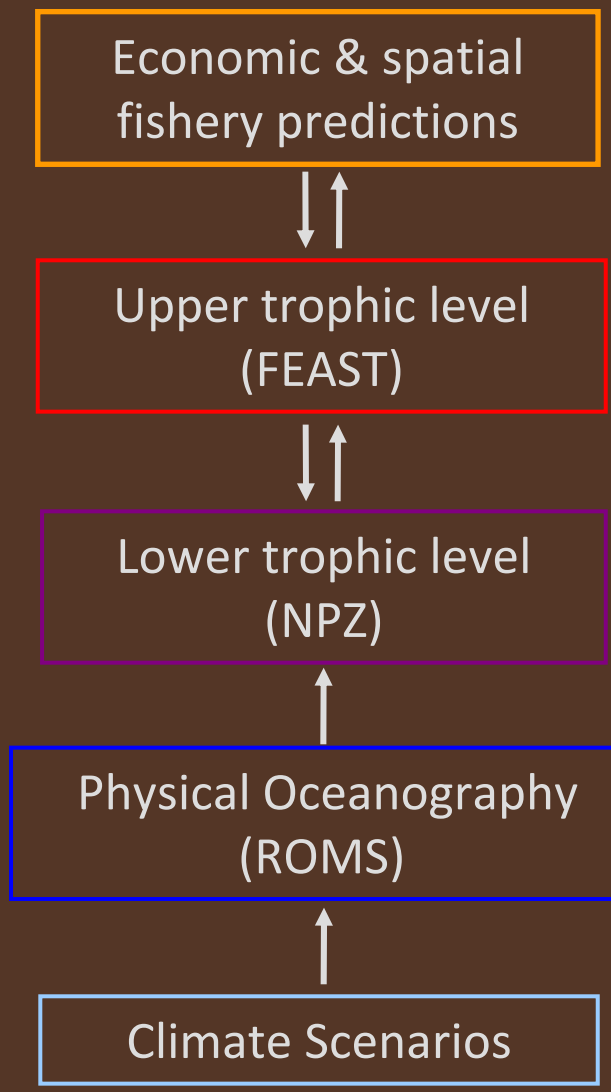

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Econ: Mike Dalton & James Murphy

FEAST: Kerim Aydin, Ivonne Ortiz, Al Hermann

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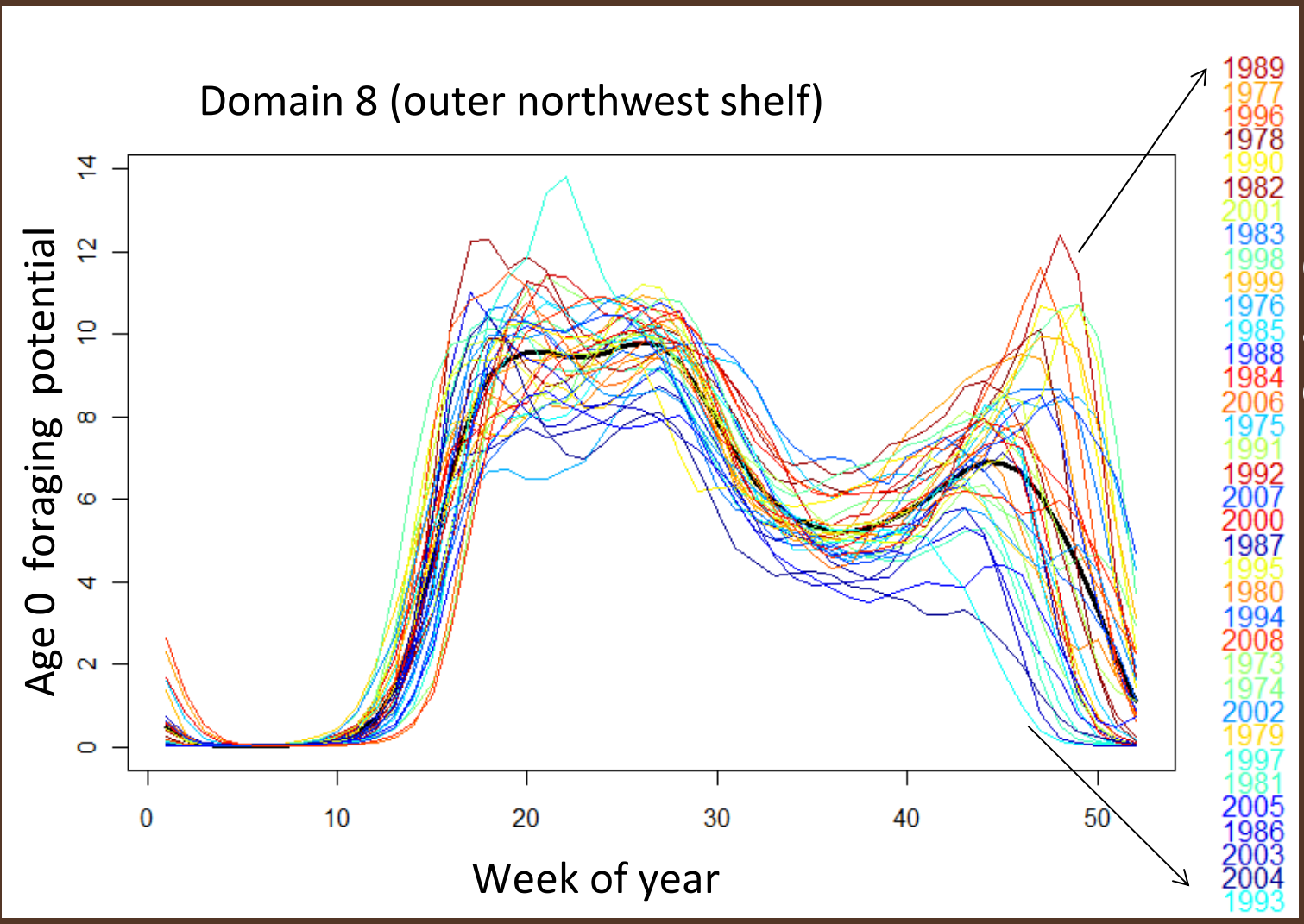
NPZ: Georgina Gibson

ROMS/NEP5 Enrique Curchitser, Kate Hedstrom

Climate: Nick Bond & Muyin Wang

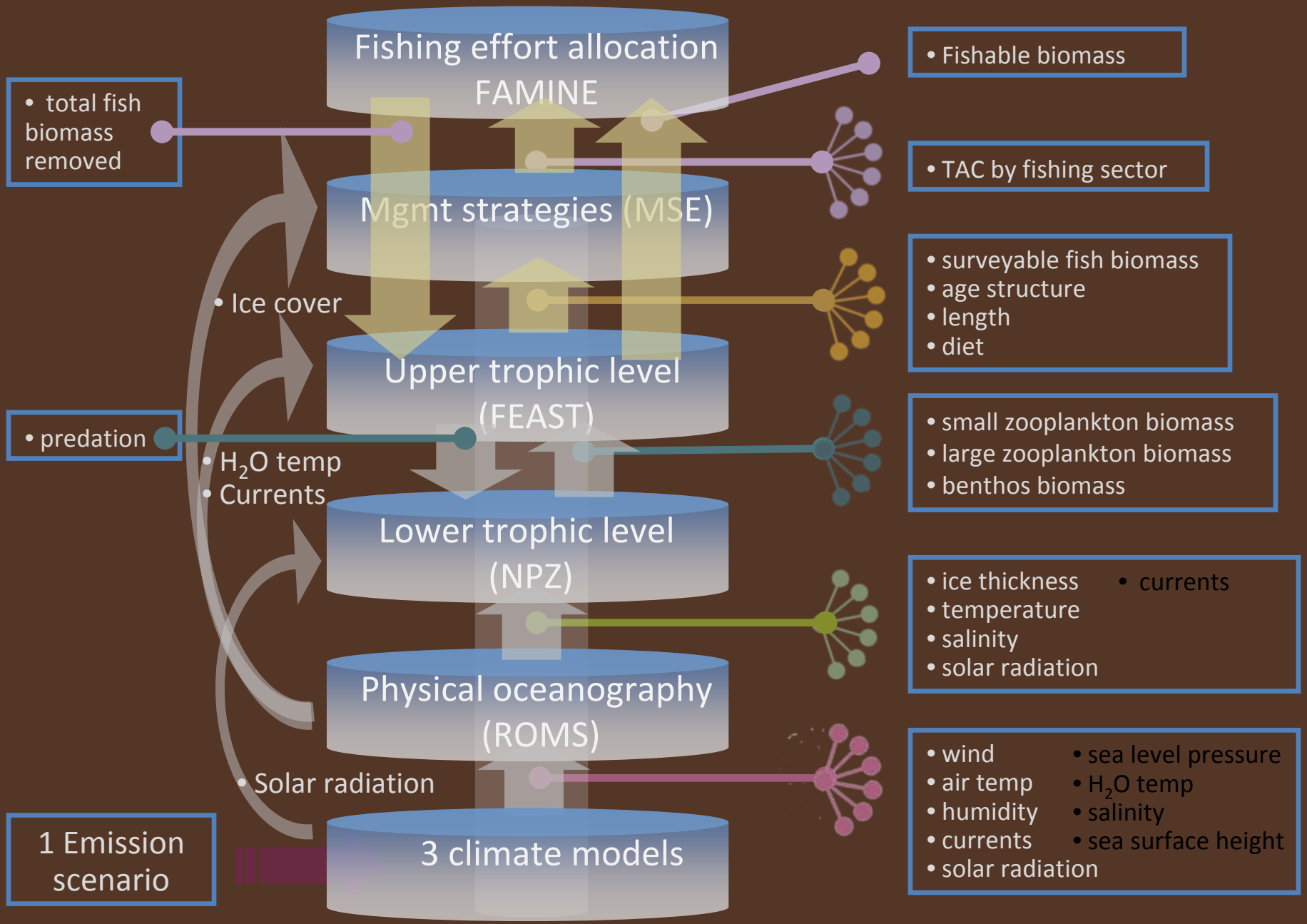
FEAST age-0 seasonal forage potential and stock-assessment estimate of year-class strength



Colors: stock-assessment year-class strength

- Blue weakest
- Red strongest

Vertically-integrated model Forecast – *Data links*



Vertically-integrated model Forecast – *Spatial and Temporal scales*