

# Early Life Survivorship for Lake Trout in Lake Ontario

Brian Lantry (USGS)

Ted Schaner (OMNR)

Jana Lantry (NYSDEC)

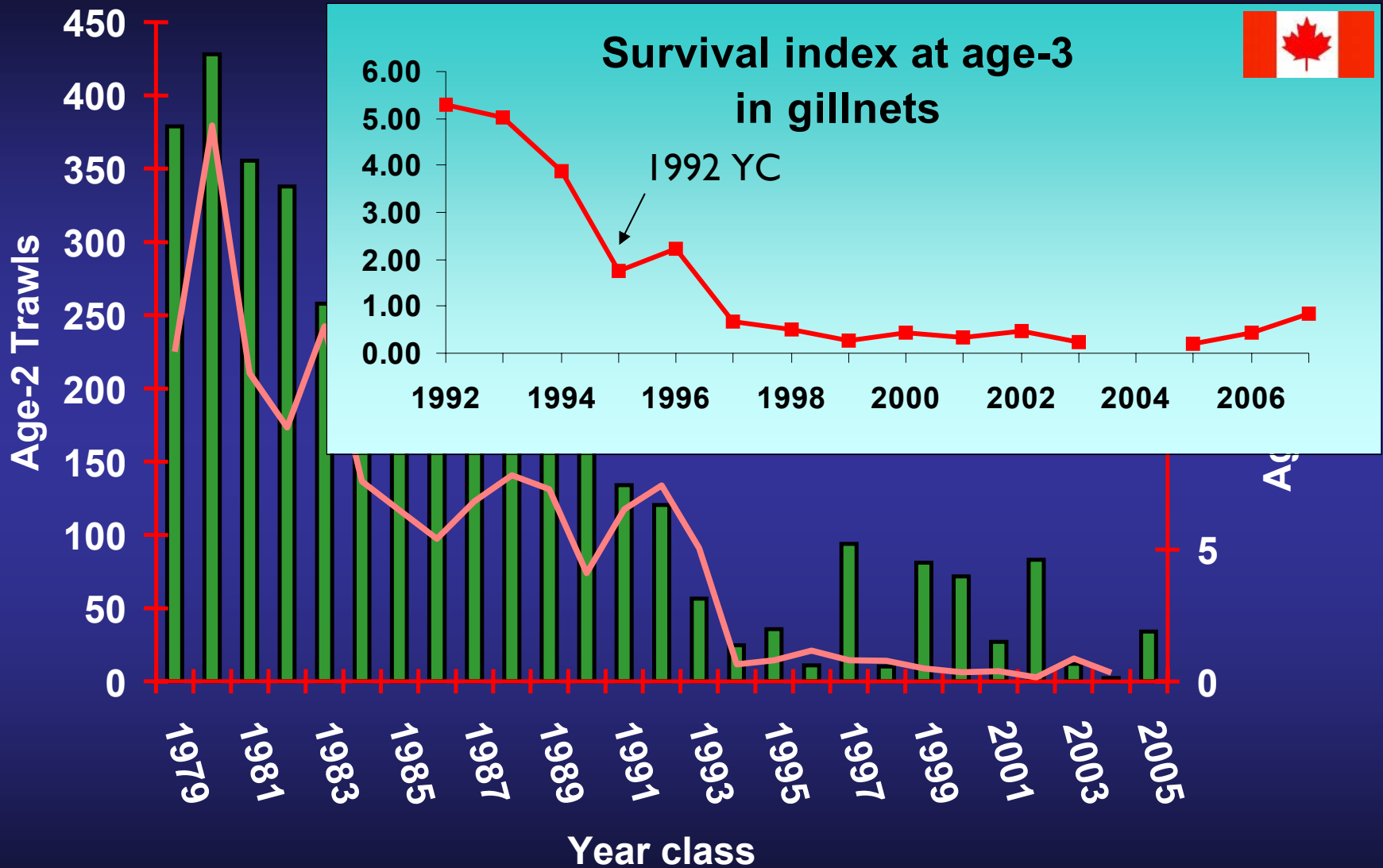
## Past Research:

- Depth: SEN adults deeper than other lean strains, only 1/4<sup>th</sup> of available habitat is used. Young lake trout deeper than adults. (1987, 1996 JGLR)
- Dispersal: Homing is weak in stocked fish, still 38-88% of adult fish were recaptured near stocking locations. Within the first year in the lake SYs disperse up to 62 km from stocking sites. (JGLR 1987, 1996)
- Stocking: No survival difference for onshore vs. offshore stockings (2 fold difference recently). SYs survive 2.41 times better than FFs. (NAJFM 1988, 1992, 1997)
- Prey: Slimy sculpin declines correlated to juvenile lake trout abundance. (TAFS 1994)
- Fecundity: Fecundity dependent on size and age. (JGLR 1996)

# Outline:

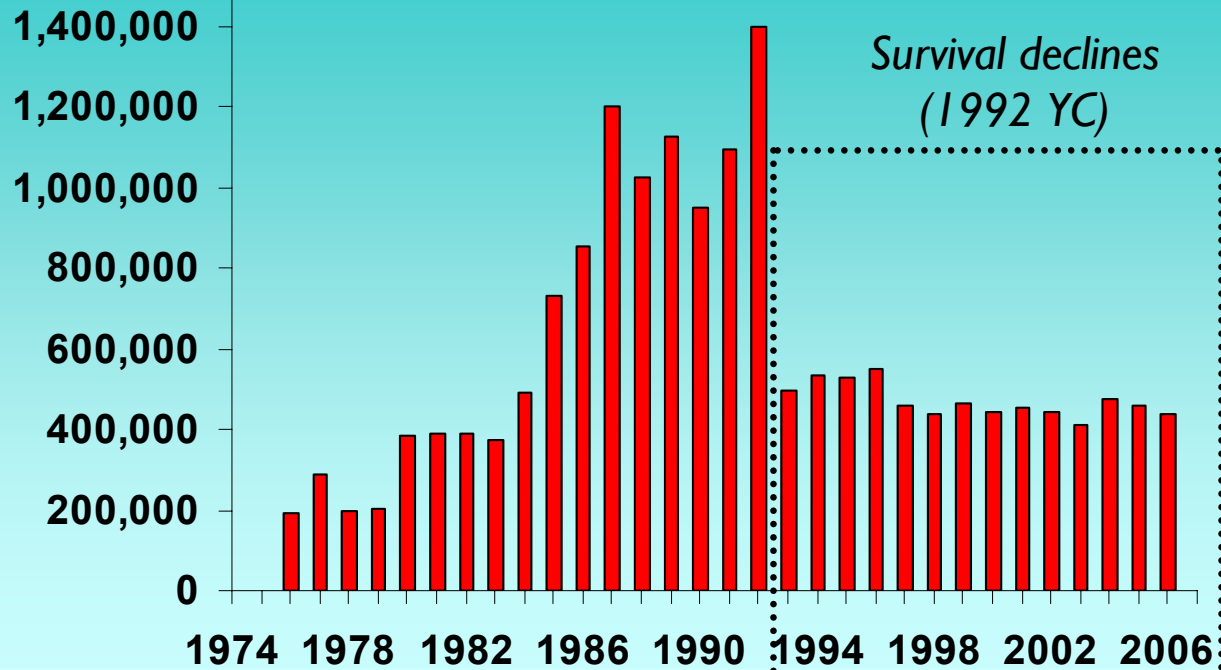
- *Population trends*
- *Stocking decreases*
- *Strain related differences*
- *Ecosystem shift*
- *Stock – recruitment*
- *Stocking method evaluations*

# Juvenile Survival Index





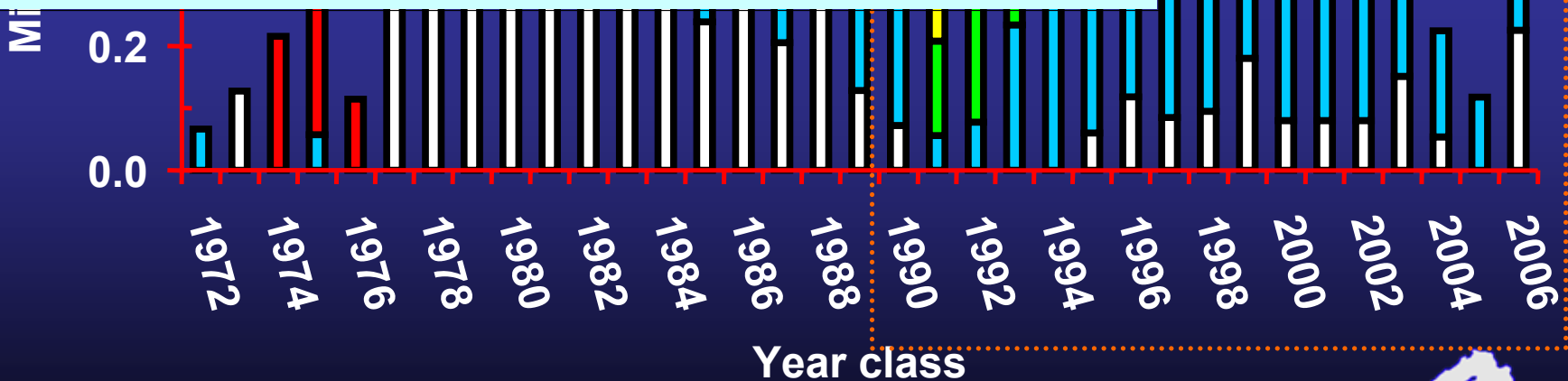
## Yrl.Equiv. Stocked



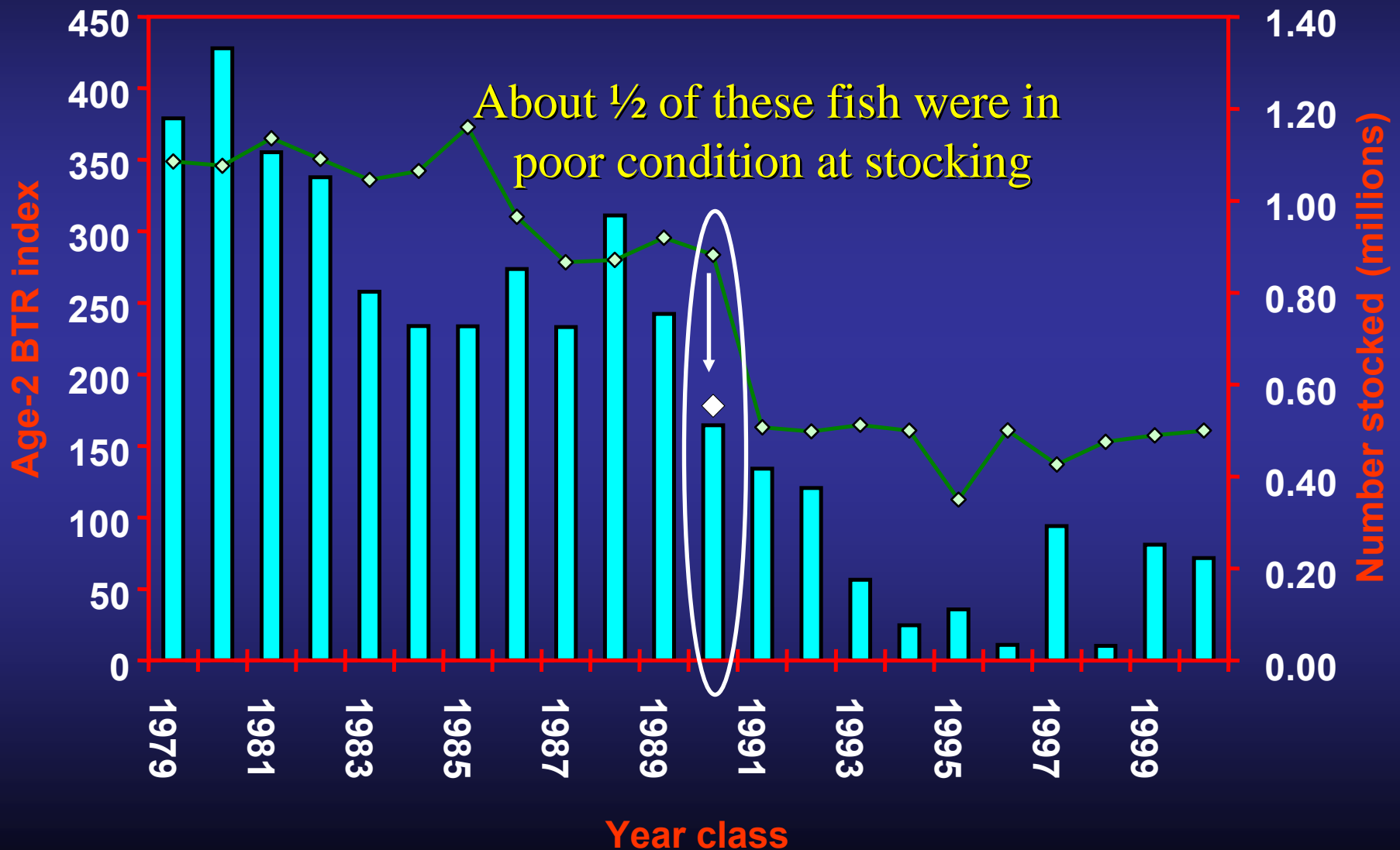
the hatchery

ng cut by 40%

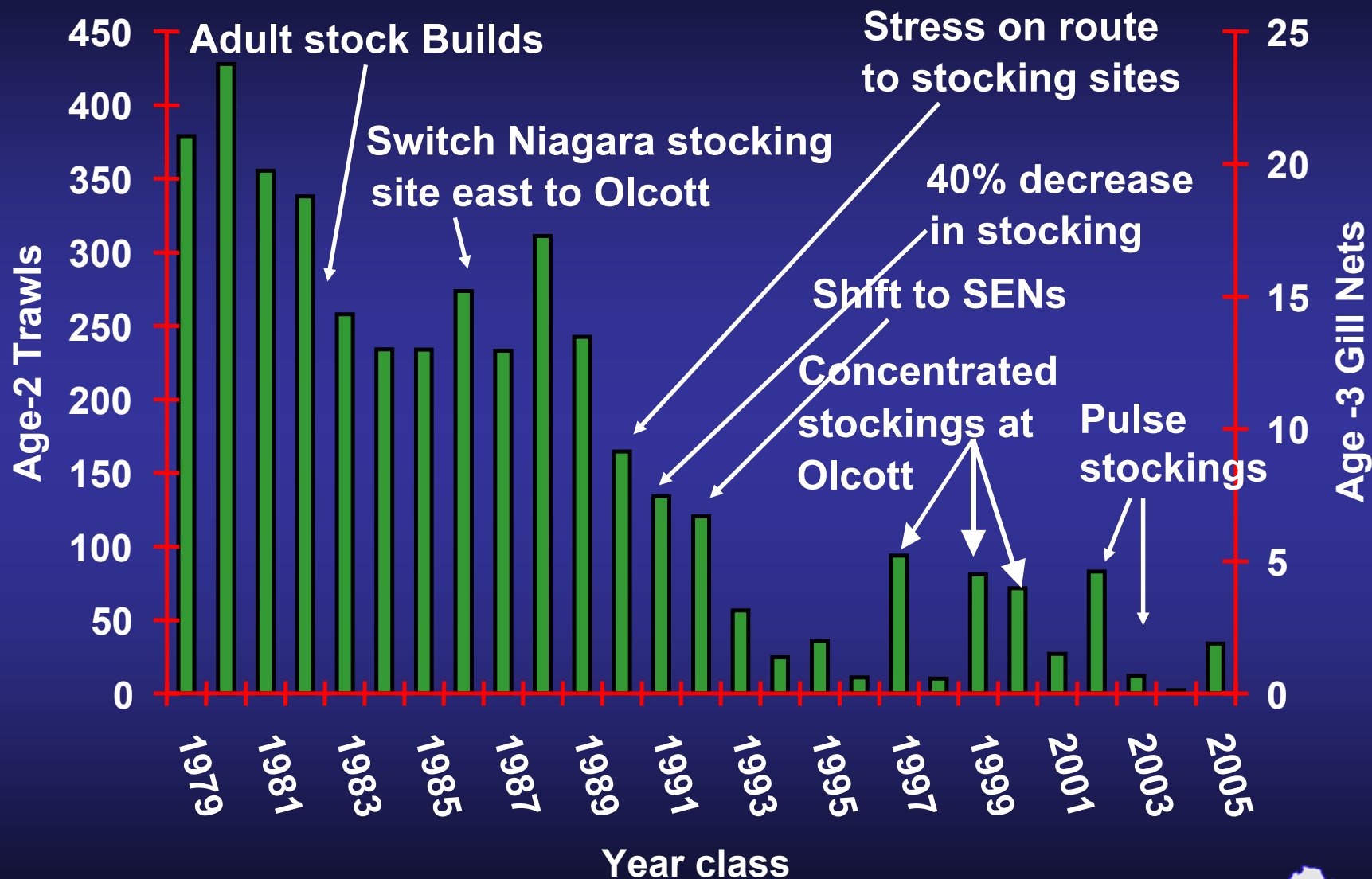
nphasis on SEN strain



# Age-2 Survival Index (adjusted for: no. stocked, stocking location, and strain)

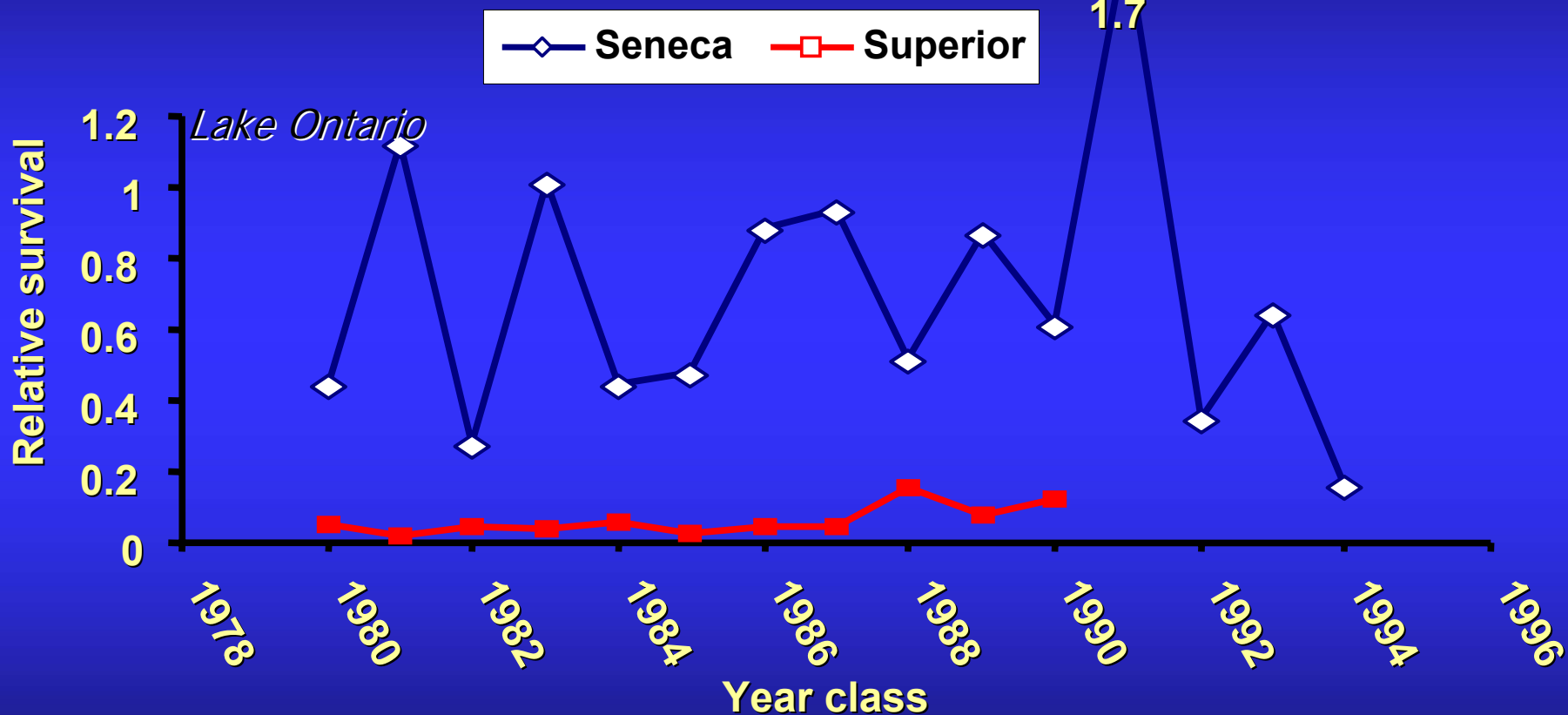


# Juvenile Survival Index



# Relative Survival Ratio

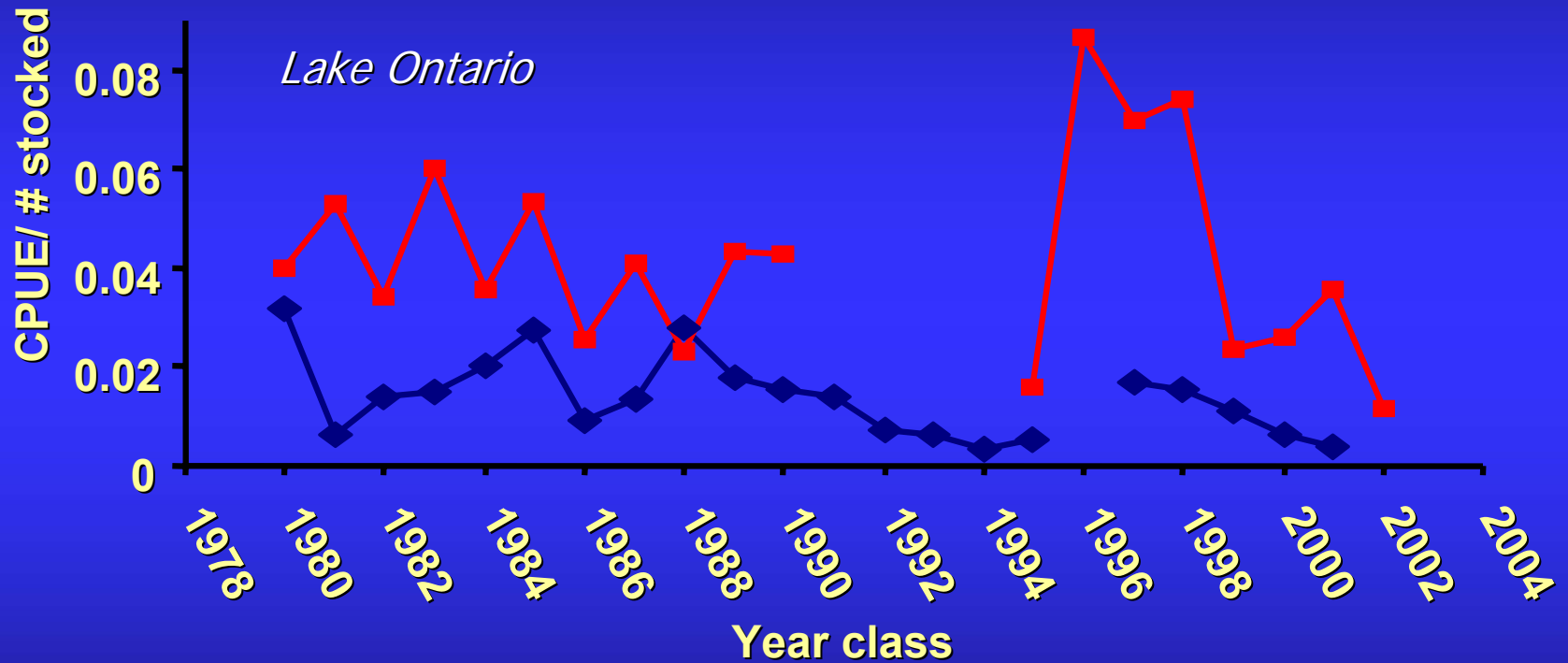
(age-11 CPUE / age-3 CPUE)





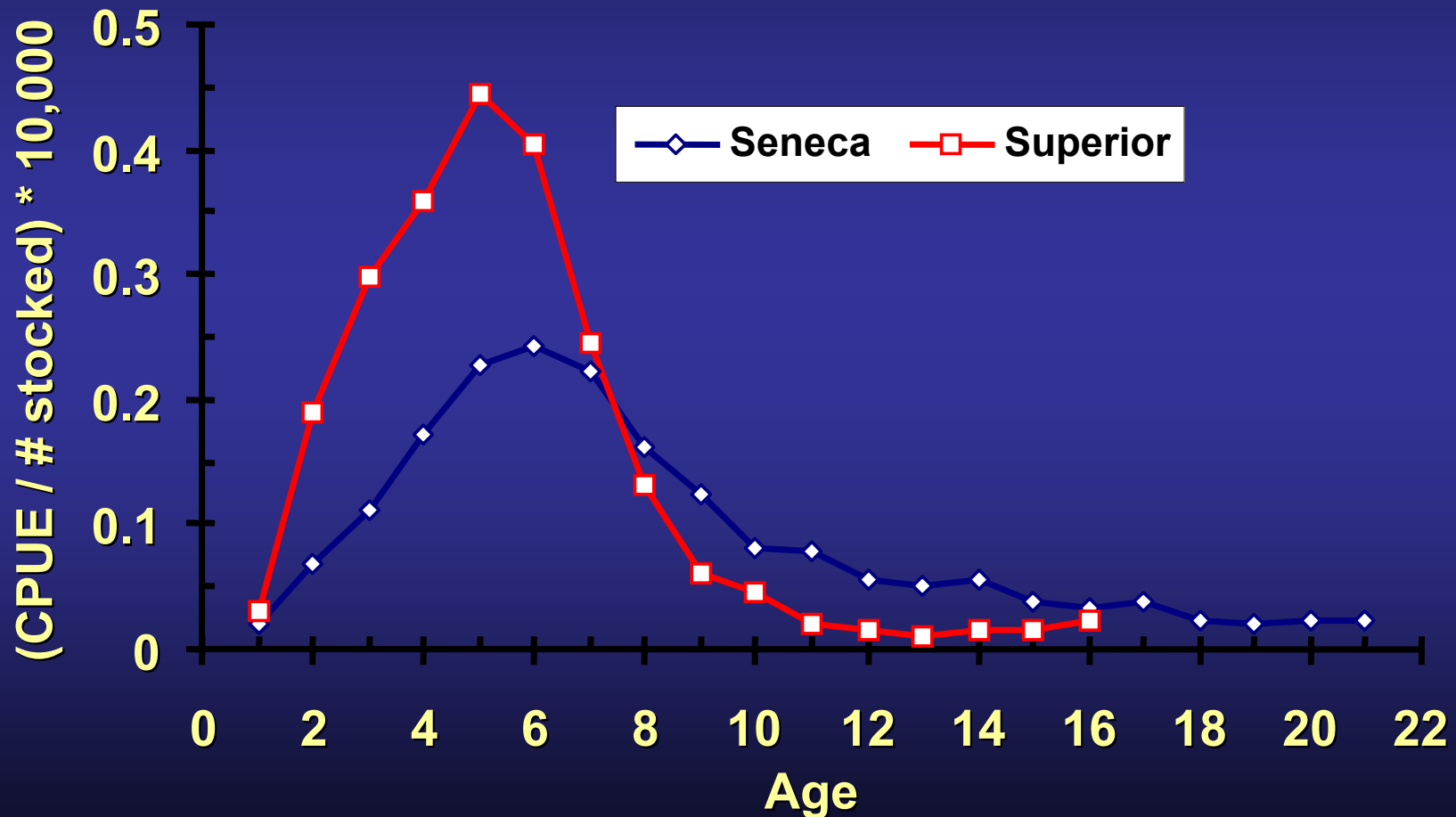
# Juvenile Performance

(Age-3 CPUE / # Stocked) \* 10,000



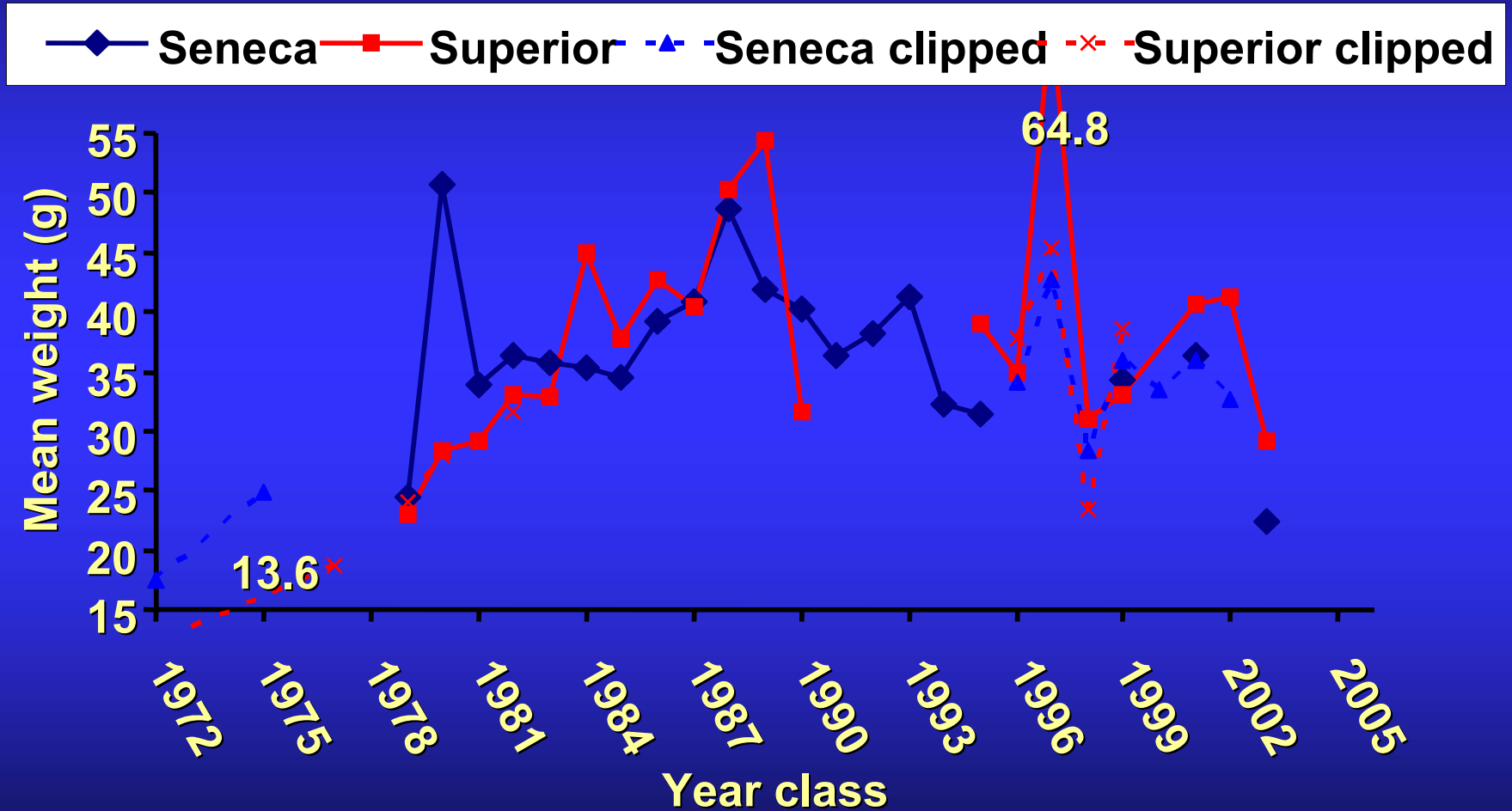
# Lake Ontario Strain Performance

$(\text{CPUE} / \# \text{ stocked}) * 10,000$

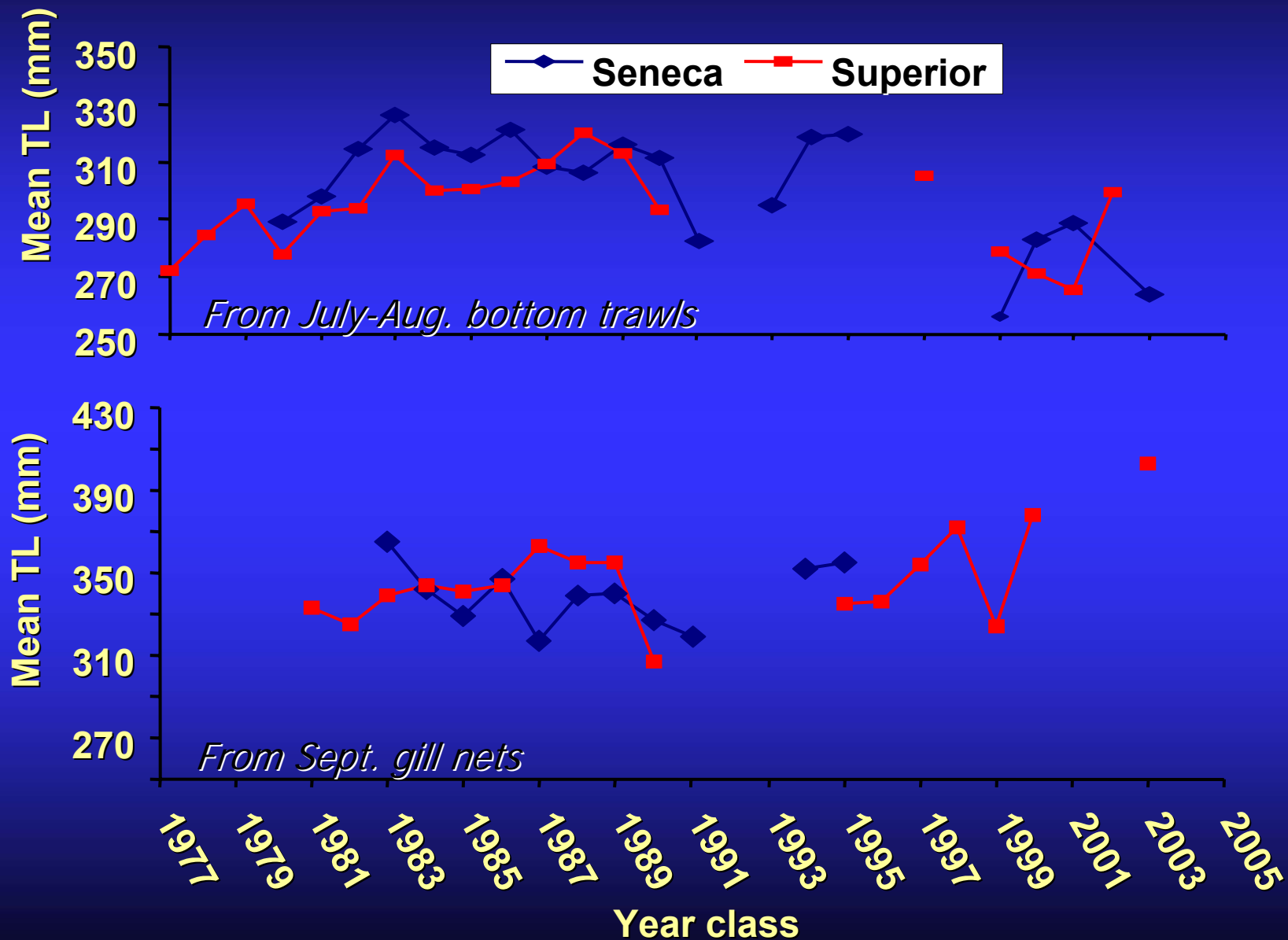


# Mean Weight at Stocking

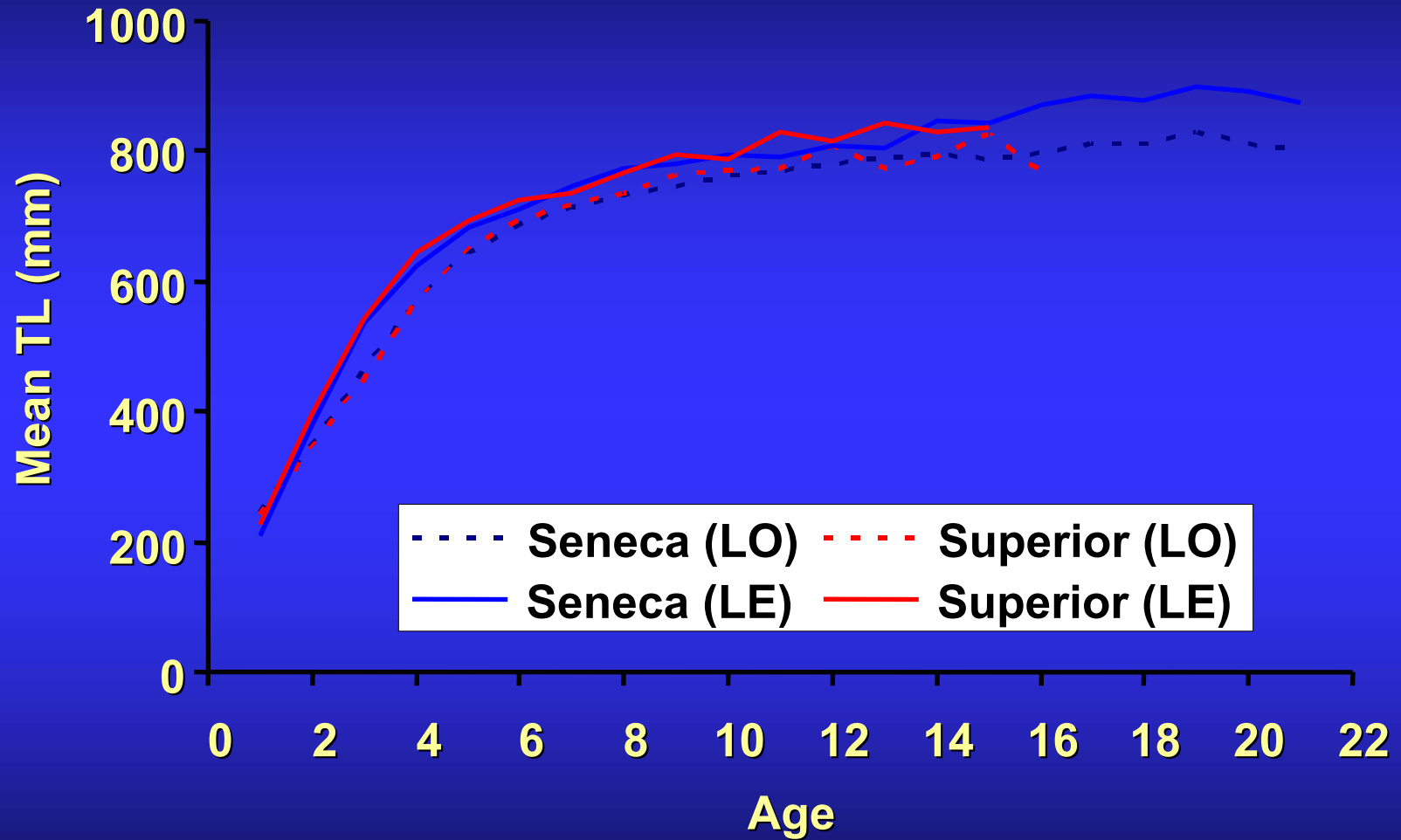
(spring yearlings)



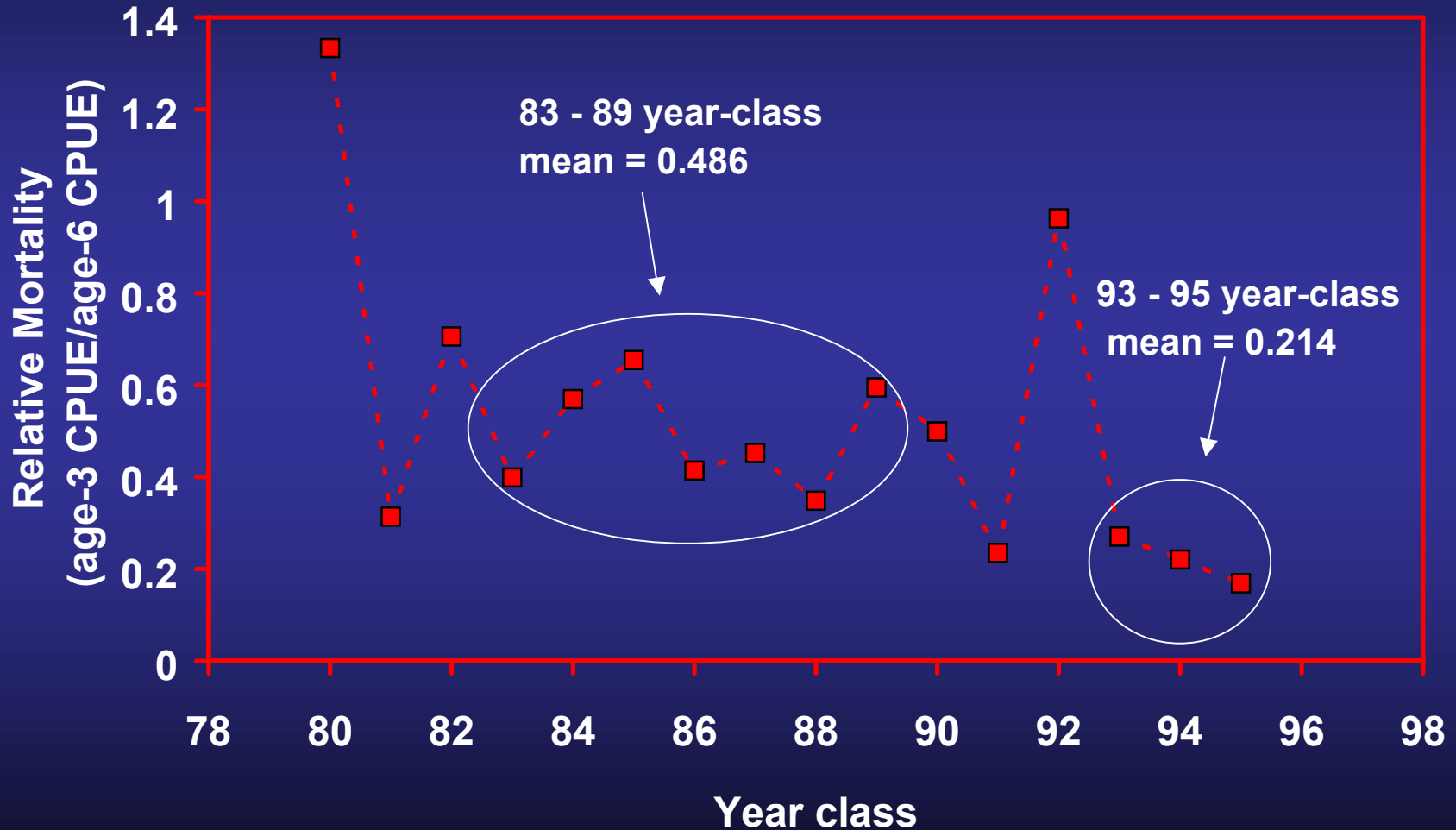
# Age-2 Size (Lake Ontario)



# Growth Curves



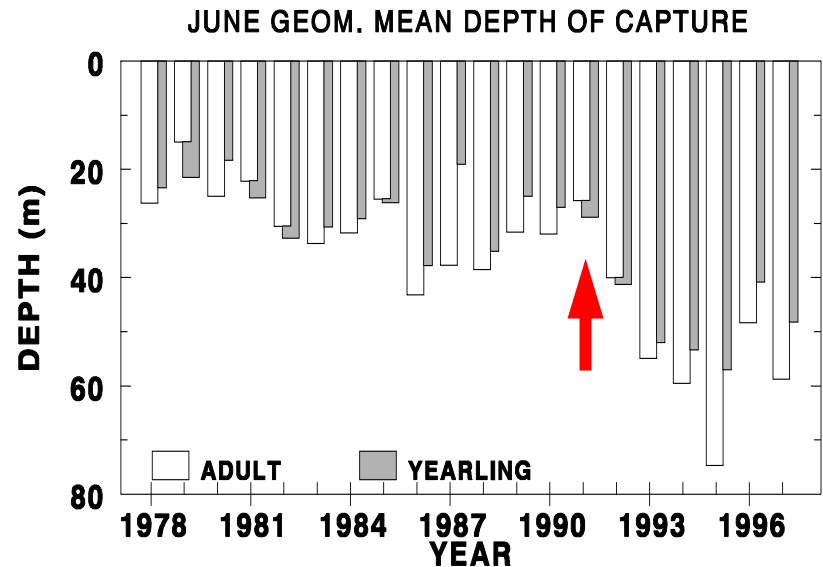
# Seneca Strain Relative Mortality



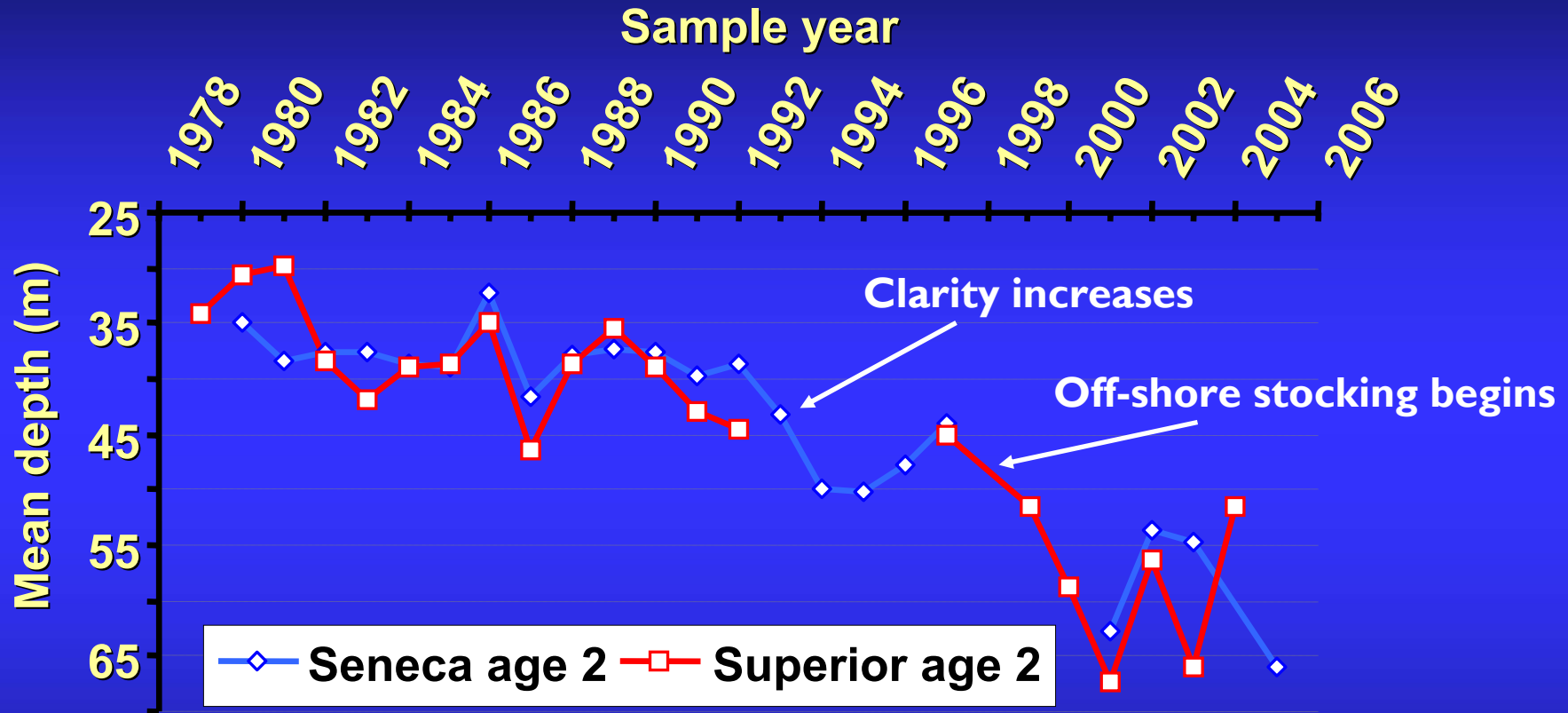


# Invasive Species: Impacts of Dreissenid Mussels

- Dreissenids invade early 1990s
- Shifts in distribution patterns of a number of fish species
- Analyses of long-term data indicate mussels best explain cause of food-web shifts

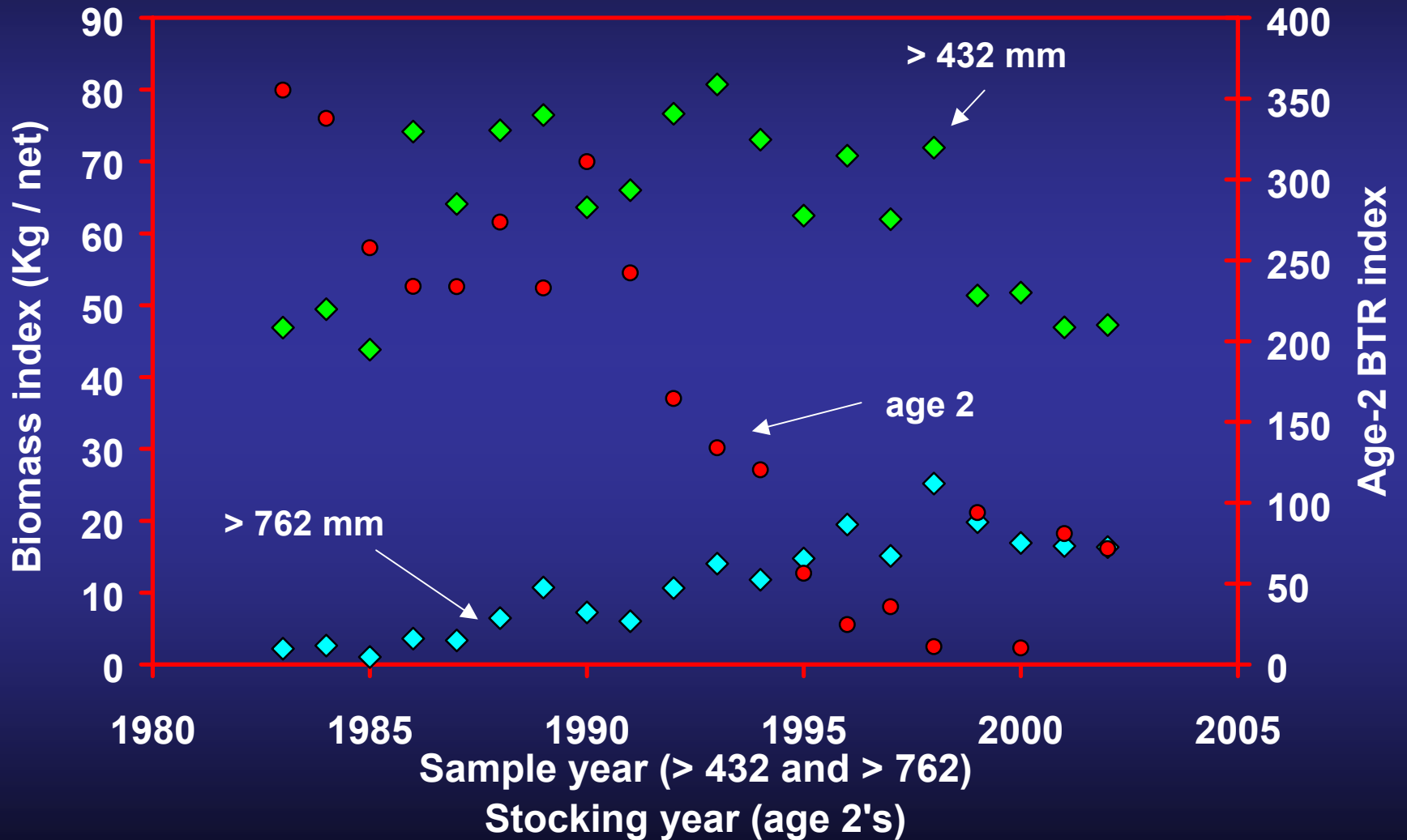


# Mean Depth of Capture (BTRs)

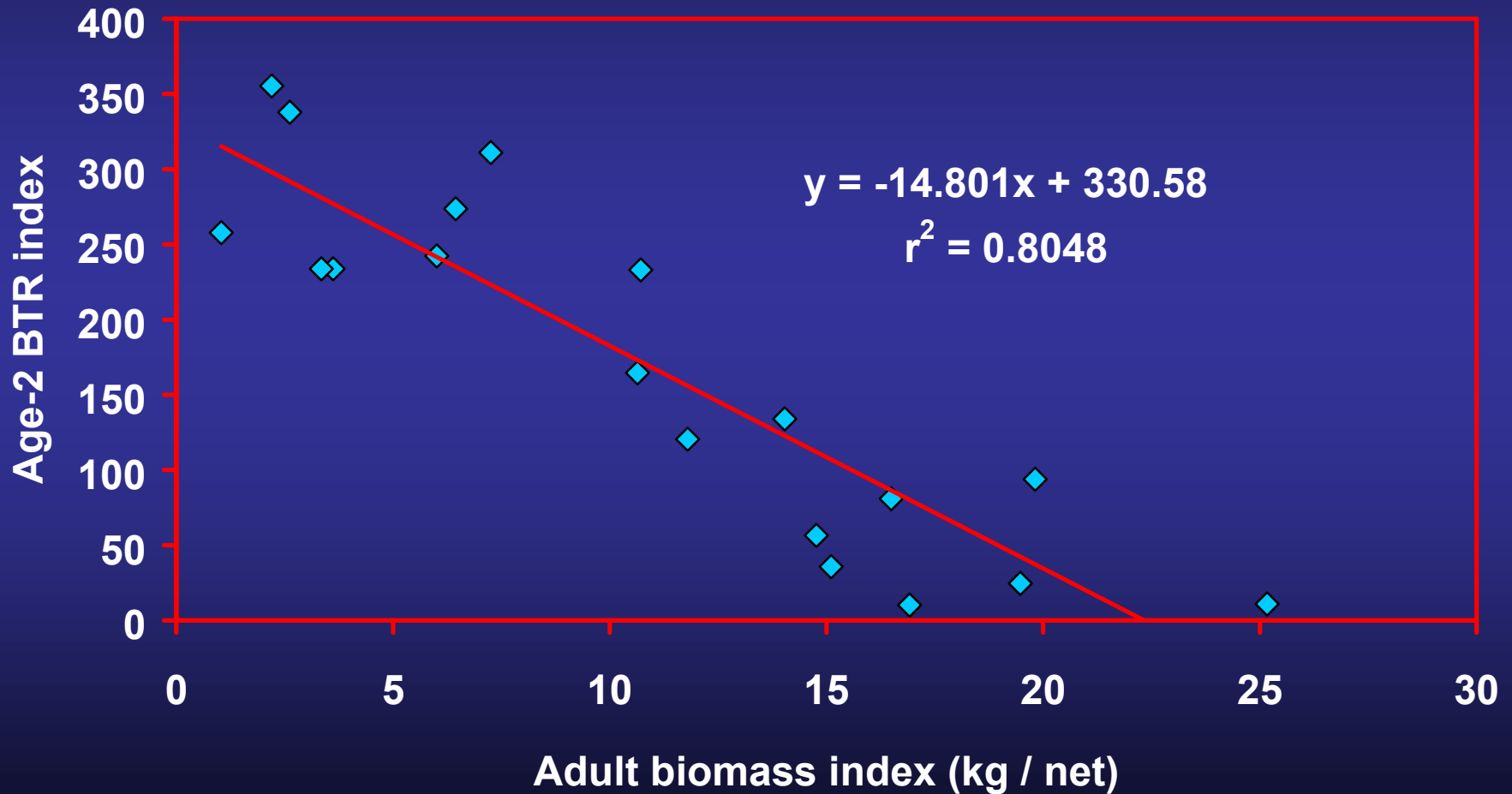




## Adult Stock vs Recruitment to Age 2



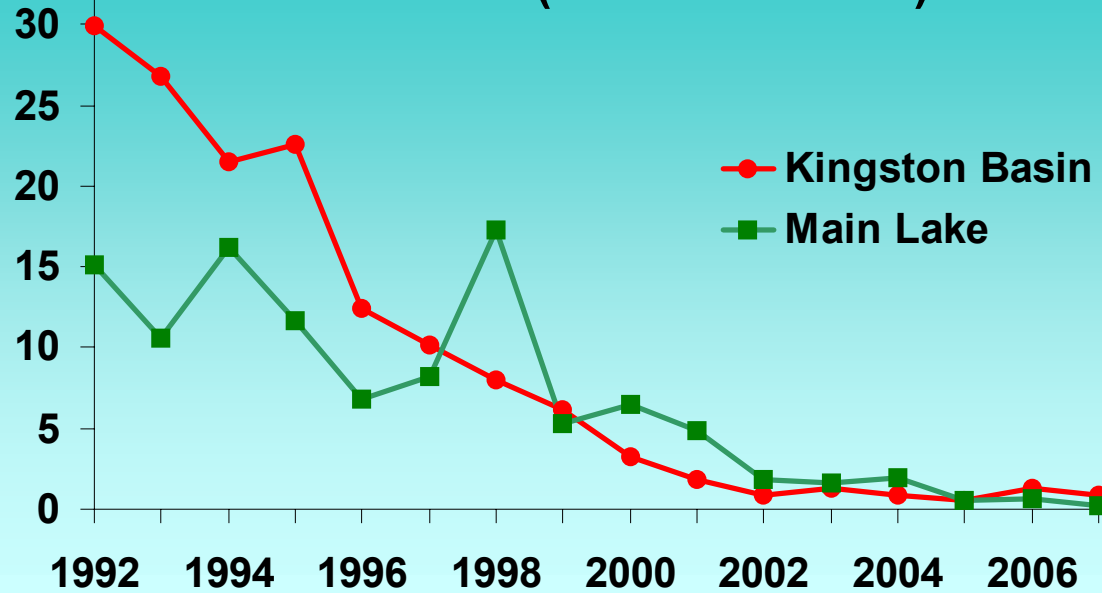
## Age-2 BTR Index vs. Adult Biomass index (>762 mm)



# Abundance from September Gill Net Catches



## Mature fish (males+females)

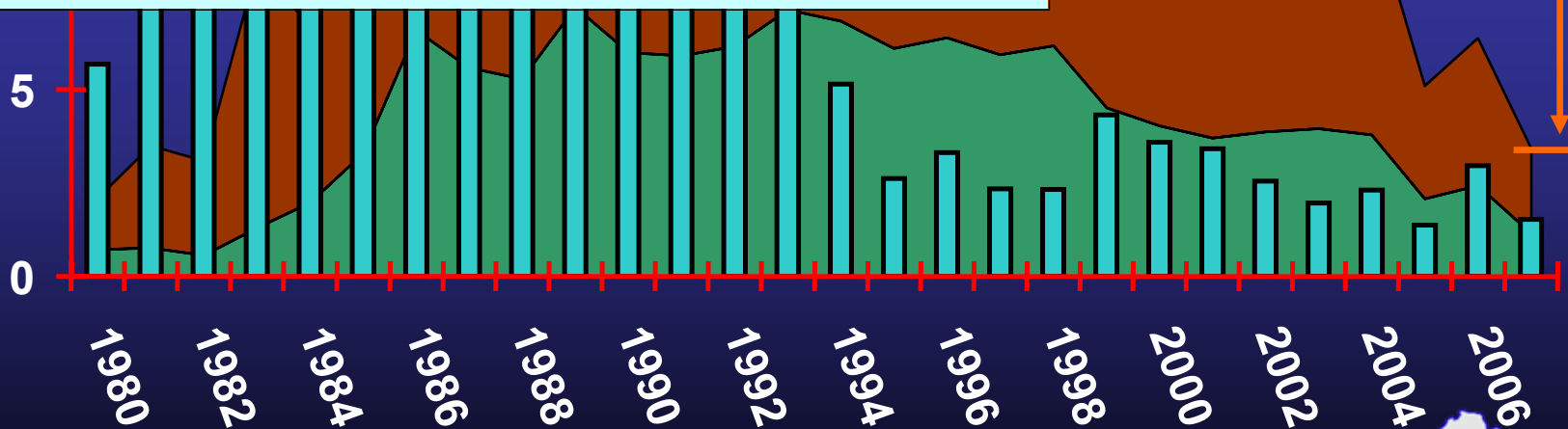


Male

Female

Immature

- 80%





CWT's recovered



# Shoreline Predation



Stocked lake trout



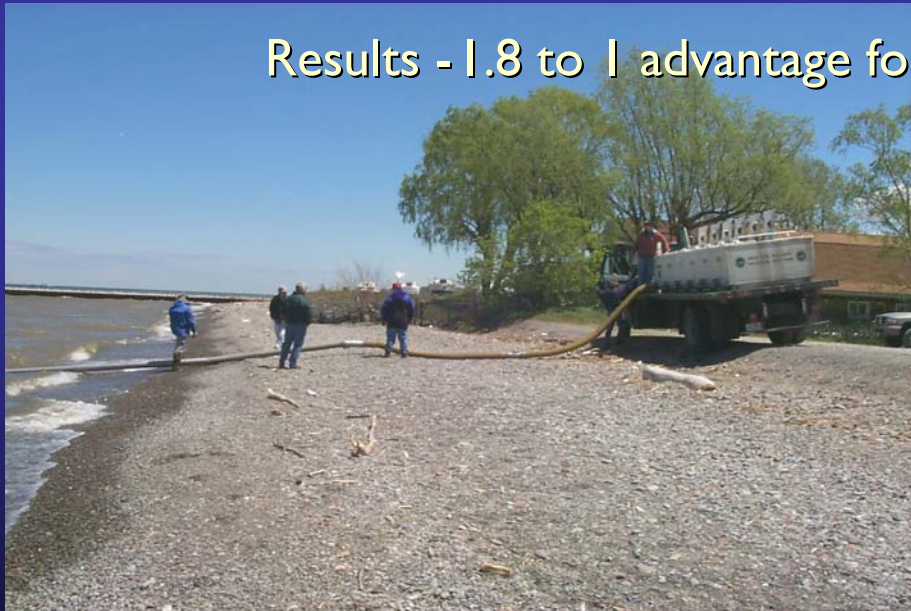
# Methods:

3 treatments - May Offshore (55 m)  
May Onshore  
June Onshore

Collect survivors –

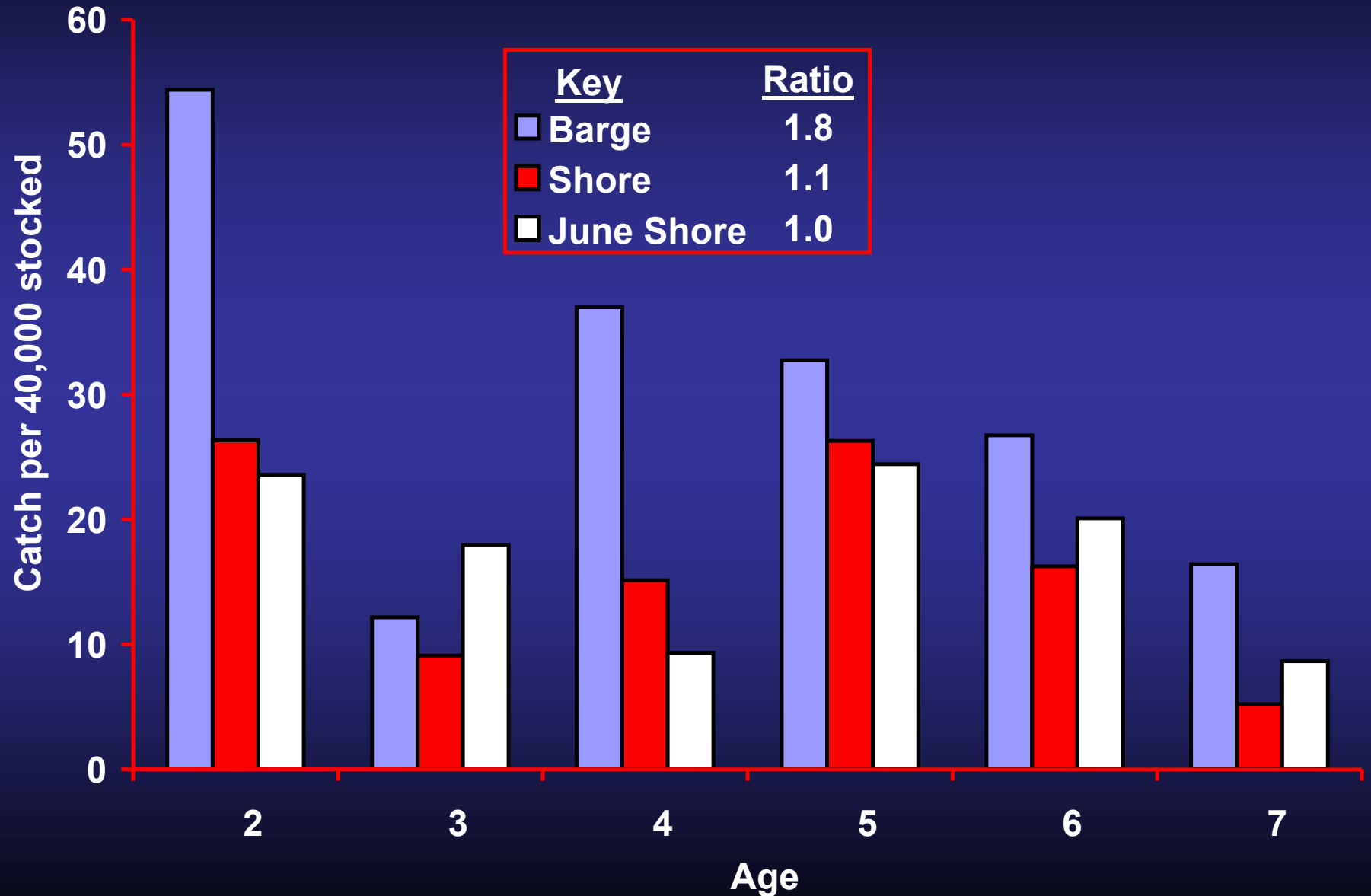
assessments surveys, contaminant collections,  
and creel surveys (for ages 2 to 4,  $n = 382$ ).

Results - 1.8 to 1 advantage for offshore stockings.

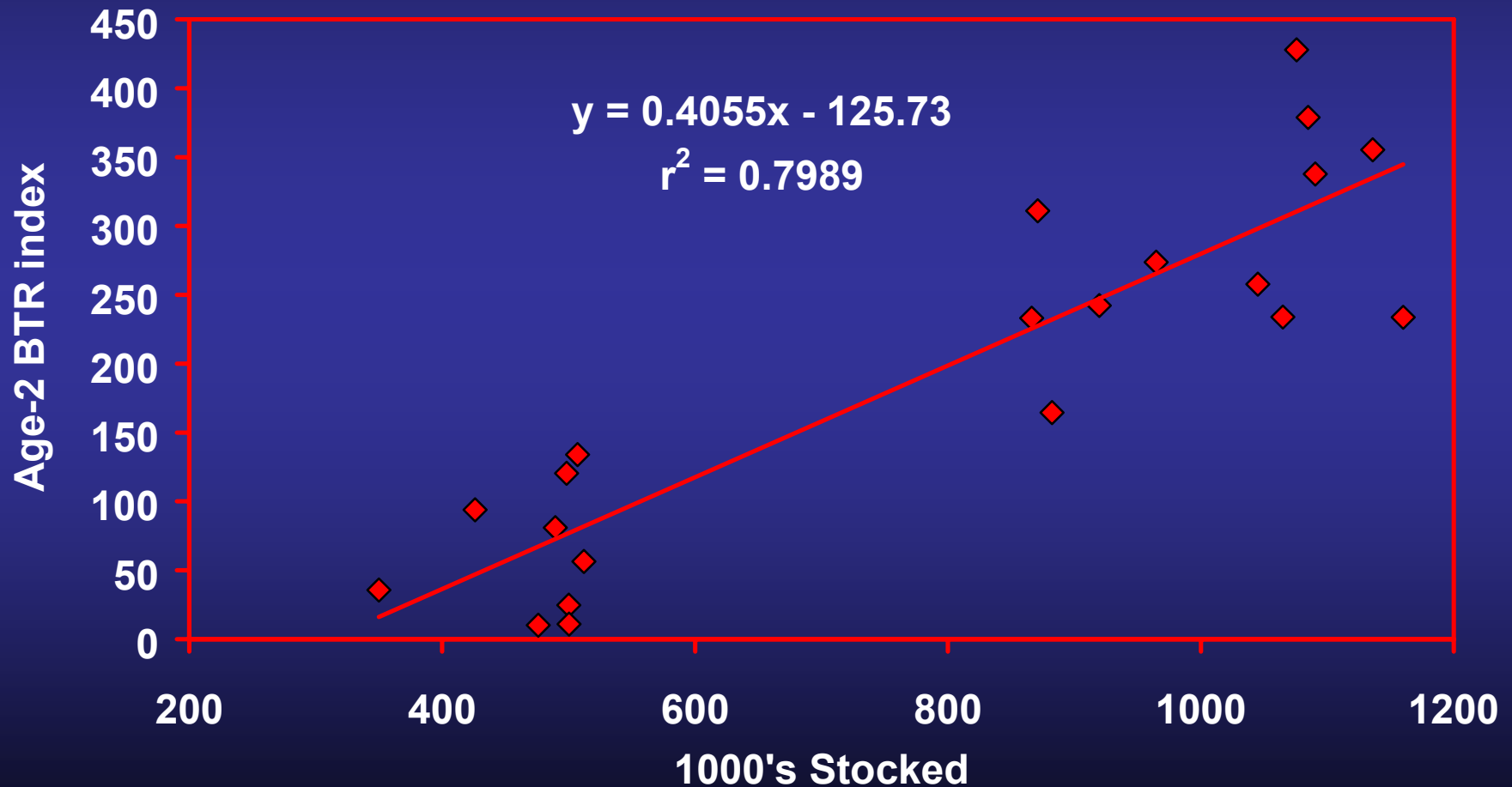


# Offshore Stocking Study Results

*(both sites)*

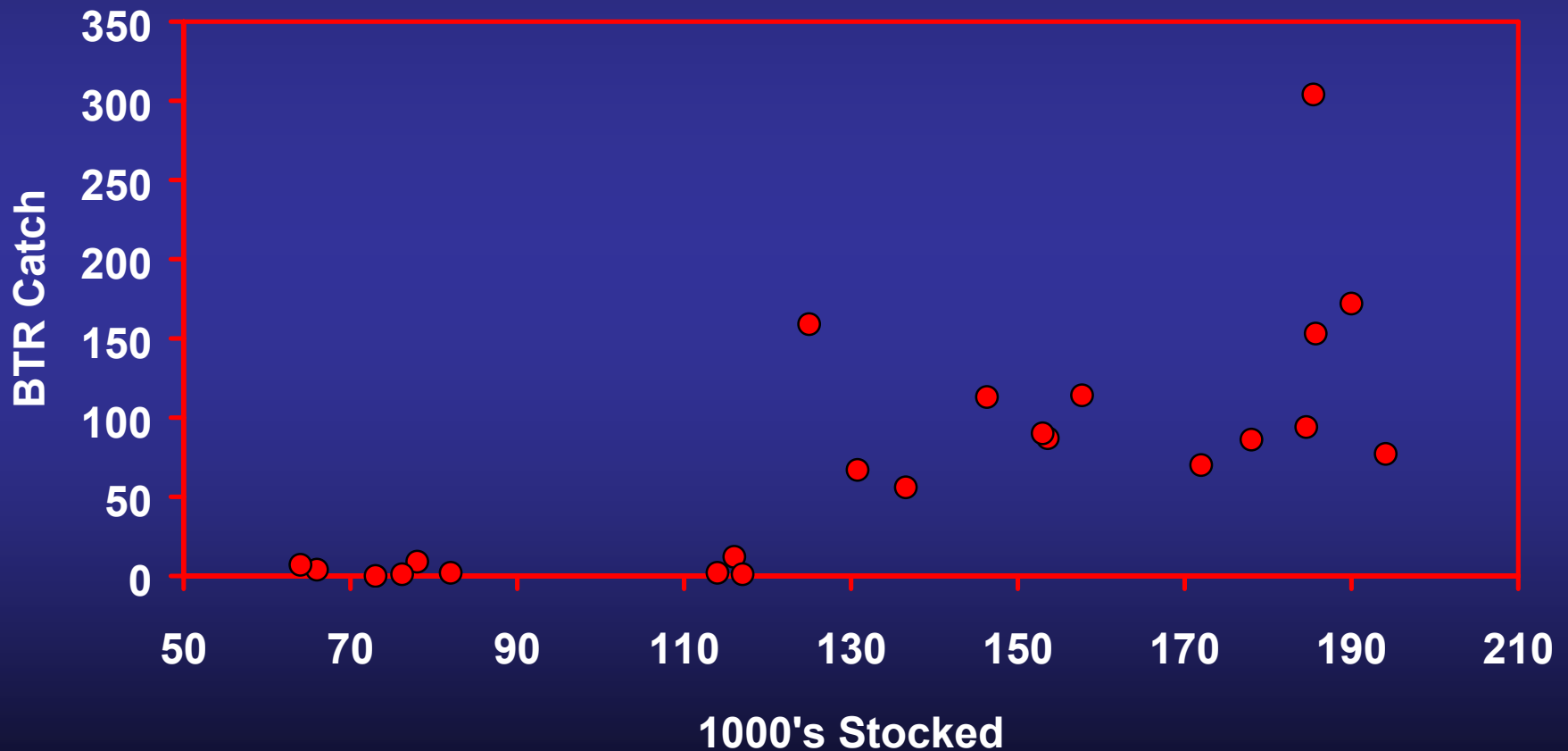


# Yearlings Equivalents Stocked vs. Age-2 BTR Index



# Selkirk Stocking vs Age-2 BTR Catch

## For: Nine Mile Pt. + Mexico Bay



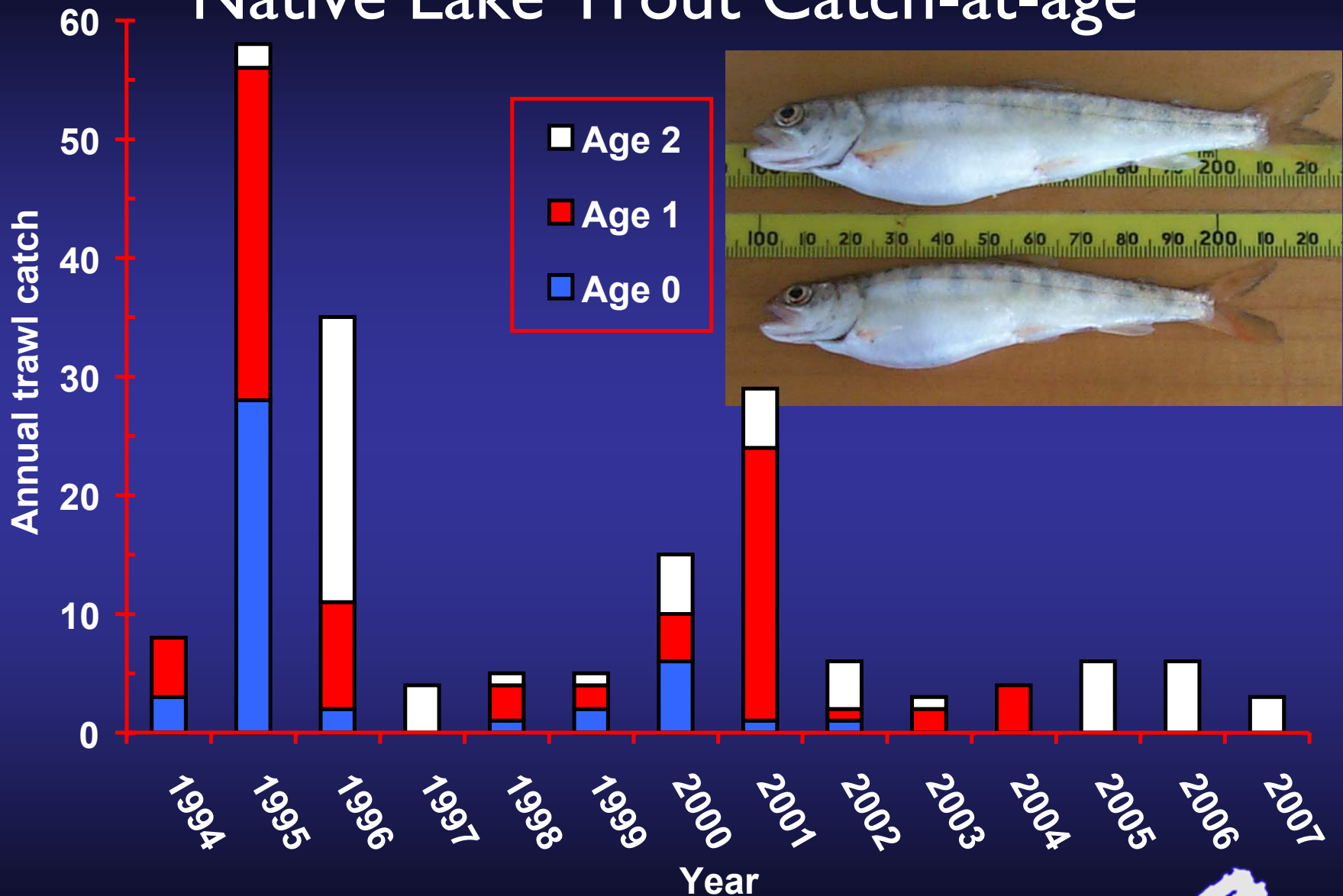


# Pulse Stocking

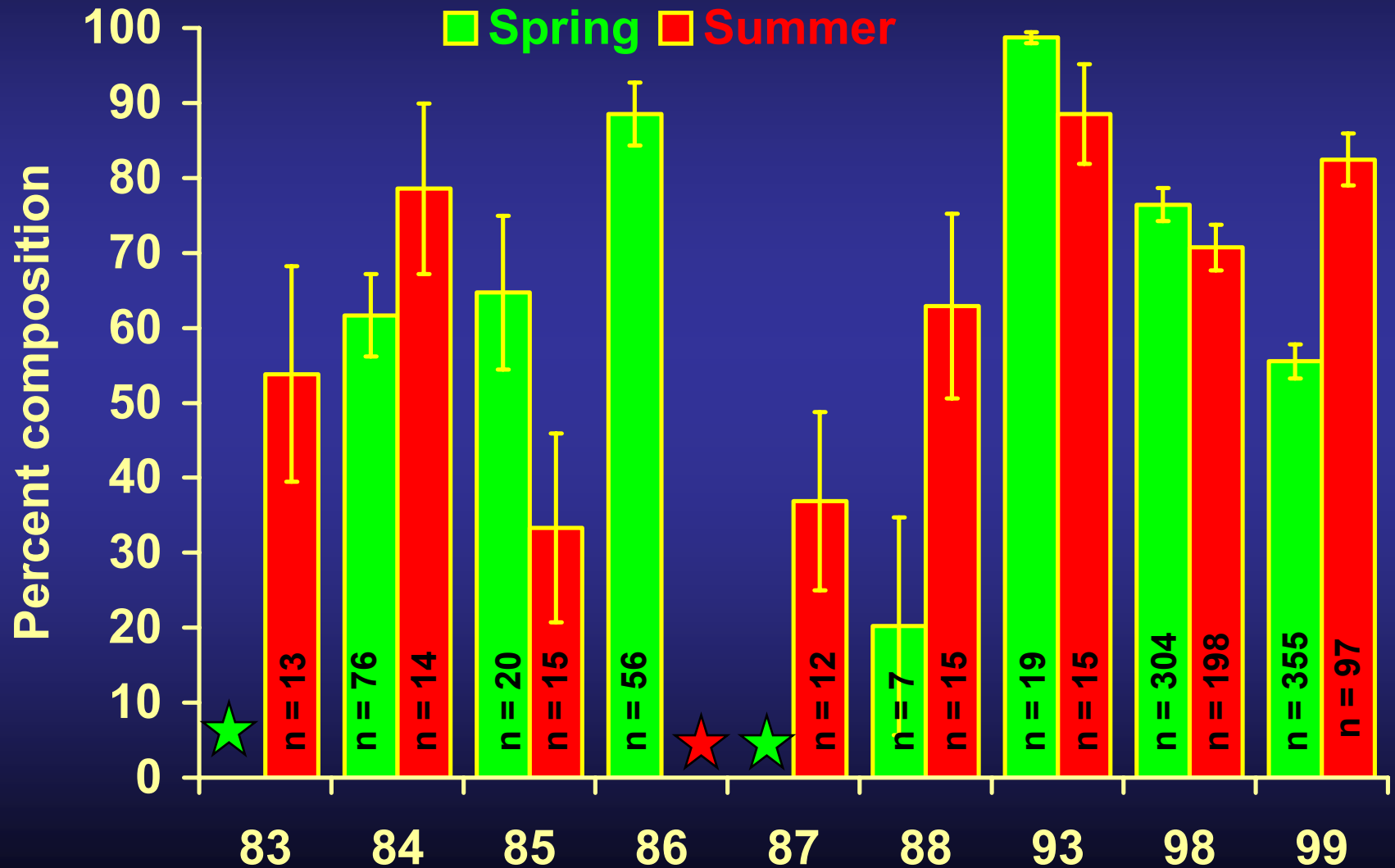
(Numbers in 1000s, Pulse threshold ≈ 135,000)

Stocking Year (YC)	Olcott	Oak Orch.	Sodus	Oswego	Stony	Total
2000 (99)	<b>143</b> (105/37)	65	122	64	96	<b>490**</b>
2001 (00)	<b>160</b> (120/40)	72	120	76	72	<b>500**</b>
2002 (01)	120	76	120	92	92	500
2003 (02)	80	120	60	<b>140</b> (100/40)	100	<b>500**</b>
2004 (03)	38	<b>156</b> (76/80)	38	<b>153</b> (76/76)	71	457
2005 (04)					<b>224</b>	224
2006 (05)	<b>118</b>					118 ?
2007 (06)		86	85	<b>83 / 71</b>	<b>43 / 85</b>	453

# Native Lake Trout Catch-at-age



# Percent Composition of Adult Alewife in Lake Trout Diets



# Responses:

- *Increase site-specific stocking levels to >135,000*
- *Increase the total stocked from 500,000 to 800,000 SYs*
- *Continue to stock offshore*
- *Stock a more even mix of strains*
- *Re-evaluate FF vs. SY survivorship*