

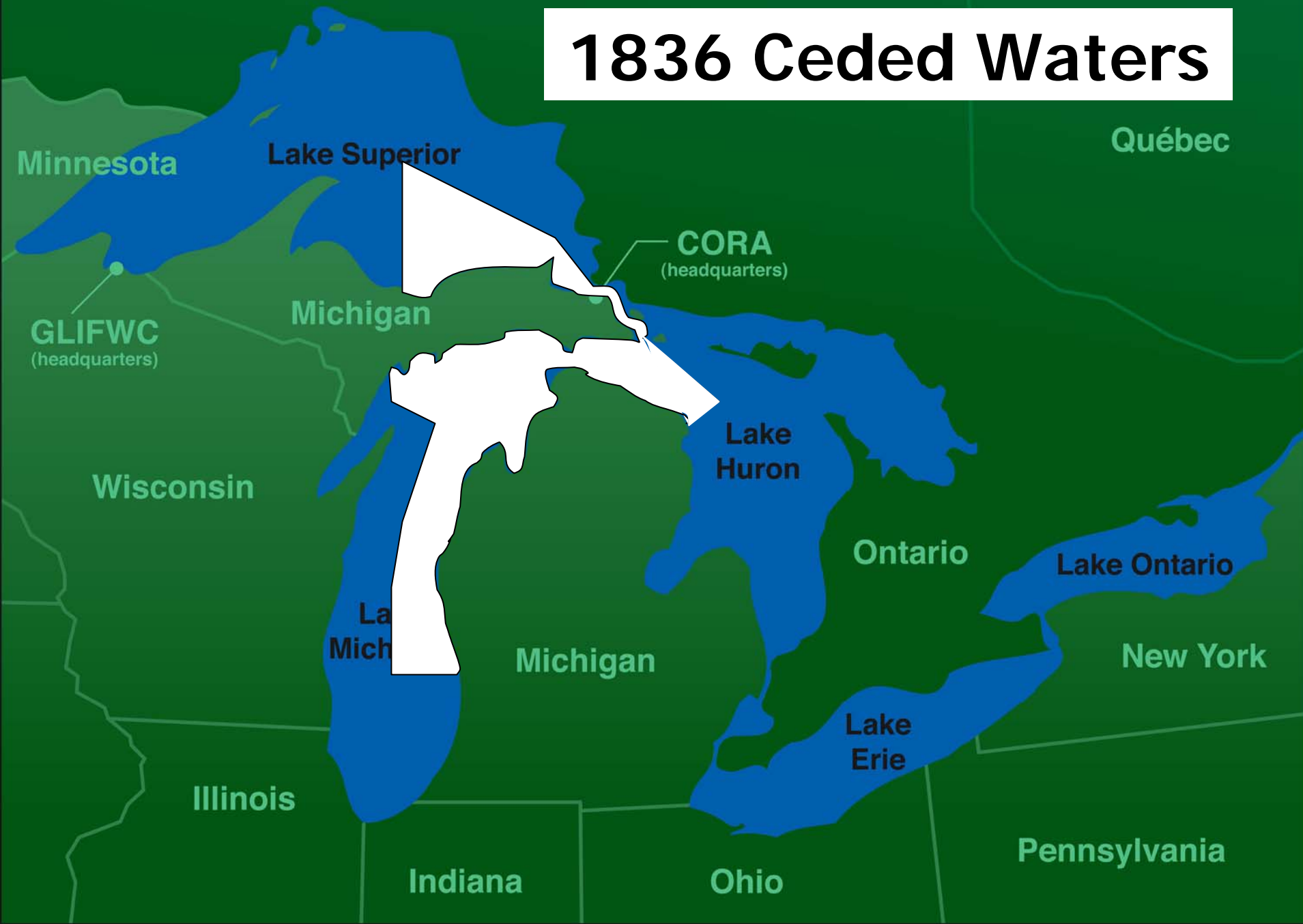
Recovery of Lake Huron Lake Trout: what we can learn from the “Superior” experience?

A presentation made at the Mortality of Age-1
Lake Trout in the Great Lakes
October

Mark Ebener

Chippewa Ottawa Resource Authority

1836 Ceded Waters



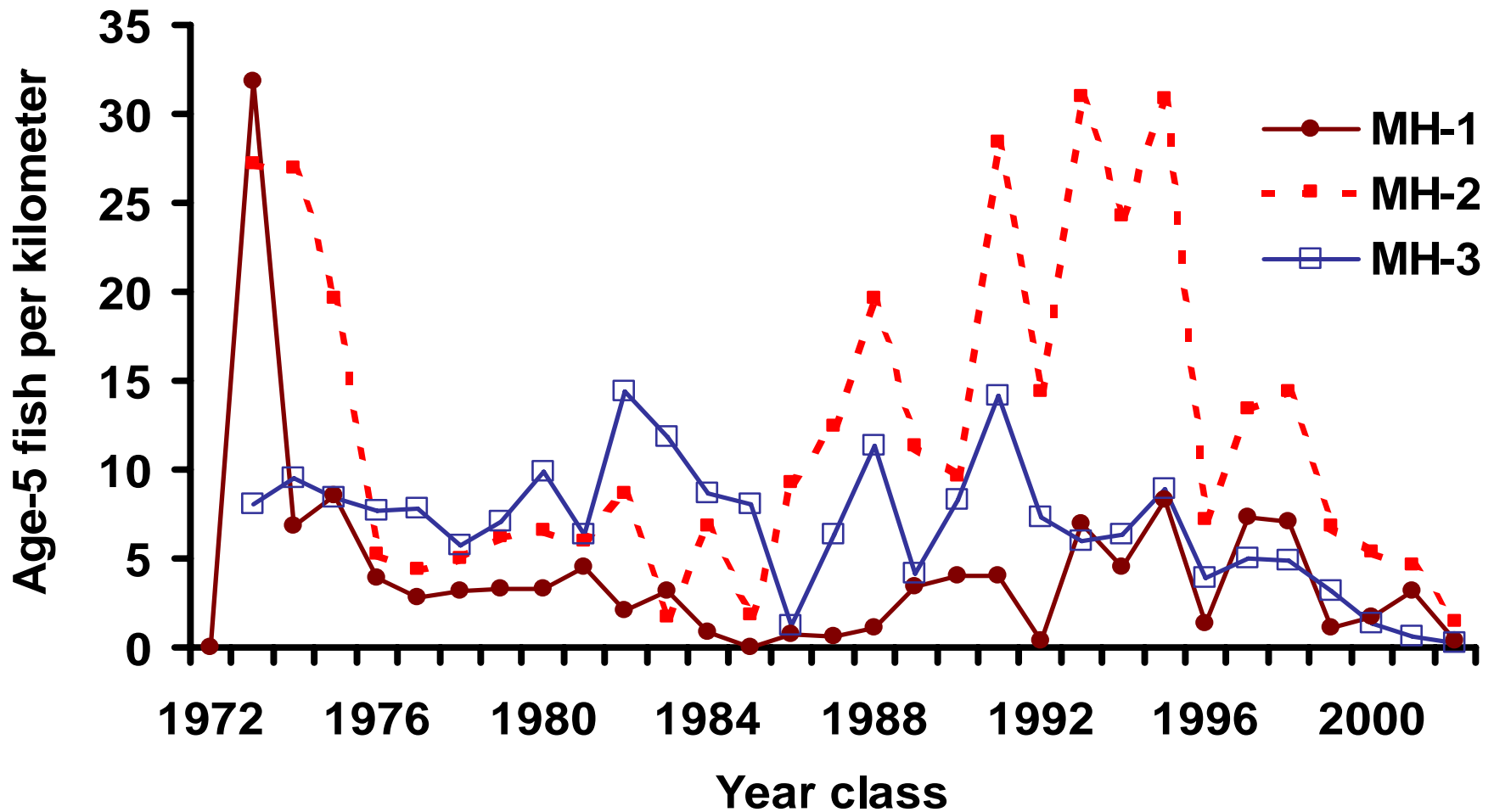
2000 Consent Decree

1836 Ceded Waters

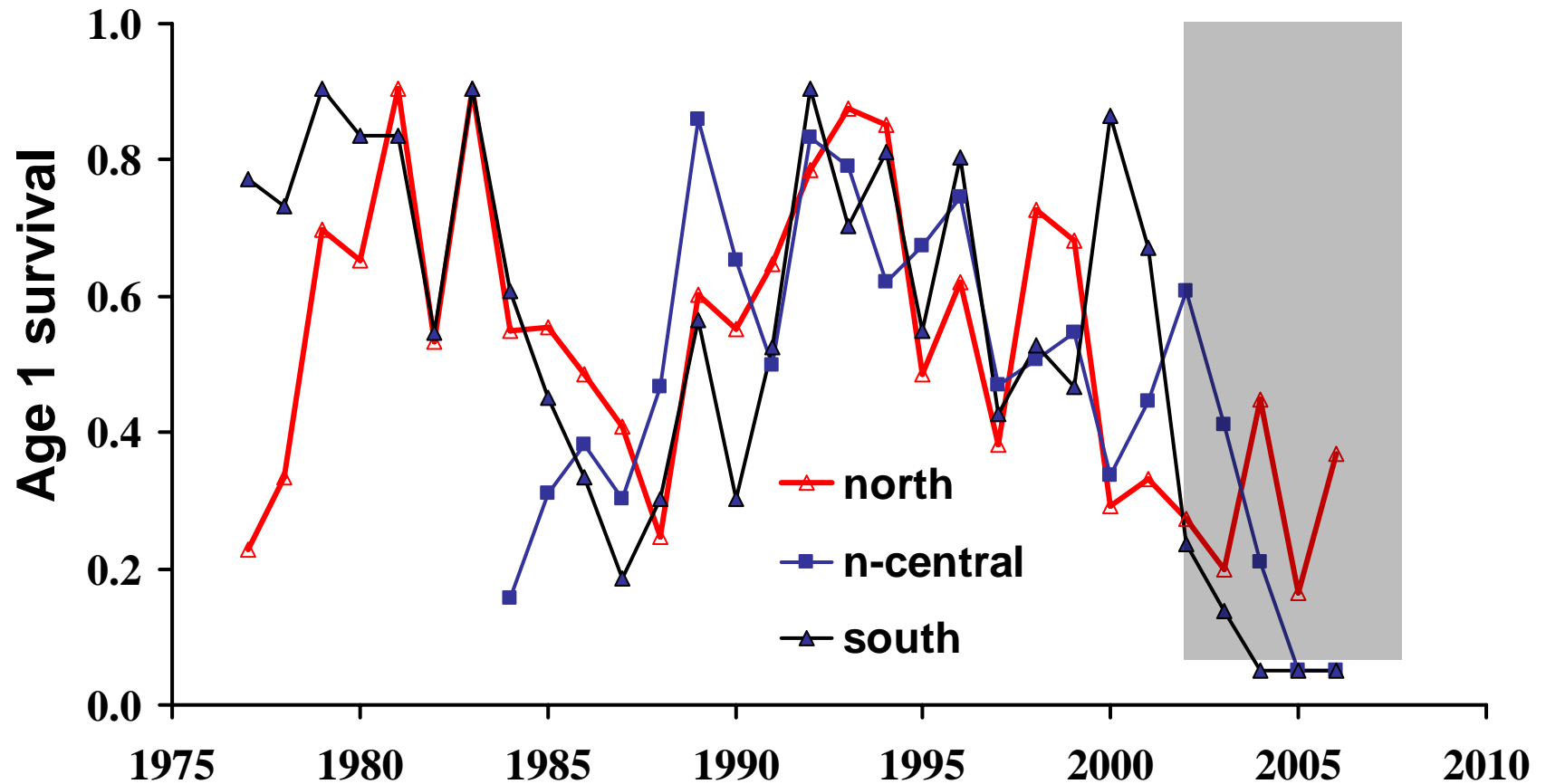
- **Lake trout harvest regulated with harvest & effort limits**
- **Harvest & effort limits calculated by Modeling Subcommittee using appropriate statistical & mathematical modeling techniques**

Survival Index Age-5 Lake Huron

1972-2002 year classes



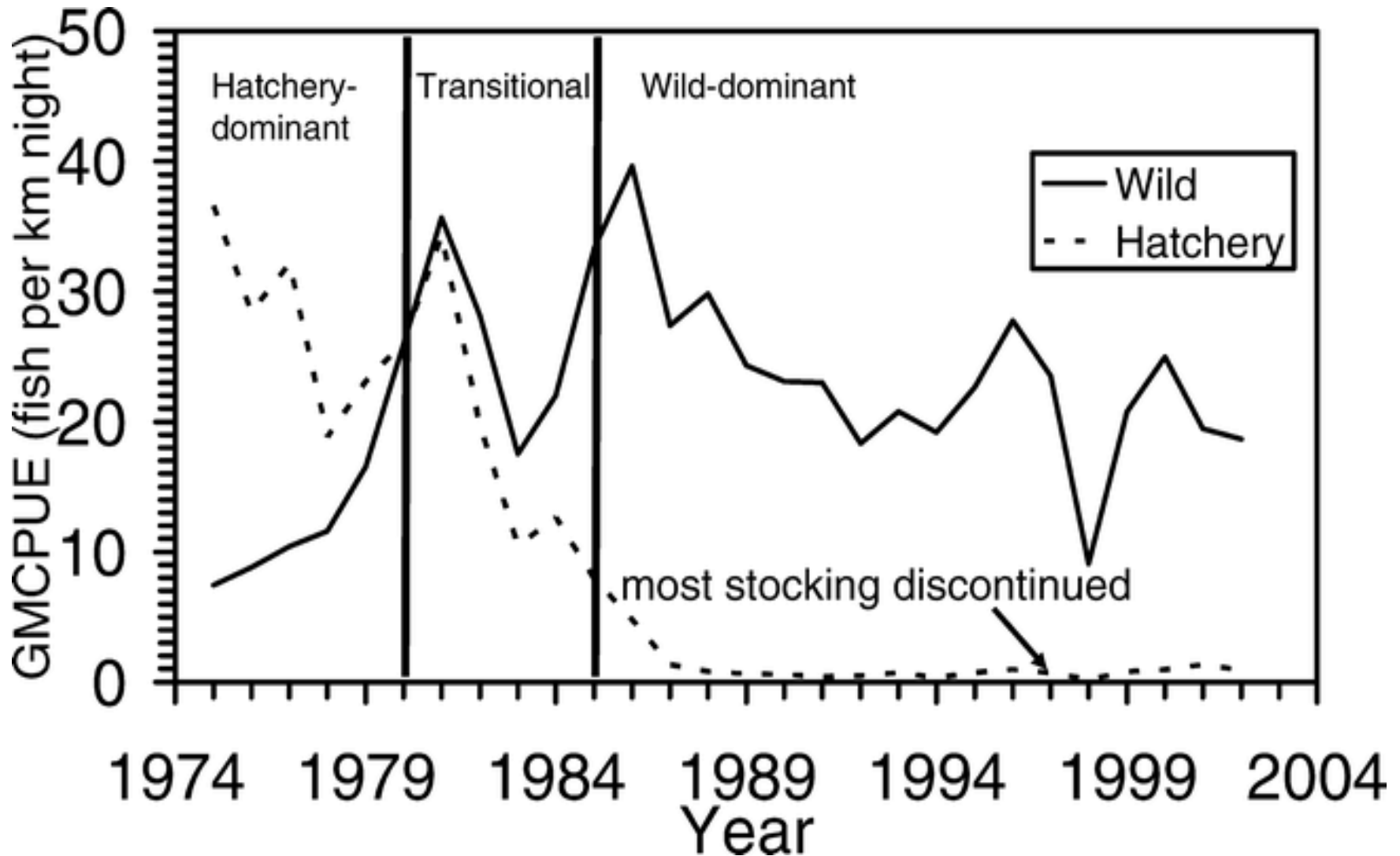
Estimates Age-1 Survival Lake Huron



Hash marked area represents year classes not fully part of fisheries

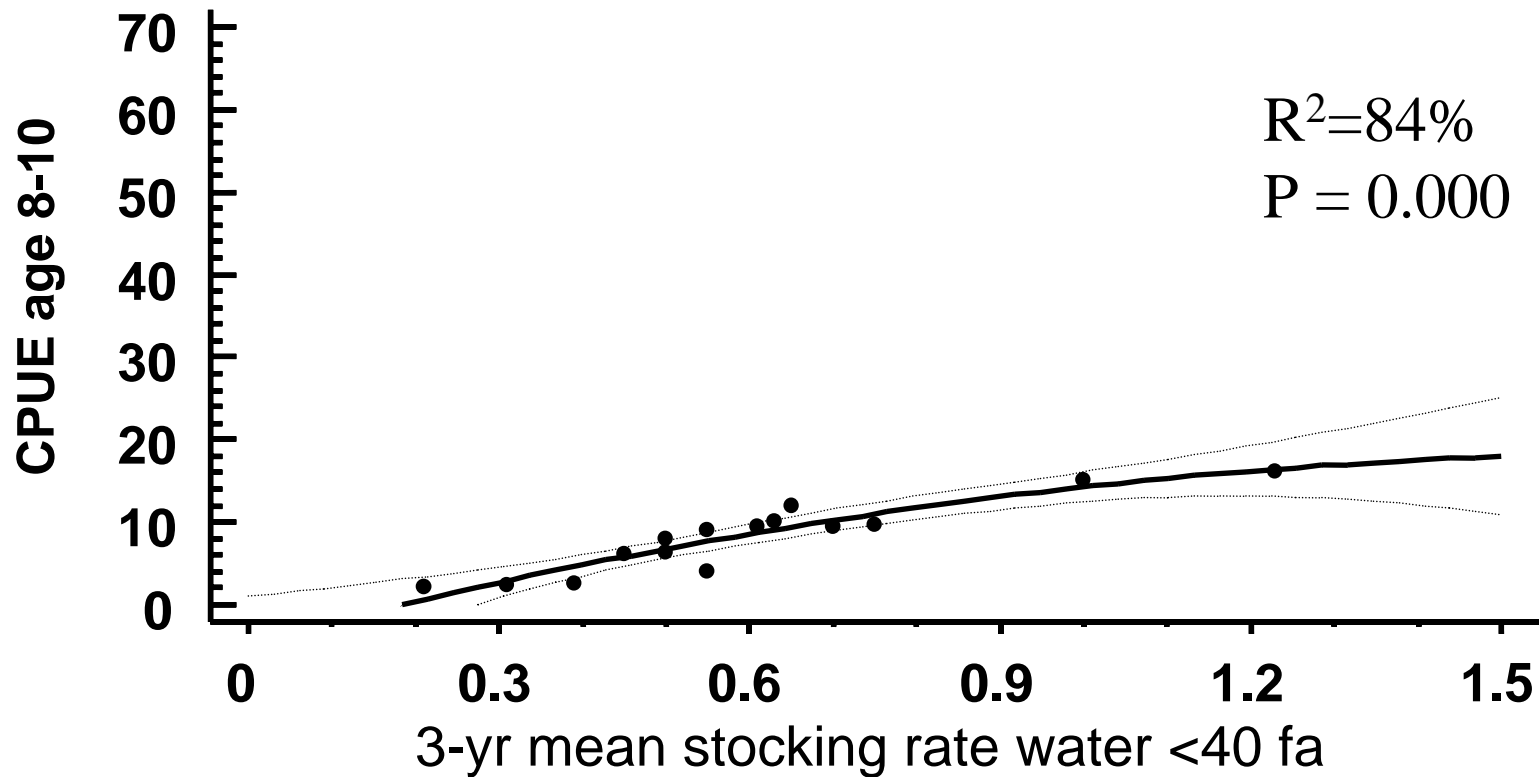
Lean Lake Trout Transition Lake Superior

Sitar & He (2006)



Stocking Rate & Spawner Abundance

Minnesota Waters 1971-1986

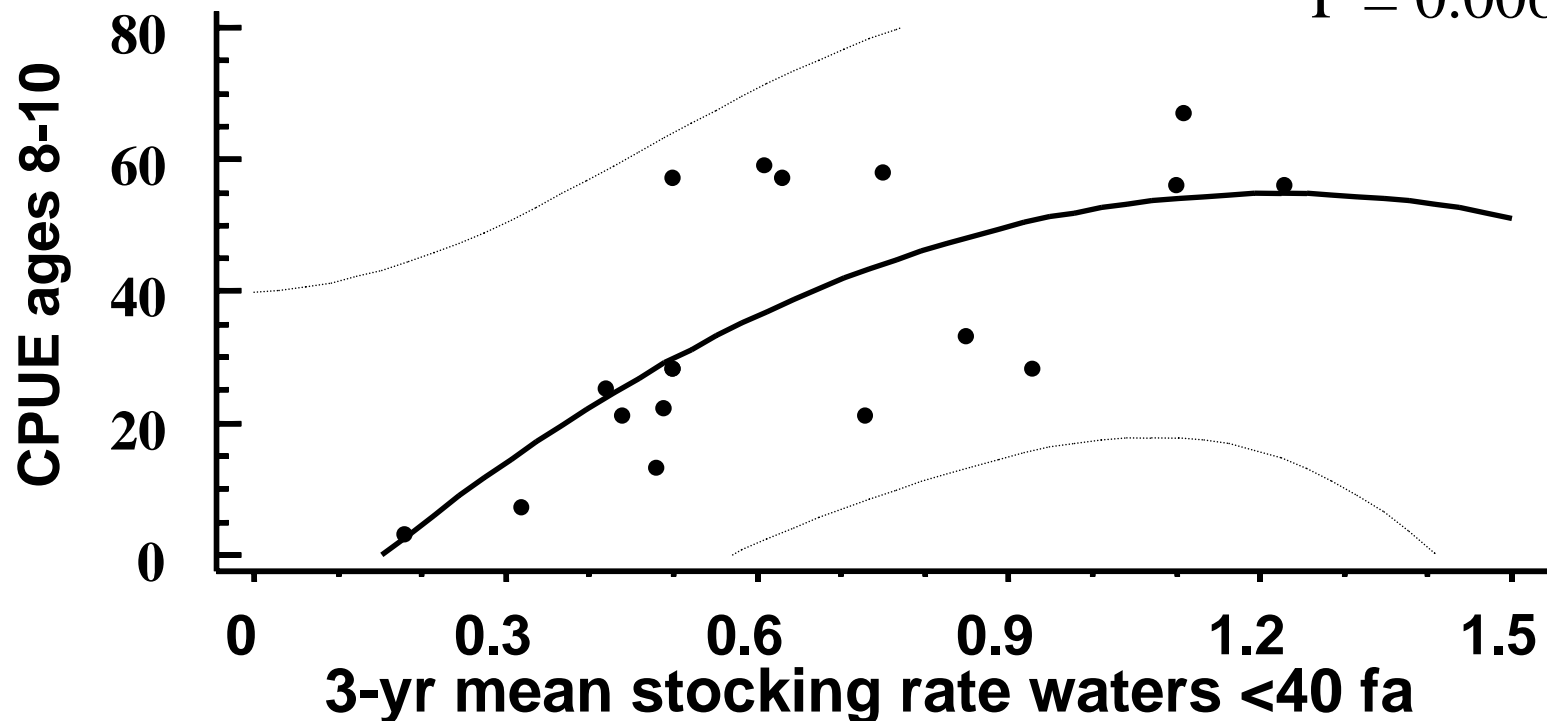


Stocking Rate & Spawner Abundance

Wisconsin Waters 1968-1985

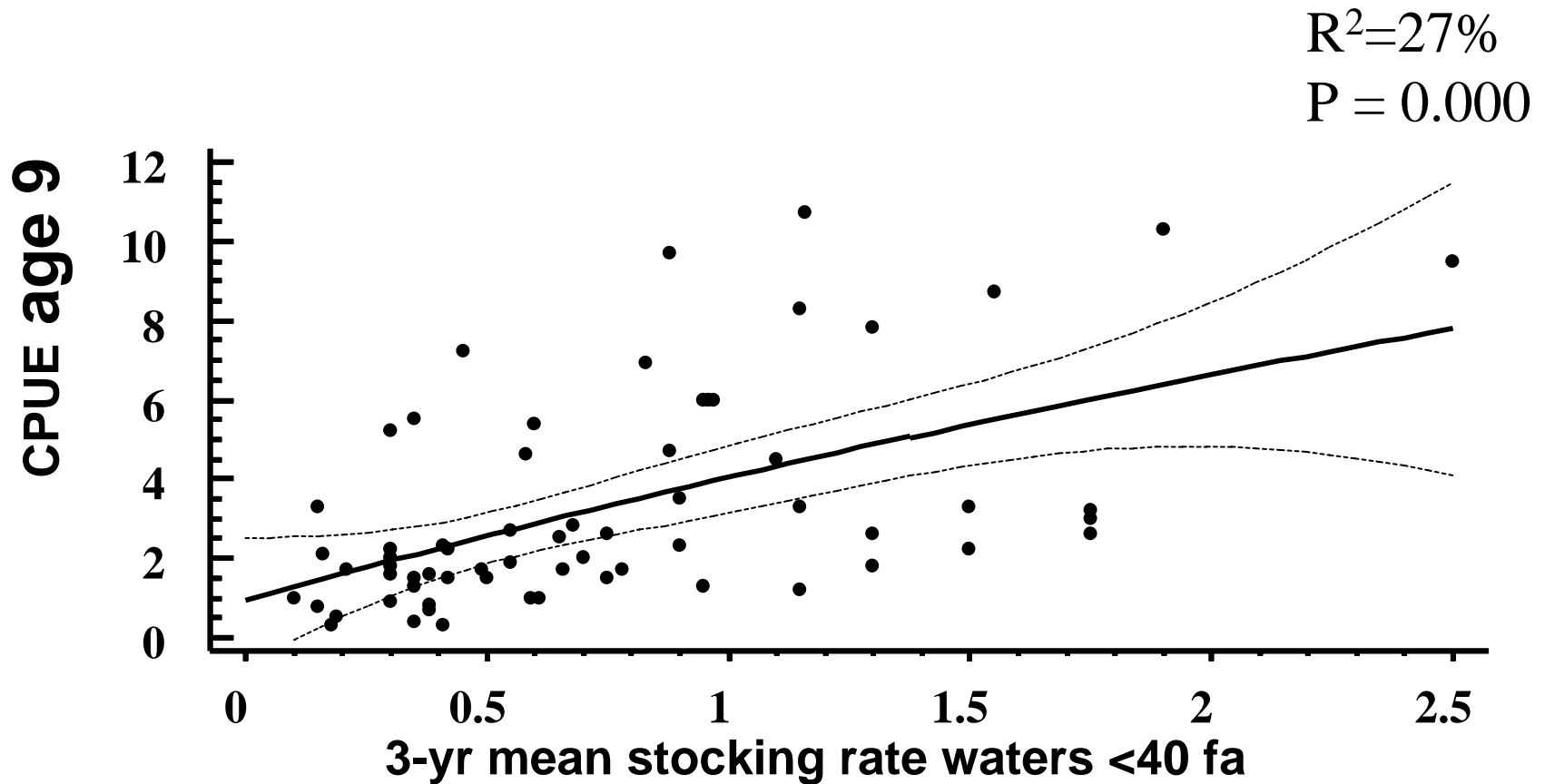
$R^2=43\%$

$P = 0.006$



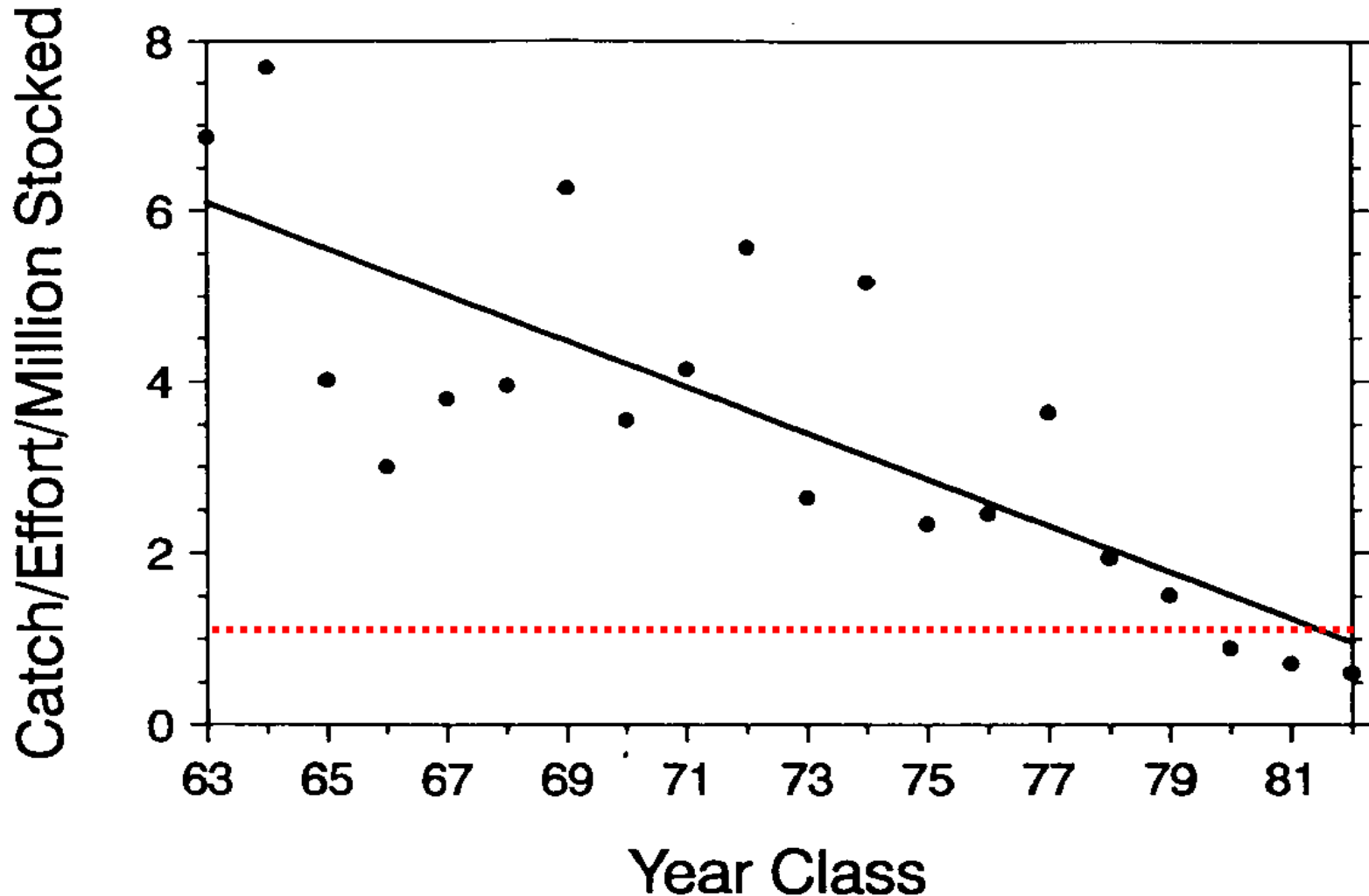
Stocking Rate & Spawner Abundance

Michigan Waters 1961-1977 Year classes



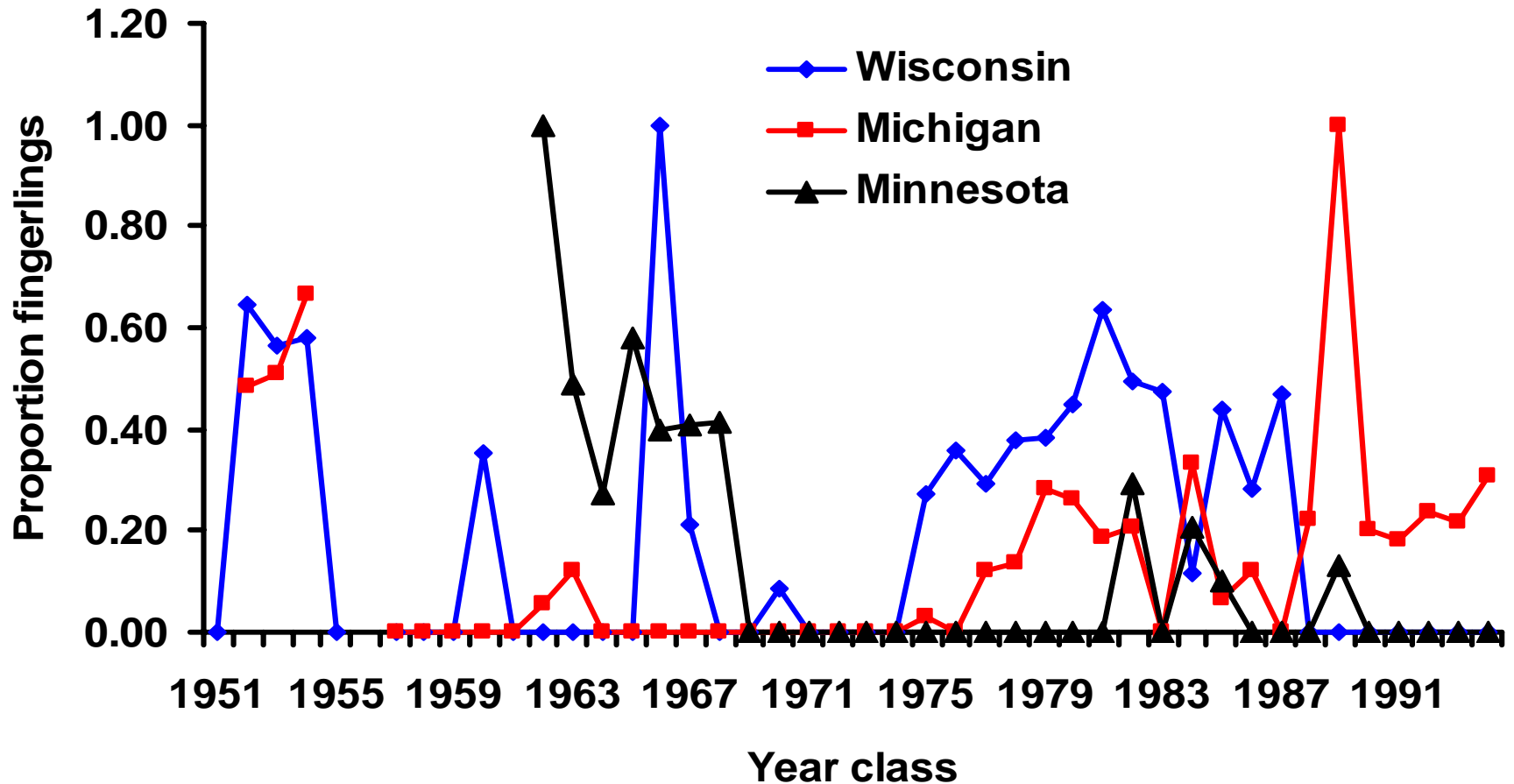
Survival Index Lake Superior

1963-1982 year classes (Hansen et al. 1994)



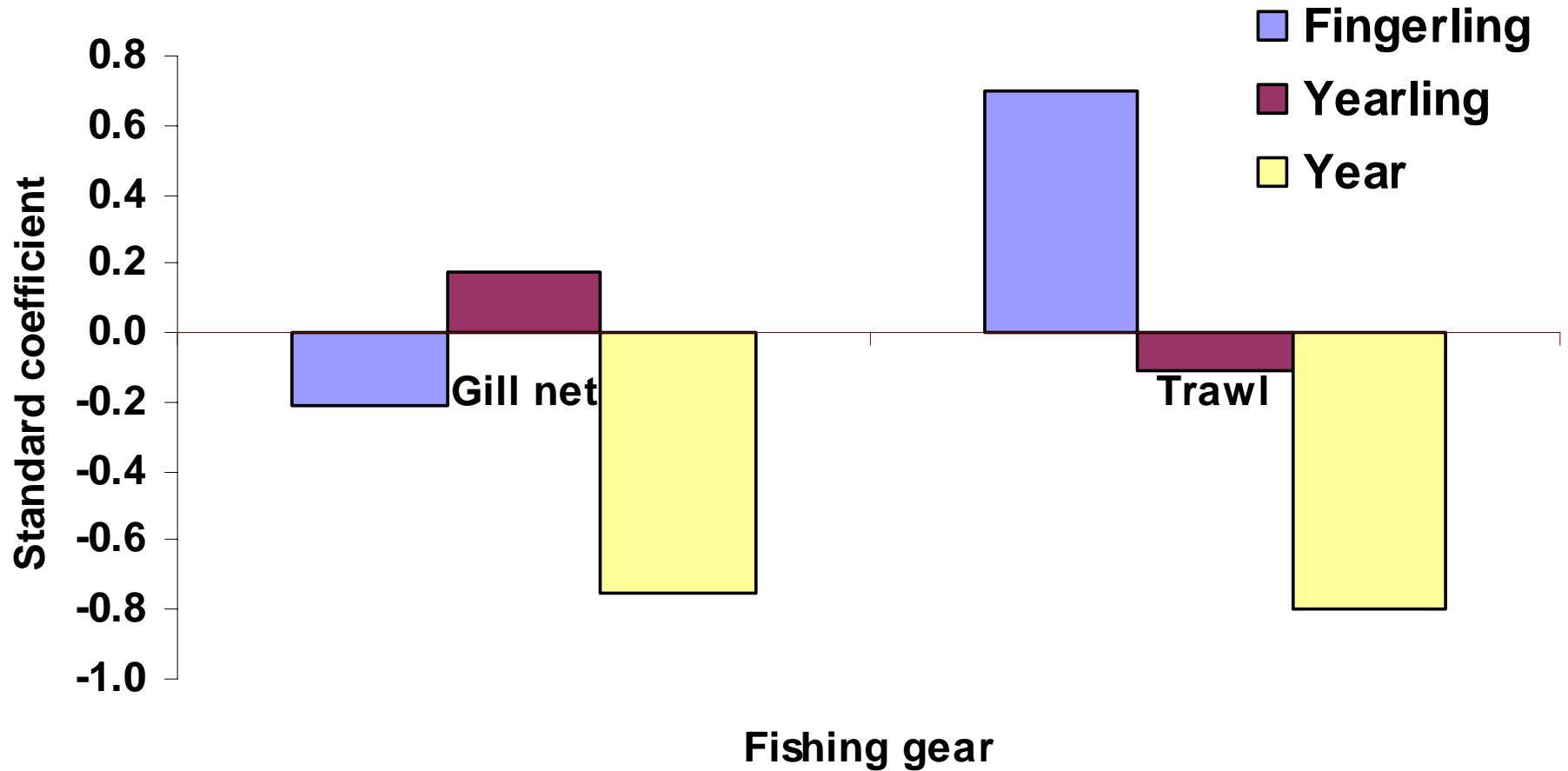
% Fingerlings Stocking Lake Superior

1951-1994 year classes

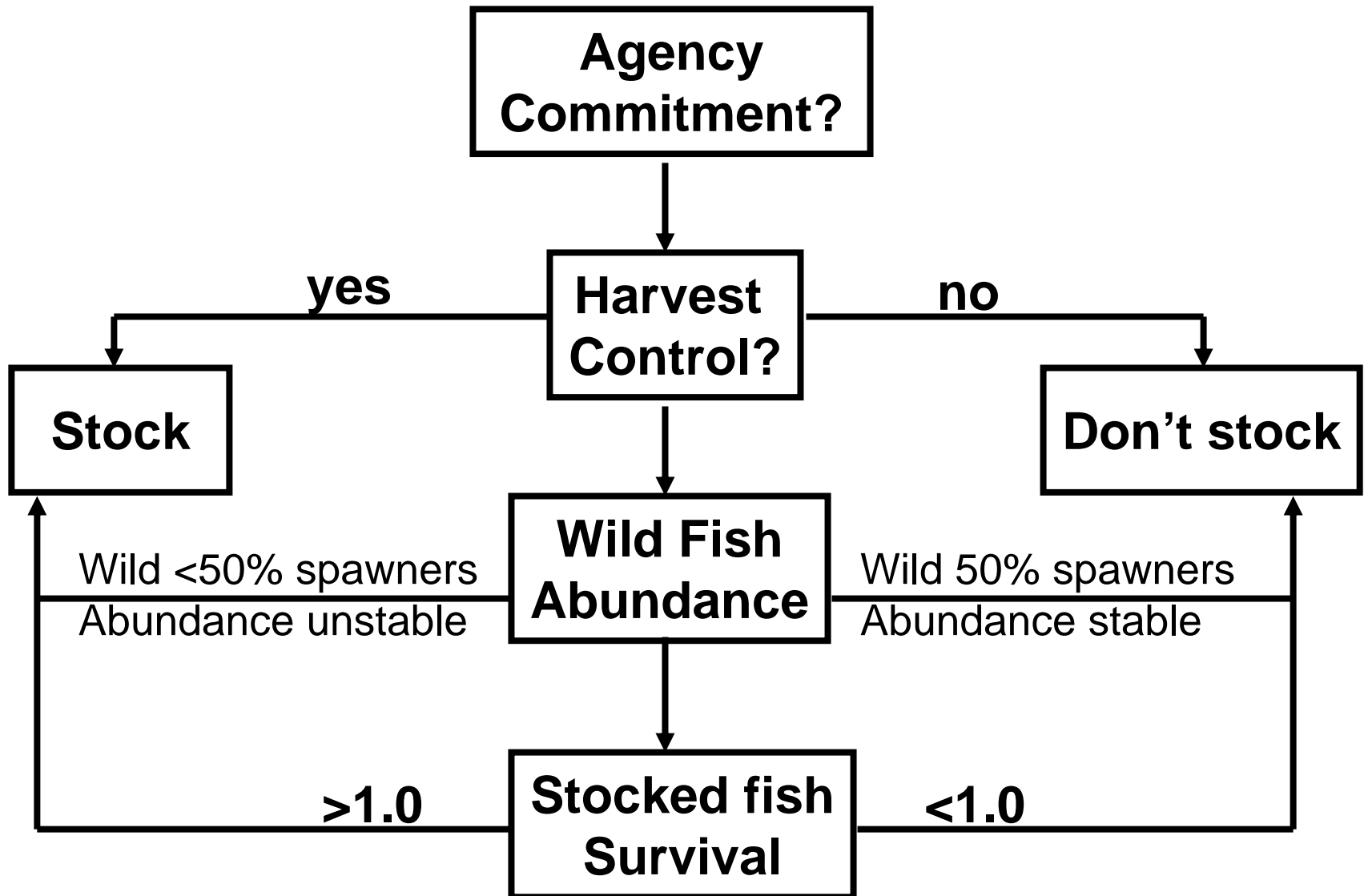


Stocking effect on CPUE

Standardized Residual from Multiple Regression



Lake Superior Stocking Criteria



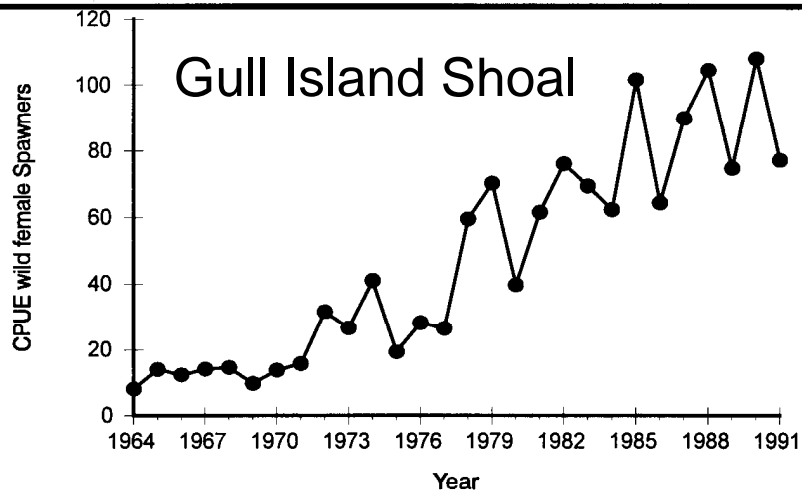


Fig. 1 . Catch per unit effort of wild adult female lake trout caught at Gull Island Shoal in Lake Superior, October 1964-1991 (Schram et al. 1995).

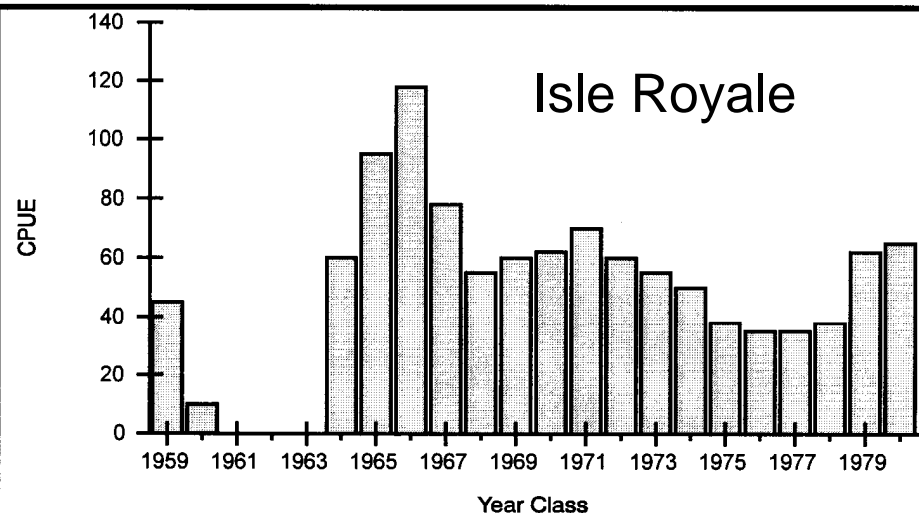


Fig. 3 . Year class strength of lake trout caught at Isle Royale in Lake Superior, spring 1959-1987 (Curtis, in press)

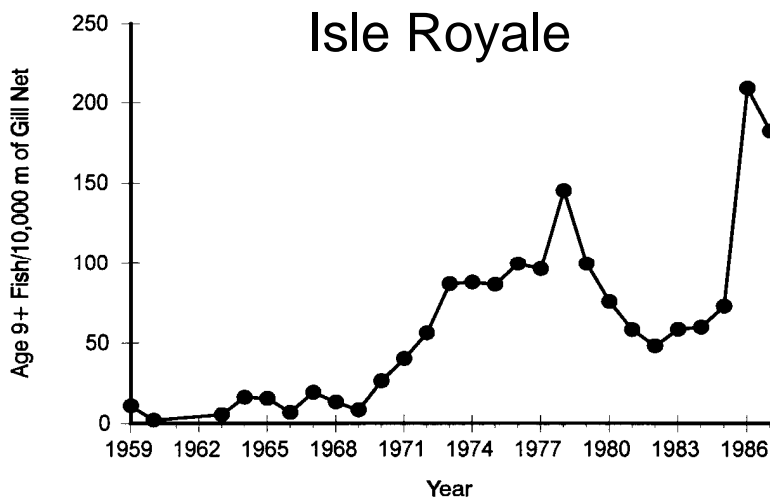


Fig. 2 . CPUE of age 9 and older lake trout caught at Isle Royale in Lake Superior, spring 1959-1987 (Curtis, in press).

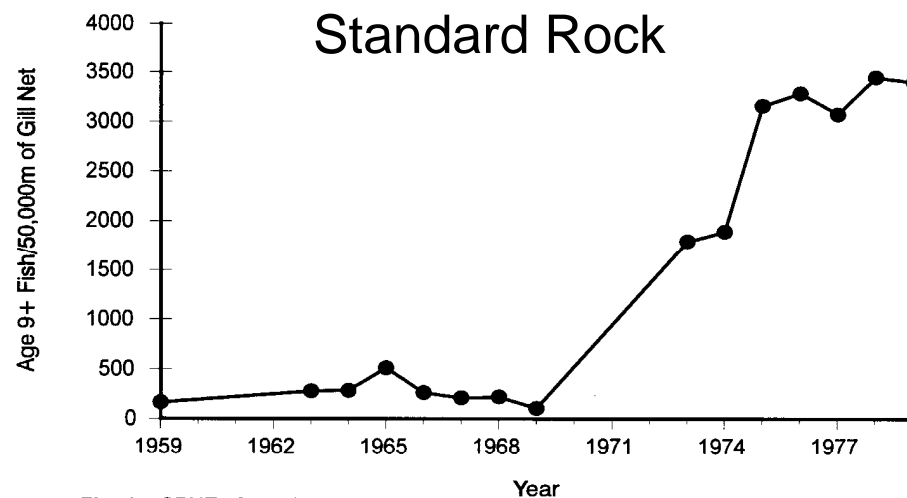
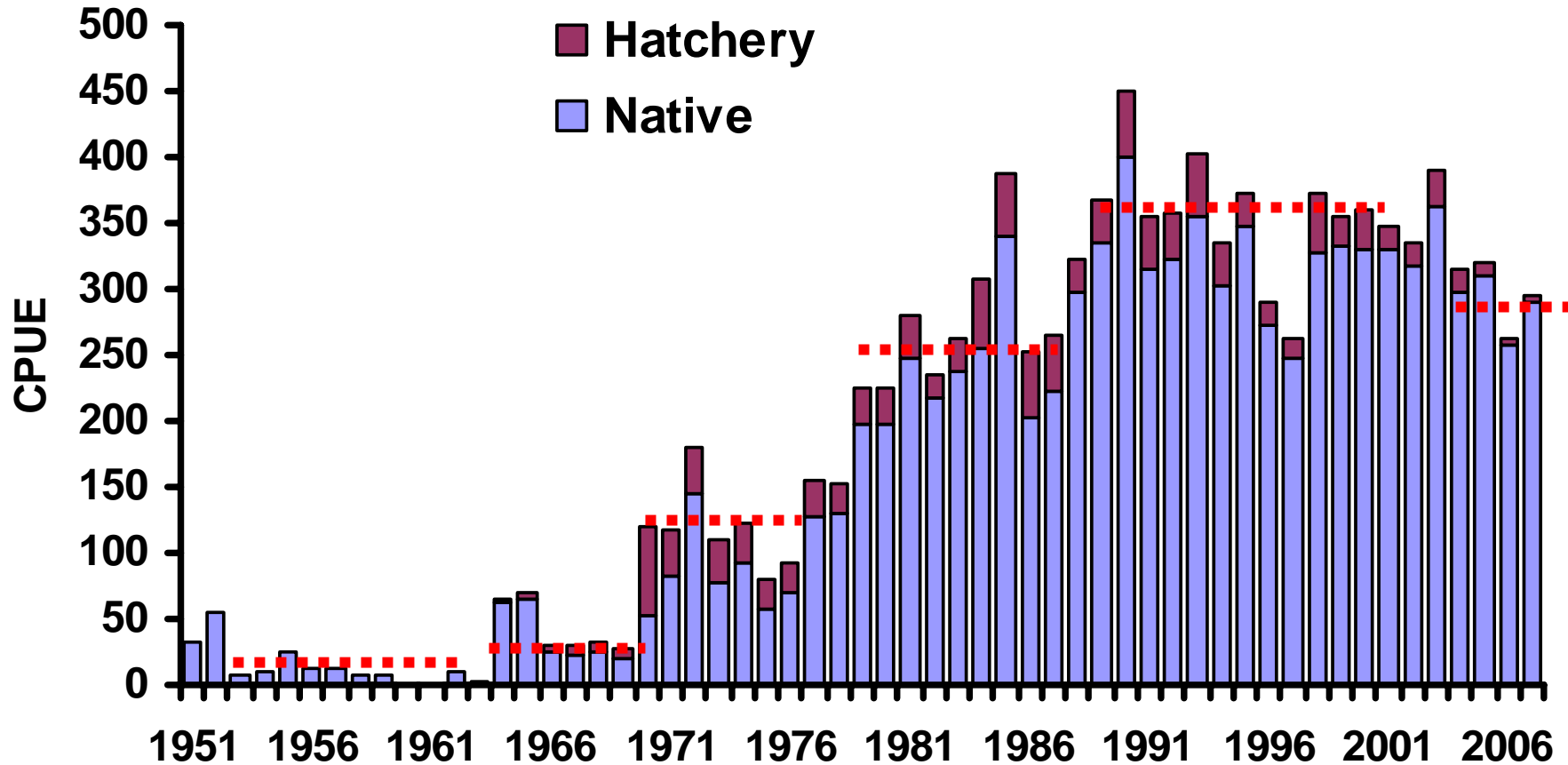


Fig. 4 . CPUE of age 9 and older lake trout caught at Stannard Rock in Lake Superior, spring 1959-1979 (Curtis 1990).

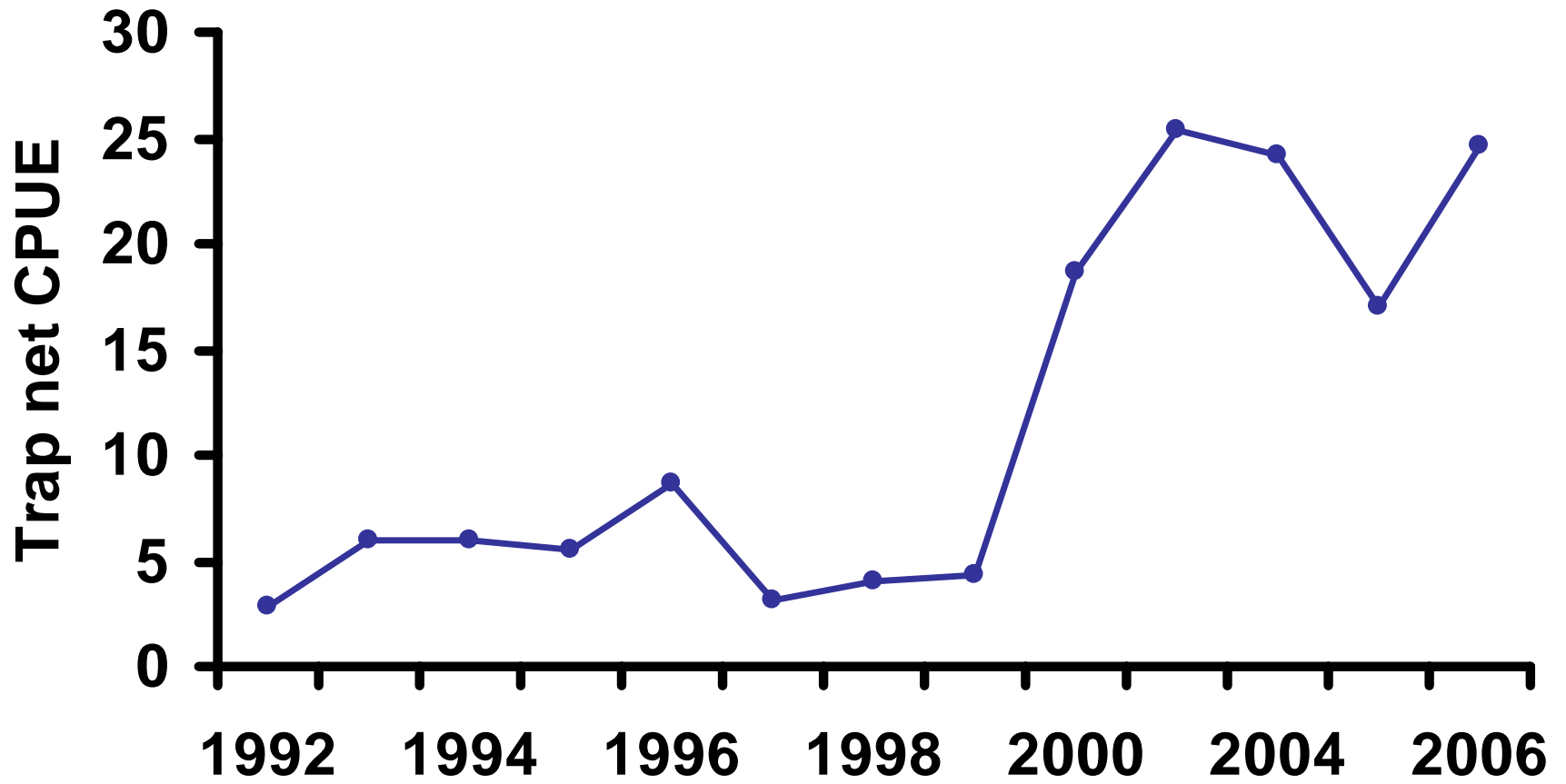
Spawner CPUE Gull Island Refuge

Lake Superior 1951-2007



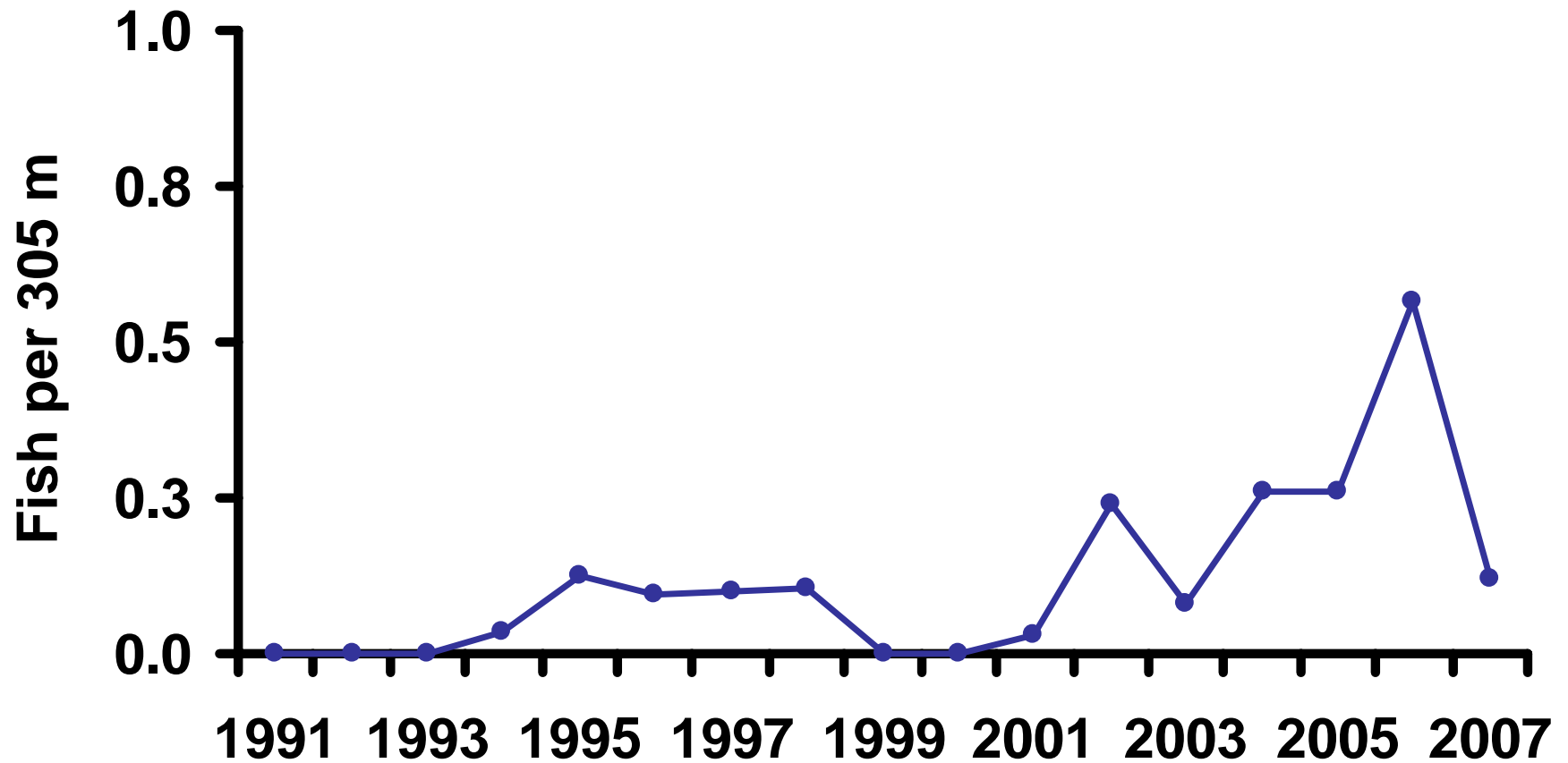
Wild Spawner Abundance

Parry Sound



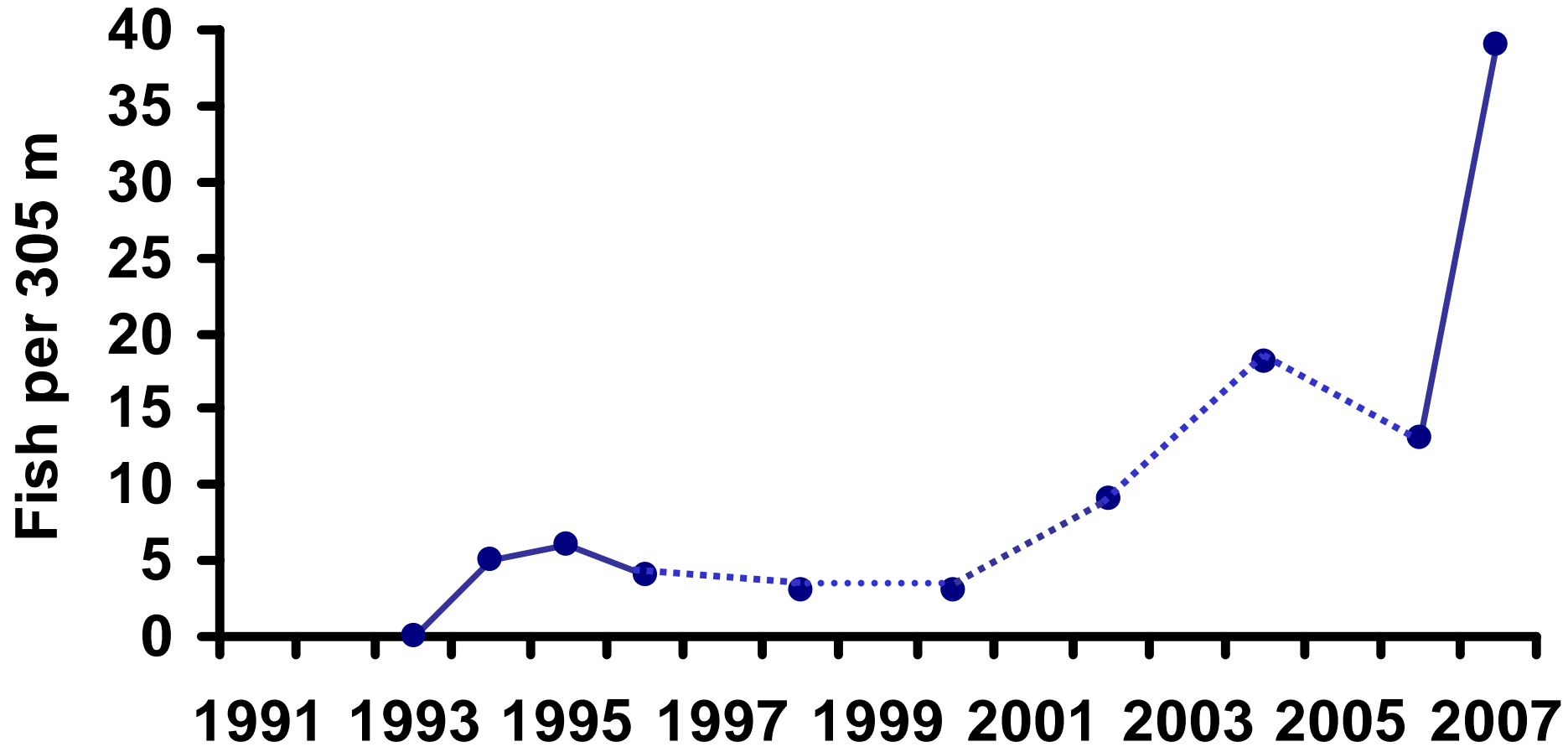
Unclipped (wild) Spawner Abundance

Drummond Island Refuge



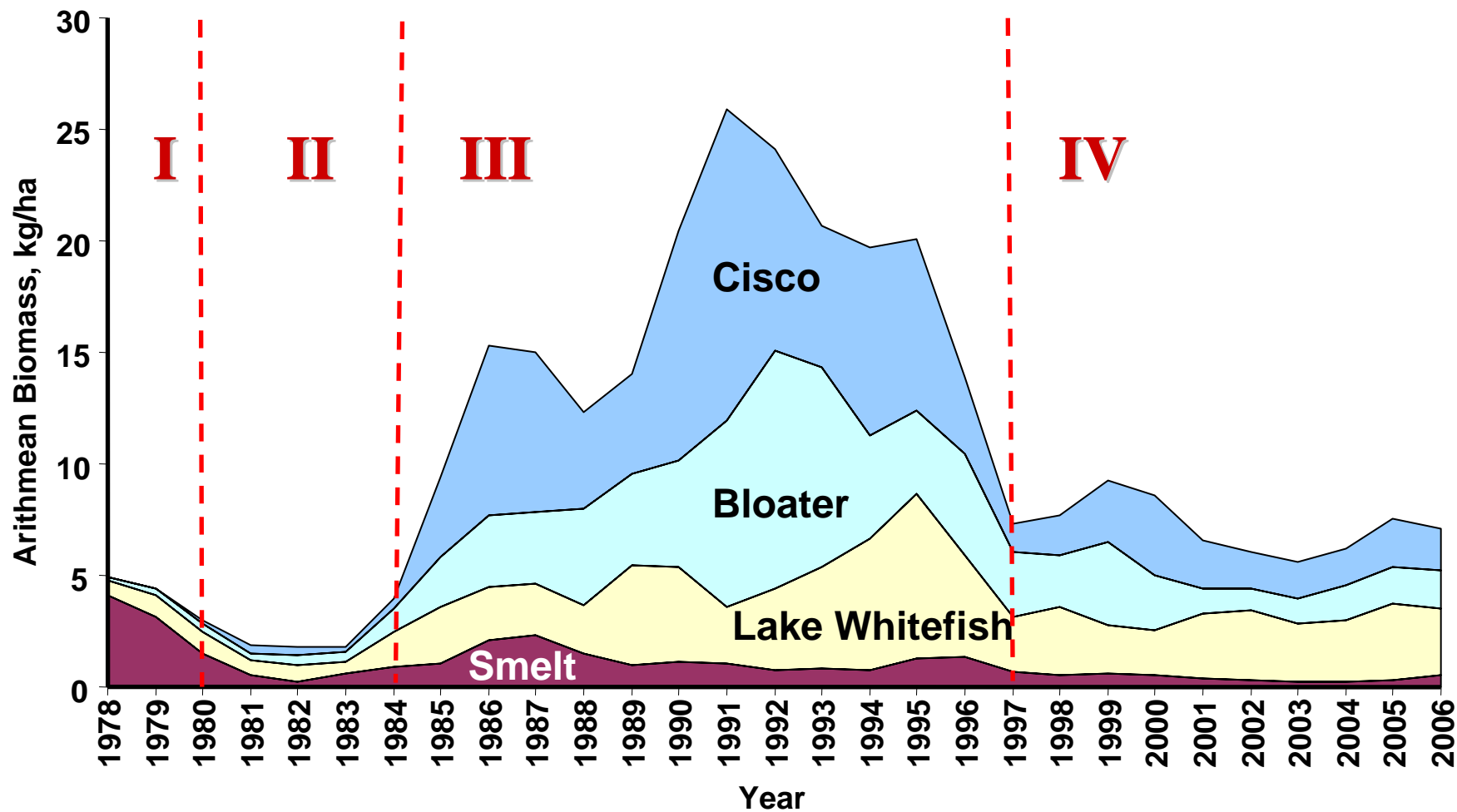
Wild Spawner Abundance

Six Fathom Bank



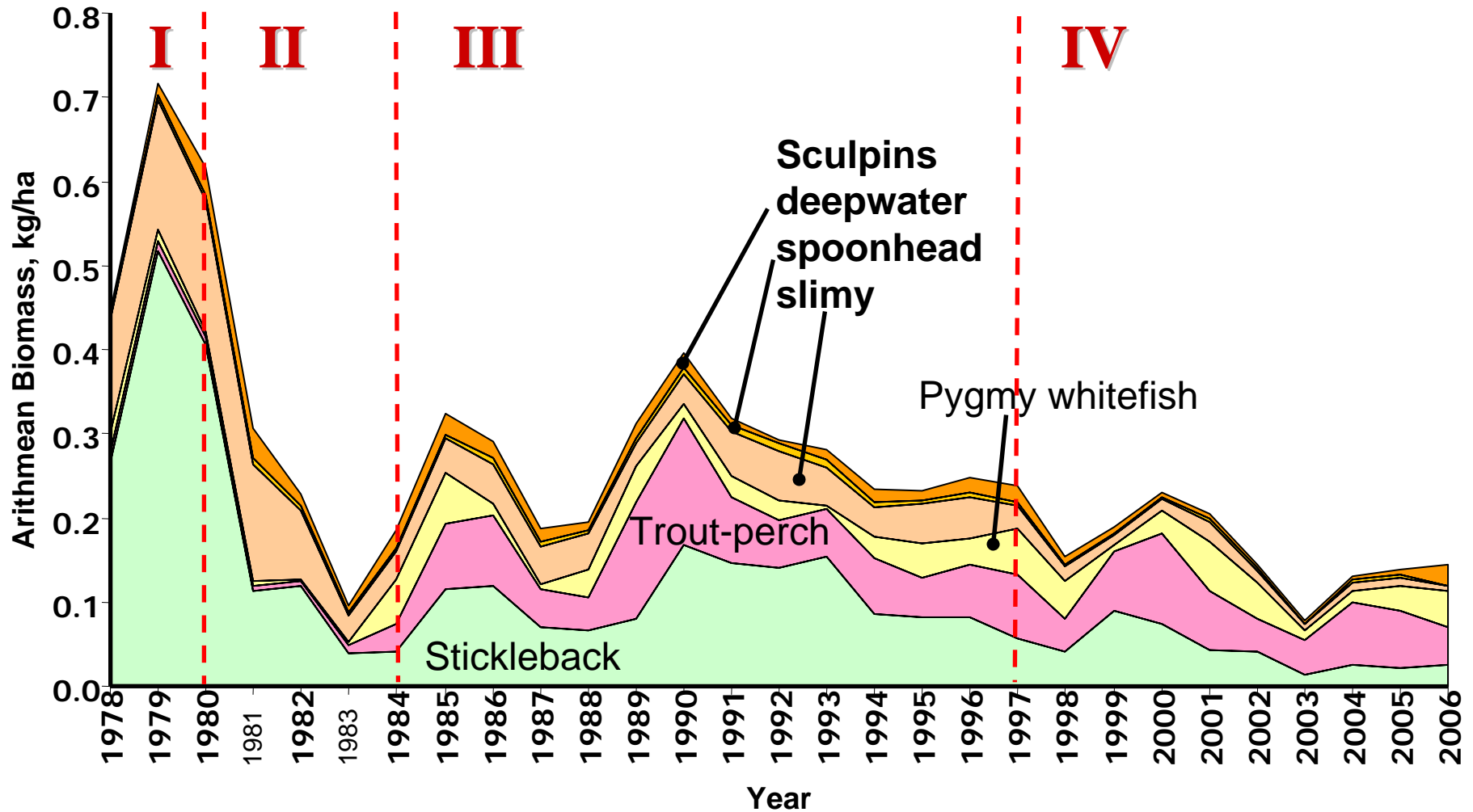
Biomass Principle Prey Fishes

U.S. Waters Lake Superior 1978-2006



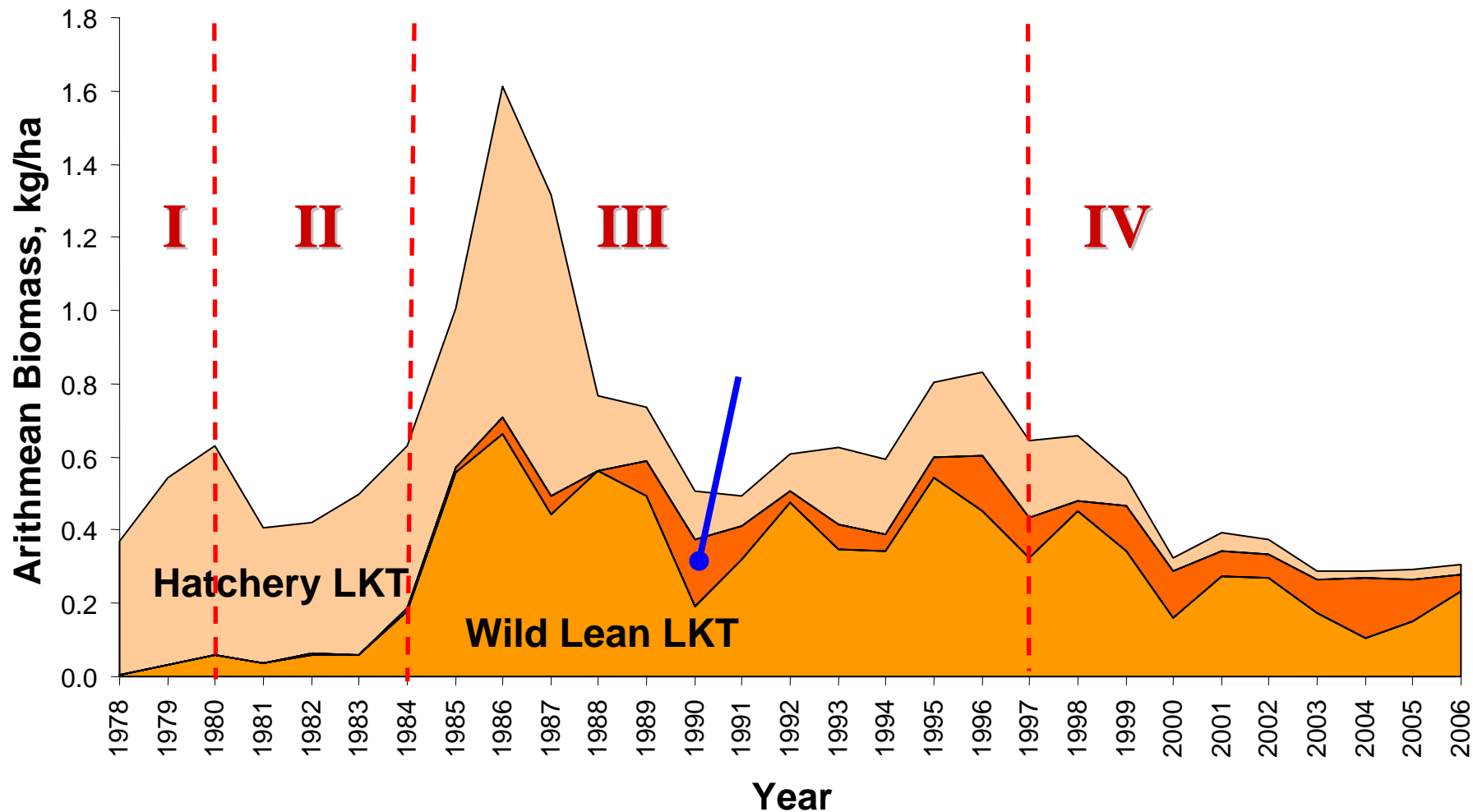
Biomass Demersal Prey Fishes

U.S. Waters Lake Superior 1978-2006



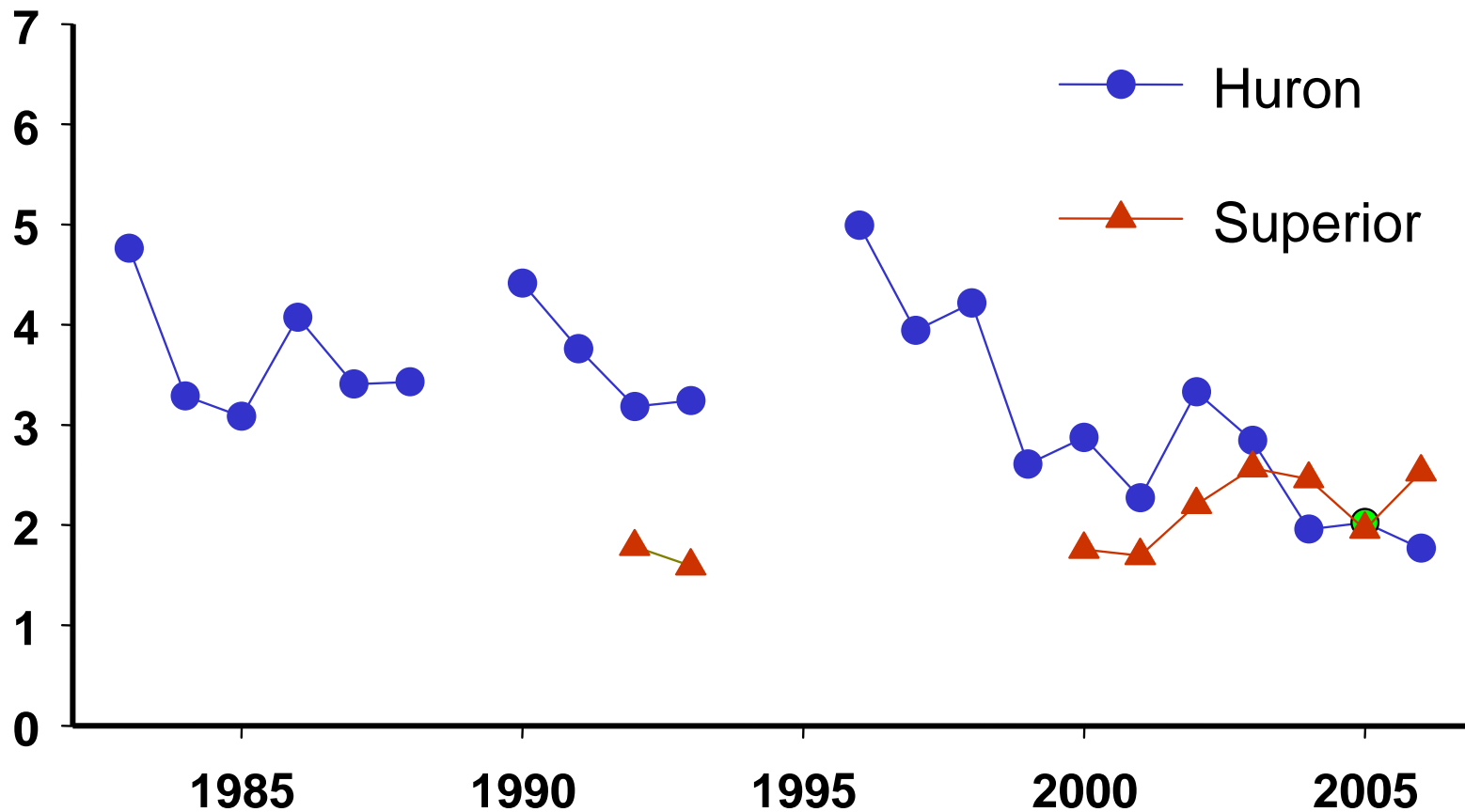
Biomass Lake Trout

U.S. Waters Lake Superior 1978-2006

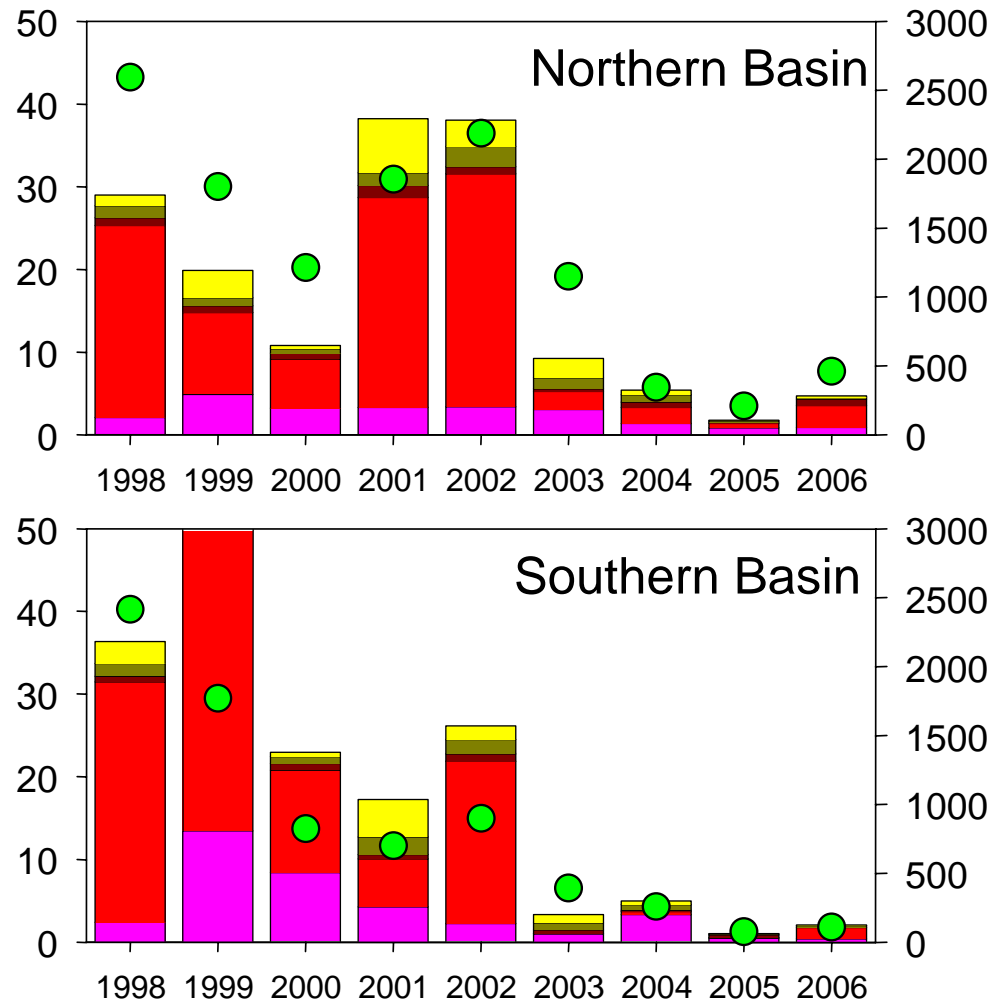


Phosphorus Concentrations

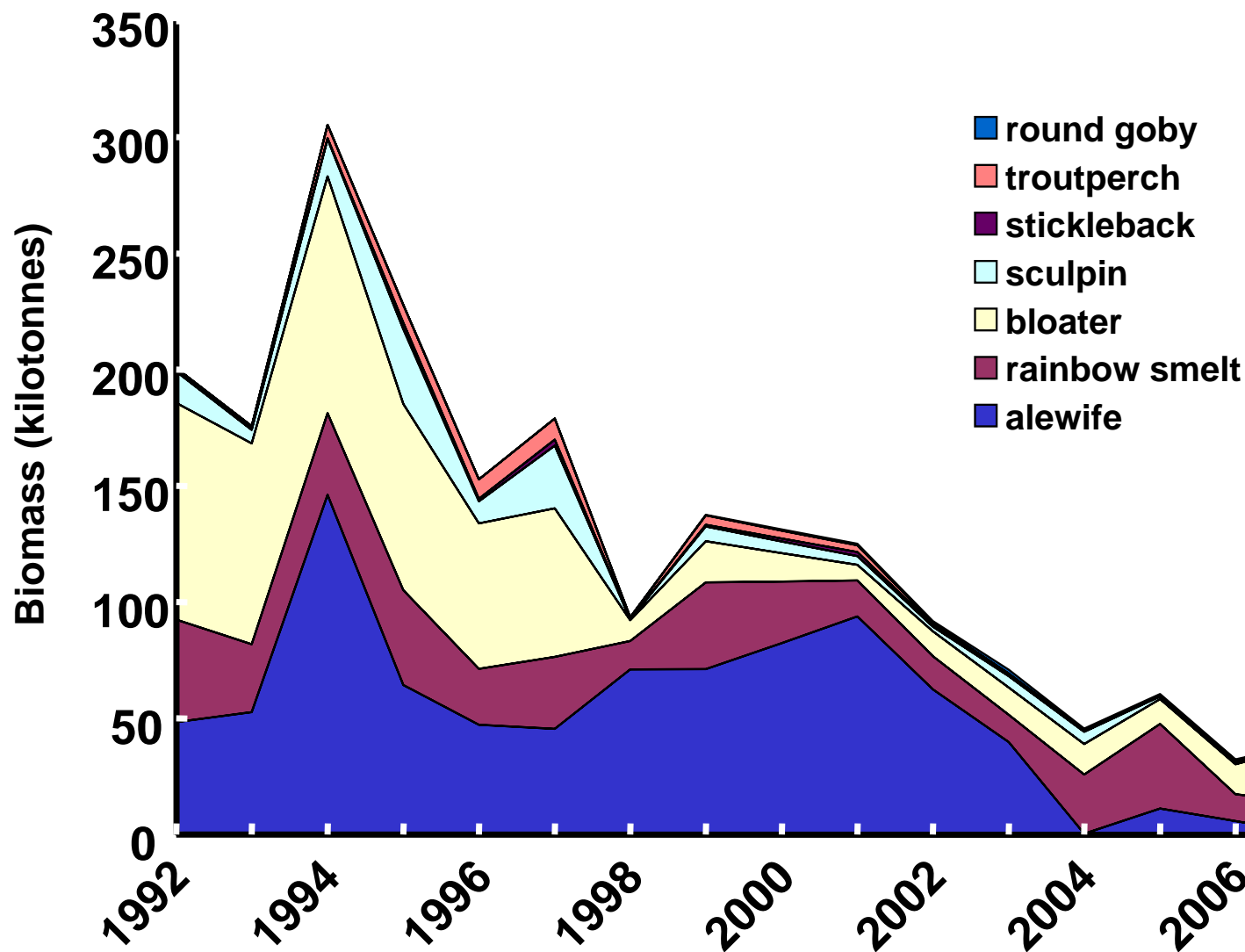
Lakes Huron & Superior



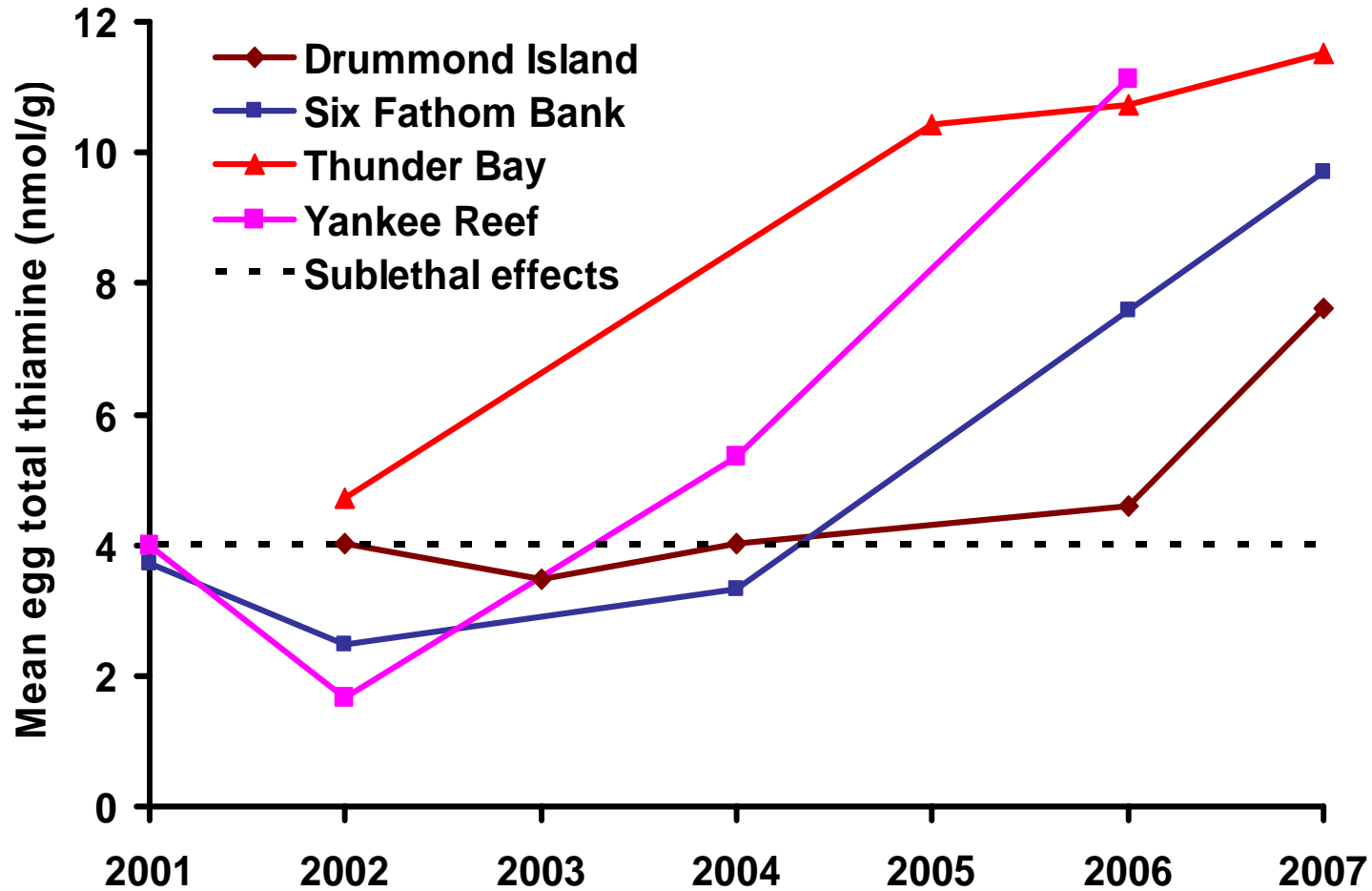
Crustacean & Diporeia Biomass Lake Huron



Lake Huron Prey Fish Biomass

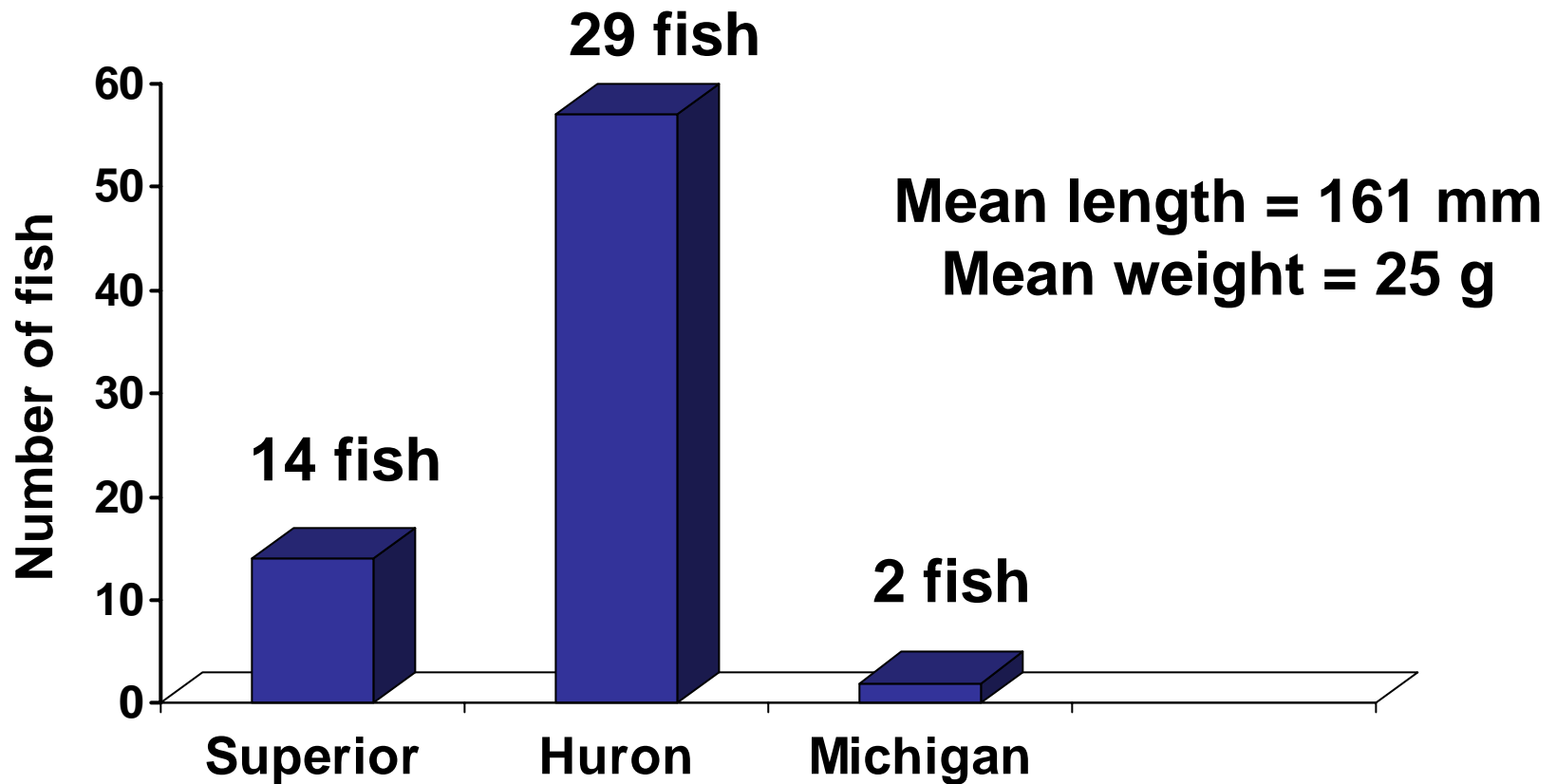


Egg Thiamine Levels Lake Huron Spawners



Lake Trout in Predator Stomachs

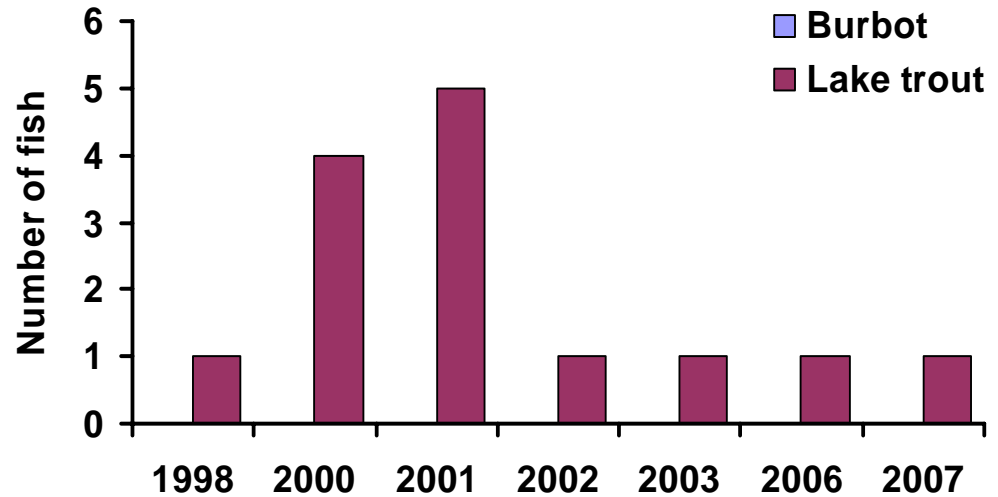
CORA diet data 1994-2007



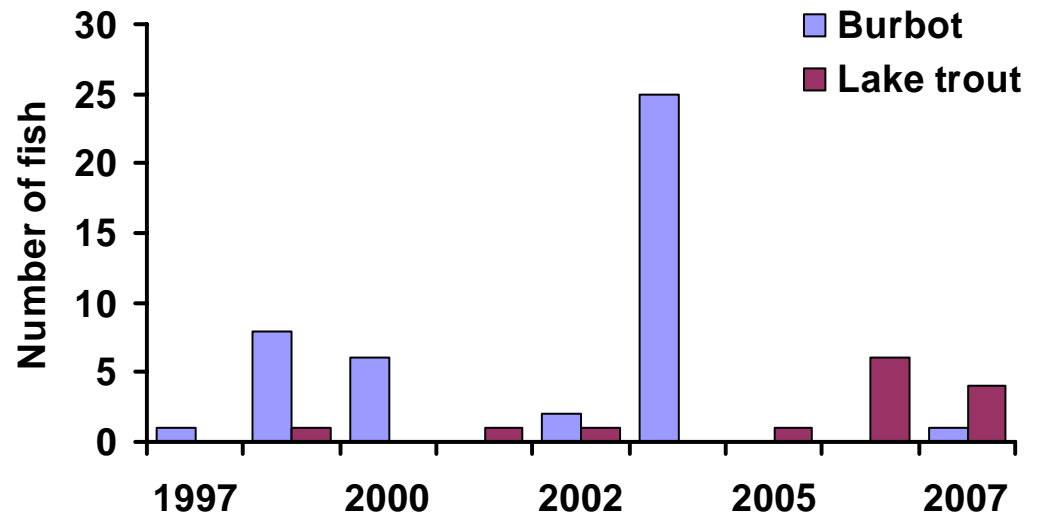
Lake Trout as Prey

Lake Huron Burbot & Lake trout

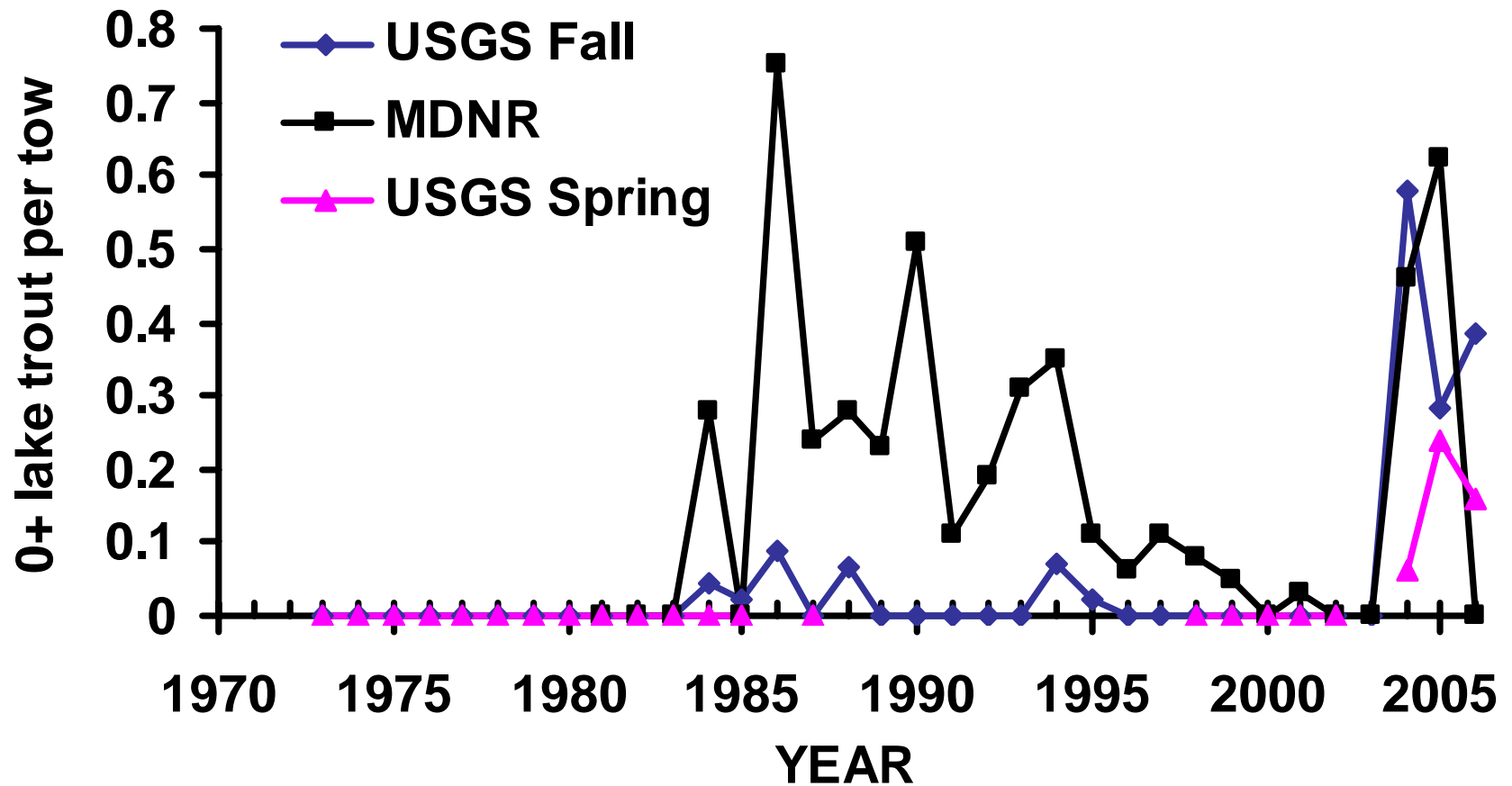
Lake Superior



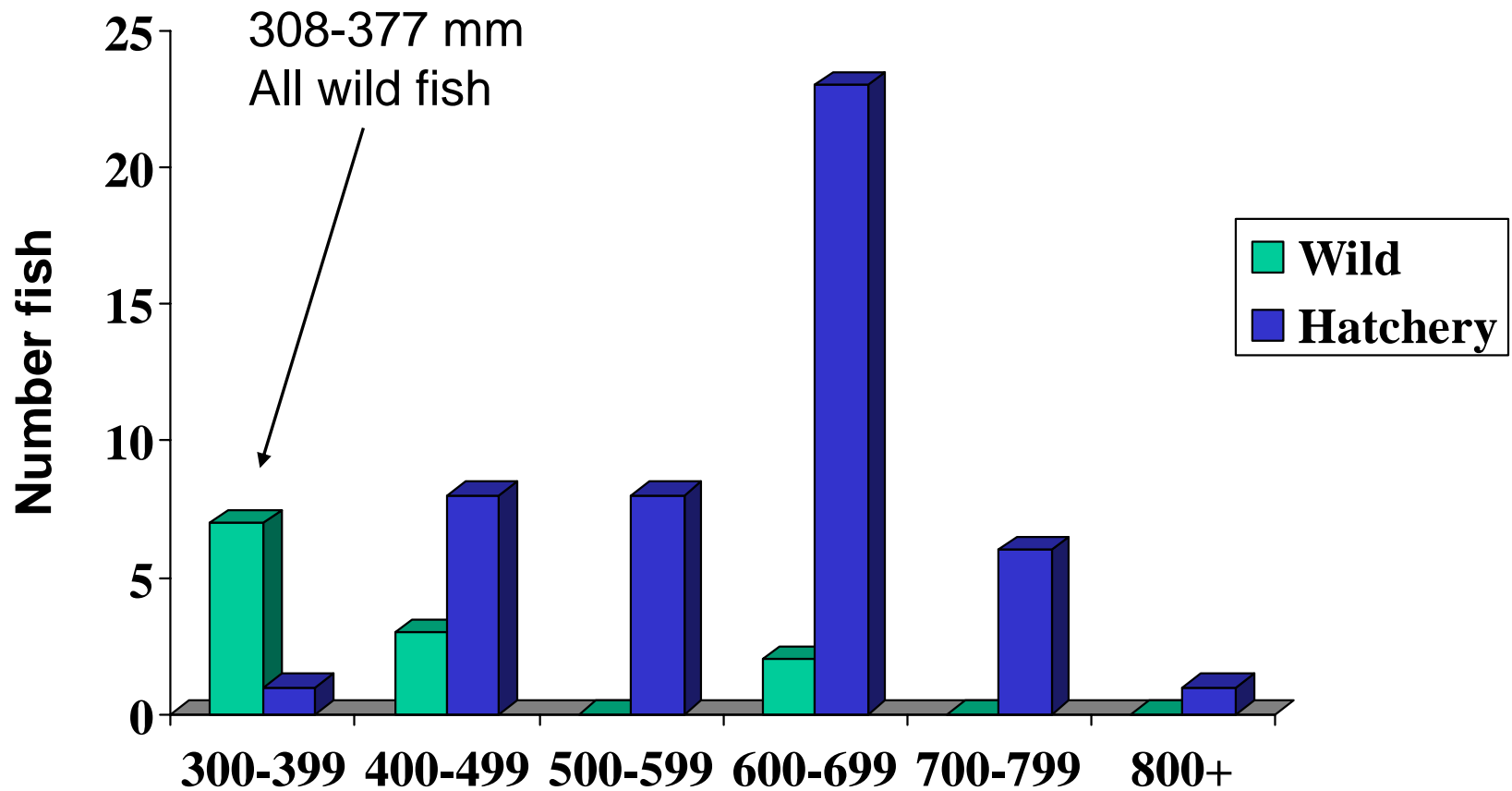
Lake Huron



Age-0 Lake Trout Catches



Lake Trout Catch Drummond Island Refuge 2008



Conclusions

- **Lake Huron on verge of recovery**
 - Parry Sound recovered
 - Six Fathom Bank
 - Owen Sound
 - MH-1
- **Favorable ecological conditions**
 - Reduced alewife abundance
 - Lake Superior-like productivity
- **Reduced survival of recruits normal**

Recommendations

- **Reconsider pulse stocking**
 - Increase survival of stocked fish
 - Reduce effects of stocked fish on wild fish
 - Overcome impediments
- **Consider reducing stocking rates early in process**
 - i.e. before 50% wild