

# Lake Michigan Stocking Strategies Workshop #2

Salmon Growth, Condition, and Health

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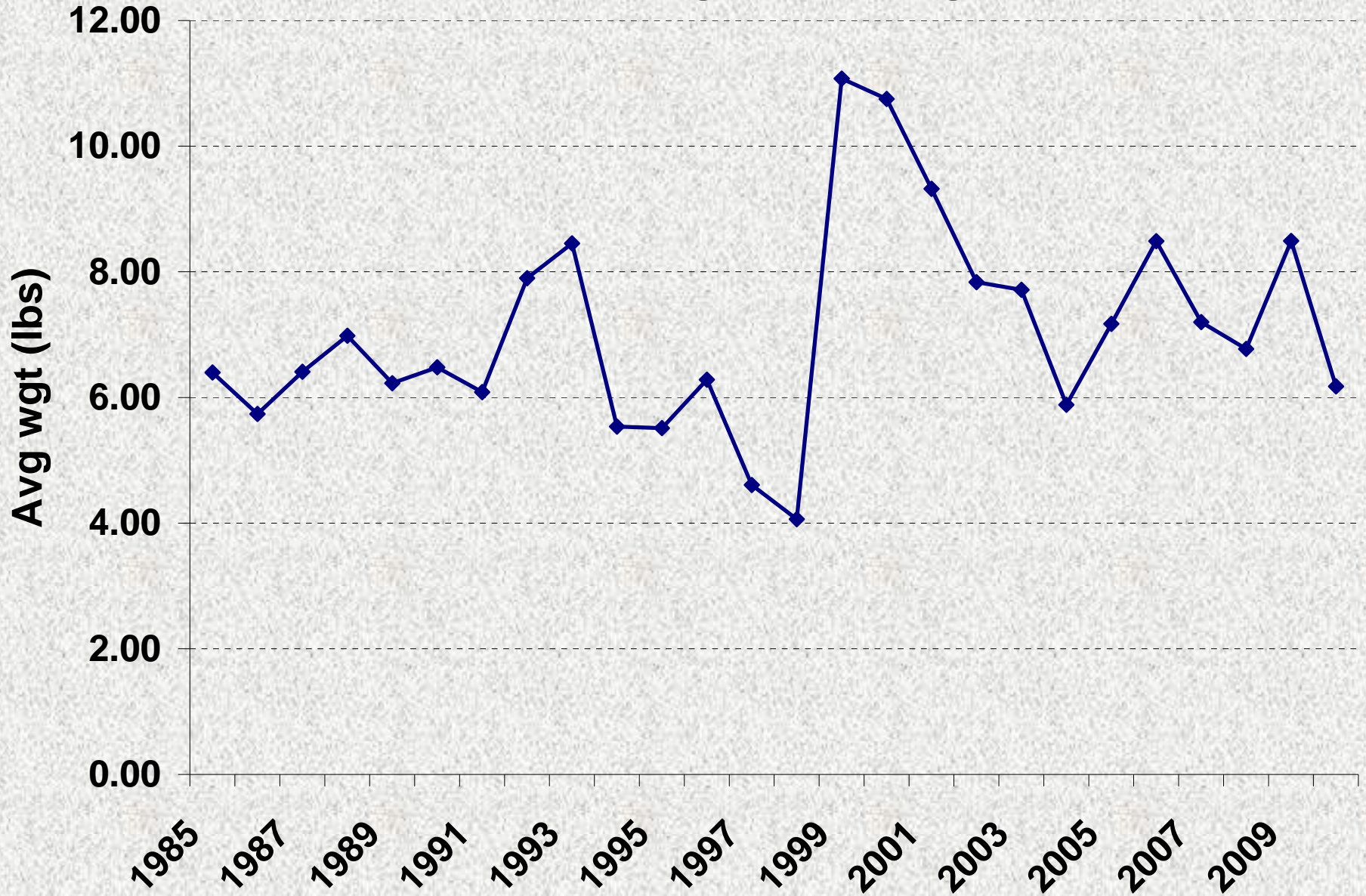
# Overview

- Growth and condition indices
  - Annual measures to monitor body condition
    - Primarily Chinook focus
    - Length and weight at age information
    - Other physical attributes as indicators
- Health
  - Disease prevalence
  - Thiaminase impacts
  - Salmonine composition

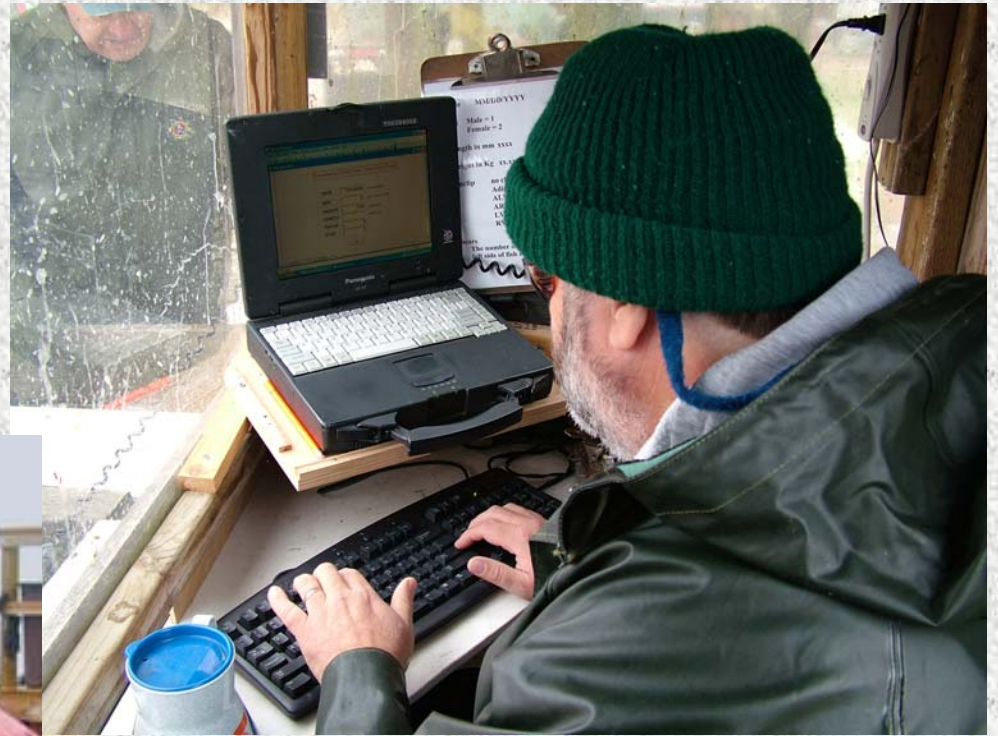
# Growth/Condition Indices

- Salmon growth and condition
  - Index of forage availability and pred/prey balance
  - Provides information to aid stocking decisions
  - Several “Red Flags” indices:
    - Creel weight at age 2+
    - Weir weight at age 3+
    - Weir standard weight of a 30” Chinook

# Chinook Weight at Age 2+



# Weir Returns



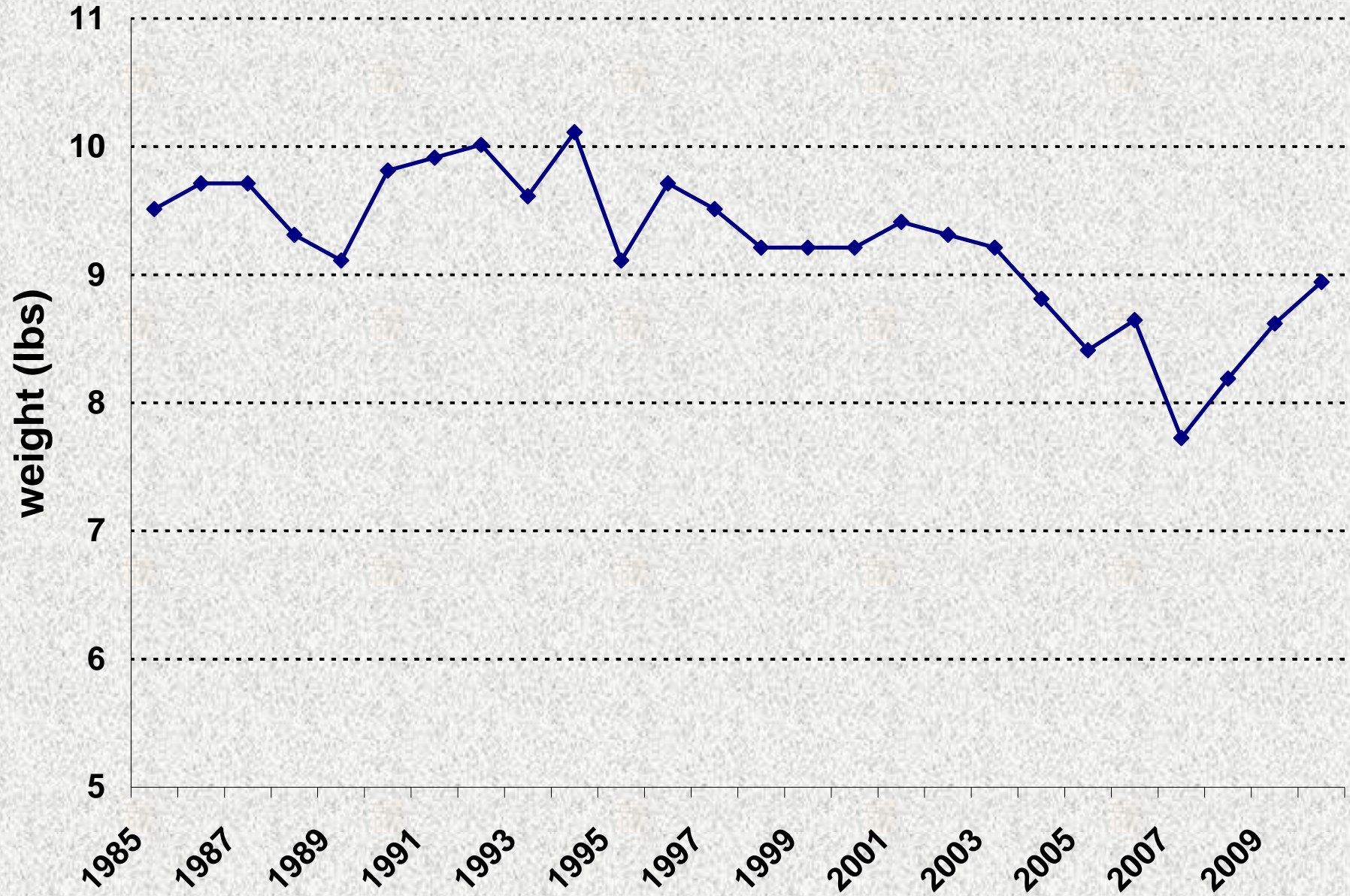
# Chinook Weight Age 3+



# Growth/Condition Indices

- Salmon growth and condition
  - Index of forage availability and pred/prey balance
    - Creel weight at age 2
      - Michigan annual creel data
    - Weir weight at age 3
      - Strawberry Creek Weir, Wisconsin
    - **Weir standard weight**
      - Weight of a 30" salmon taken from l/w regression
        - » Strawberry Creek Weir data

# Standard Weight 30" Chinook





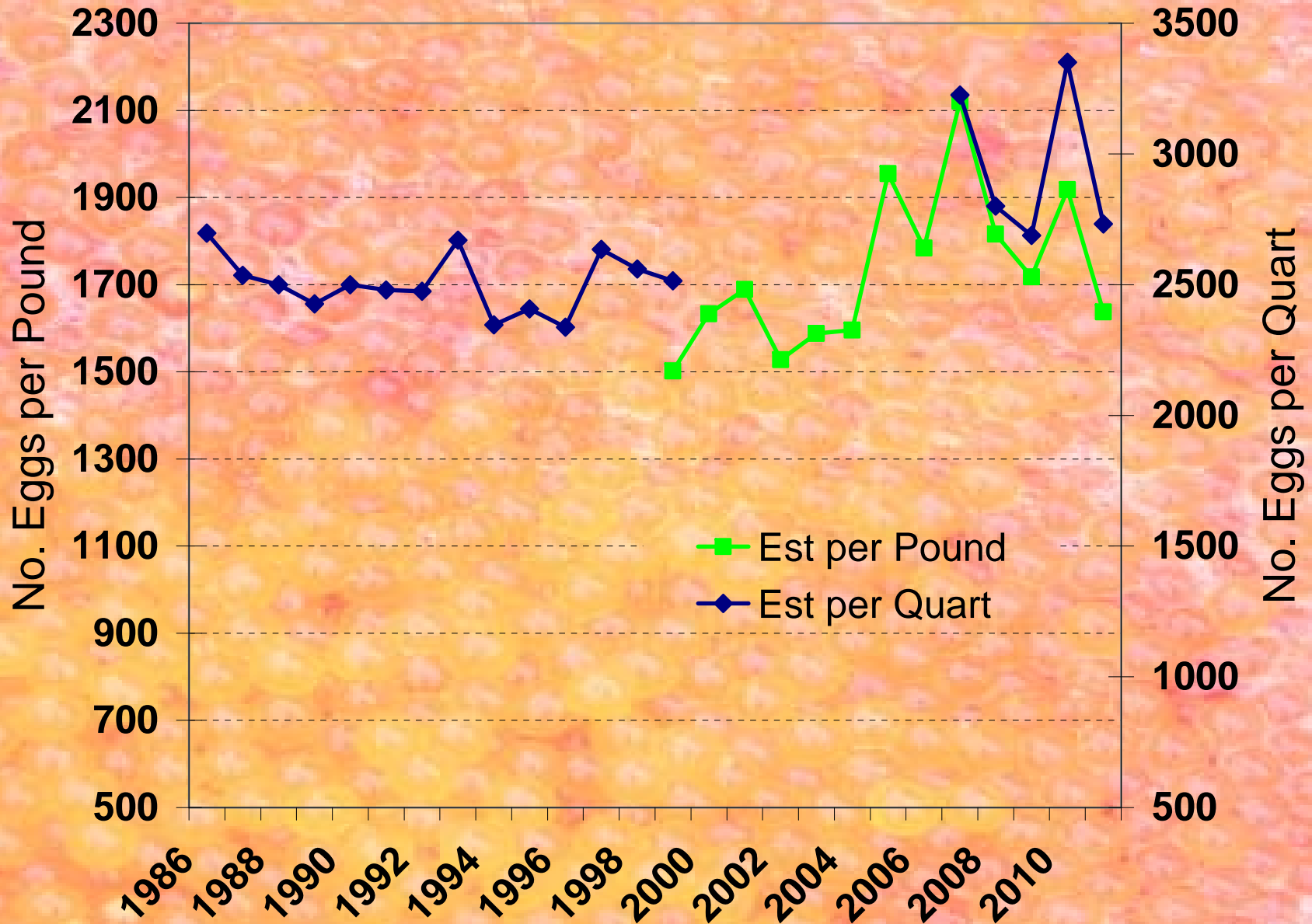
# Salmon Body Condition

- Egg size
  - Index of resources available for egg development
  - Smaller eggs = limited food resources

A microscopic view of Chinook salmon eggs, showing a dense field of small, reddish-orange, oval-shaped eggs. The eggs are arranged in a somewhat regular pattern, with some showing a distinct yolk and a surrounding vitelline membrane. The overall color is a vibrant orange-red.

# Chinook Egg Size

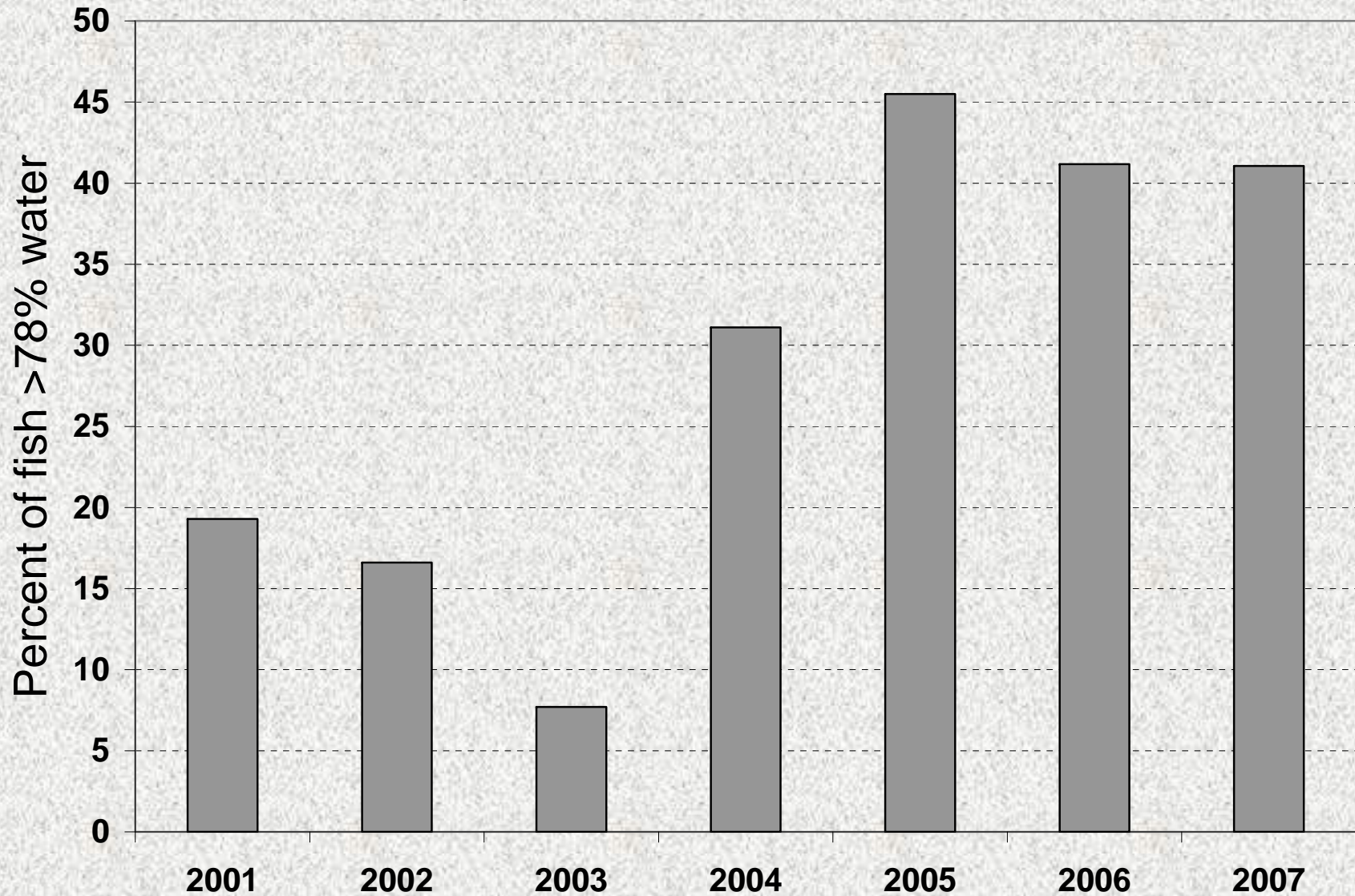
# Chinook Egg Size



# Salmon Body Condition

- Egg size
  - Index of resources available for egg development
  - Smaller eggs = limited food resources
- Percent water
  - Amount of water displacing fat stores
  - Higher percent water = lower fat stores

# Percent of Chinook Salmon above 78% water (high water = low fat)





# Fish Health

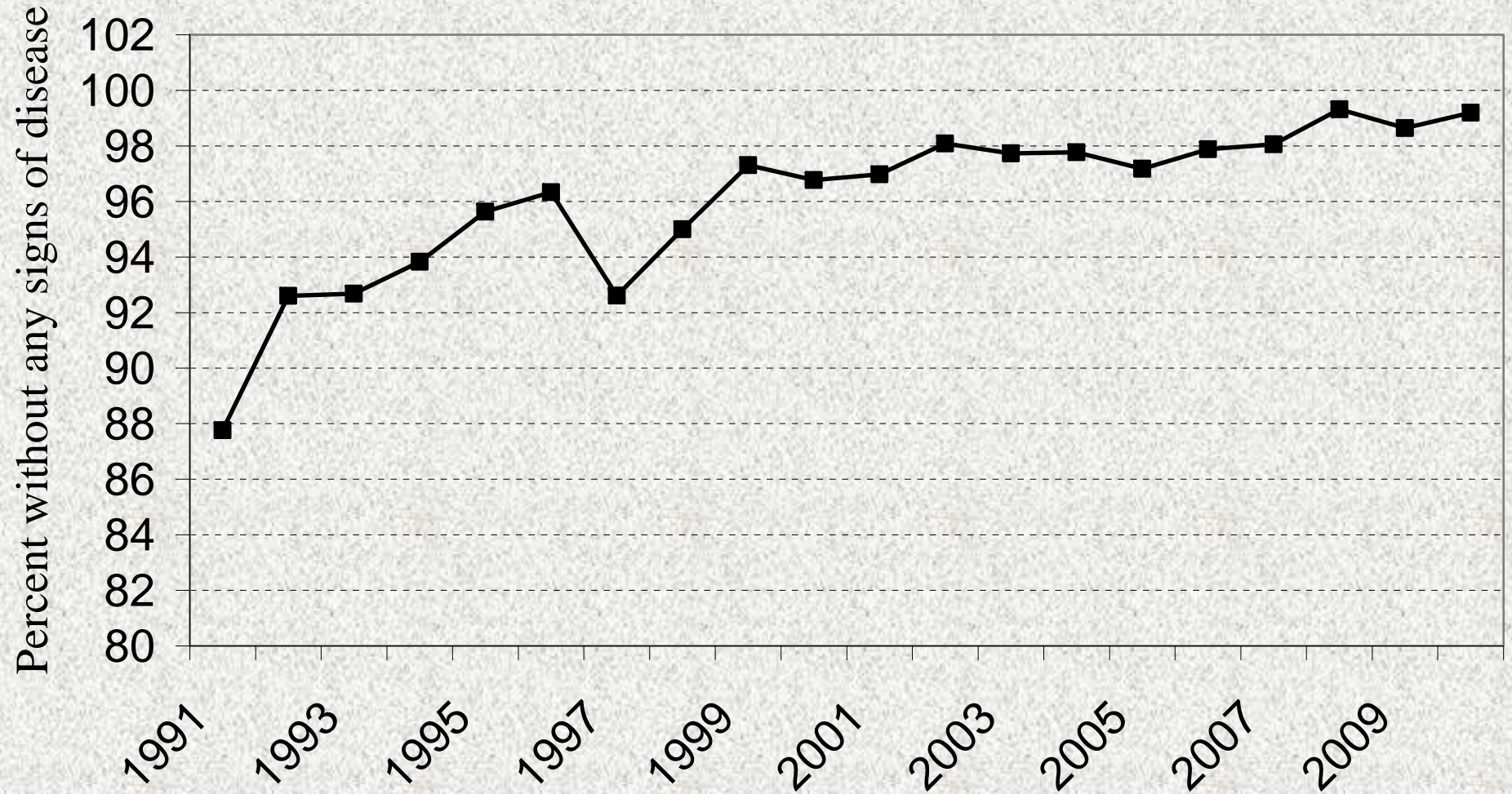


# Fish Health

## Percent signs of disease

- Visual exam
- Full necropsy
  - Viral and bacterial diagnostics
  - Parasites
  - Histology

# Visual Disease Exam

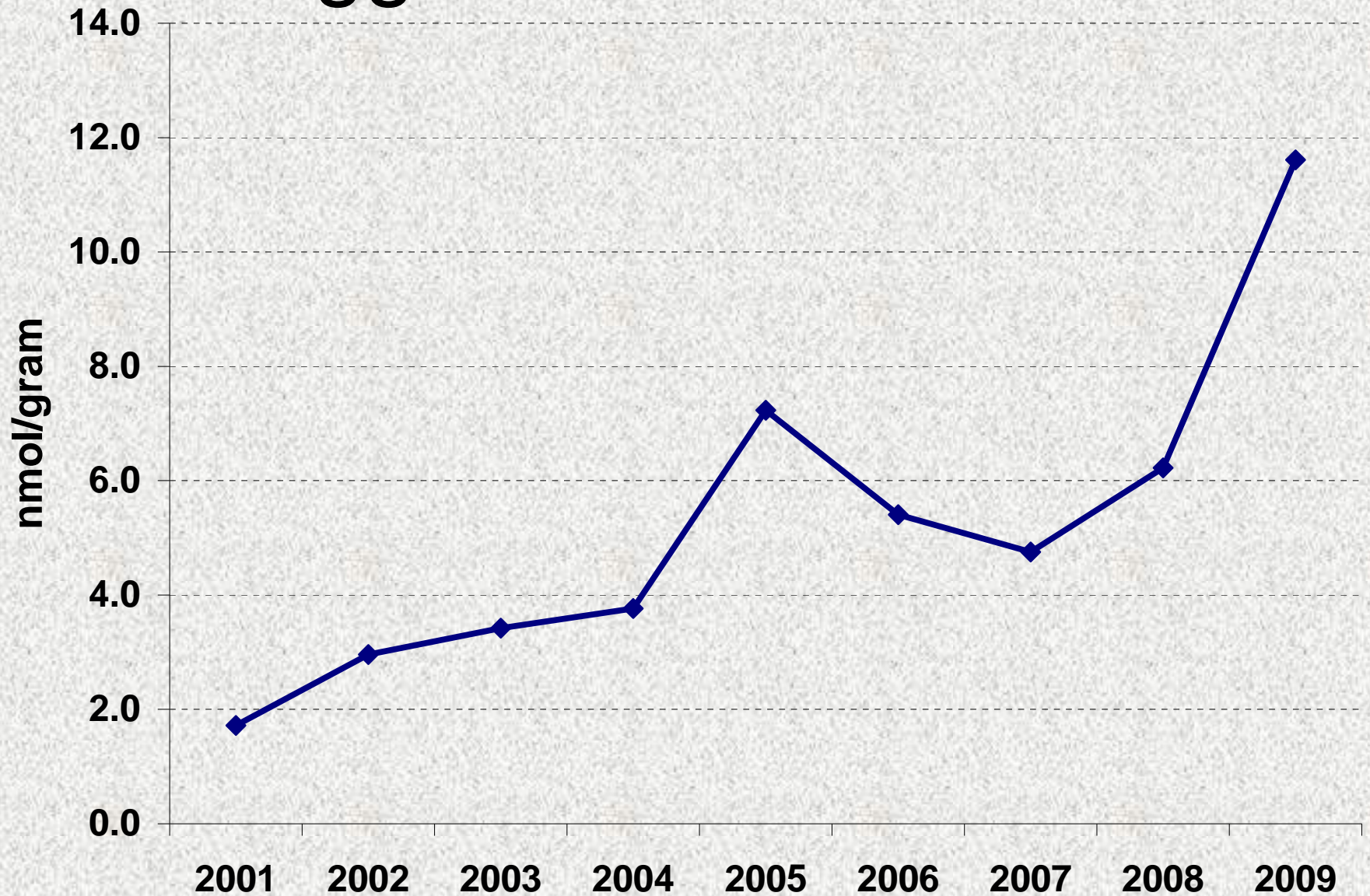




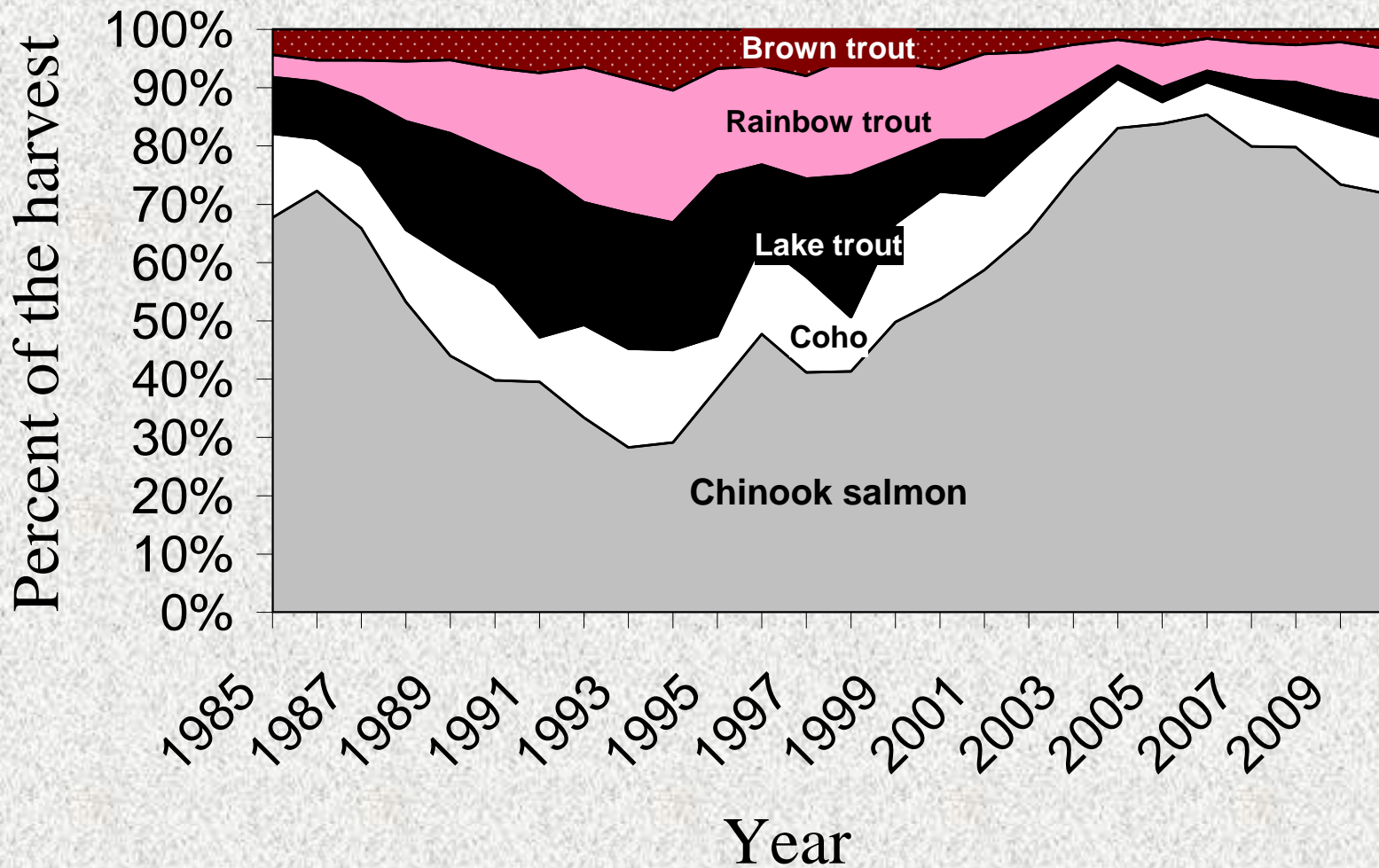
# Fish Health

- **Egg thiamine levels**
  - Thiaminase effects from alewife consumption
    - Negative impacts on reproductive success
  - Eggs for hatchery treated with thiamine supplement

# Egg Thiamine Levels



# Salmonid Community Composition



# Summary

- Growth and condition generally declining trends through 2007
  - Last few years rebounding levels; should be better in 2011
  - Generally is consistency among indices we measure
  - Tied closely to alewife availability
  - Stocking cuts effective
- Disease incidence decreased considerably
  - Low incidence of bacterial kidney disease in recent years
  - General improvement from disease aspect