

Scientific Writing and Presentations ~ Conceptual Models ~

NRC 601

Research Concepts in Natural Resources

Department of Natural Resources Conservation
University of Massachusetts Amherst

Fall 2009

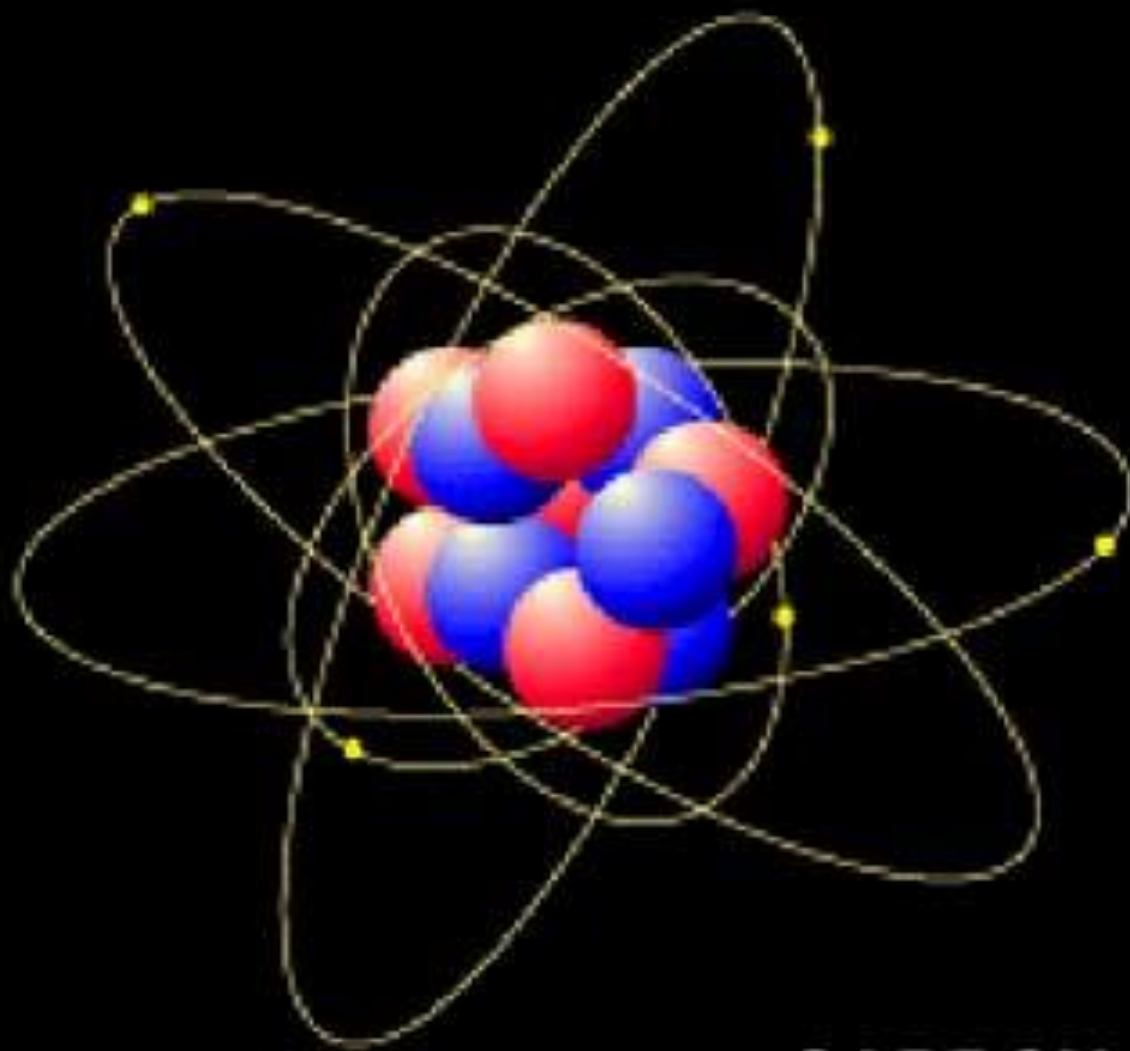
Instructor: *Stephen DeStefano*

What's is a Conceptual Model?

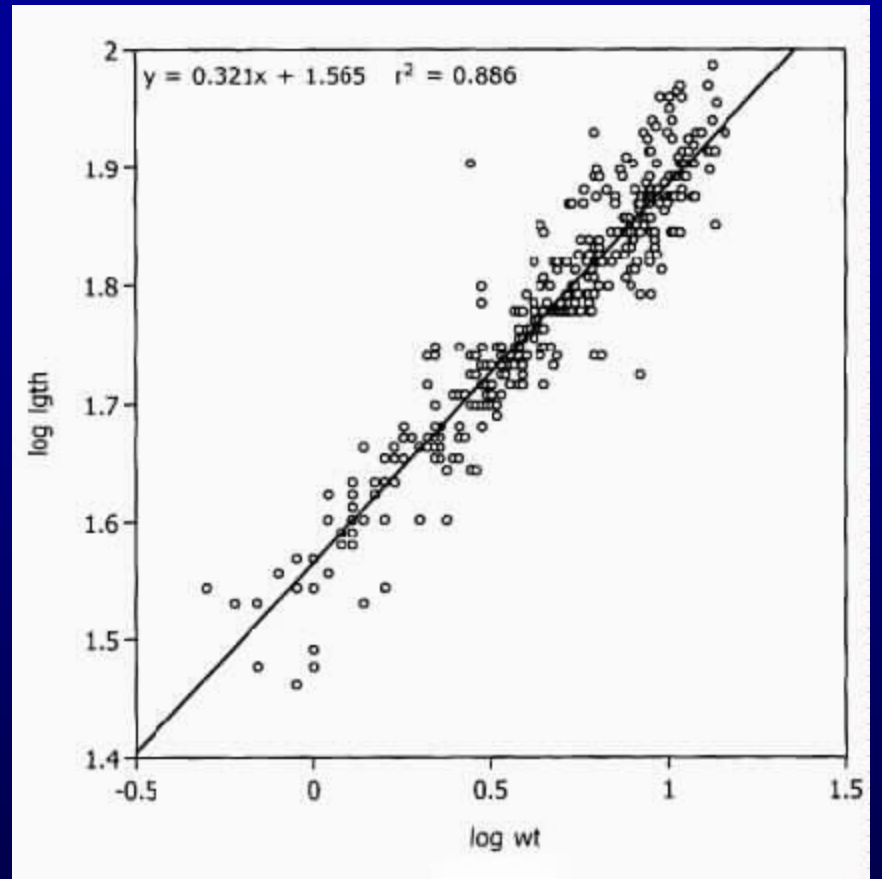
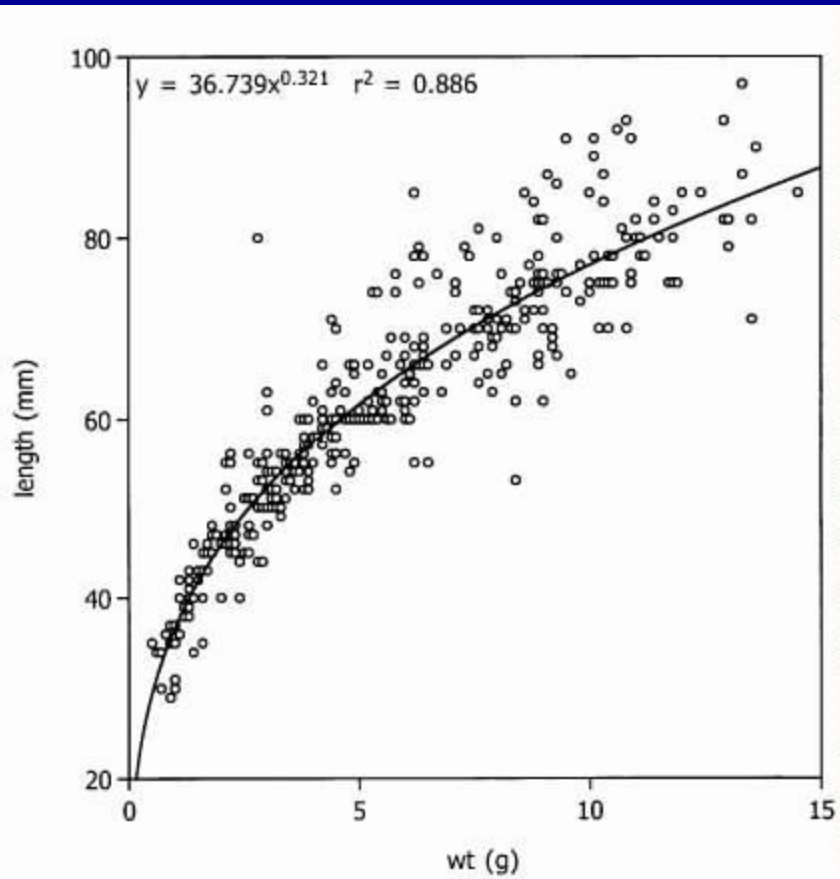
- "... a written description and visual representation of predicted relationships between ecological entities." - *U. S. EPA*
- "... defines the types of entities or objects which are of immediate interest and the relationships between them." - *Dept. of Geography, U. of Aberdeen*
- "An abstract representation of [a] phenomenon that provides a common understanding." - *Enterprise Architecture, Sugar Land, Texas*
- "A user's understanding of what an application does and how it works." - *Computer Science Dept., Virginia Tech University, Blacksburg, VA*
- "A set of qualitative assumptions used to describe a system." - *International Atomic Energy Agency*

... conceptual models, more definitions

- “A diagram of a set of relationships between factors that . . . impact or lead to a target condition. It is the foundation of project design . . . and it is the first part of a complete plan.” - *International Fund for Agricultural Development*
- “The expert's view of the process being modeled. Often conveyed as a schematic; for example, as interconnected compartments, each compartment having inflow, outflow, and reactions . . .” - *Engineering Research Center, Montana State University*
- “An abstract view of the data [or system] . . . Describes the main data objects, avoiding details.” - *ECollege of Business Admin., Troy State University, Dothan, AL*



CARBON



What are Conceptual Models?

People receive information >>> Process that information >>> Respond

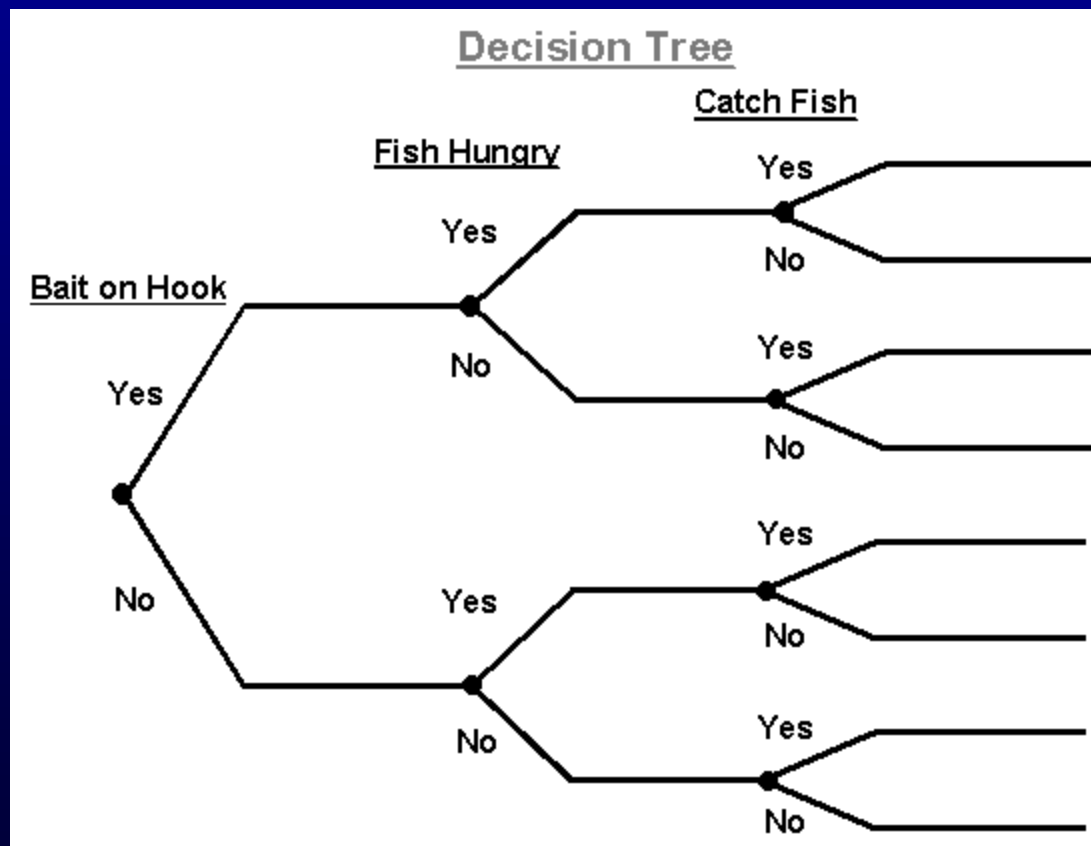
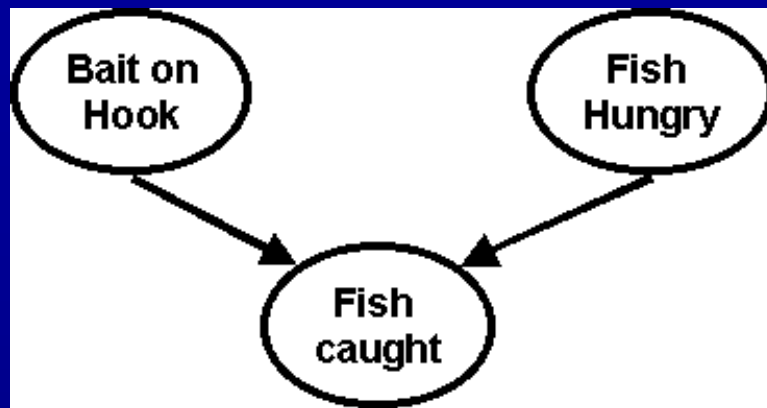
This is a mental or conceptual model of how things work
in our surrounding environment.

Why Use Conceptual Models?

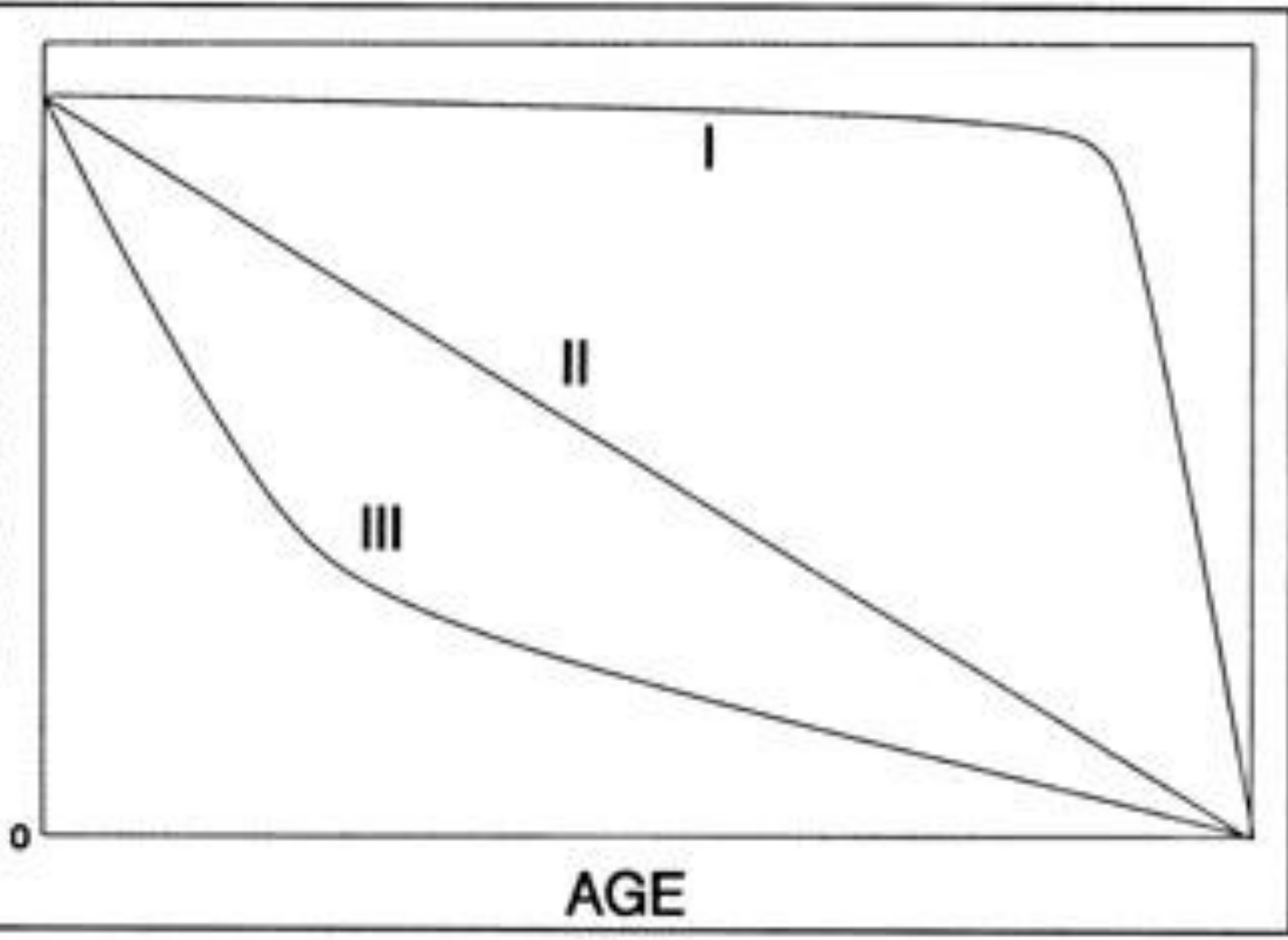
As a teaching tool, to present terminology, to illustrate relationships.

A first step in developing more complex or detailed plans or proposals.

To help explain and discuss interesting features in data sets.



Cohort Abundance



AGE

article

abstract

headline

superHeadline

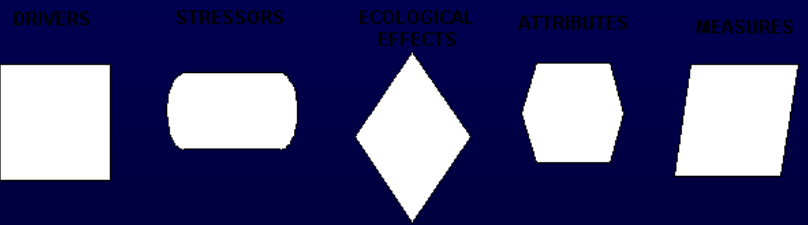
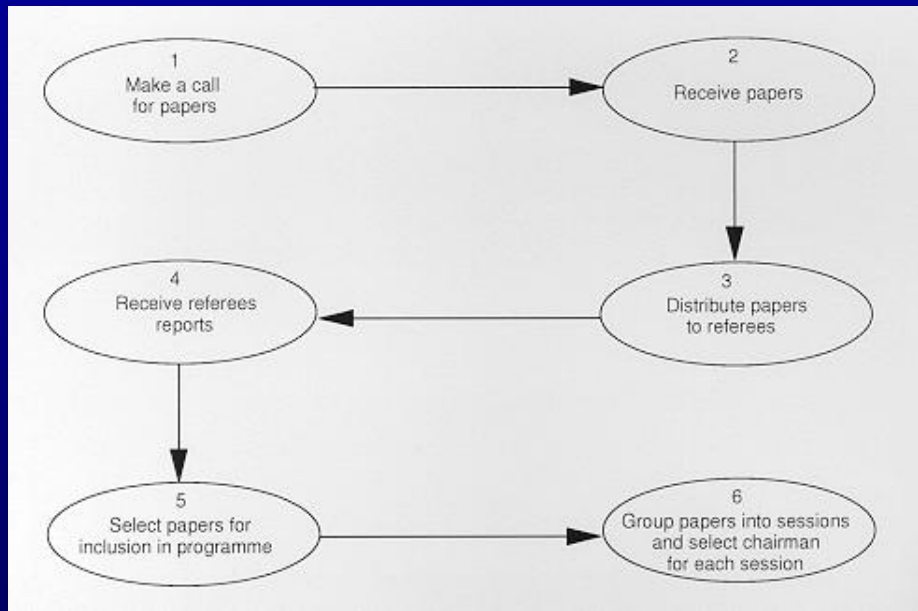
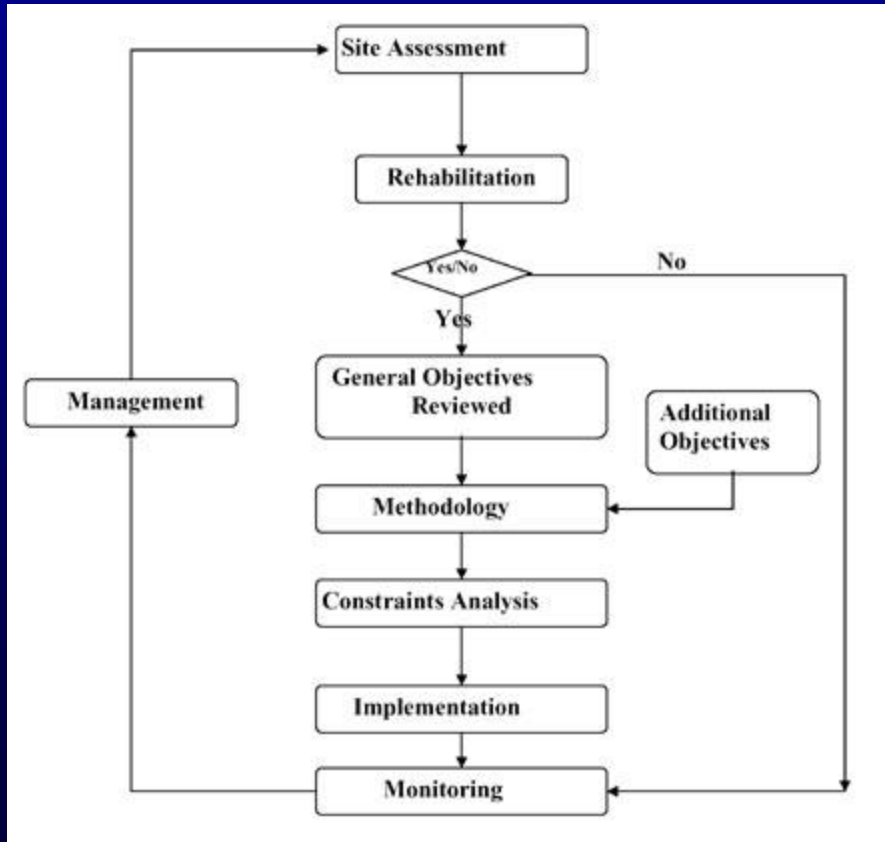
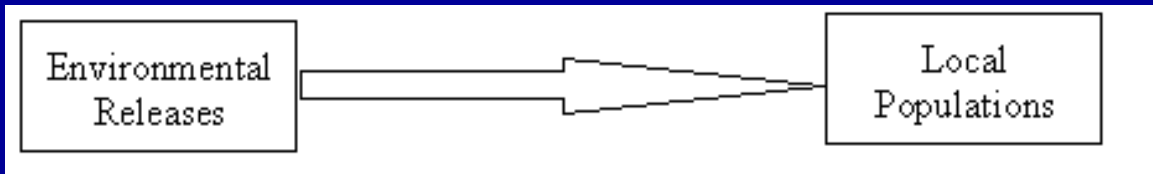
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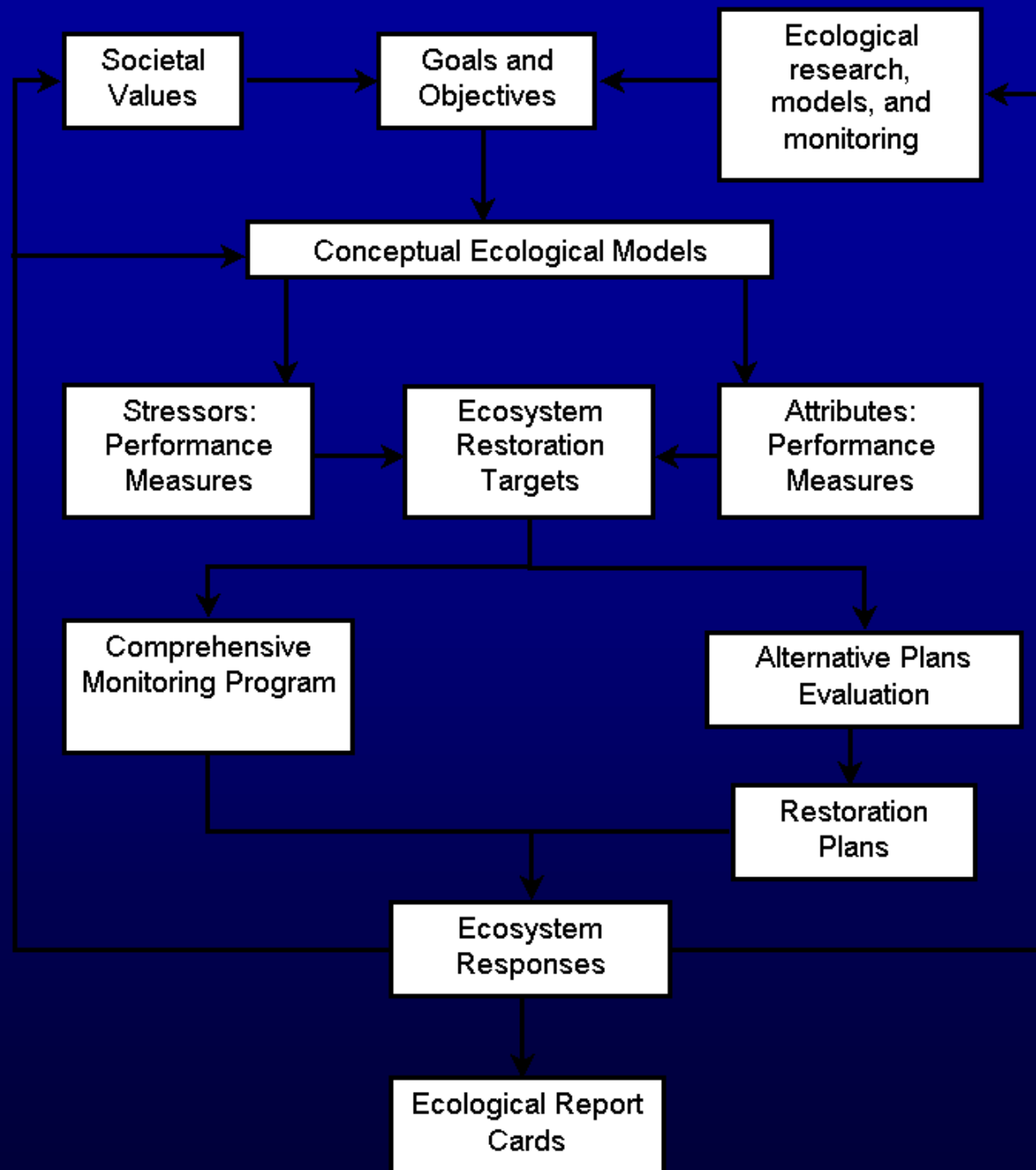
subHeadline

byline

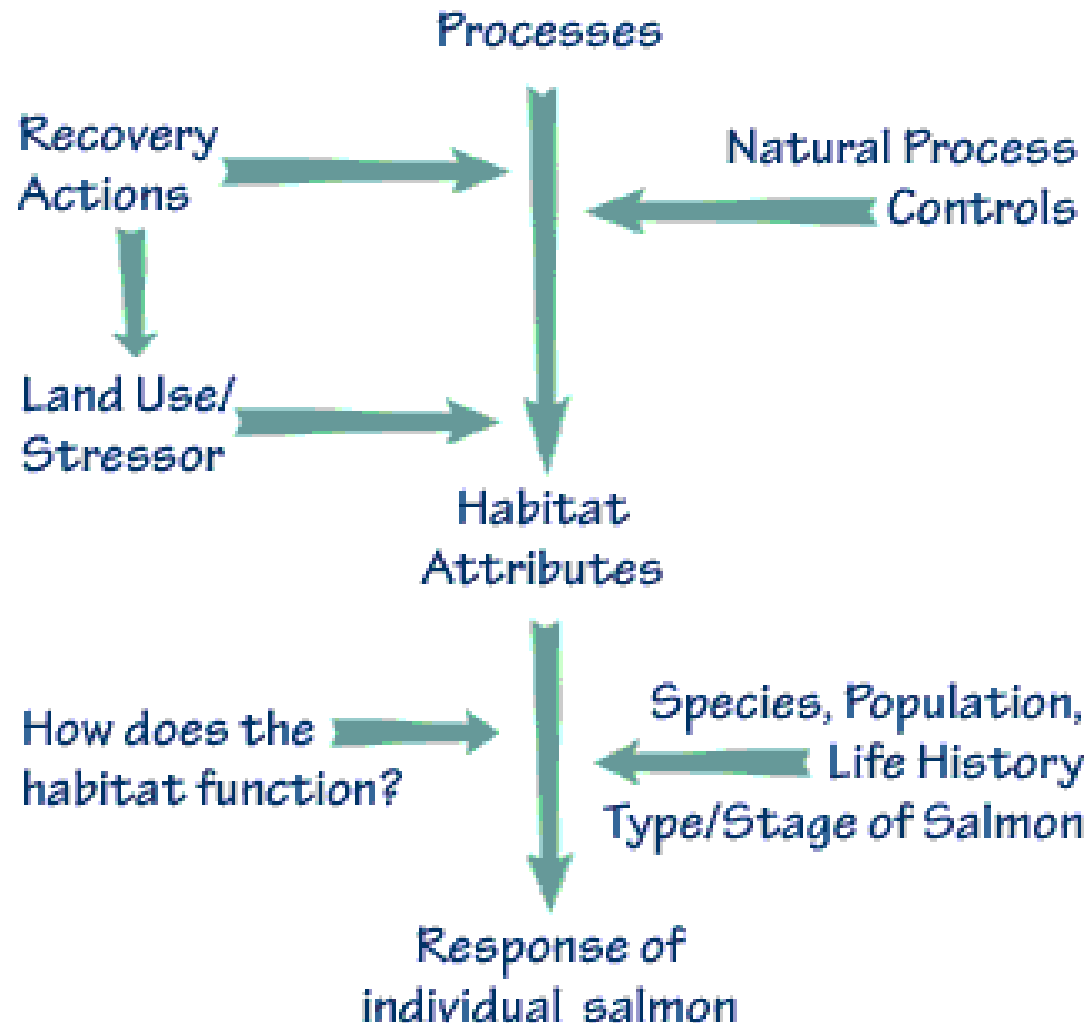
Containers

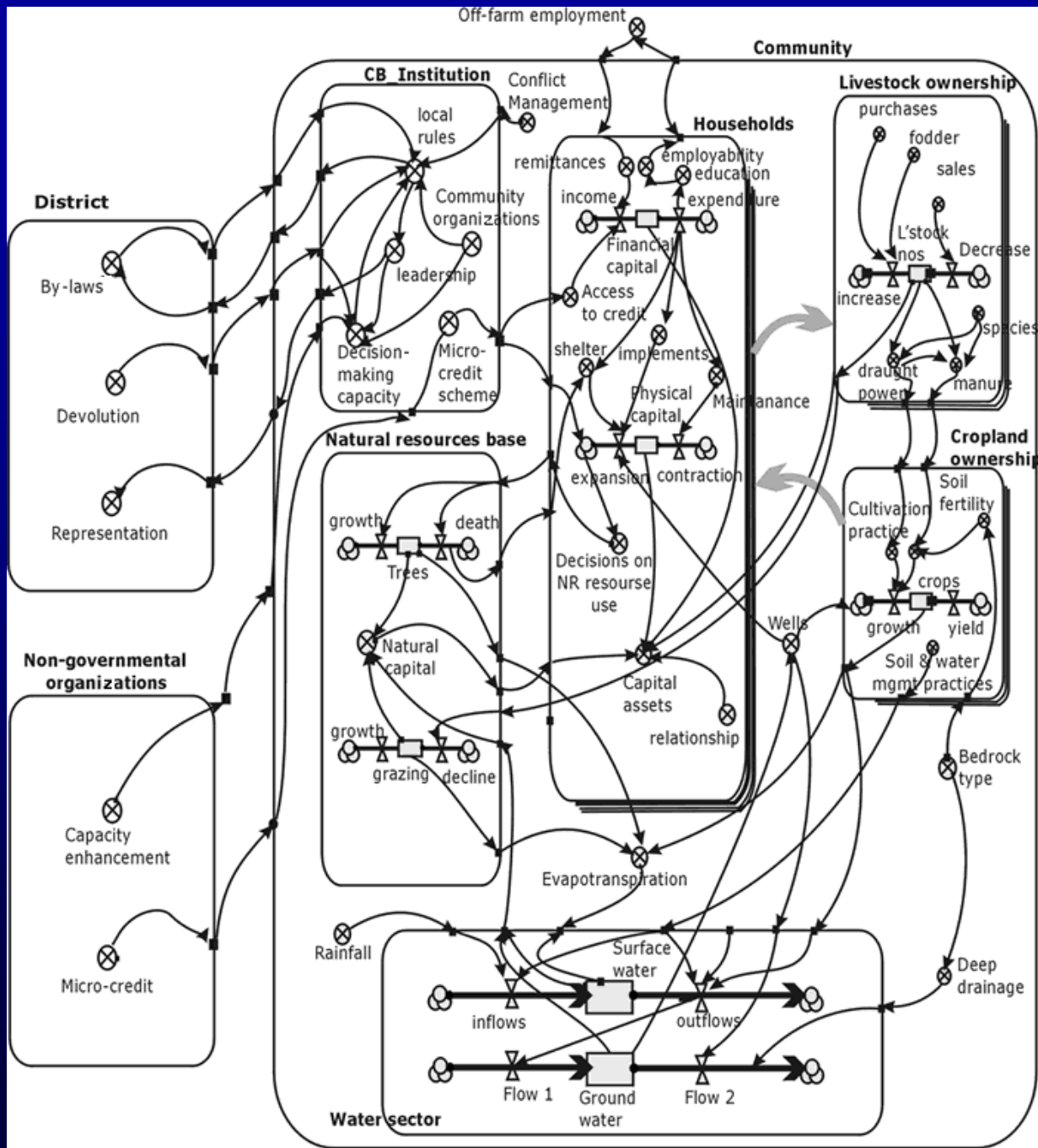
Closer

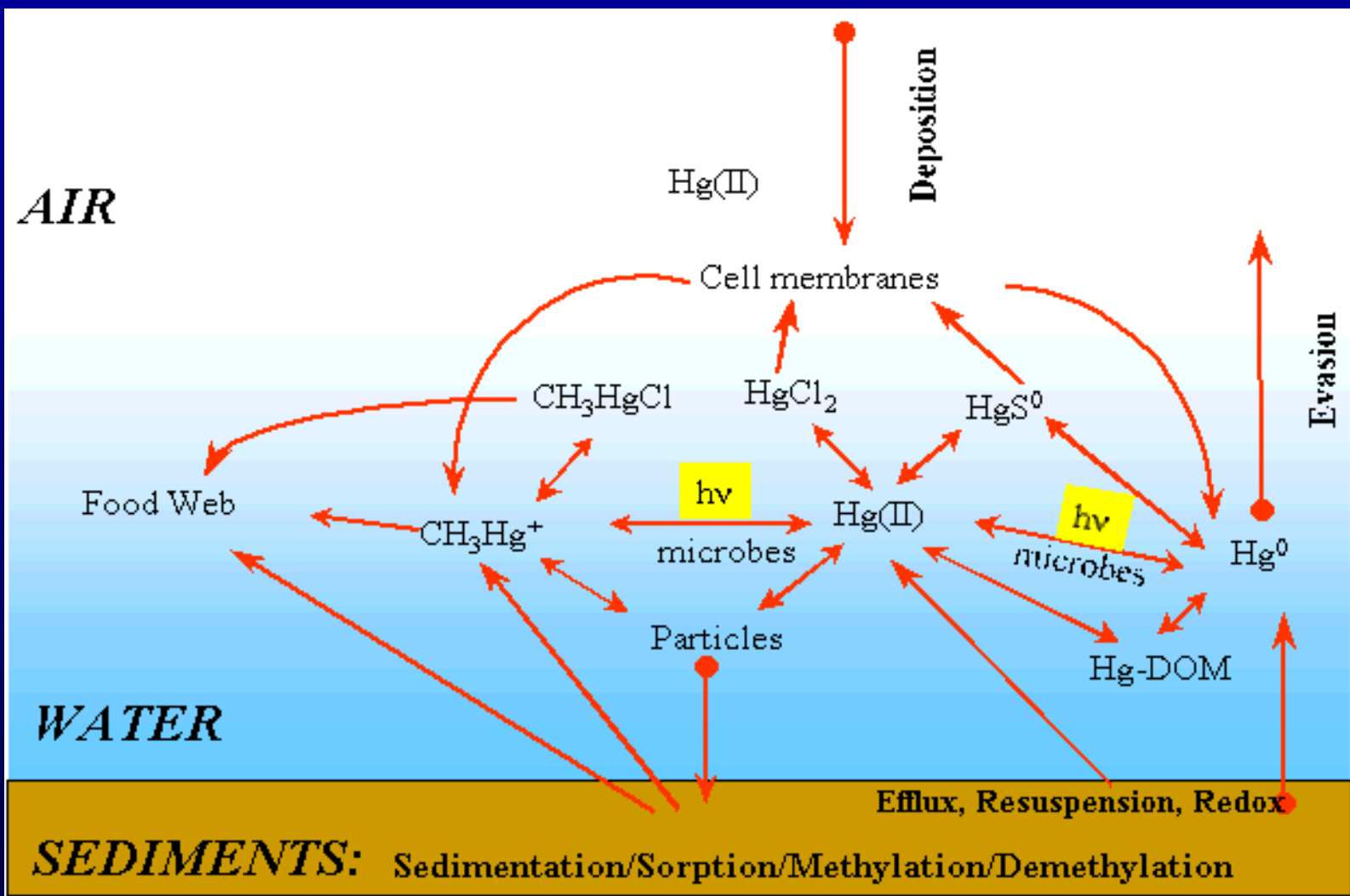




Salmon Conceptual Model







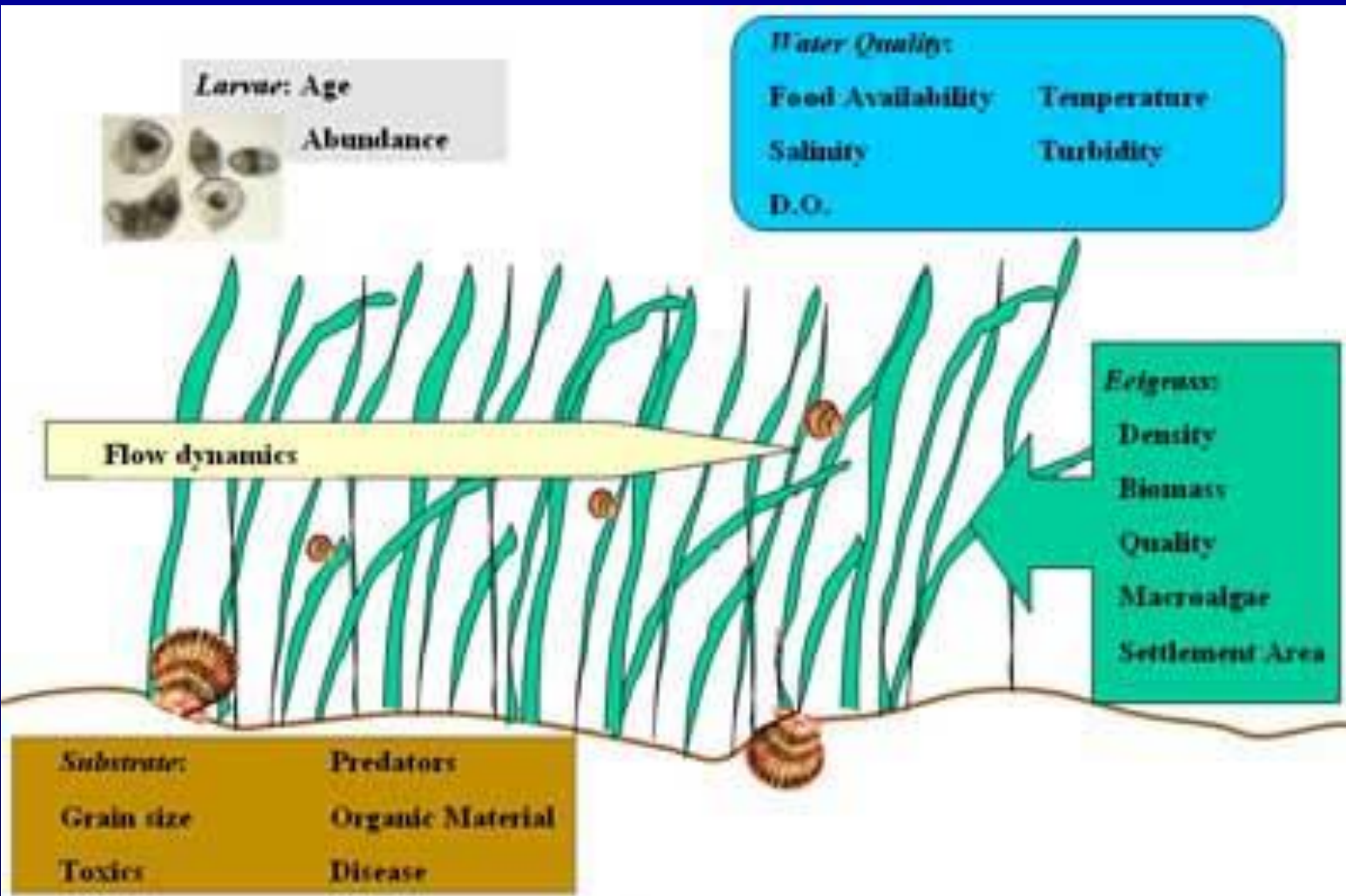


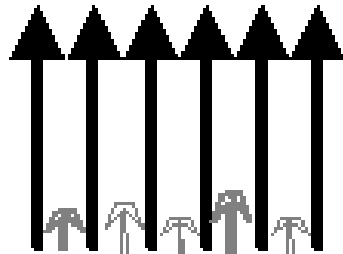
Figure 2. A conceptual model of the relationship between bay scallops and their habitat.

Stage 1:
Dense pioneer stand
No understorey



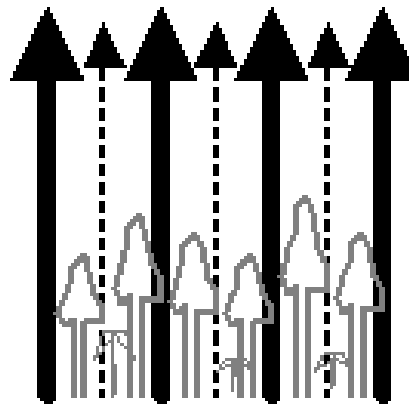
Invasive plant, or
Planted tree for
timber, fruit, etc.

Stage 2:
Growing up &
self-thinning
Sparse understorey



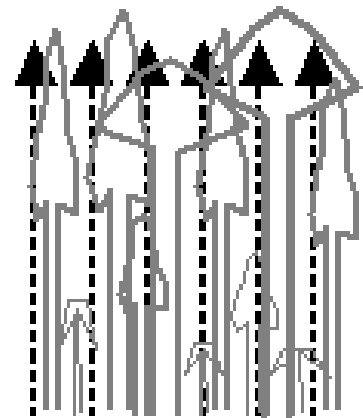
Invasive plant or planted
woodlot tree removed
for use or other purpose
(thinning)

Stage 3:
Further development/
thinning
Young regrowth forest



Forest trees and other
species establishing
naturally or interplanted
(potentially traditionally
used species)

Stage 4:
Pioneer stand totally
removed
Mixed regrowth forest



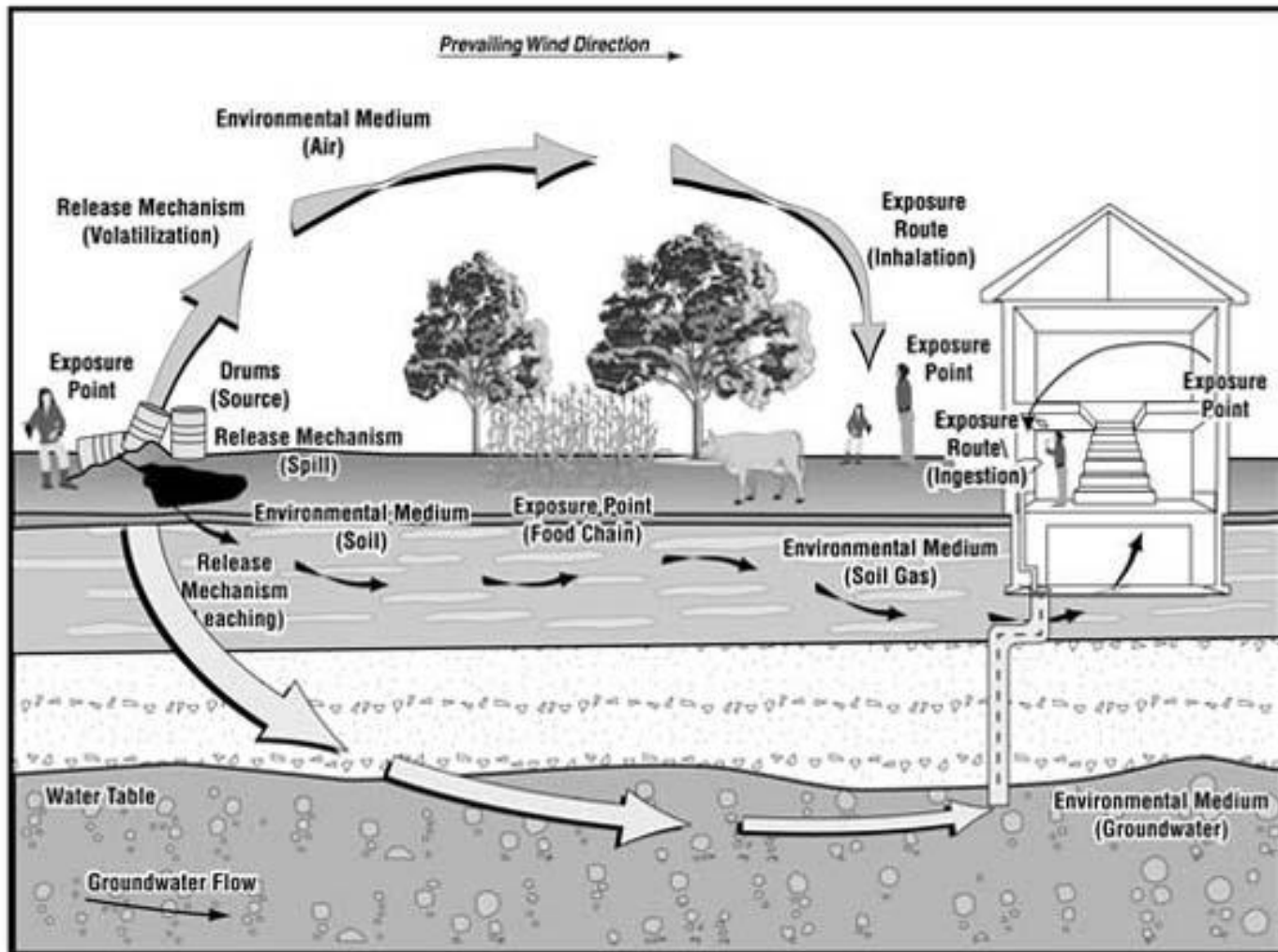
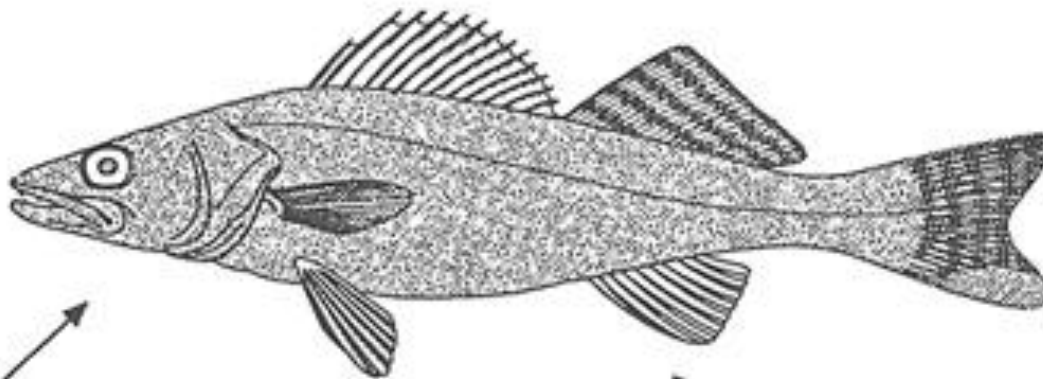


Figure 6-2. Site Conceptual Model—Exposure Pathway Schematic

Bioaccumulation Model Process

**food chain
transfer**



uptake from water



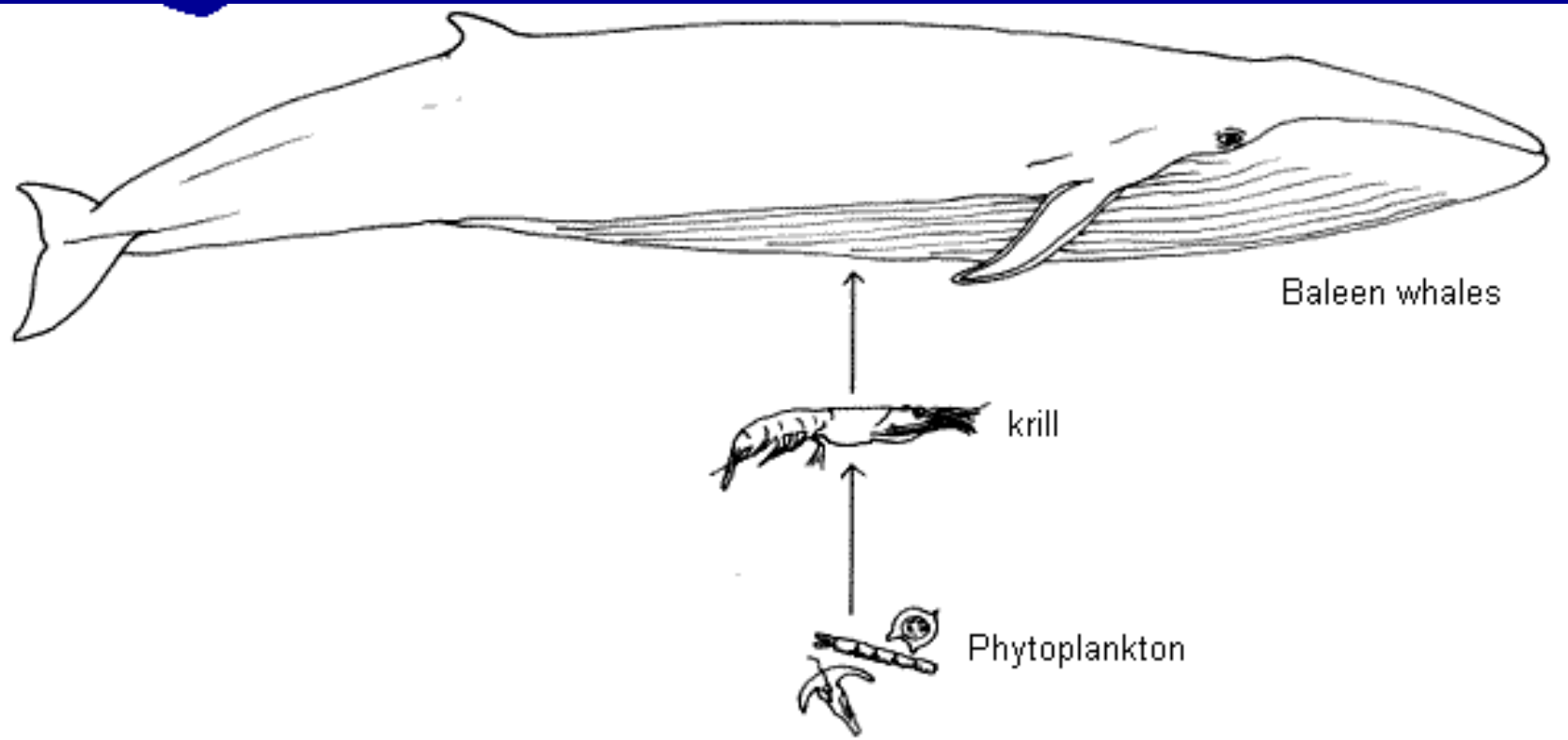
**elimination
(via respiration and excretion)**

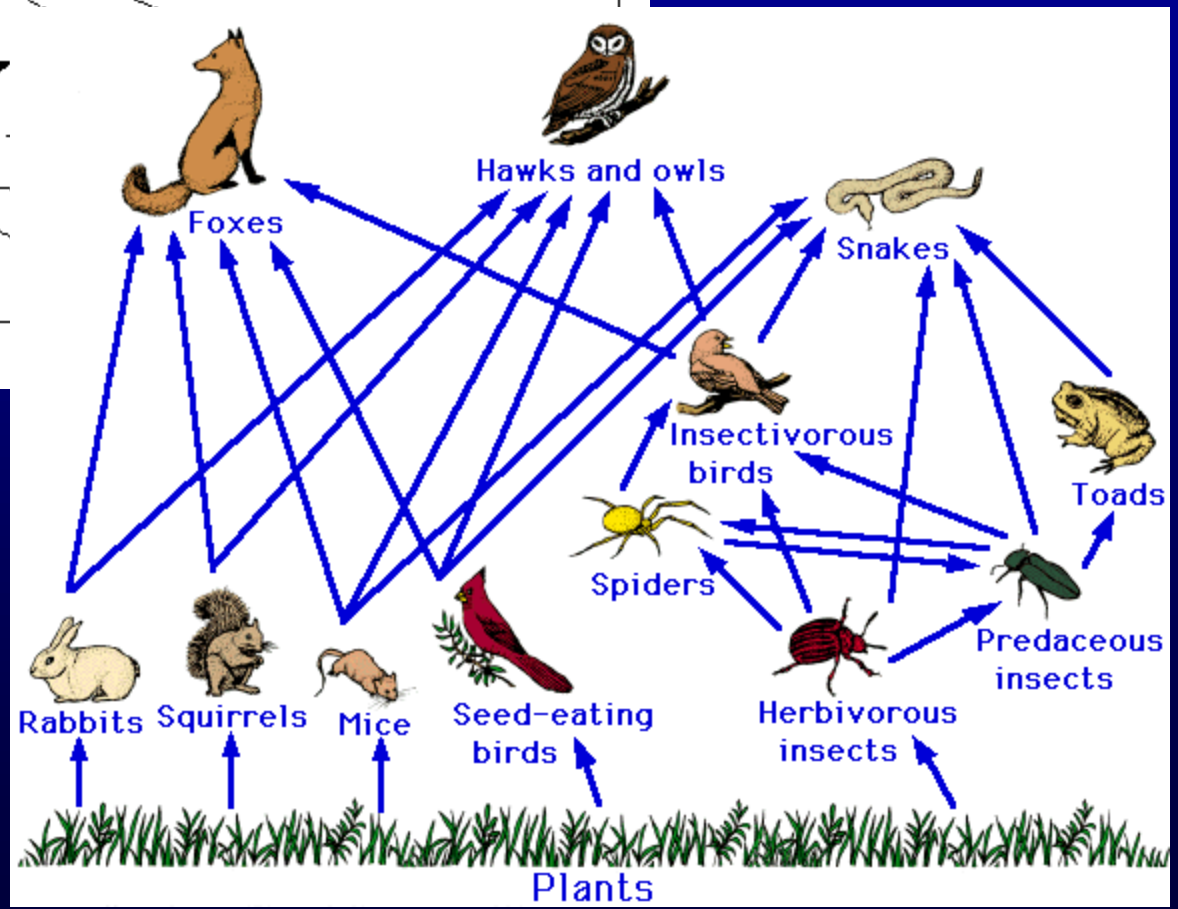
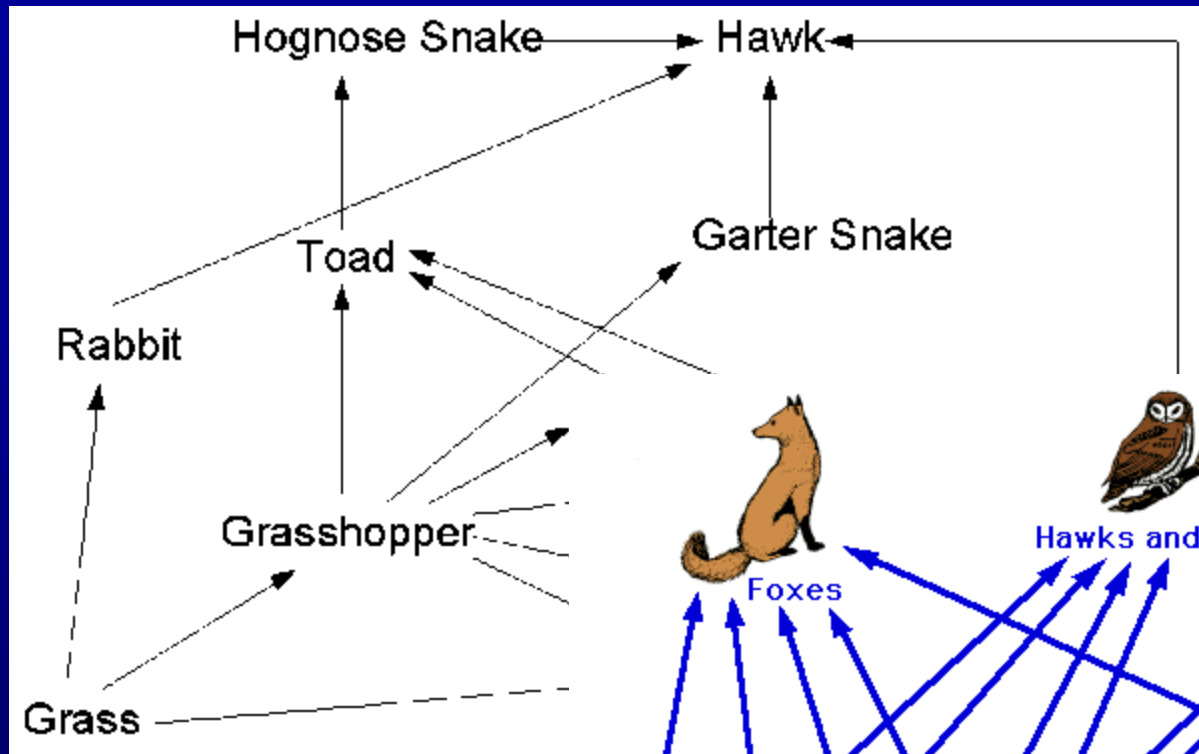


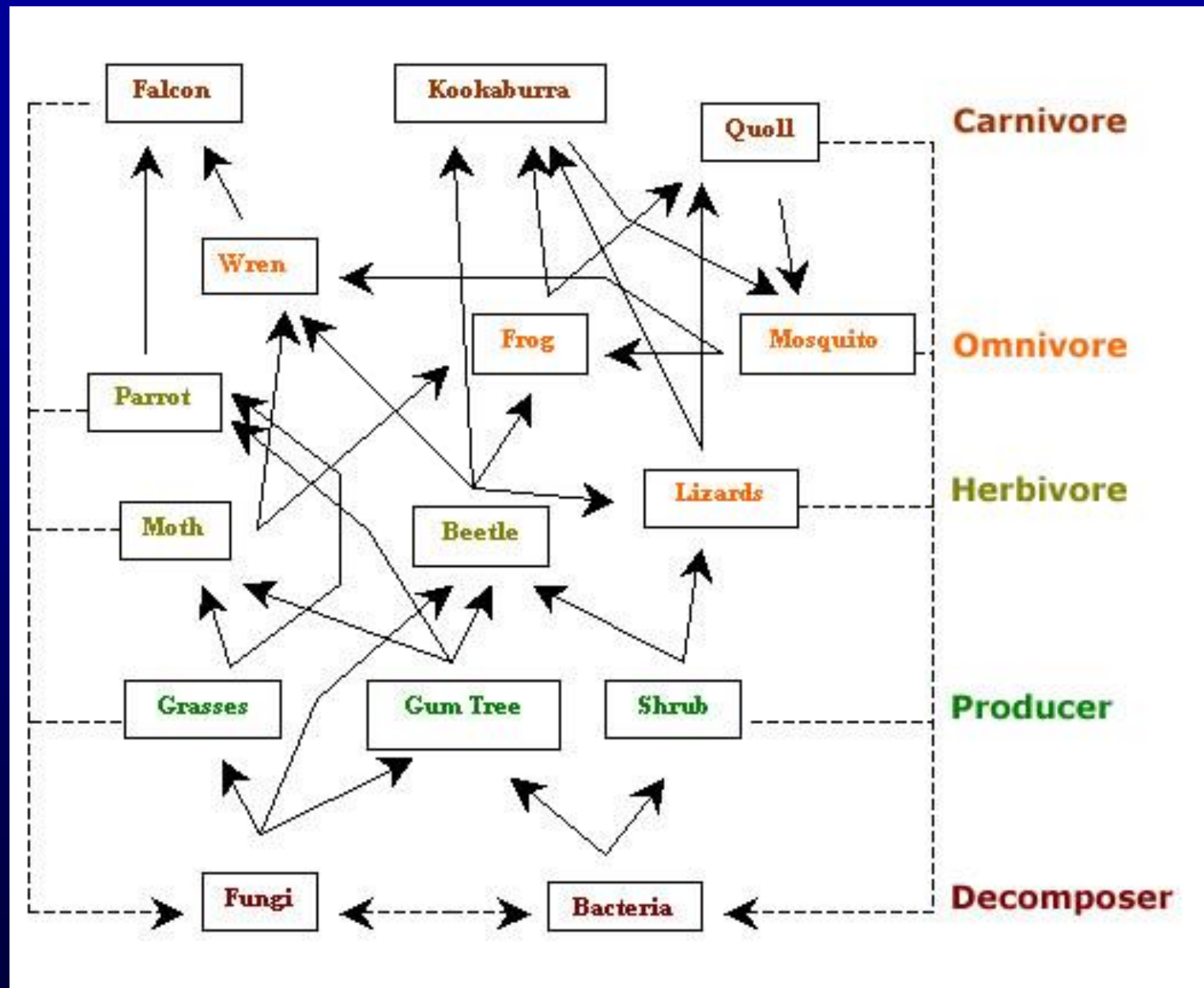
$$\text{bioaccumulation} = \text{uptake from water} + \text{food chain transfer} - \text{elimination} - \text{growth dilution}$$

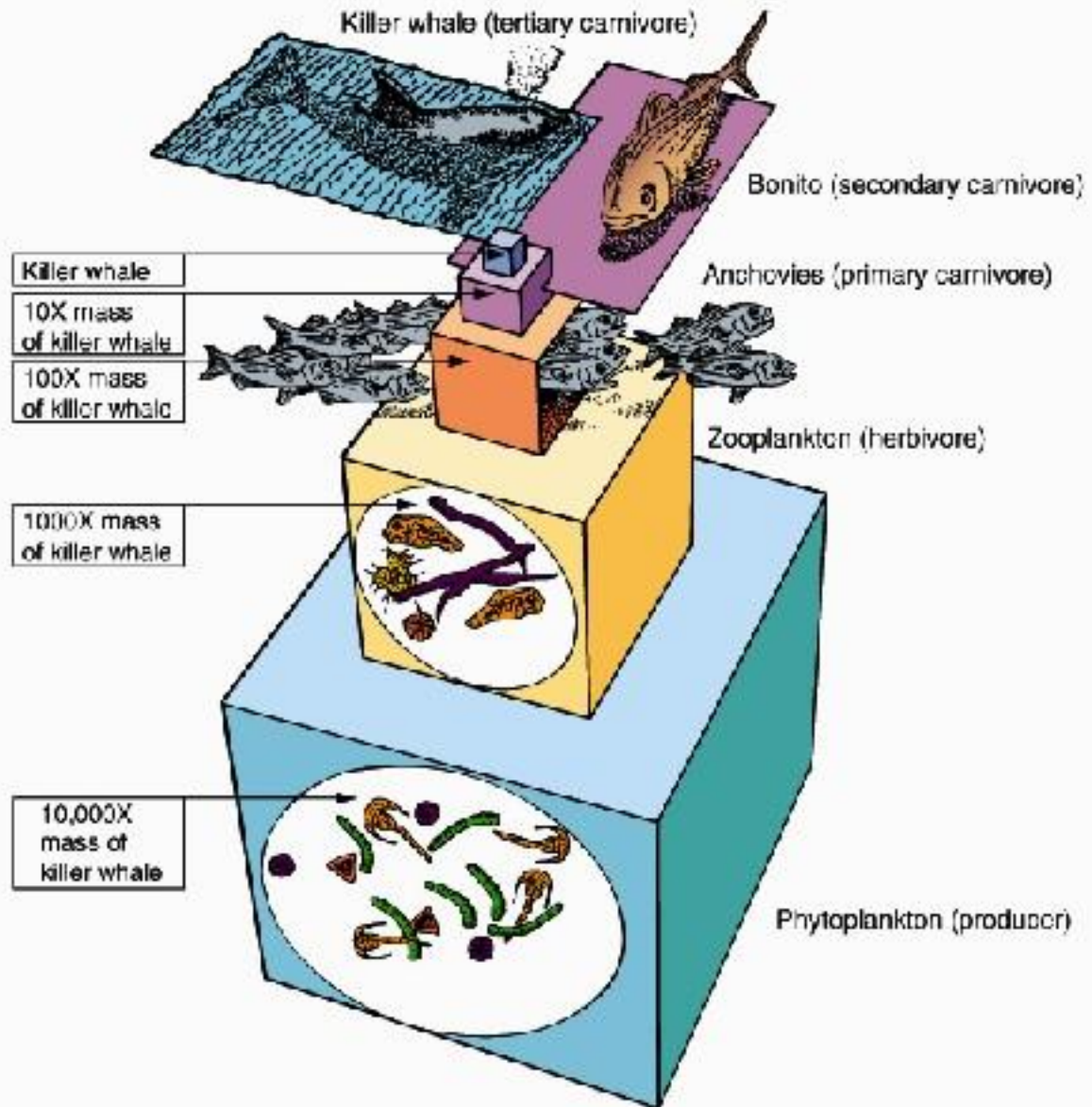
Figure 3.

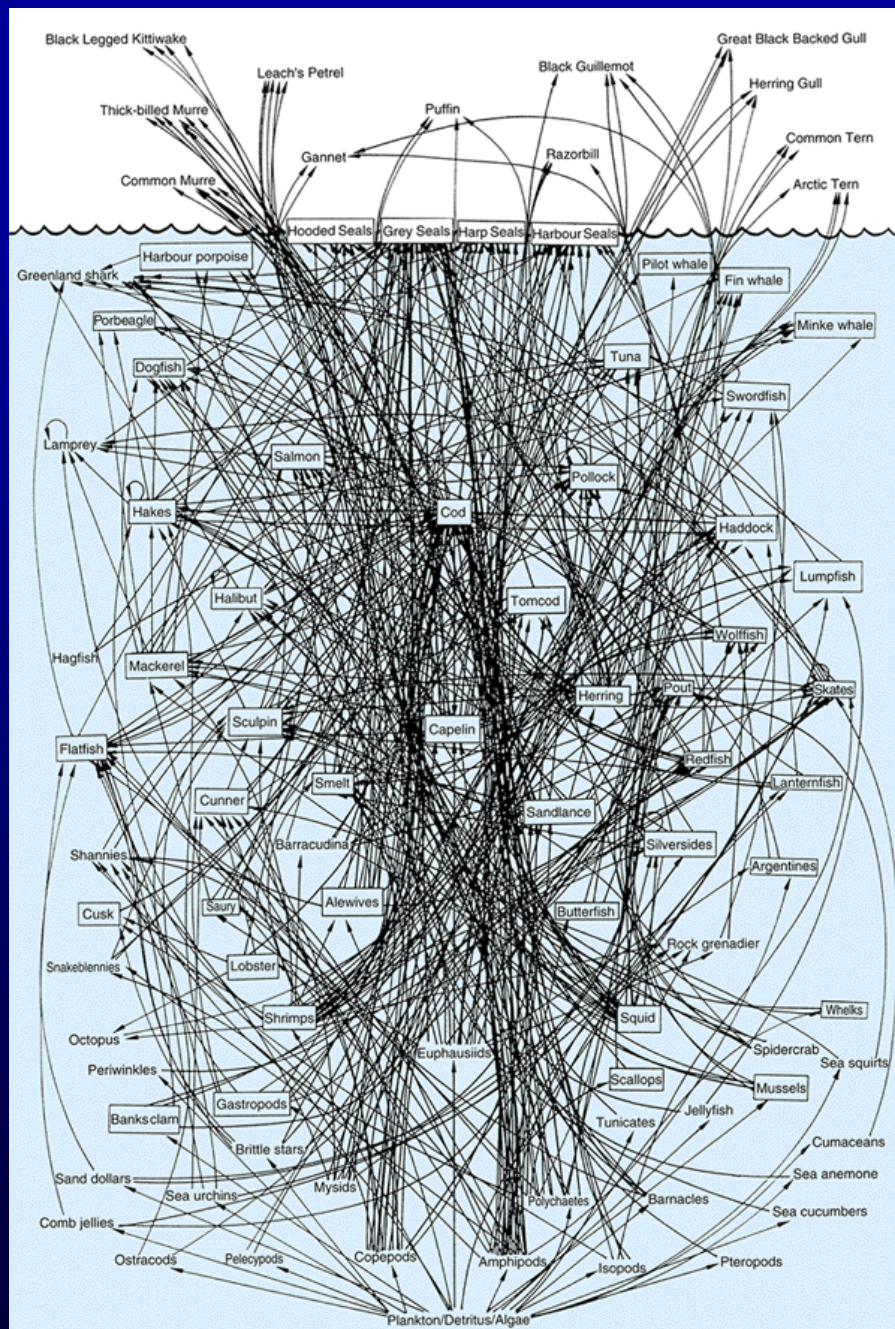
Bioaccumulation Model Process



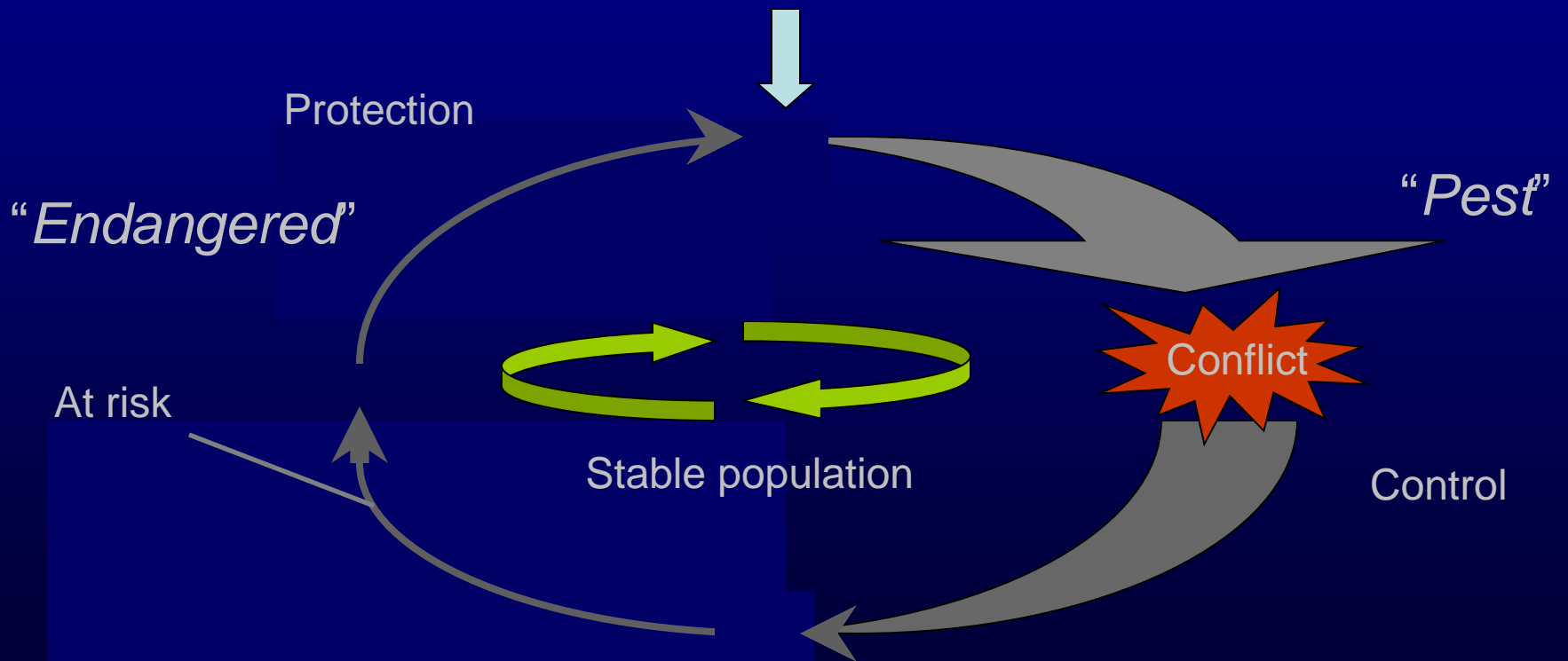








A simplified food web for the Northwest Atlantic



Beaver in Massachusetts

