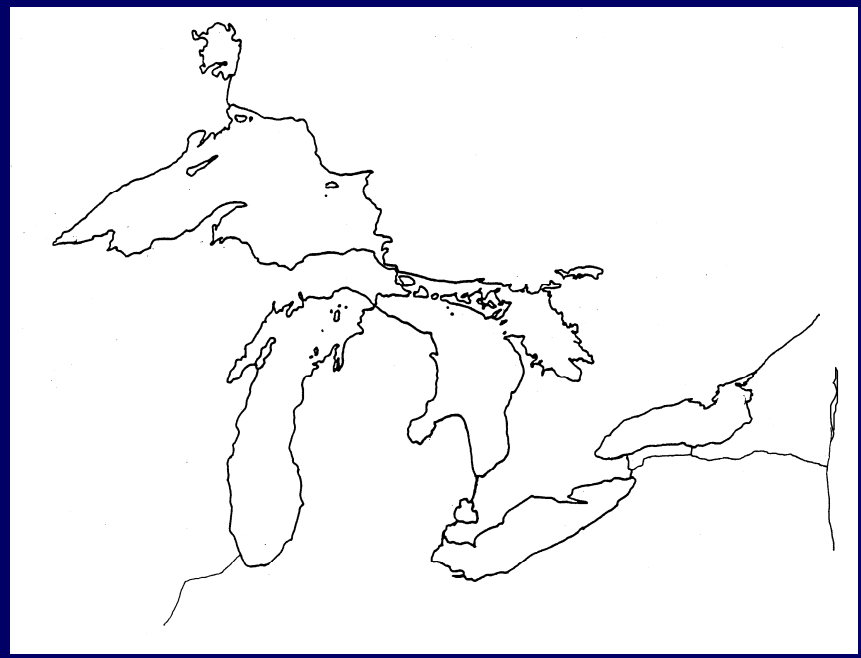
Investigations into age-0 mortality of lake trout in Lake Champlain



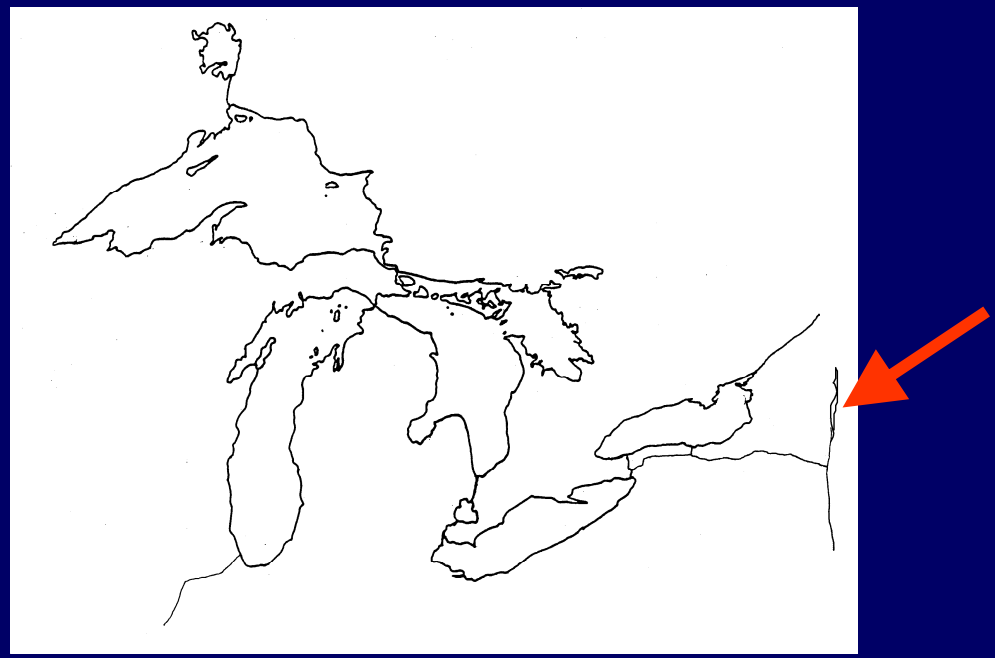
J. Ellen Marsden - and graduate students

University of Vermont

Great Lakes Fishery Trust

RUBENSTEIN ECOSYSTEM SCIENCE LABORATORY

Investigations into age-0 mortality of lake trout in Lake Champlain



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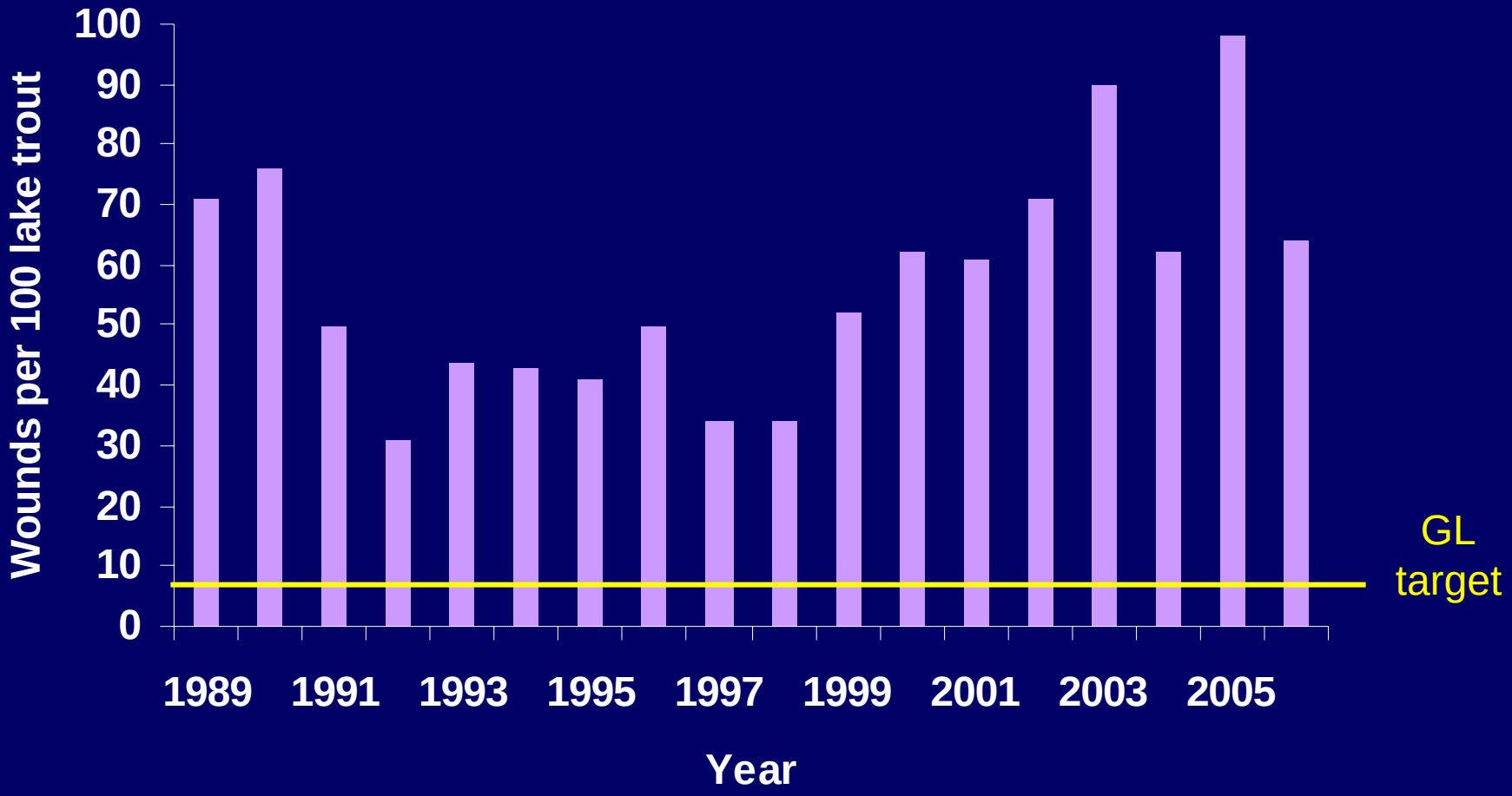
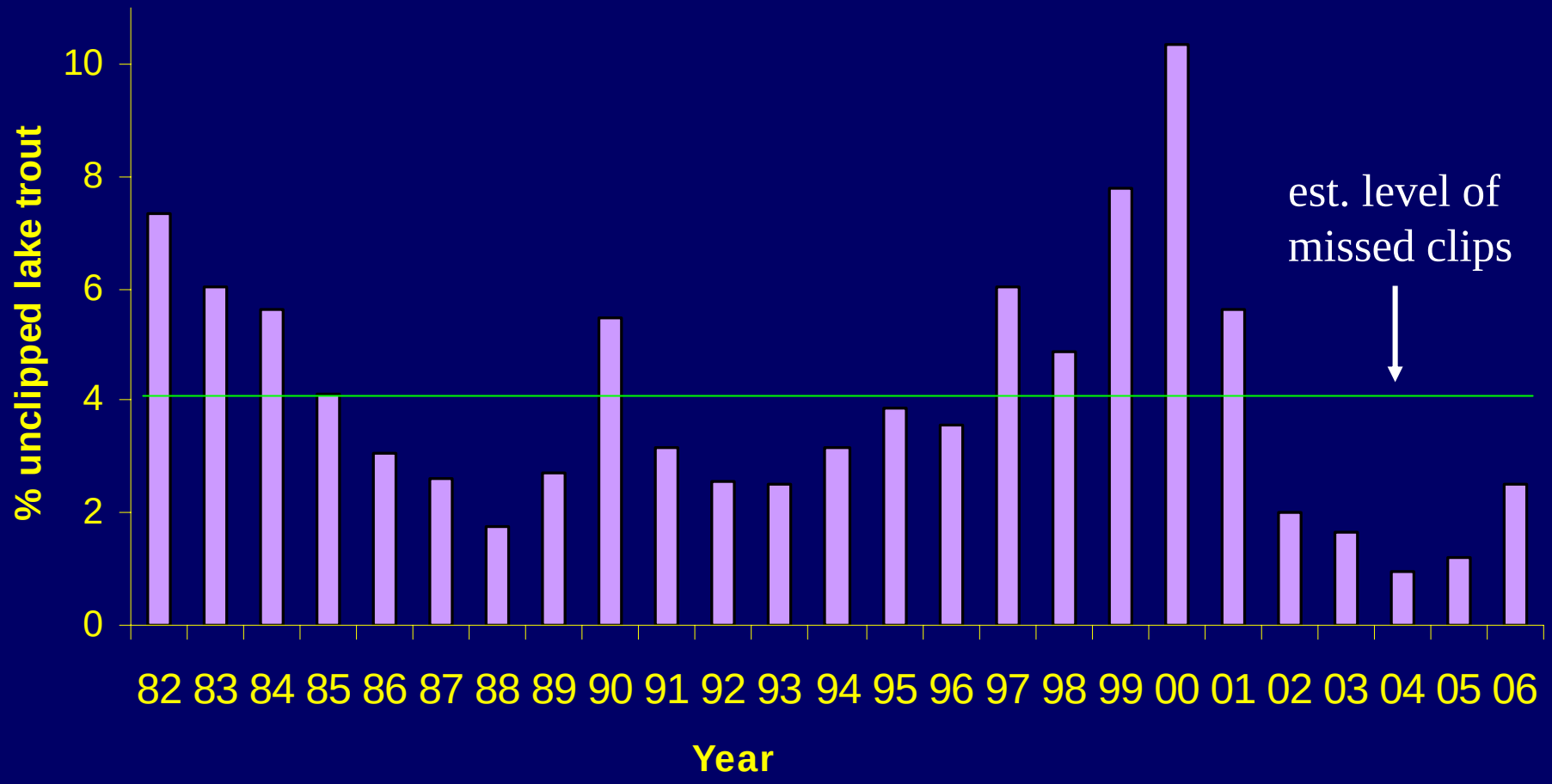
Lake trout in Lake Champlain

- extirpated by 1900
- stocked since 1973
  - 60,000-90,000 yearlings annually
  - primarily Seneca strain
- lamprey control begun in 1990

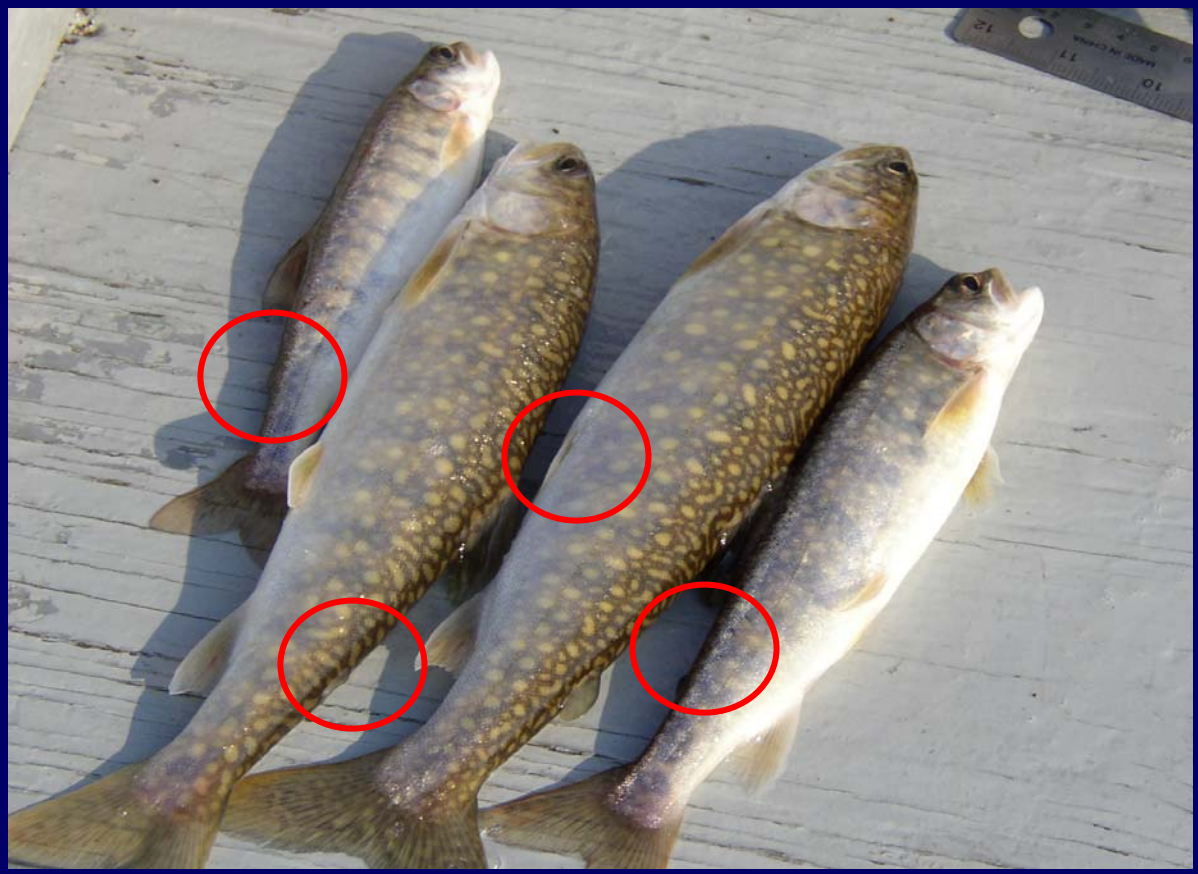

Wounds per 100 lake trout
100
90
80
70
60
50
40
30
20
10
0
1989
1991
1993
1995
1997
1999
2001
2003
2005
Year
GL
target

RECRUITMENT
(spawning adult assessment)

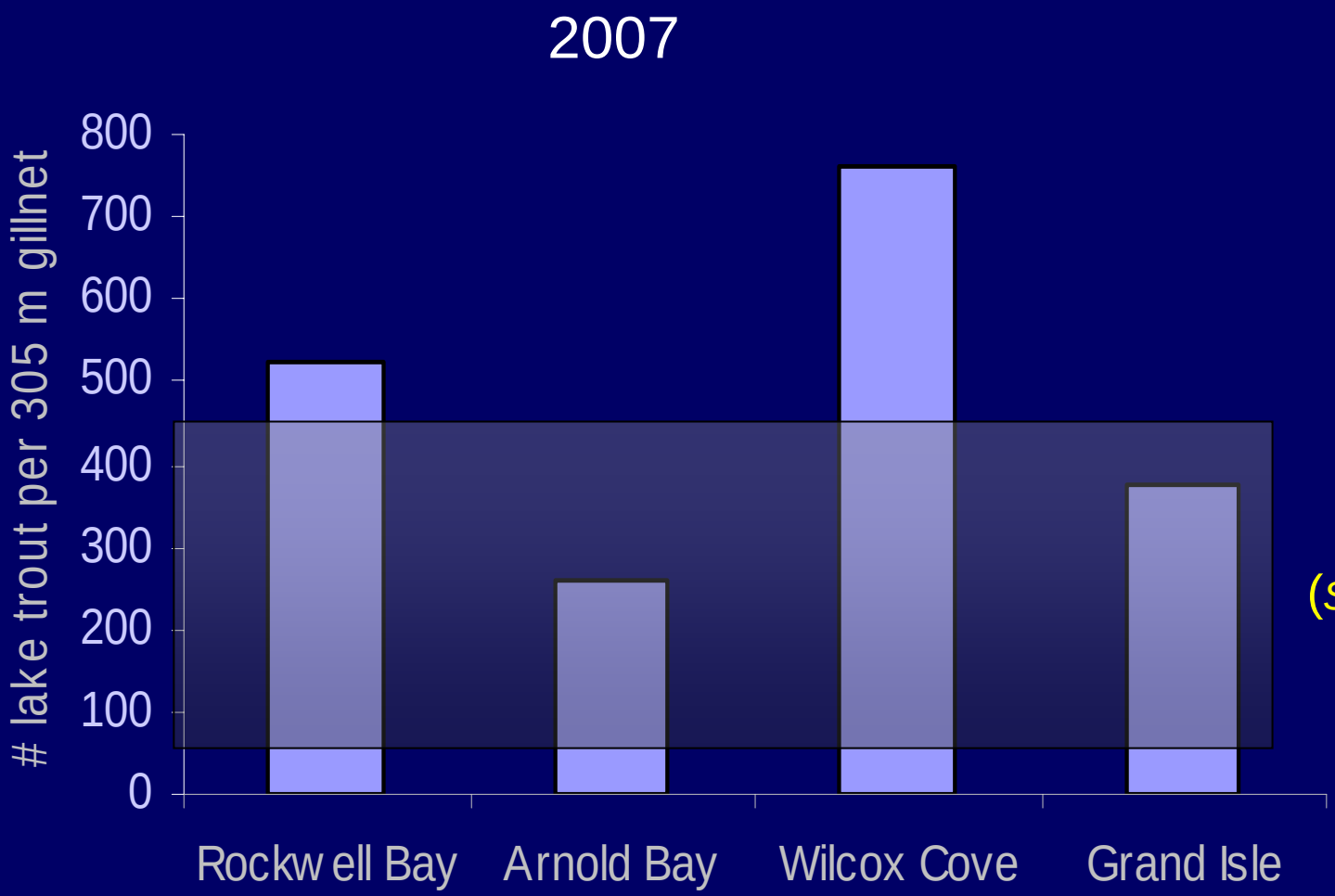


RECRUITMENT
(juveniles)

2005 - 2008: 52 age-2 and age-3 lake trout, all fin-clipped



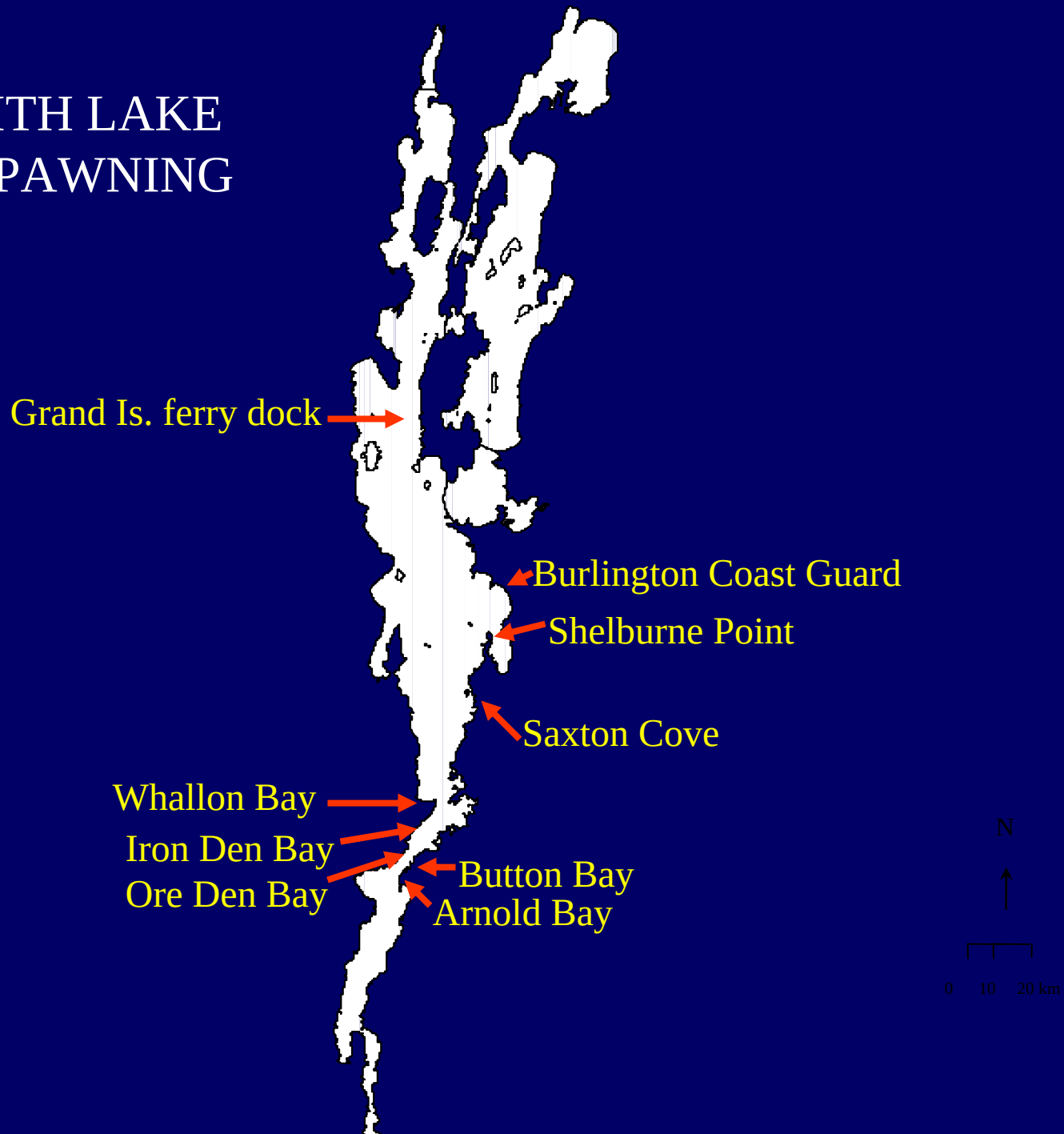
ADULT STOCK SIZE

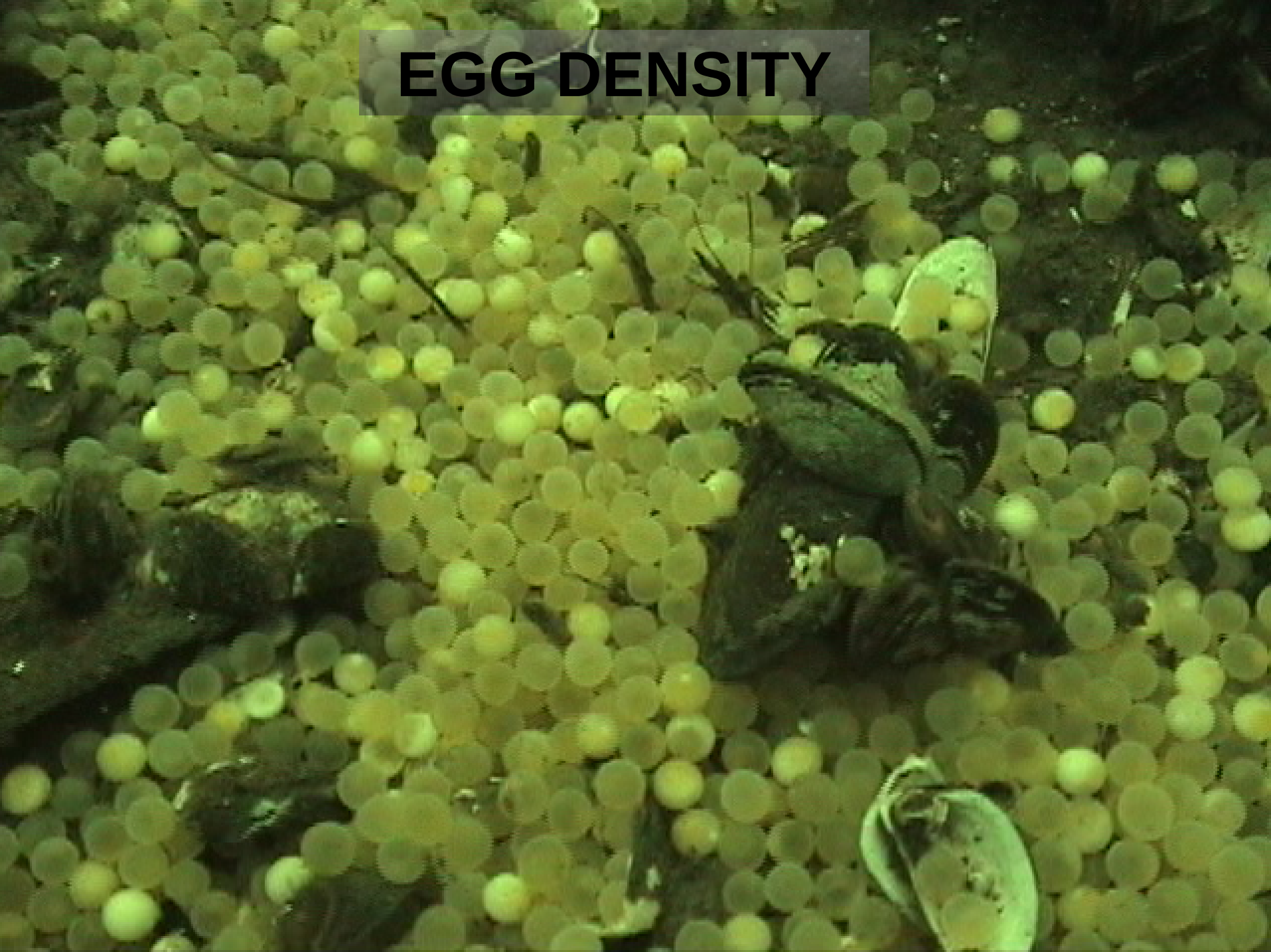


Criterion for successful restoration (*Selgeby et al 1995*)

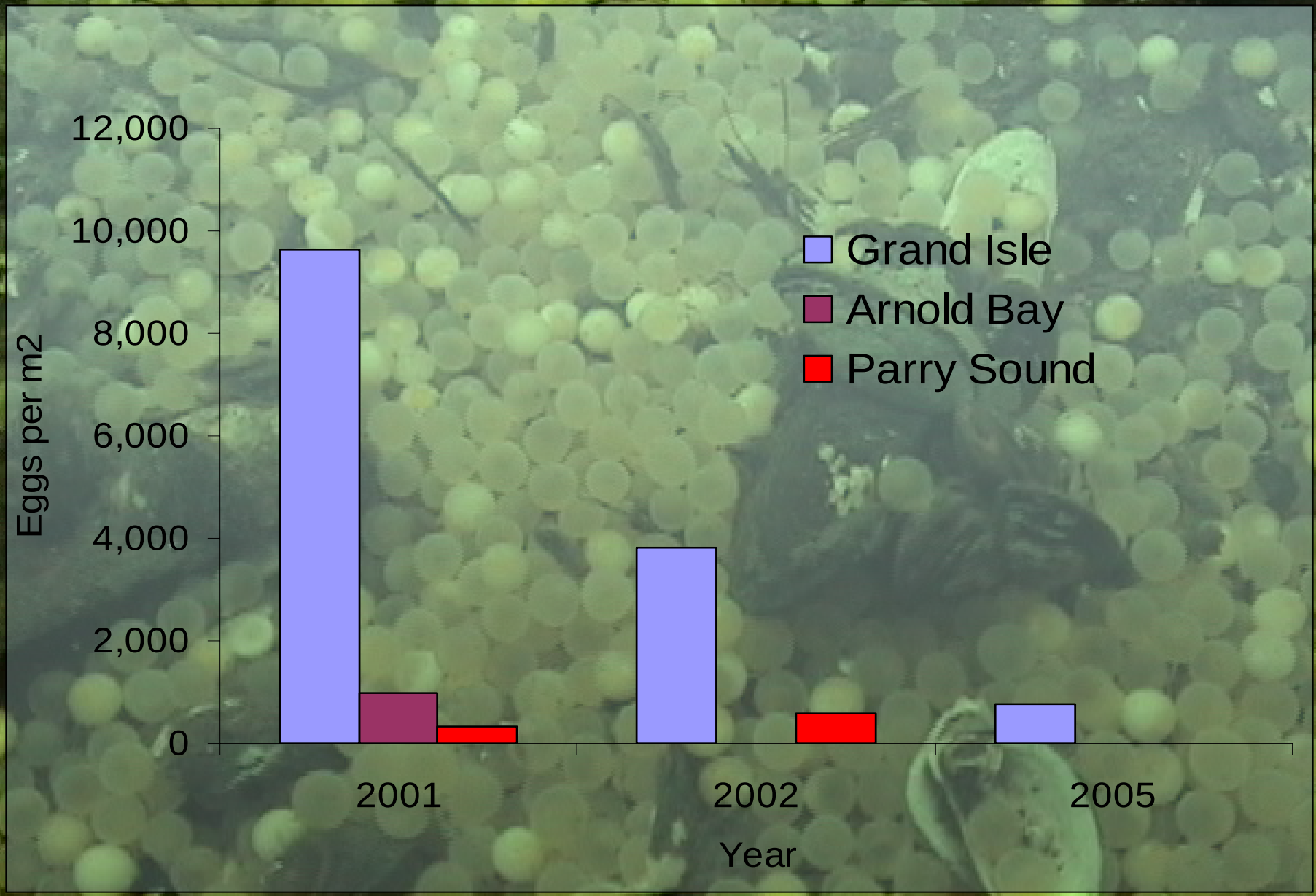
Effects of interstitial predators on lake trout recruitment. J. Fitzsimons, J. E. Marsden, J. Jonas, R. Claramunt. 2001-2003, Great Lakes Fishery Trust

SITES WITH LAKE TROUT SPAWNING



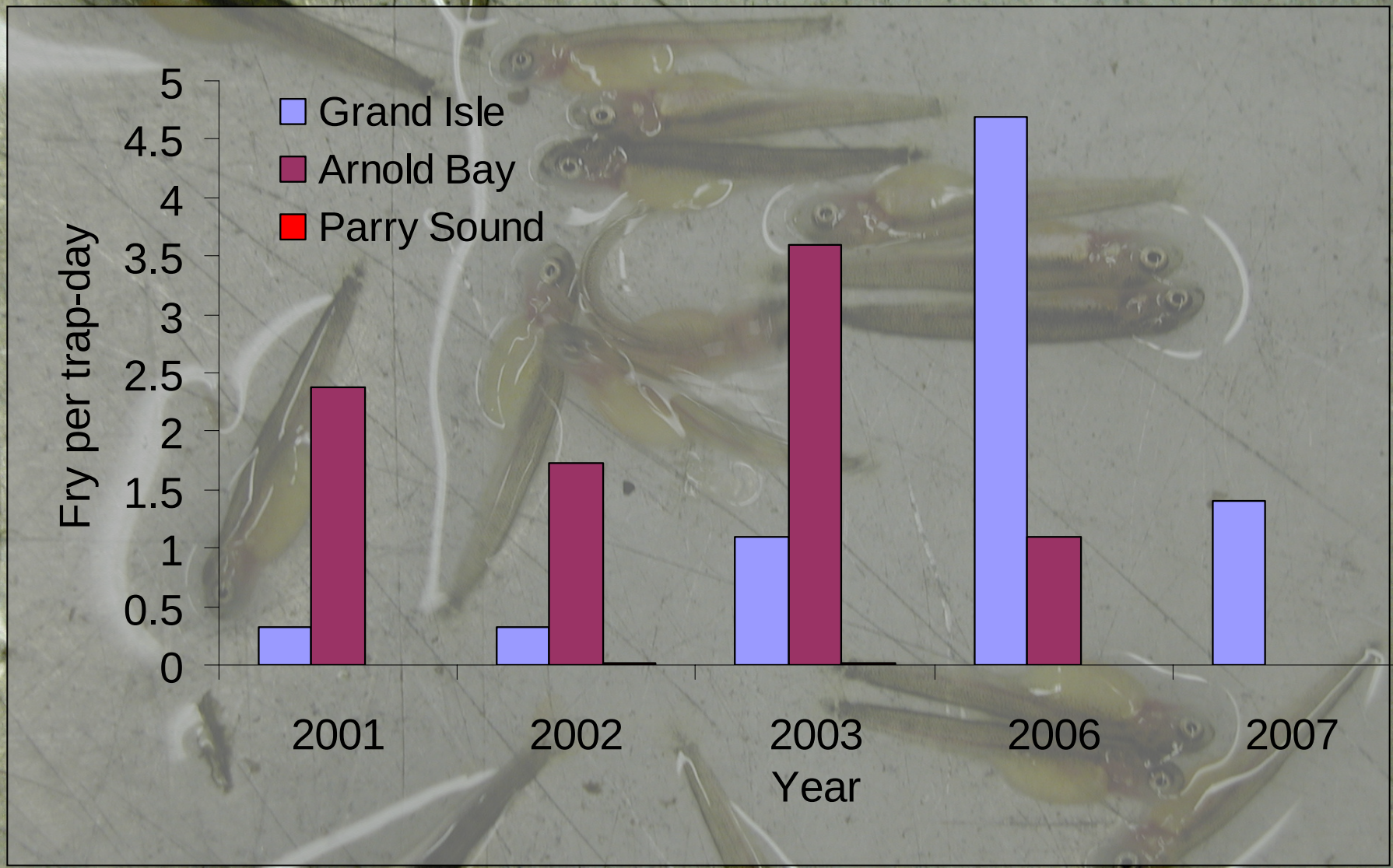

EGG DENSITY

EGG DENSITY


12,000
10,000
8,000
6,000
4,000
2,000
0
Eggs per m2
Grand Isle
Arnold Bay
Parry Sound
2001
2002
2005
Year


FRY DENSITY

FRY DENSITY


Grand Isle
Arnold Bay
Parry Sound
Fry per trap-day
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2001
2002
2003
2006
2007
Year

HYPOTHESES

High predation losses?

Assess fry predation at two shallow, artificial spawning reefs

Starvation?

Document survival and dispersal of post-emergent lake trout fry

MONITOR FRY EMERGENCE

- 10 fry traps per site
- checked weekly, April - June

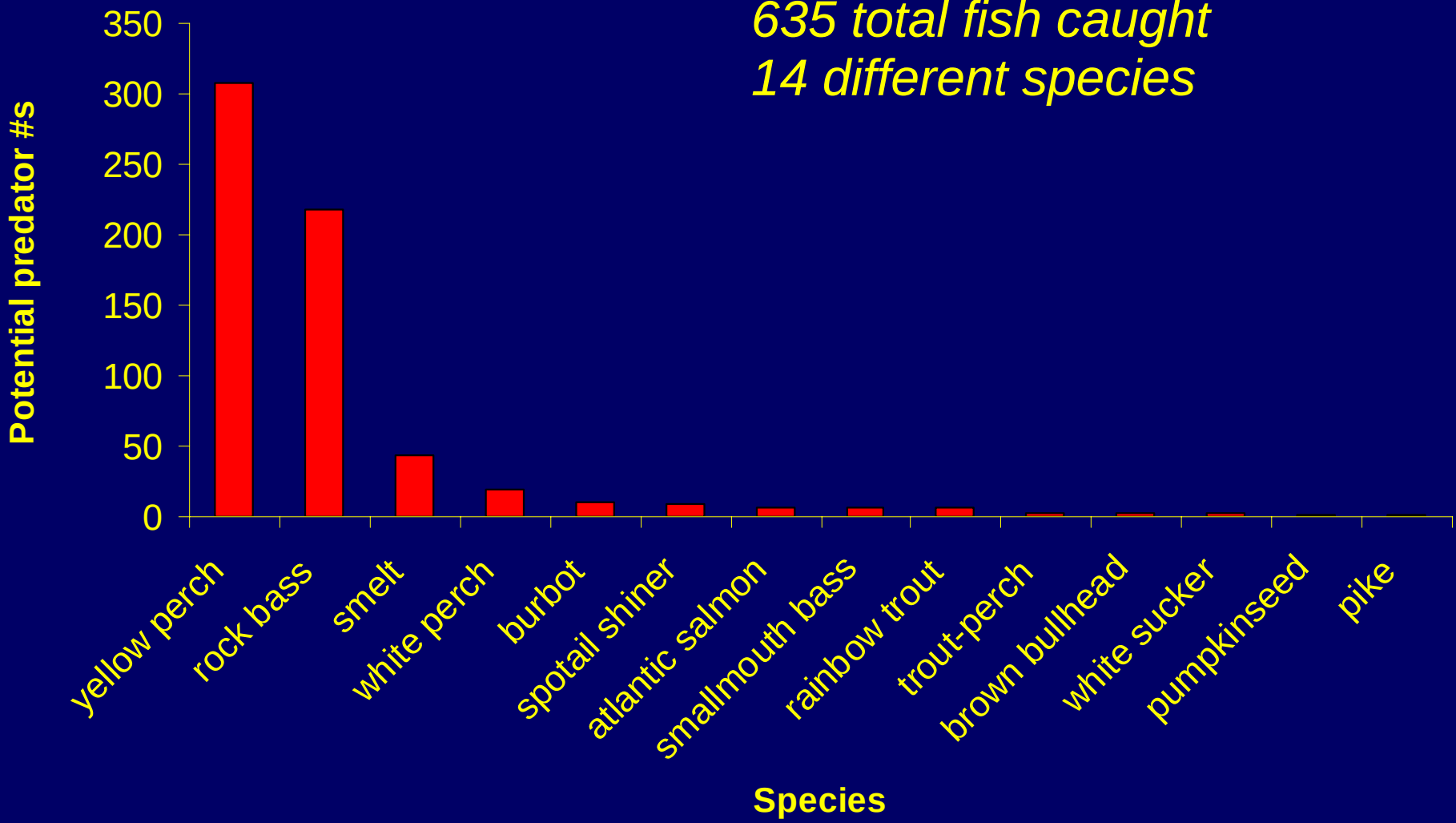
COLLECT POTENTIAL PREDATORS

- 100-min gill net sets (40 m, 5 panels)
- 8 sets per site, April - June
- catch frozen immediately

RESULTS

What is the potential predator assemblage?

635 total fish caught
14 different species

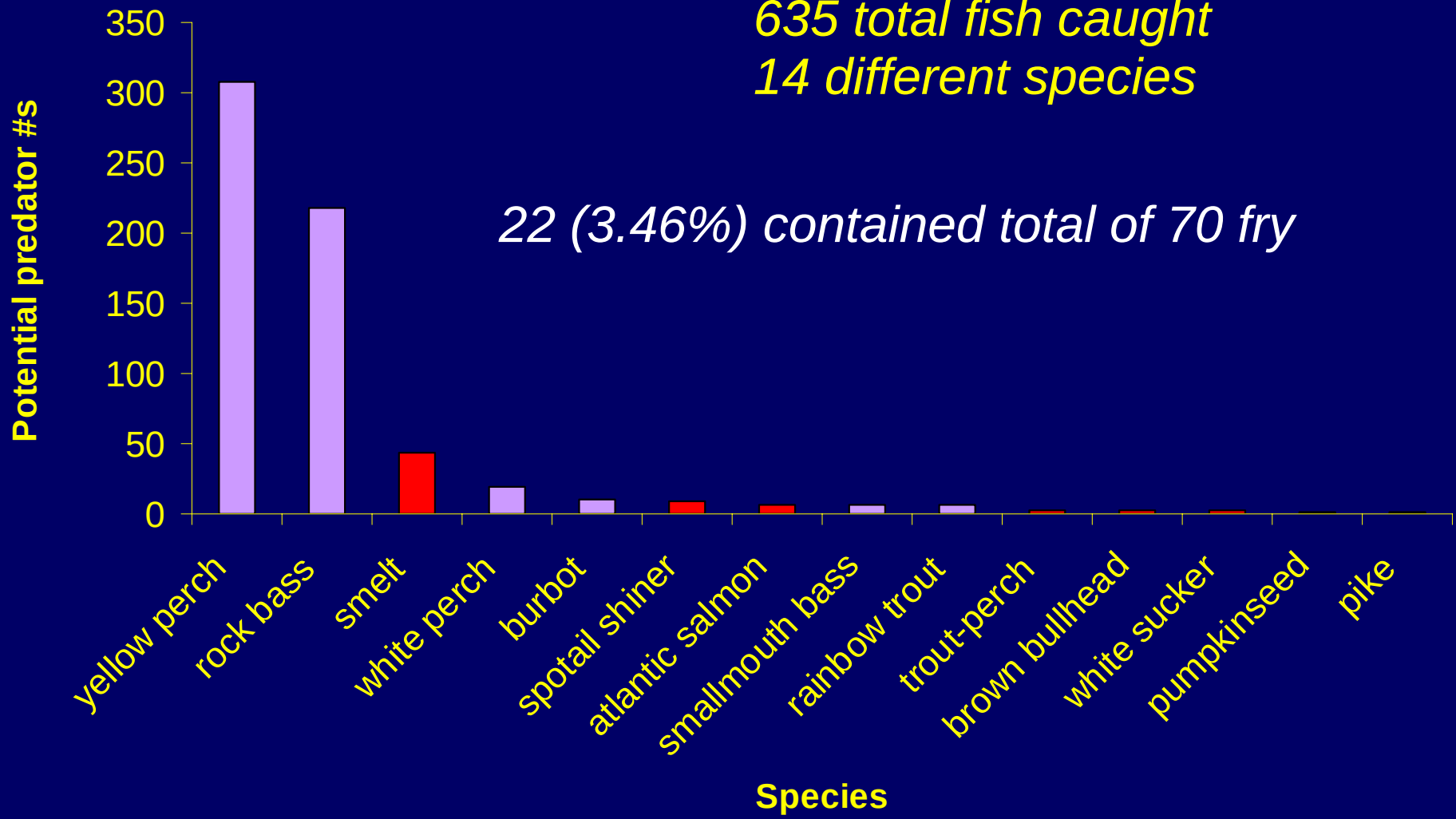


RESULTS

What is the potential predator assemblage?

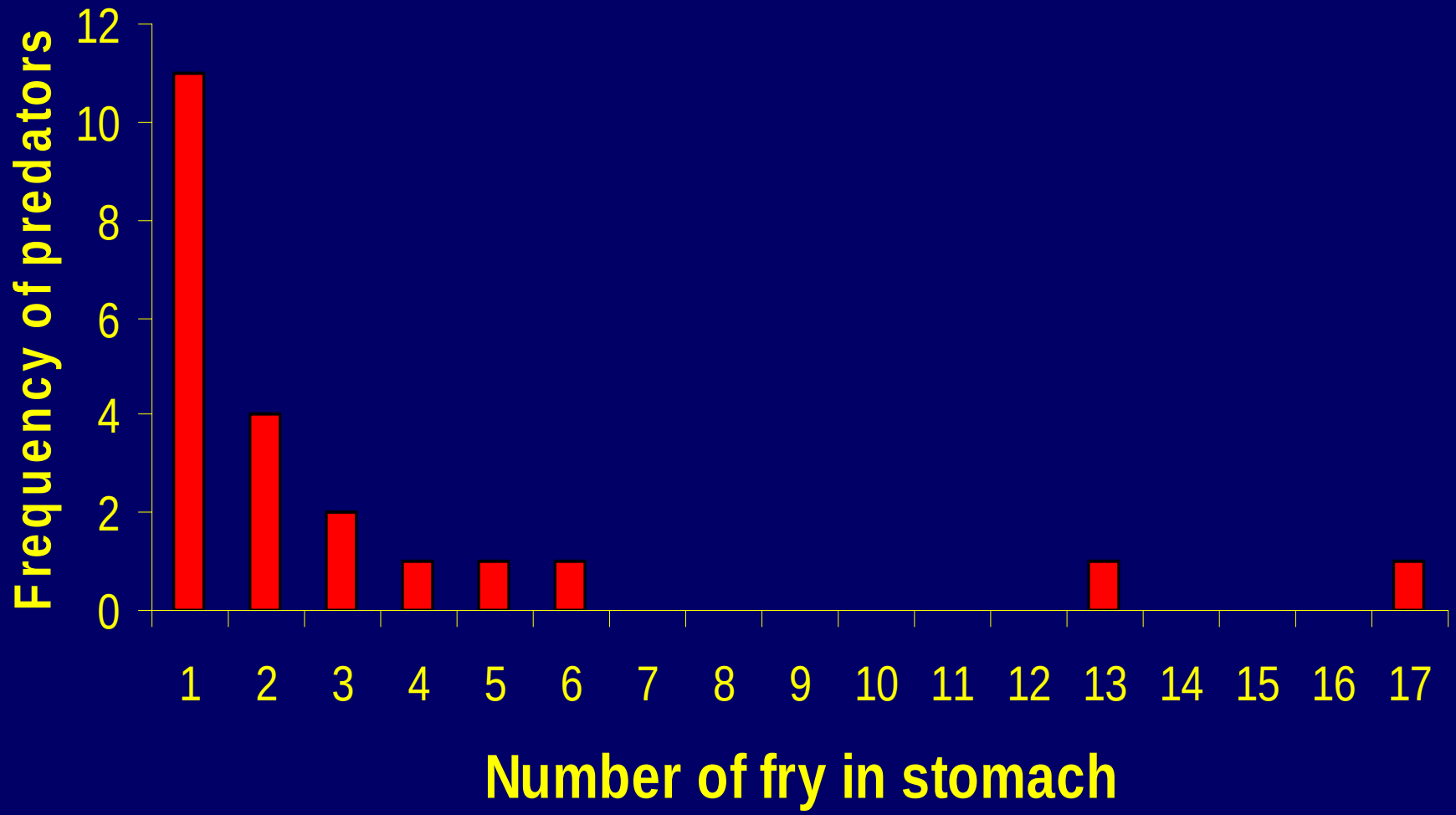
635 total fish caught
14 different species

22 (3.46%) contained total of 70 fry



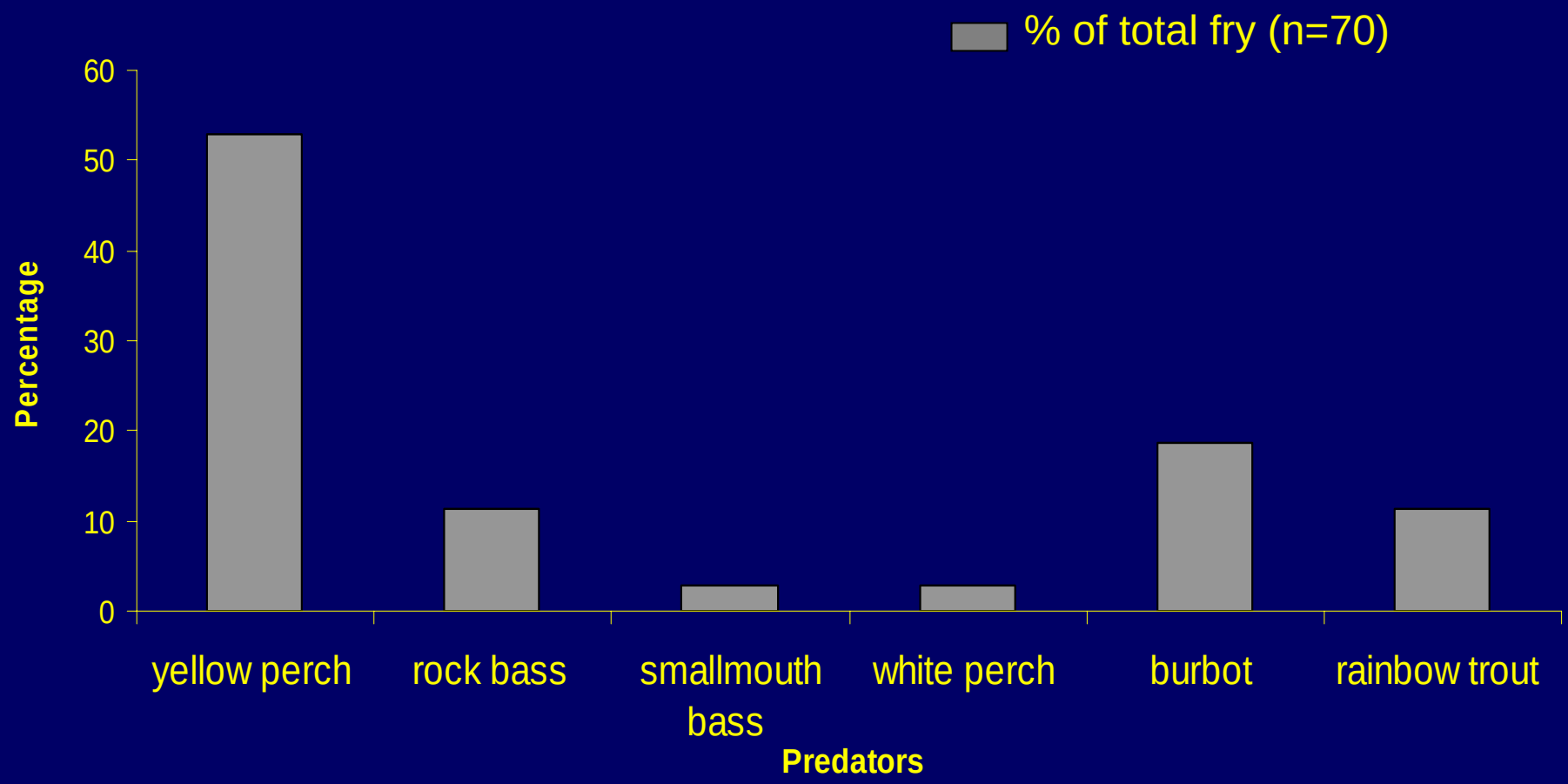
RESULTS

How many fry do the predators eat ?



RESULTS

Who are the main predators ?



AGE-0 ABUNDANCE

Trawled 3 - 60 m depths - late May to late July
Sampled 696 min bottom time, 49 tows over 9 days
- total post-emergent fry collected:

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zero

SUMMARY

1) Multiple littoral species consume LT fry

2) High variance in predation rates
   (1-17 fry/predator)

3) Predation focused in the morning

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1) Multiple littoral species consume LT fry

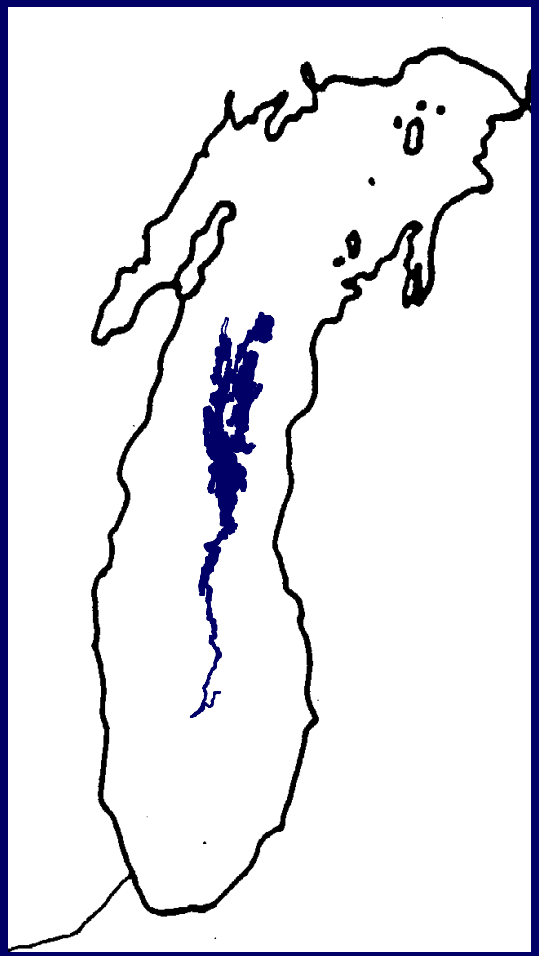
2) High variance in predation rates
   (1-17 fry/predator)

3) Predation focused in the morning

4) Shallow, nearshore area is hazardous

From shallow, small, artificial reefs in a trial size lake….

….to deep, huge, natural reefs in Lake Michigan



John Janssen, Great Lakes WATER Institute

Chuck Bronte, USFWS

David Jude, Univ. of Michigan

Great Lakes Fishery Trust

From shallow, small, artificial reefs in a trial size lake….

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