




Assessing the Effect of Habitat Alteration on Shellfish Populations

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Why Conduct Habitat Alteration Research?

-  Essential habitat for shellfish species is rapidly altered
-  Many restoration/replacement efforts are underway for habitats and shellfish
-  Need to develop criteria to protect important habitats for shellfish support and for focusing restoration efforts

Two Main Types of Habitat Alteration

Negative: Loss
Alteration

Positive: Restoration
Replacement



**Relatively
Unaltered**

**Relatively
Altered**



Highly Altered



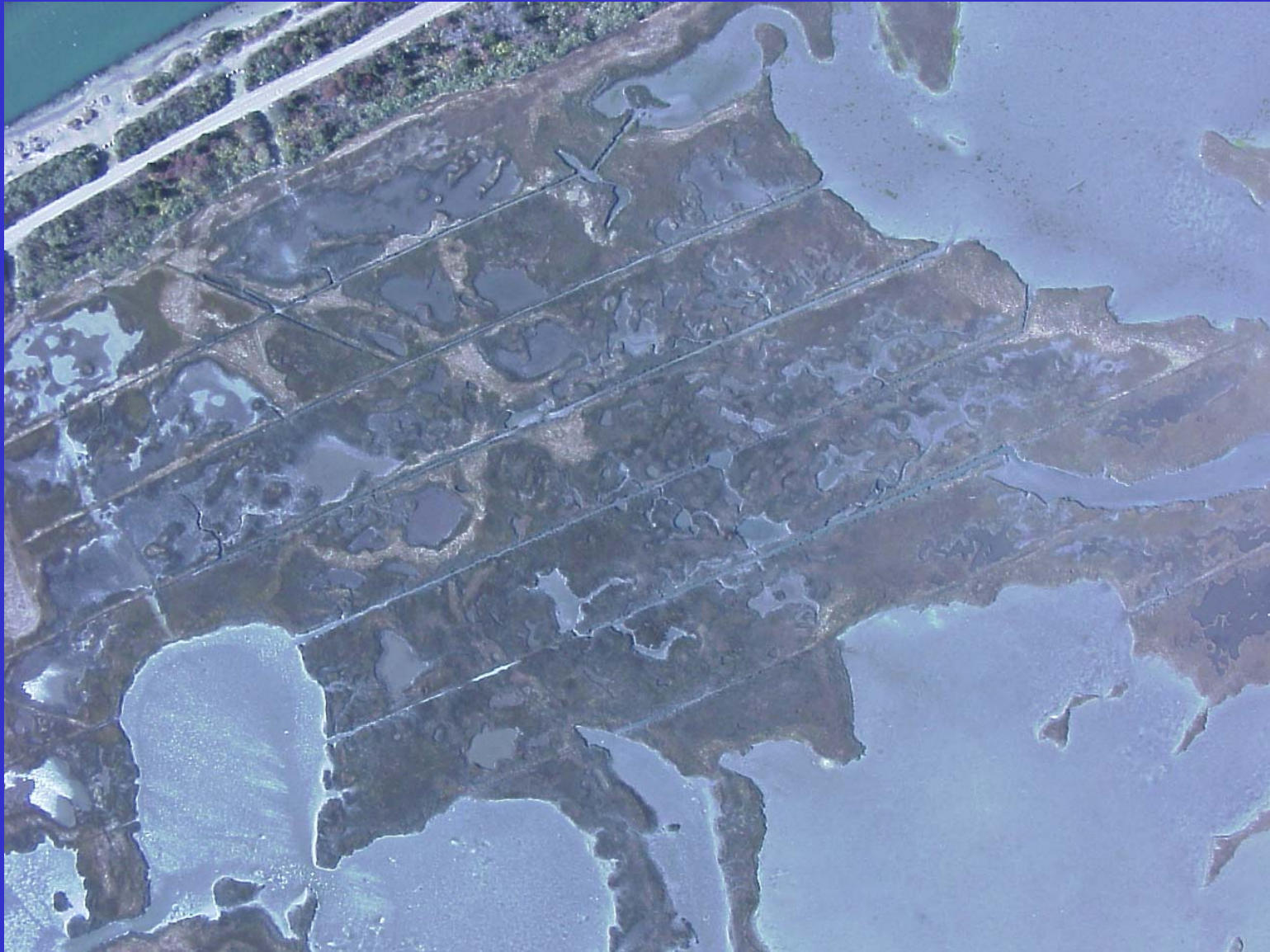
Black Rock Harbor

Road Construction

Sachuest Marsh, RI
NOAA



Ditch Construction



Shellfish Dredging



1 10:22 AM

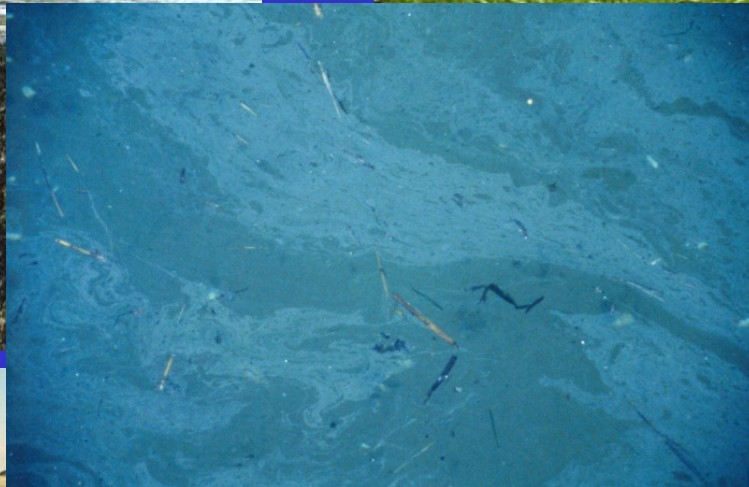
Dredging & Bulldozing



Sediment Plumes



Pollution



Eutrophication



Prime Fishing Spot

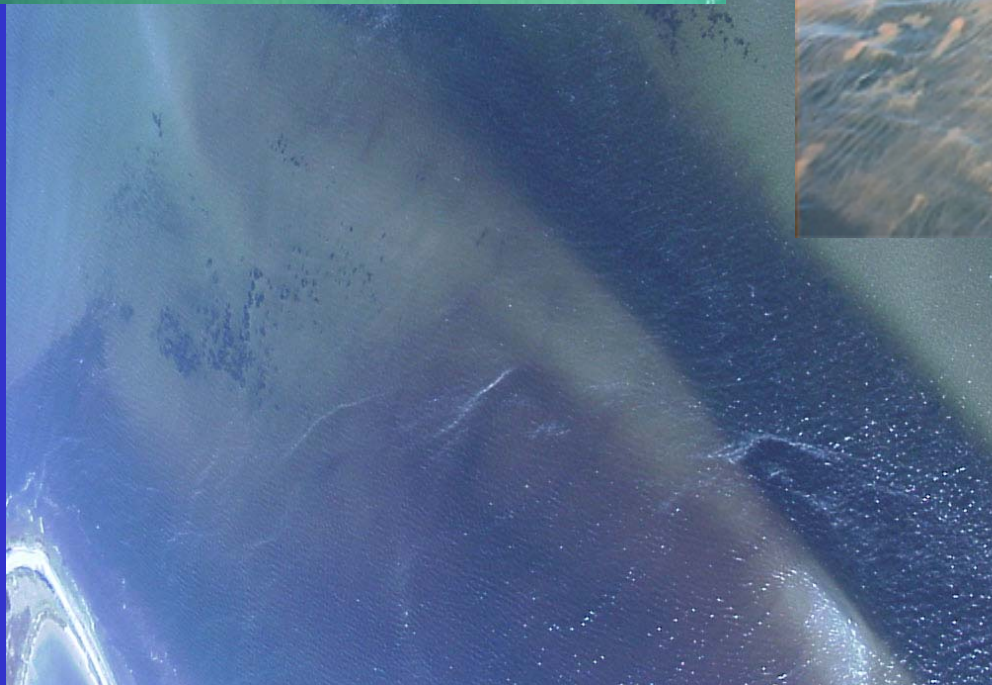
Potato Farm



4 12:43 PM

Fogland Point, Tiverton, RI

Eutrophication





My House



31 11:52 AM

Scallop - Eelgrass Relationship

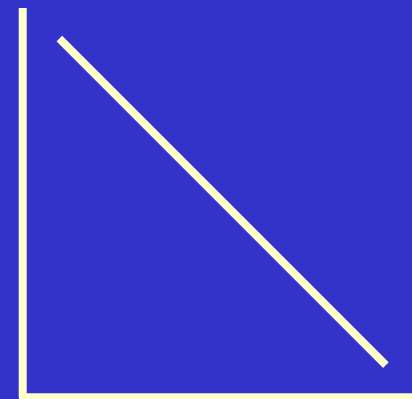


FUNCTIONAL ASSESSMENT FOR A SPECIALIST OR HABITAT-SPECIFIC SPECIES



Scallop Population

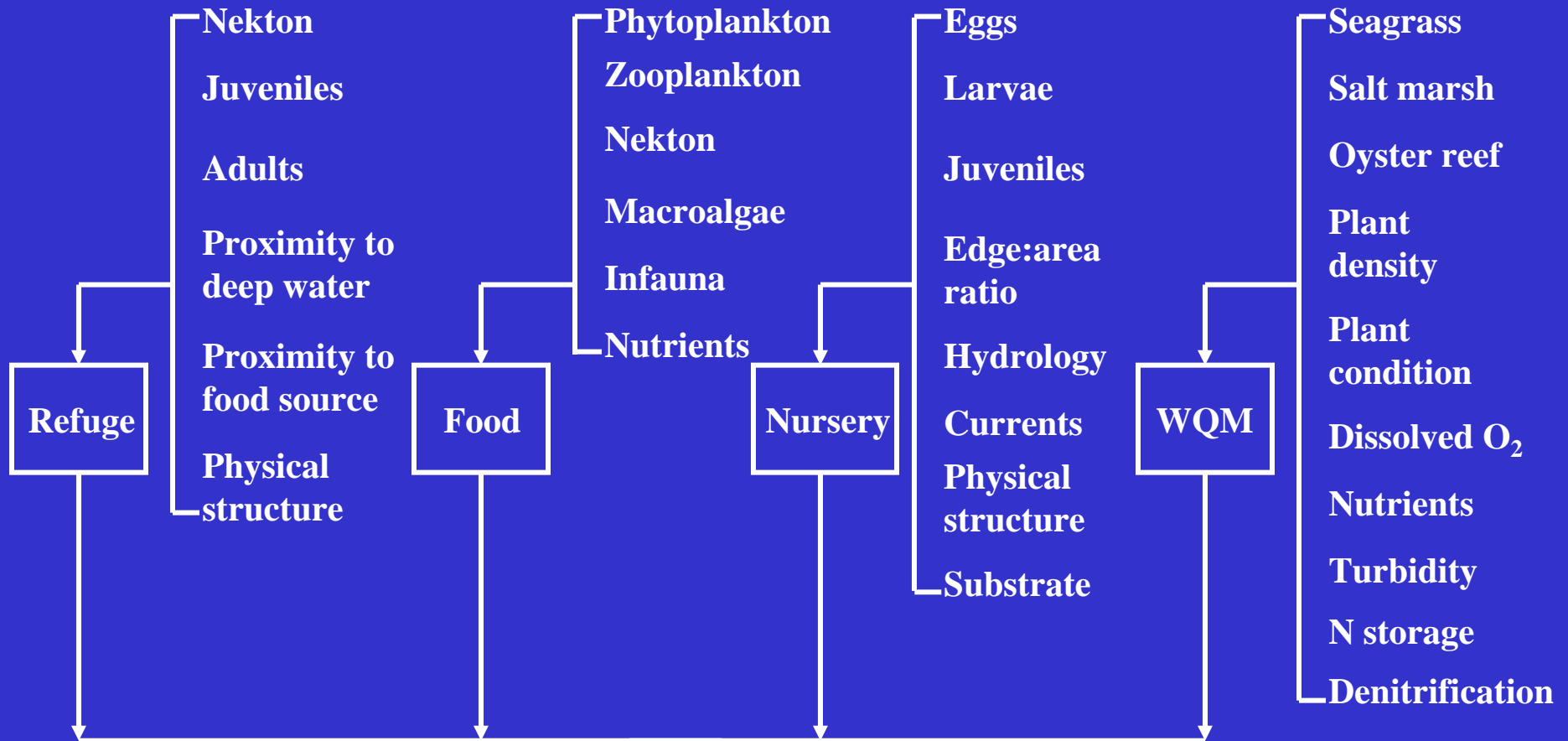
Population



Habitat alteration

FUNCTIONAL ASSESSMENT

Habitat attributes that constitute life support functions required to support fish, shellfish, and wildlife



Successful populations of fish, shellfish, wildlife

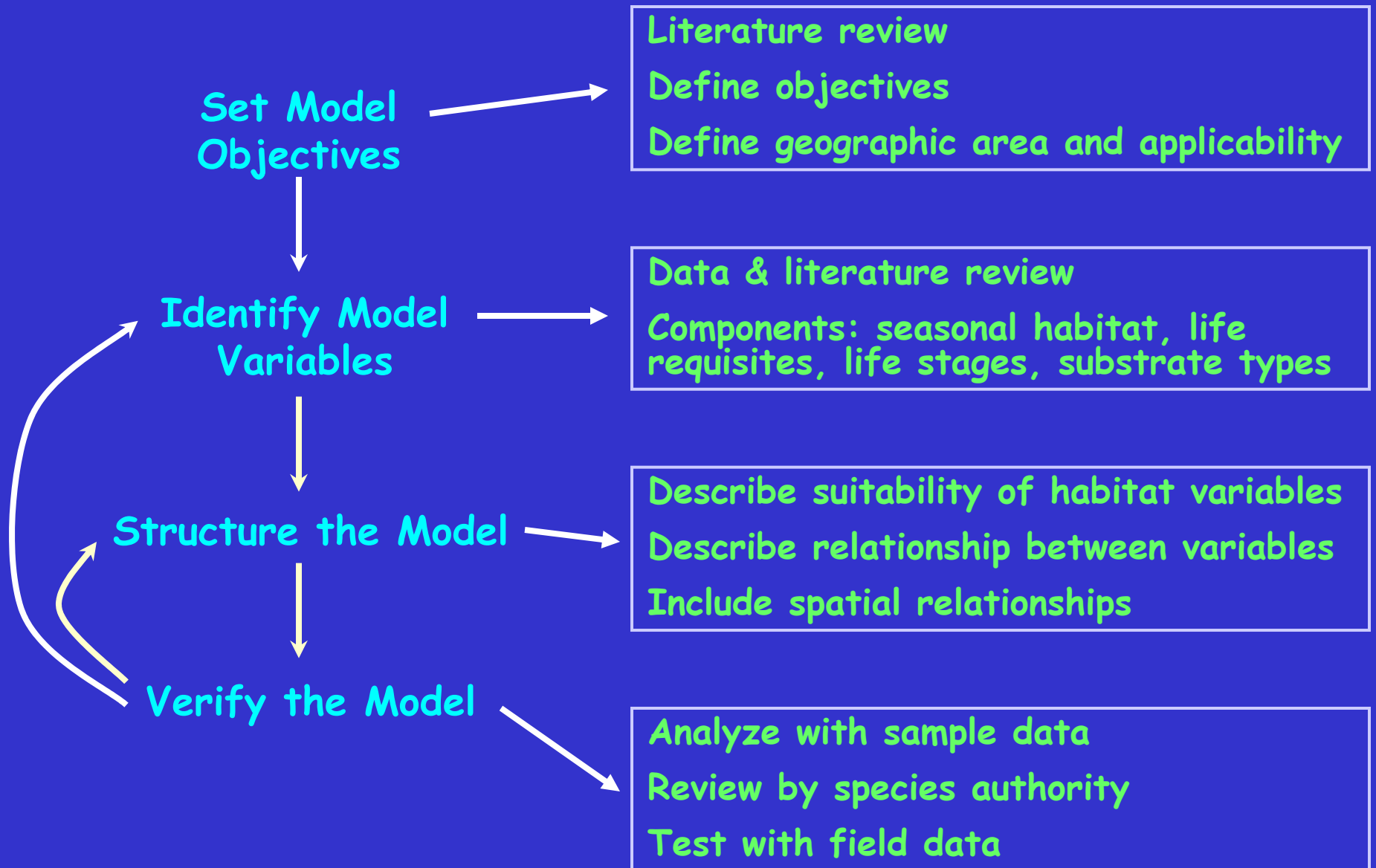
How will we assess habitat function for bay scallops?

- 🐚 Three pronged modeling approach:
 - 🐚 Habitat Suitability Index
 - 🐚 Demographic Population Model
 - 🐚 Systems Model
- 🐚 The North Cape Restoration Project

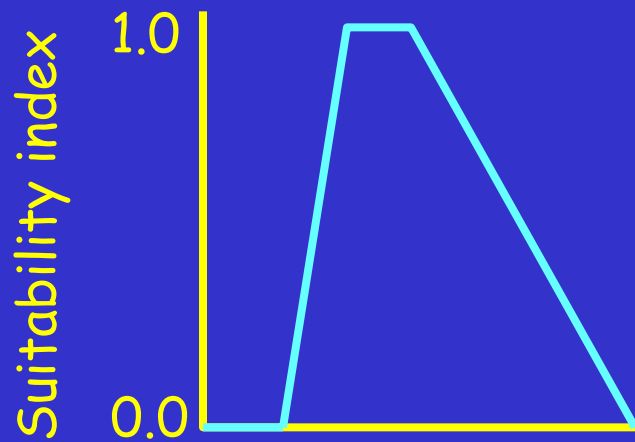
What are some potential objectives for the models?

1. Develop a bay scallop HSI for New England
2. Determine how well the models predict bay scallop standing stocks in seagrass habitats
3. Determine potential population bottlenecks
4. Relate models to restoration projects as well as loss of habitats
5. Adapt model for other biogeographic provinces (ex. Carolinian)

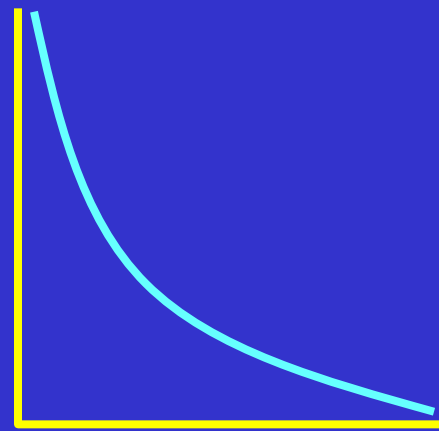
Constructing the HSI



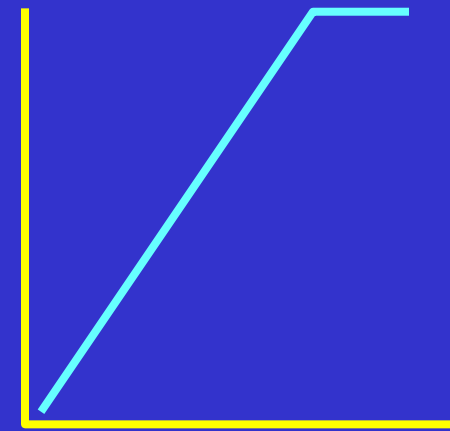
Suitability Index Examples



Mean salinity (ppt)



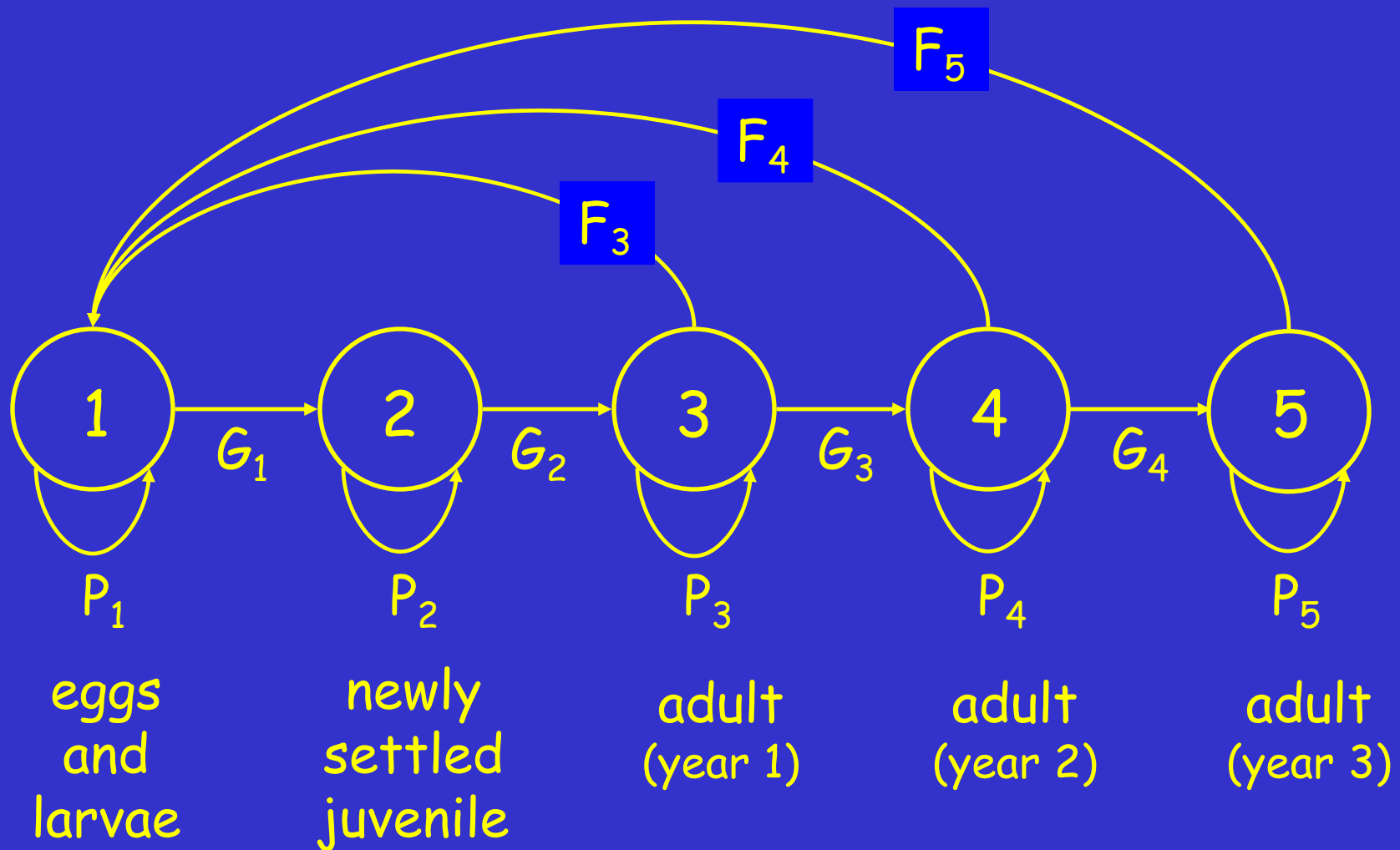
Predator abundance/m²



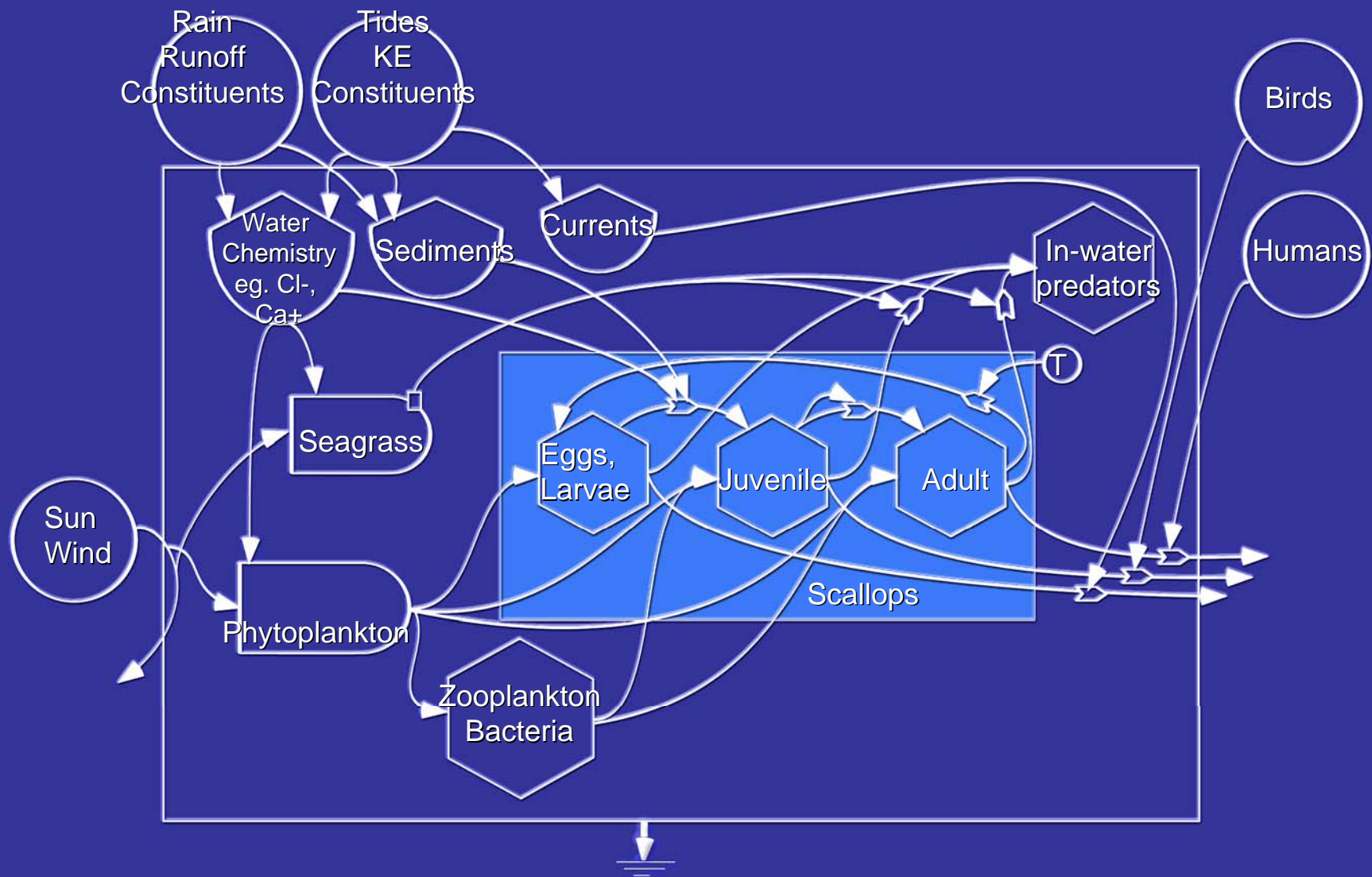
Seagrass cover (%)



Population Model

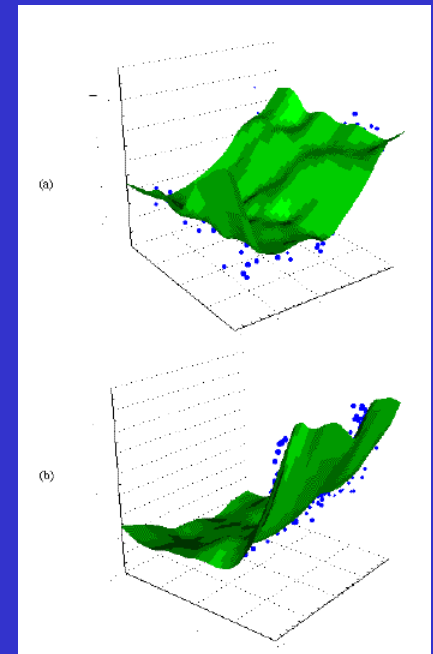


Systems Perspective of Scallop Habitat



Key Landscape Parameters For Systems Model

- 🐚 Bathymetry
- 🐚 Watershed land use, elevation, soils
- 🐚 Currents
- 🐚 Grass bed locations and density
- 🐚 DO, chlorophyll, turbidity and salinity isopleths
- 🐚 Sediment attributes



North Cape bay scallop restoration efforts



🐚 Scallop seeding & monitoring:

🐚 2002: 600,000 seed

🐚 2003: 2,000,000 seed

🐚 Spatfall Monitoring



How will models help with bay scallop habitat alteration?

 Help set criteria for loss of seagrass habitats

 Help determine effective habitats for reseeding efforts

Many Thanks to....

Sherry Brandt-Williams

Giancarlo Cicchetti

Tim Gleason

Cathy Wigand

