

# Potential Effects of Siltation on Fish, Shellfish and Lobsters in Great Bay

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# Potential Effects

- Habitat Alteration
- Gill Irritation on Fish & Shellfish
- Smothering

# Habitat Alteration

- **Increased area mud or mud/sand bottom type**
  - **Winter vs. smooth flounder spawning habitat**
    - Winter flounder prefer sand/algal mats
    - Smooth flounder prefer mud
    - Increased mud bottom more suitable for smooth flounder
  - **Softshell clams & razor clams prefer sand/mud habitat**
    - Potential expansion of habitat
  - **Horseshoe crabs spawning habitat**
    - Literature – intertidal sand preferred
    - Great Bay monitoring – higher #'s (hundreds) in mud/sand or mud/shell substrate sites

# Habitat Alteration

- **Lower productivity of SAV (eel grass)**
  - Increased sediment loading - reduced water clarity and light – reduced eel grass
  - “among the most productive ecosystems in the world and perform a number of irreplaceable ecological functions” (ASMFC 1997)
  - SAV habitat for smelt, silversides, lobsters, striped bass
    - shelter
    - food

# Gill Irritation

- High levels of suspended solids can irritate gills of fish, shellfish, & other inverts.
- *Over extended periods* of time can stress fish
  - Decreased growth rates
  - Effect reproduction
  - In extreme cases - mortality

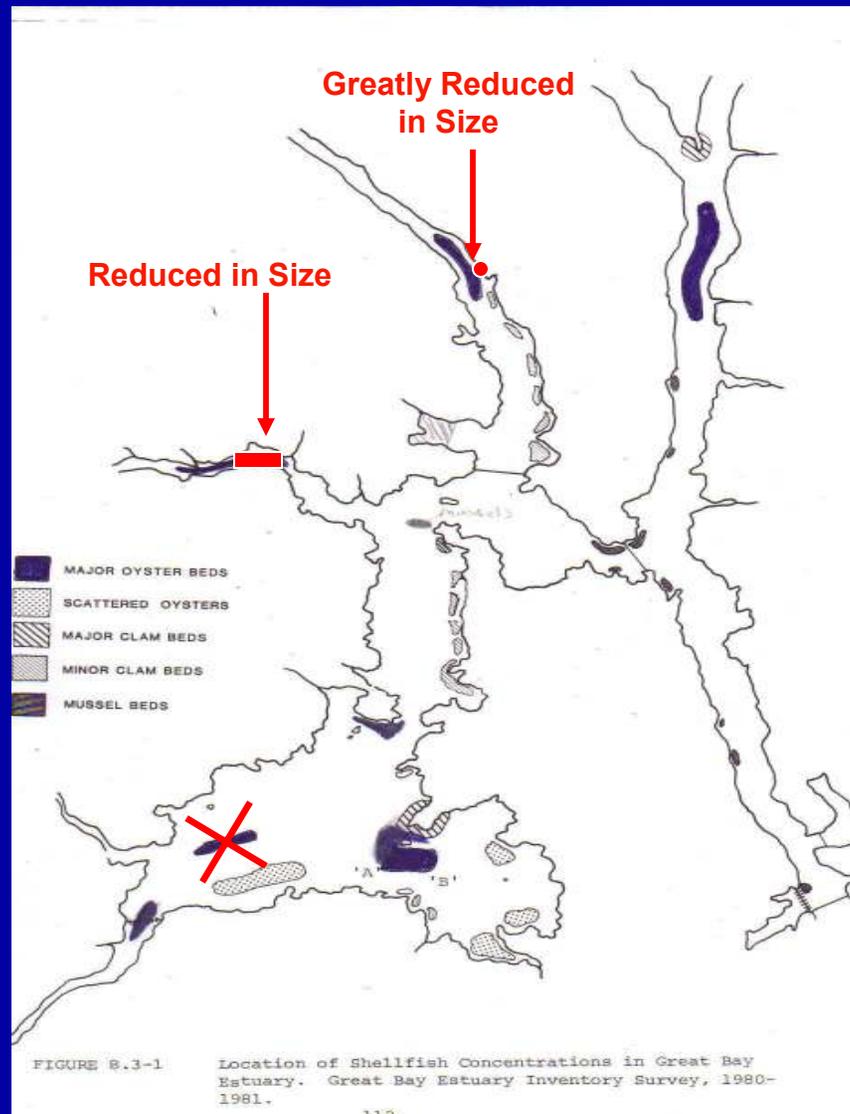
# Smothering

- Fish eggs
  - Short-term acute events (e.g. 2006 floods)
- Oysters, mussels, & other non-mobile shellfish
  - Long-term sediment deposits

# Smothering Effects on Fish Eggs

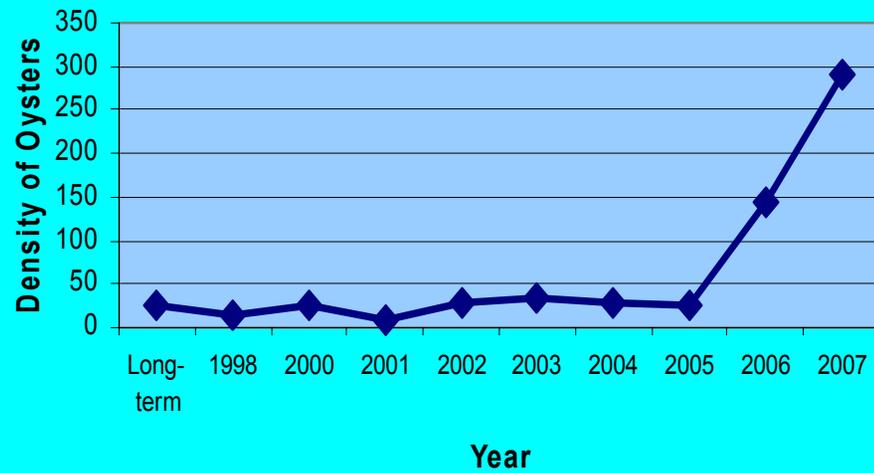
- Effect fish with demersal eggs
  - Eggs that sink to bottom
  - e. g. winter & smooth flounder, silversides, smelt, etc.
- Acute events that occur between egg laying and hatching (~1-4 week period)
- Thin layer of silt and sediment (e.g. 2006 & 2007 floods)
  - inhibit O<sub>2</sub> uptake by eggs
  - Effect survival of eggs

# Smothering Oyster Beds

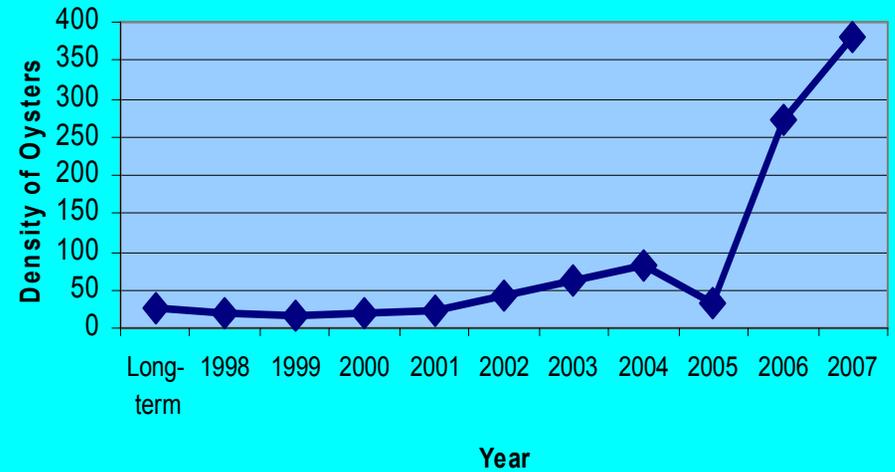


# Oyster Abundance

Adams Point

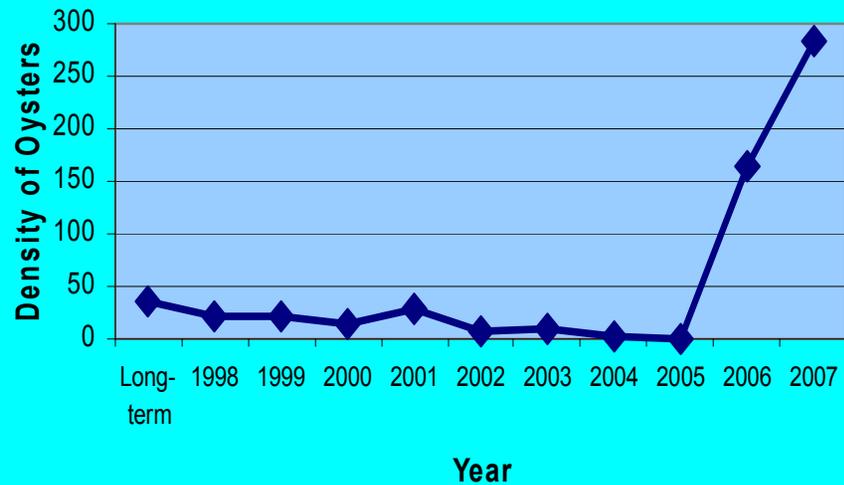


Oyster River

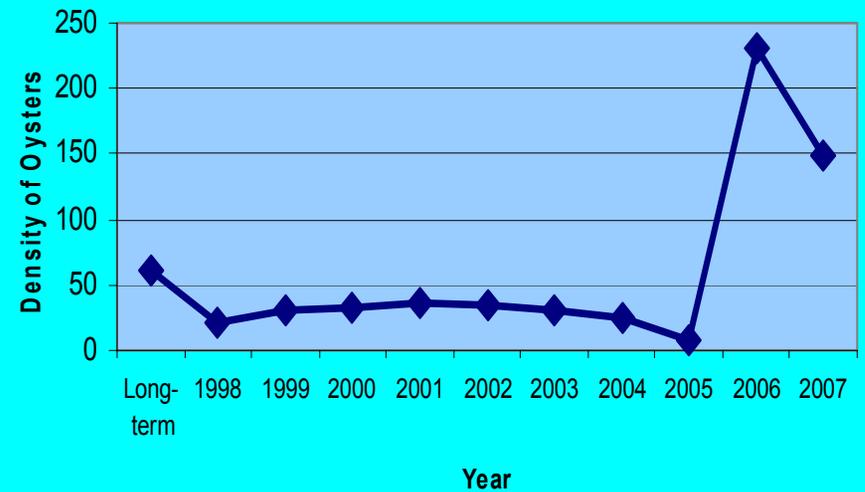


# Oyster Abundance

## Nannie (South)

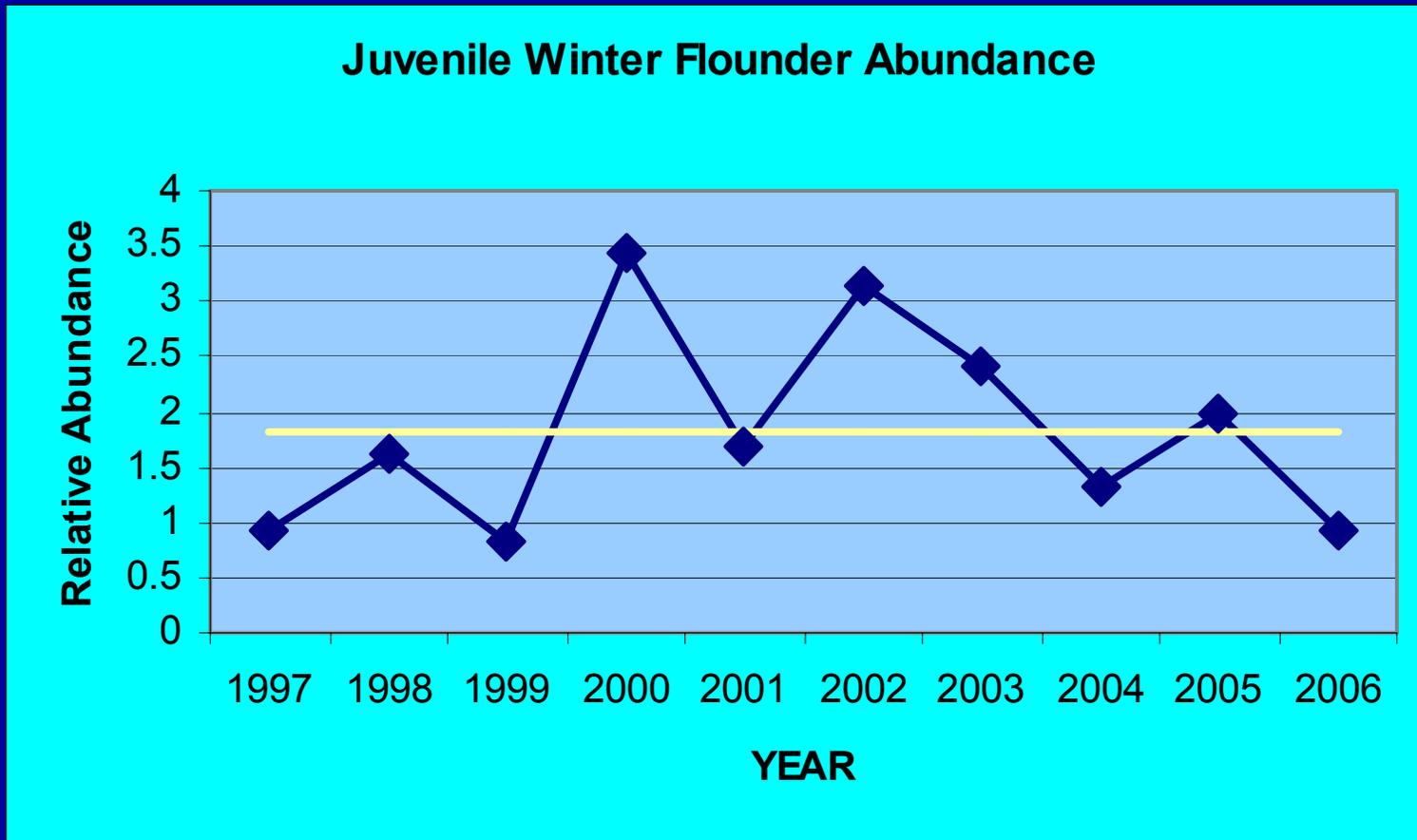


## Woodman Point



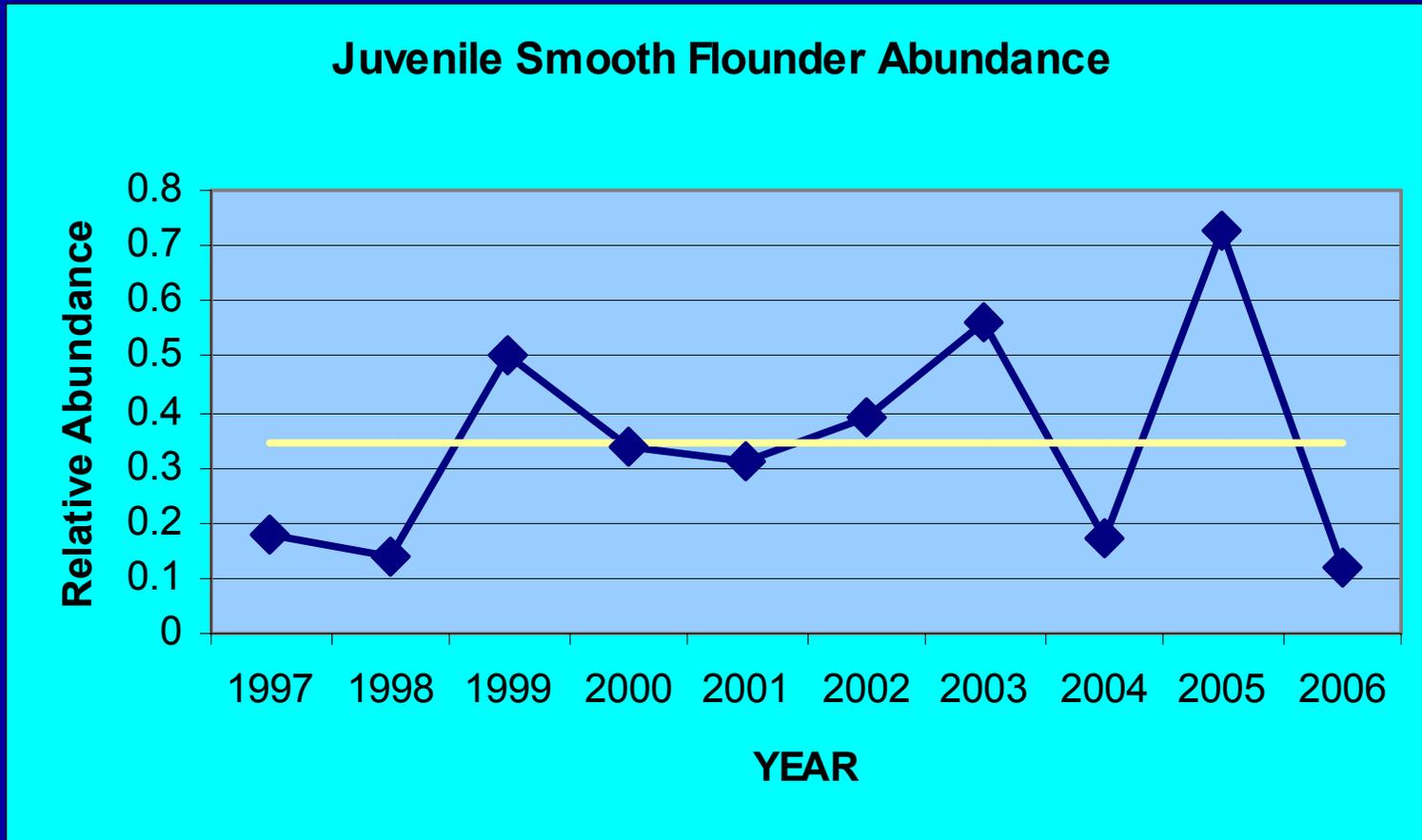
# Winter Flounder

(March/April; 15-18 days to hatch; sandy bottom/algal mats)



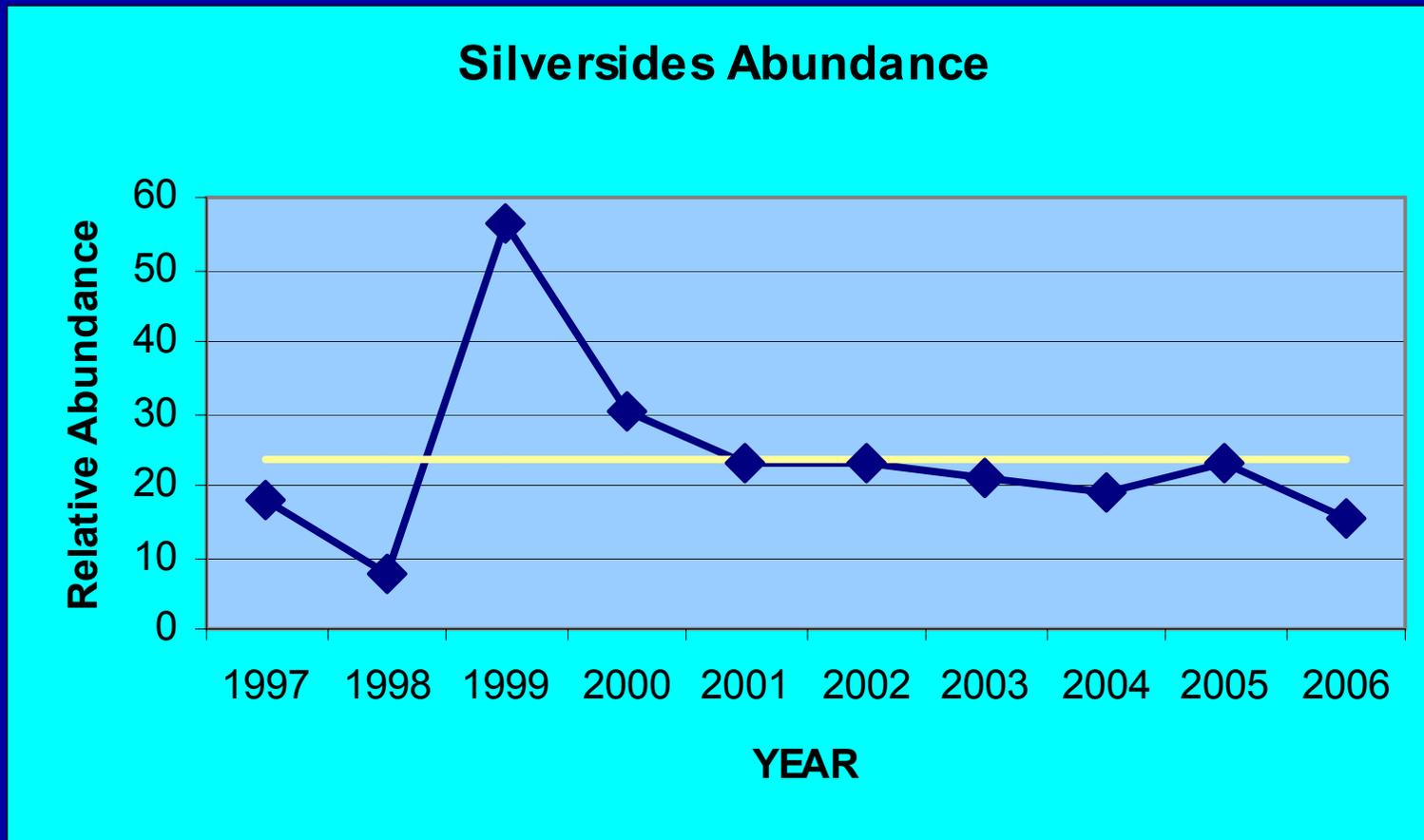
# Smooth Flounder

(Dec.-Mar.; ~25 days to hatch; soft mud bottom)



# Silversides

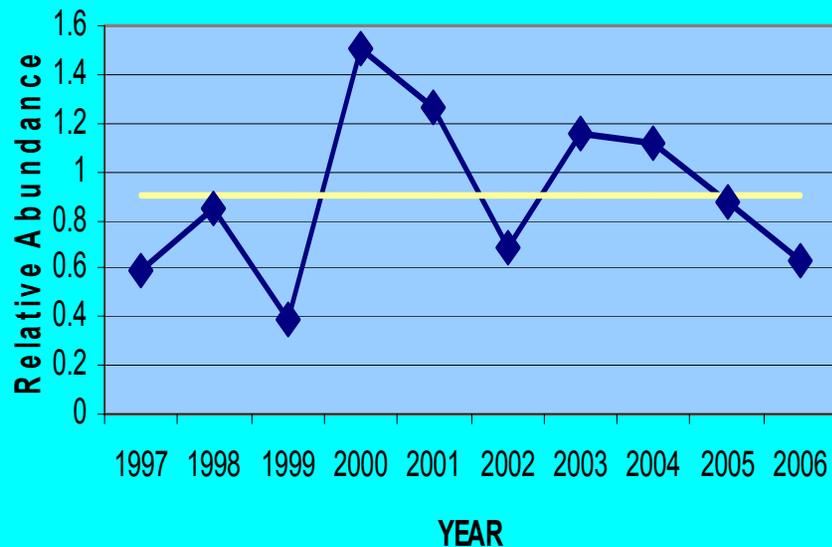
(May-July.; 4-27 days to hatch; marsh grass roots/stems, ditrital mats)



# Rainbow Smelt

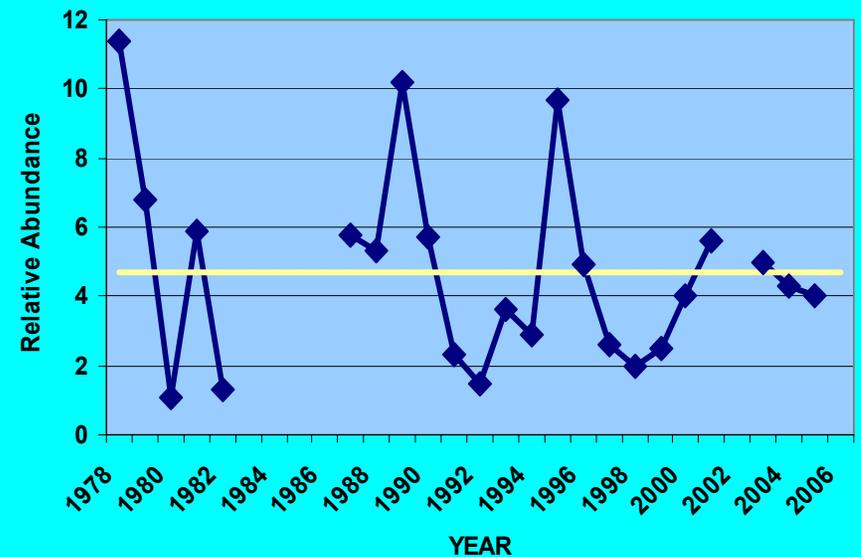
(Mar./Apr.; ~3 weeks to hatch; rock, rubble, gravel, sand; fast flowing freshwater)

Juvenile Smelt Abundance



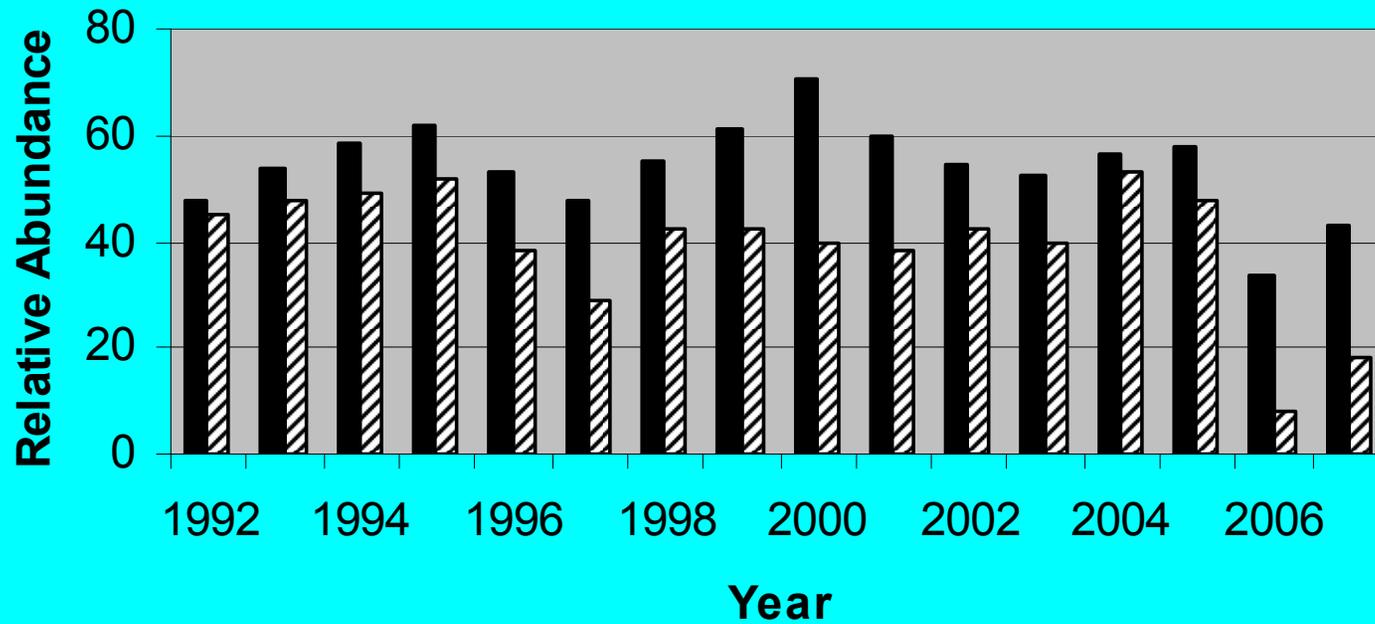
Great Bay Smelt Abundance

(\* - No Survey 1983-86; no fishery 2002 & 2006)



# Lobster

## Juvenile Lobster Abundance

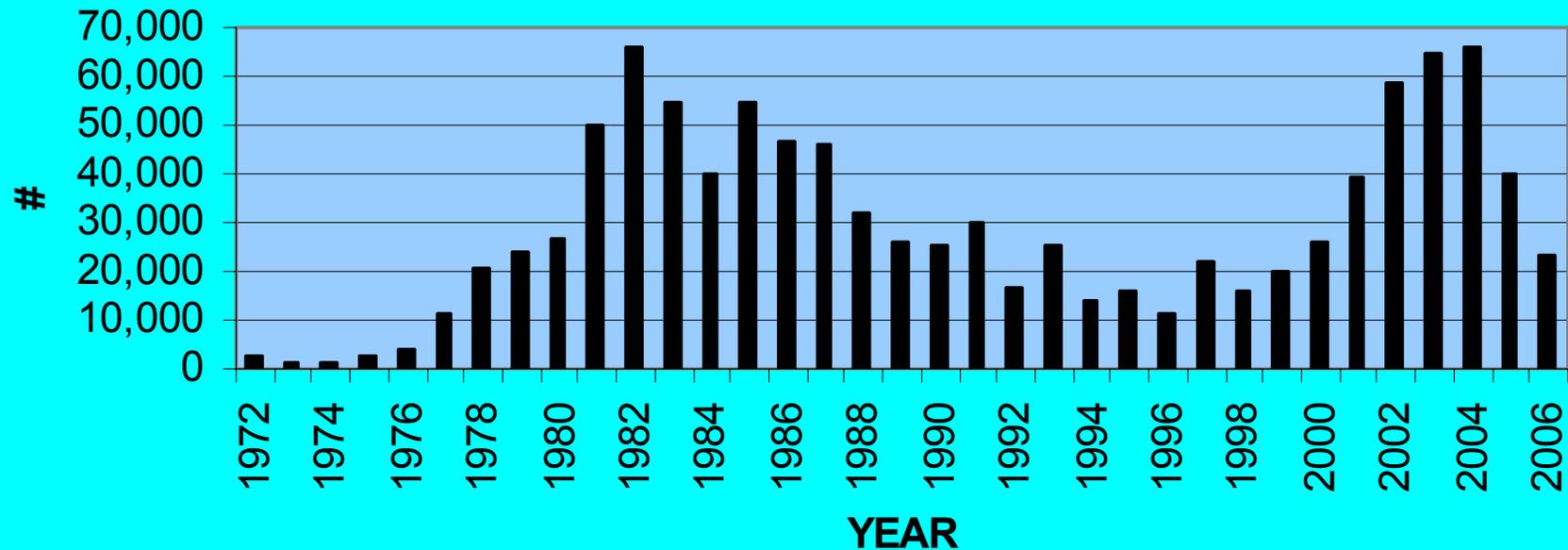


■ All sites combined ▨ Sprague Cove

# River Herring

(Alewives & blueback herring)

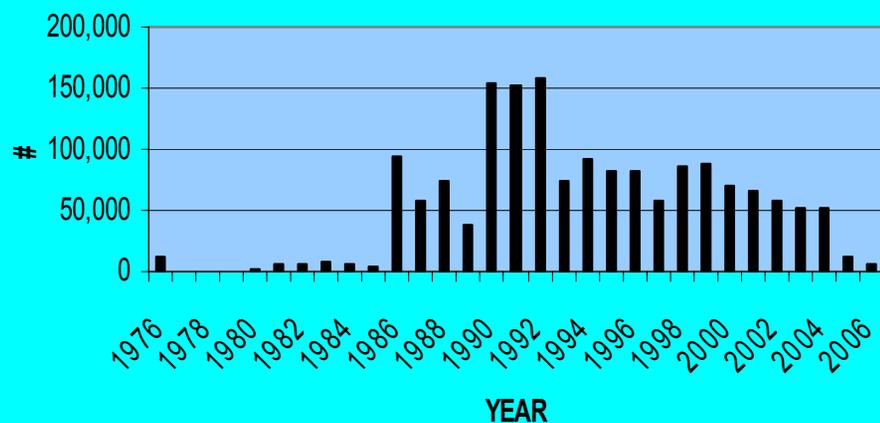
Lamprey River Fish Ladder  
River Herring Spawning Run



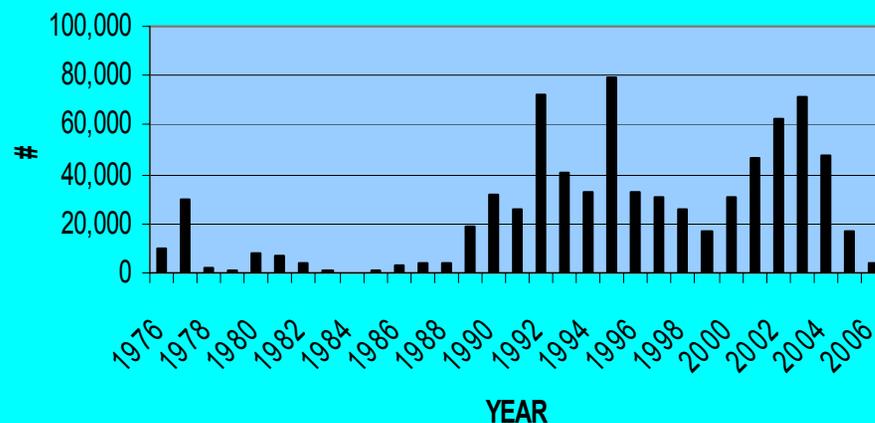
# River Herring

(Alewives & blueback herring)

Oyster River Fish Ladder  
River Herring Spawning Run

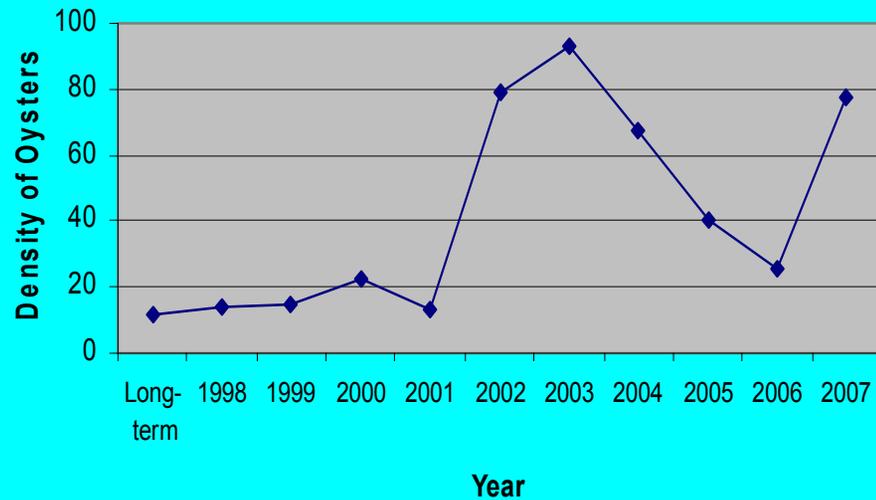


Cocheco River Fish Ladder  
River Herring Spawning Run

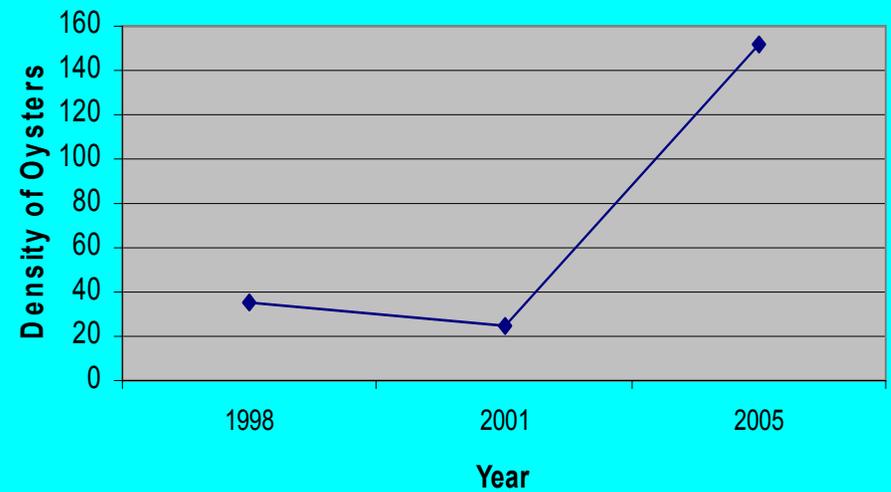


# Oyster Abundance

## Piscataqua River



## Squamscott River



# Habitat Alteration

- Reduced eel grass beds (F. Short's presentation)
- Change hard substrate to soft substrate
  - Increased area of mud or mud/sand bottom