

Do Nesting Male Bass Need Protection from Angling, and if so, What is the Most Effective Regulatory Strategy?

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Madison Philipp – Memorial University, NF

Liane Nowell – Kenauk Institute, QU

Peter Holder - Carleton University, ON

Aaron Shultz – Great Lakes Tribal F&W Commission, MI

Jeff Stein - University of Illinois, IL

Cory Suski - University of Illinois, IL

Mike Lawrence – University of Manitoba, MB

An underwater photograph of a bass fish resting on a rocky and sandy bottom. The water is slightly turbid, and the lighting is natural, highlighting the textures of the fish's scales and the surrounding environment. The fish is positioned in the upper right quadrant of the frame, facing left.

BASS REPRODUCTIVE ECOLOGY

BASS REPRODUCTIVE ECOLOGY



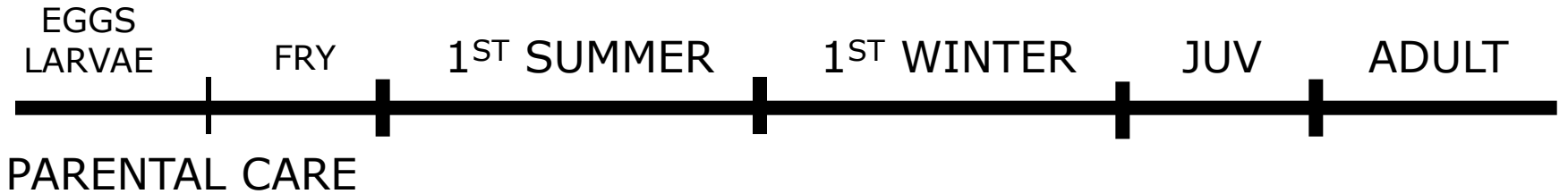


BASS REPRODUCTIVE ECOLOGY

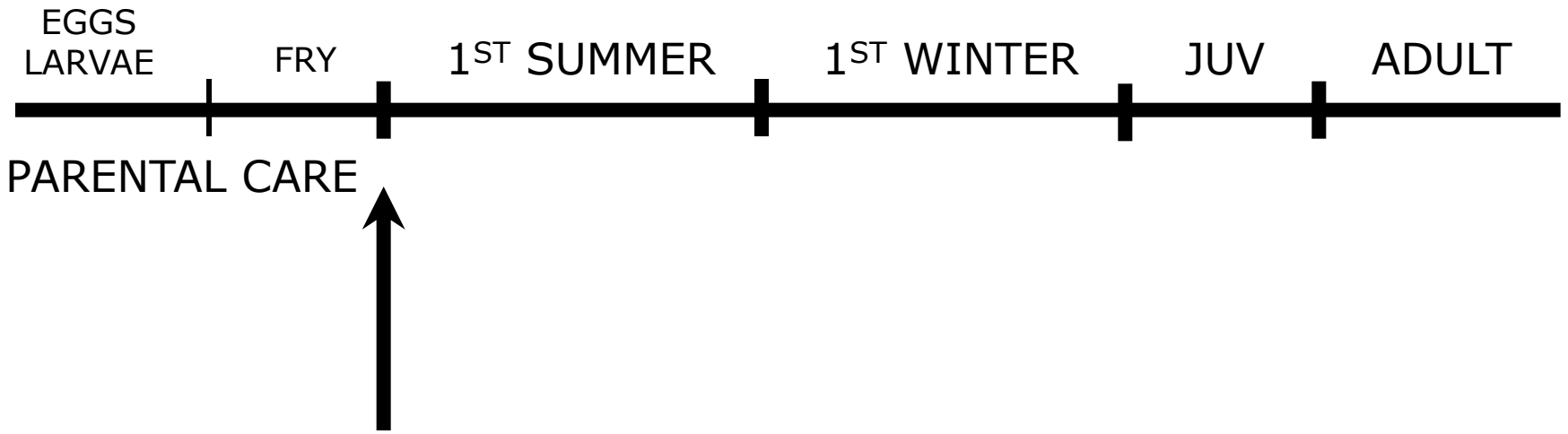
BASS REPRODUCTIVE ECOLOGY



BASS LIFE HISTORY STAGES

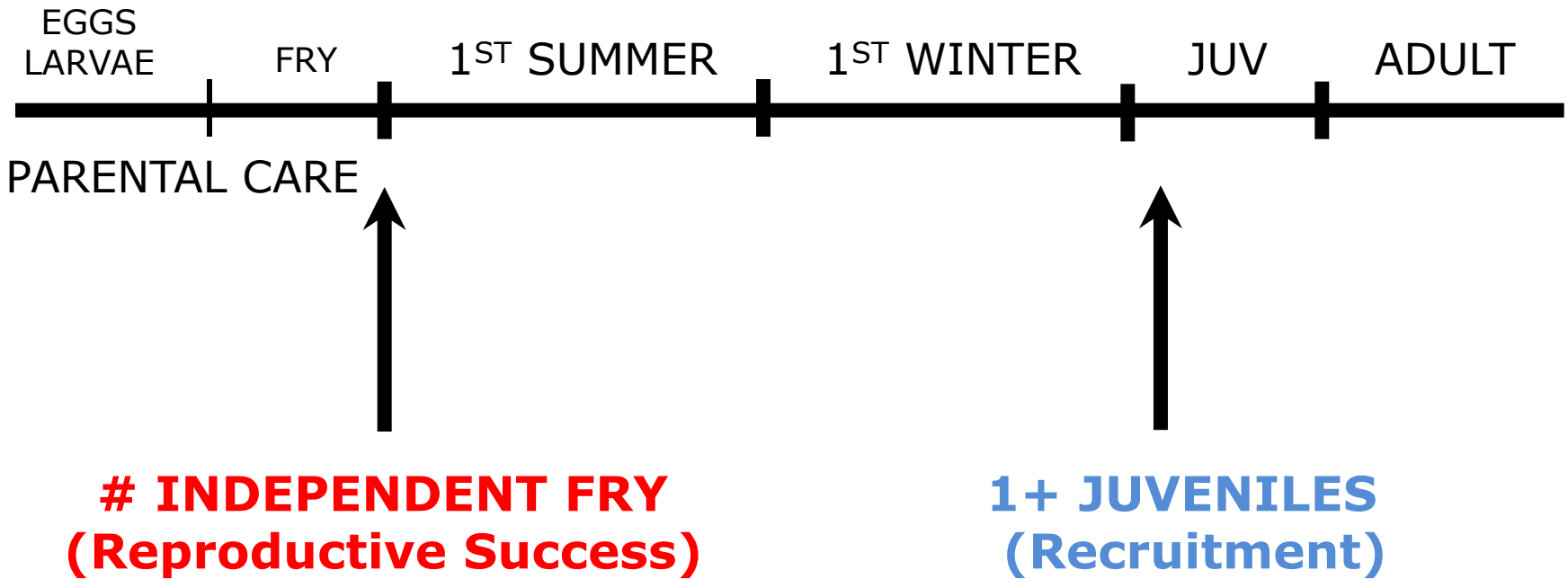


BASS LIFE HISTORY STAGES



**# INDEPENDENT FRY
(Reproductive Success)**

BASS LIFE HISTORY STAGES



TRADITIONAL THINKING

BECAUSE SPAWNING AND SURVIVAL ARE SO INFLUENCED BY ENVIRONMENTAL FACTORS,

RECRUITMENT DOES **NOT** DEPEND UPON THE AMOUNT OF SUCCESSFUL REPRODUCTION.

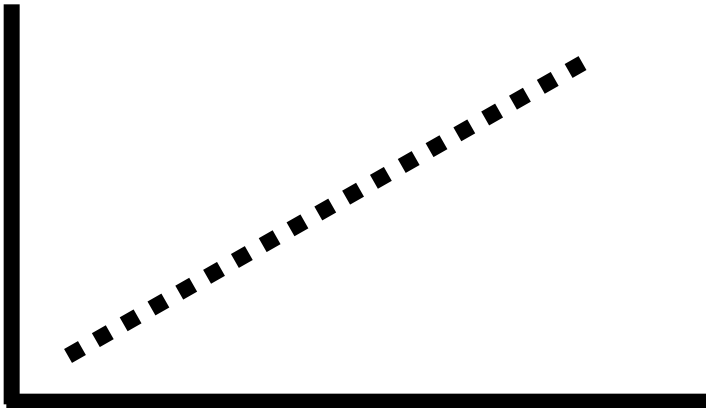
SO...ANGLING NESTING BASS HAS NO IMPACT ON RECRUITMENT.

EVIDENCE?



STOCK-RECRUITMENT RELATIONSHIP

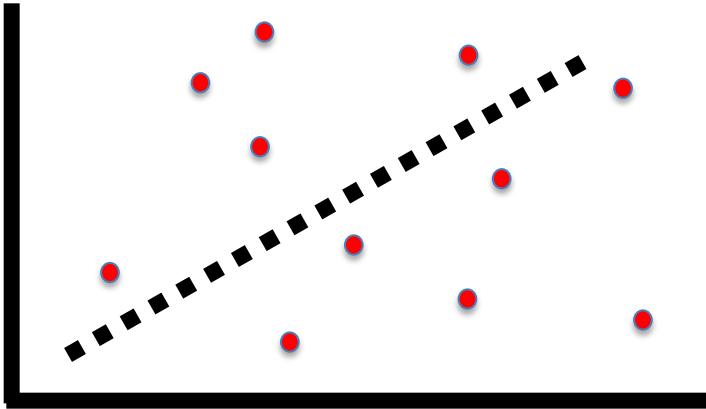
RECRUITMENT
(# 1+ BASS)



STOCK SIZE
(# NUMBER OF ADULT BASS)

STOCK-RECRUITMENT RELATIONSHIP

RECRUITMENT
(# 1+ BASS)



STOCK SIZE
(# NUMBER OF ADULT BASS)

WHY NO STOCK-RECRUITMENT RELATIONSHIP?

% MALES NESTING

% FEMALES/EGGS

BROOD PREDATORS

WEATHER EVENTS

% NESTING SUCCESS



OUR HYPOTHESIS

EVEN THOUGH SPAWNING AND SURVIVAL ARE INFLUENCED BY ENVIRONMENTAL FACTORS,

RECRUITMENT STILL DEPENDS UPON THE AMOUNT OF SUCCESSFUL REPRODUCTION.

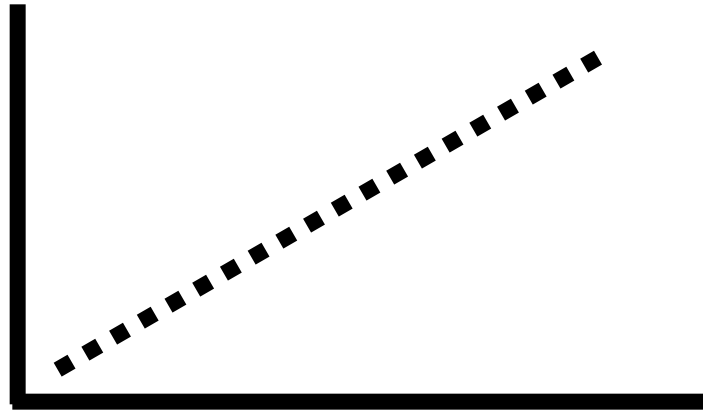
SO...BECAUSE ANGLING NESTING BASS DOES DECREASE REPRODUCTIVE SUCCESS, IT ALSO REDUCES RECRUITMENT.



OUR HYPOTHESIS DEPENDS ON A POSITIVE RELATIONSHIP BETWEEN:

REPRODUCTIVE SUCCESS AND **RECRUITMENT**

RECRUITMENT
(# 1+ BASS)

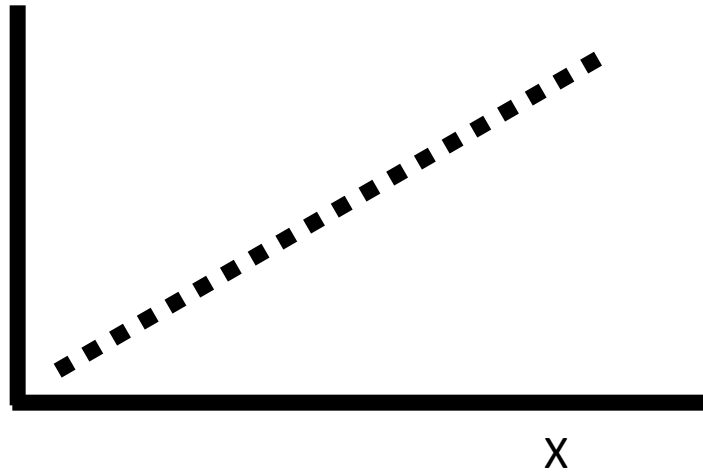


REPRODUCTIVE SUCCESS
(# INDEPENDENT FRY PRODUCED)

So...for a given lake:

During Year X:

RECRUITMENT
(# 1+ BASS)

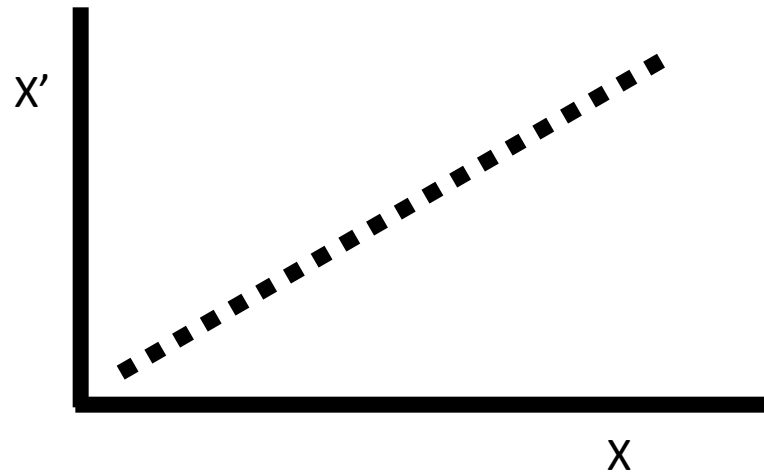


REPRODUCTIVE SUCCESS
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So...for a given lake:

During Year X:

RECRUITMENT
(# 1+ BASS)

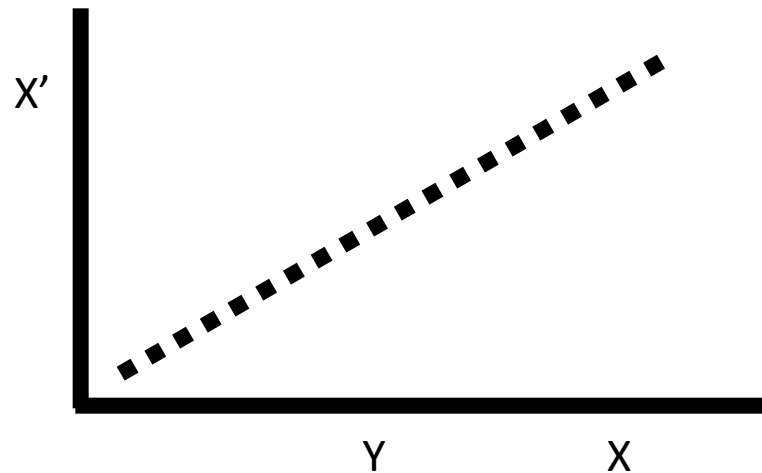


REPRODUCTIVE SUCCESS
(# INDEPENDENT FRY PRODUCED)

So...for a given lake:

During Year Y (Same bass population):

RECRUITMENT
(# 1+ BASS)

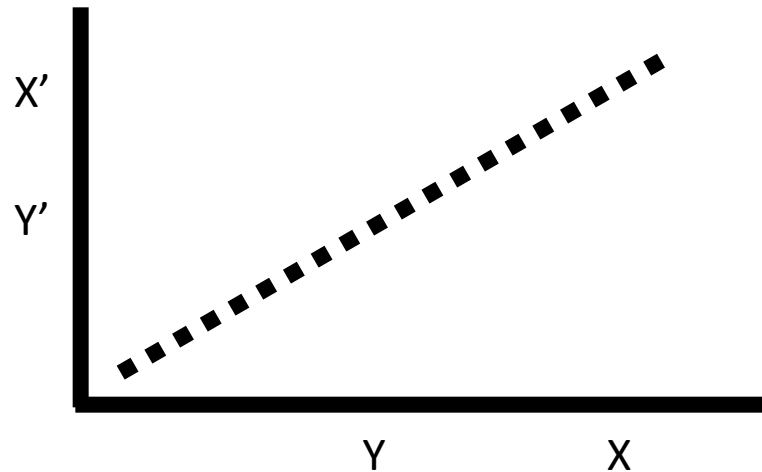


REPRODUCTIVE SUCCESS
(# INDEPENDENT FRY PRODUCED)

So...for a given lake:

During Year Y (Same bass population):

RECRUITMENT
(# 1+ BASS)



REPRODUCTIVE SUCCESS
(# INDEPENDENT FRY PRODUCED)



**FIELD STUDY TO ASSESS REPRODUCTIVE
SUCCESS/RECRUITMENT RELATIONSHIP
FOR LMB AND SMB SINCE 1990**

A photograph of a person snorkeling in a large body of water. The person is in the foreground, seen from behind, wearing a blue snorkel mask and a blue snorkel. The water is dark and rippled. In the background, there is a dense forest of green trees along the shoreline. The sky is overcast and grey. The text is overlaid on the image in white, bold, sans-serif font.

**FIELD STUDY TO ASSESS THAT RELATIONSHIP
SNORKELERS LOCATED, TAGGED, AND
MAPPED NESTS EVERY 3-4 DAYS**

FIELD STUDY

**RECORDED SP, TL, SPAWN DATE, MS
MONITORED PRESENCE / ABSENCE
NEST SUCCESS (YES/NO – INDEPENDENT FSF)
REPRODUCTIVE SUCCESS (# FRY PRODUCED)**

50

FIELD STUDY

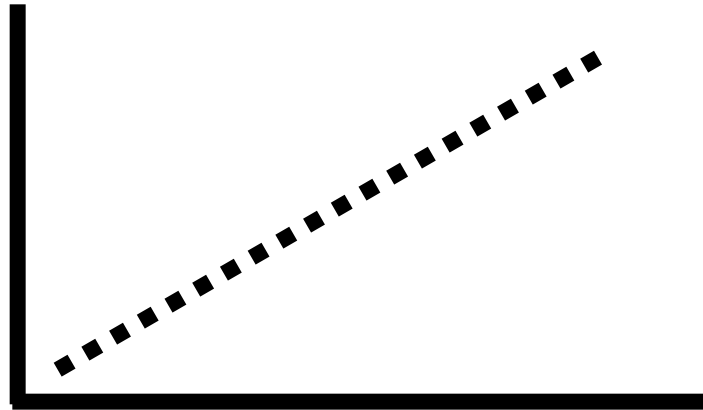
A photograph showing two divers in a body of water with white-capped waves. The diver in the foreground is wearing a black wetsuit and a blue snorkel. The diver in the background is wearing colorful swim trunks and a green snorkel. Both are swimming on their stomachs, facing away from the camera.

**DURING THE NEXT SUMMER:
VISUALLY ASSESS 1+ BASS**

OUR HYPOTHESIS DEPENDS ON A POSITIVE RELATIONSHIP BETWEEN:

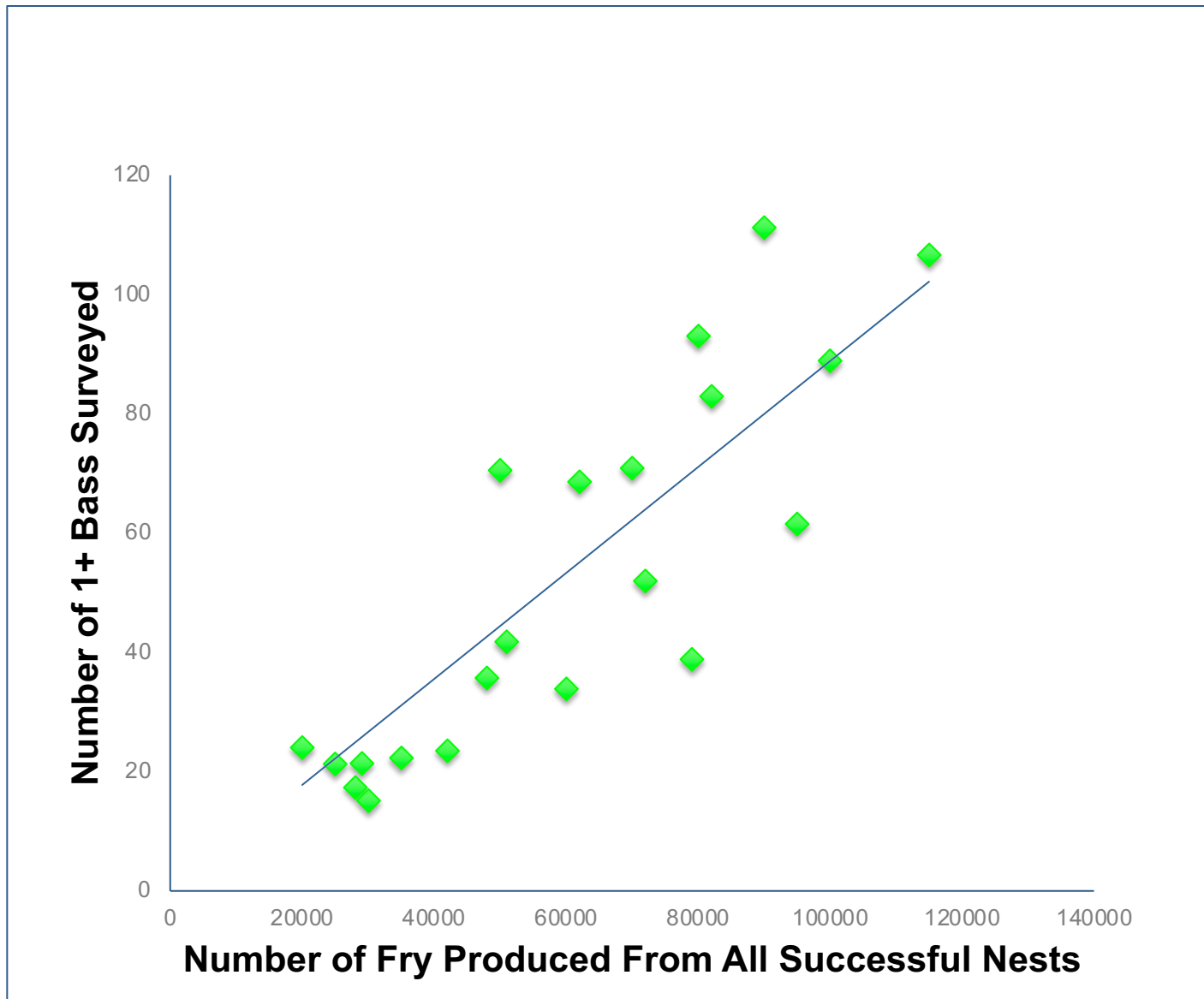
REPRODUCTIVE SUCCESS AND **RECRUITMENT**

RECRUITMENT
(# 1+ BASS)



REPRODUCTIVE SUCCESS
(# INDEPENDENT FRY PRODUCED)

RECRUITMENT (1+ JUVS) vs FRY PRODUCED



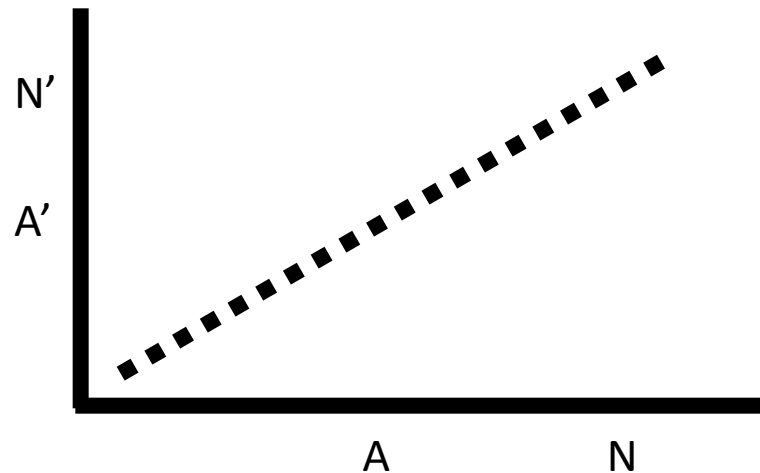
RECRUITMENT DEPENDS ON RS



OUR HYPOTHESIS ALSO PREDICTS THAT ANGLING CAN REDUCE RECRUITMENT

N = WITHOUT ANGLING A = WITH ANGLING (Predation and Abandonment)

RECRUITMENT
(# 1+ BASS)



REPRODUCTIVE SUCCESS
(# INDEPENDENT FRY PRODUCED)

**IS THERE EVIDENCE THAT ANGLING
FOR NESTING BASS ACTUALLY
DOES IMPACT RECRUITMENT?**



WHOLE LAKE EXPERIMENTAL MANGEMENT STUDY



QUEEN'S UNIVERSITY
Biological Station

WHOLE LAKE EXPERIMENTAL MANAGEMENT STUDY

- EXPERIMENTAL DESIGN: 12 YEAR STUDY
 - FOUR PRIVATE LAKES (controlled access/regulations)
[32-224 acres in Ontario (QUBS) and Quebec (Kenauk)]
 - MANAGEMENT OPTIONS (alternate years)
 - NO ANGLING DURING BASS SPAWNING SEASON
 - OPEN TO PRESEASON ANGLING (Res Team, others)
 - ANGLING = C/R ONLY – NO BAIT – TARGET SHORE
 - ASSESSED RECRUITMENT BY COUNTING 1+ IN YR 2

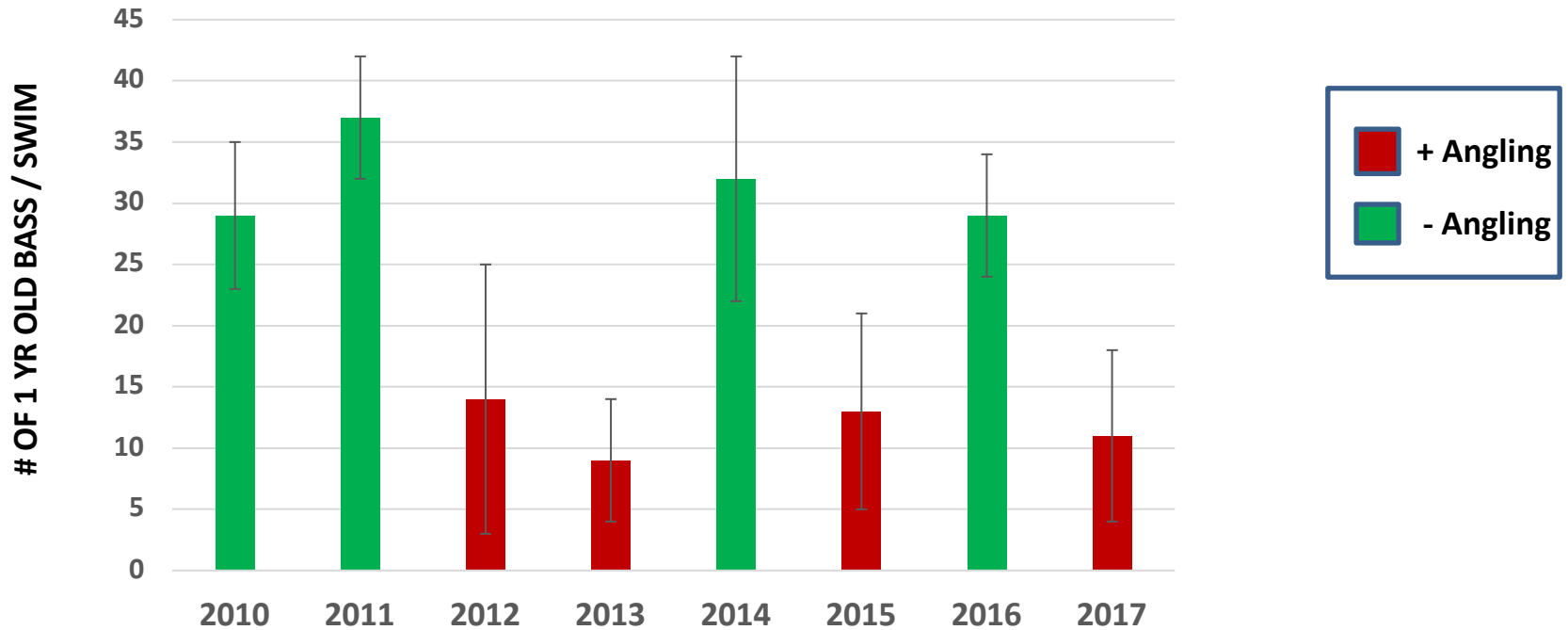
WHOLE LAKE EXPERIMENTAL MANAGEMENT STUDY

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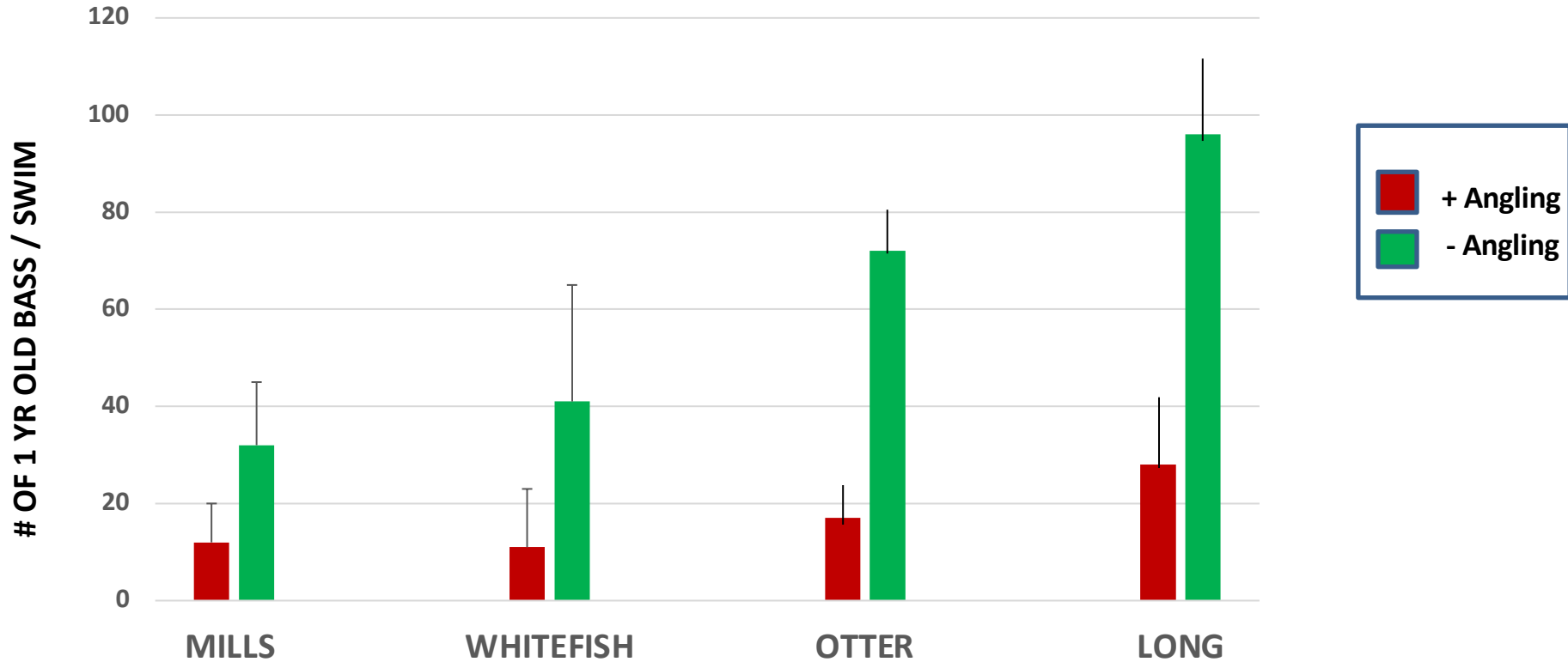
RESULTS = SO STRIKING, WE STOPPED AFTER 8 YEARS

RESULTS: Pattern of Recruitment Across Years

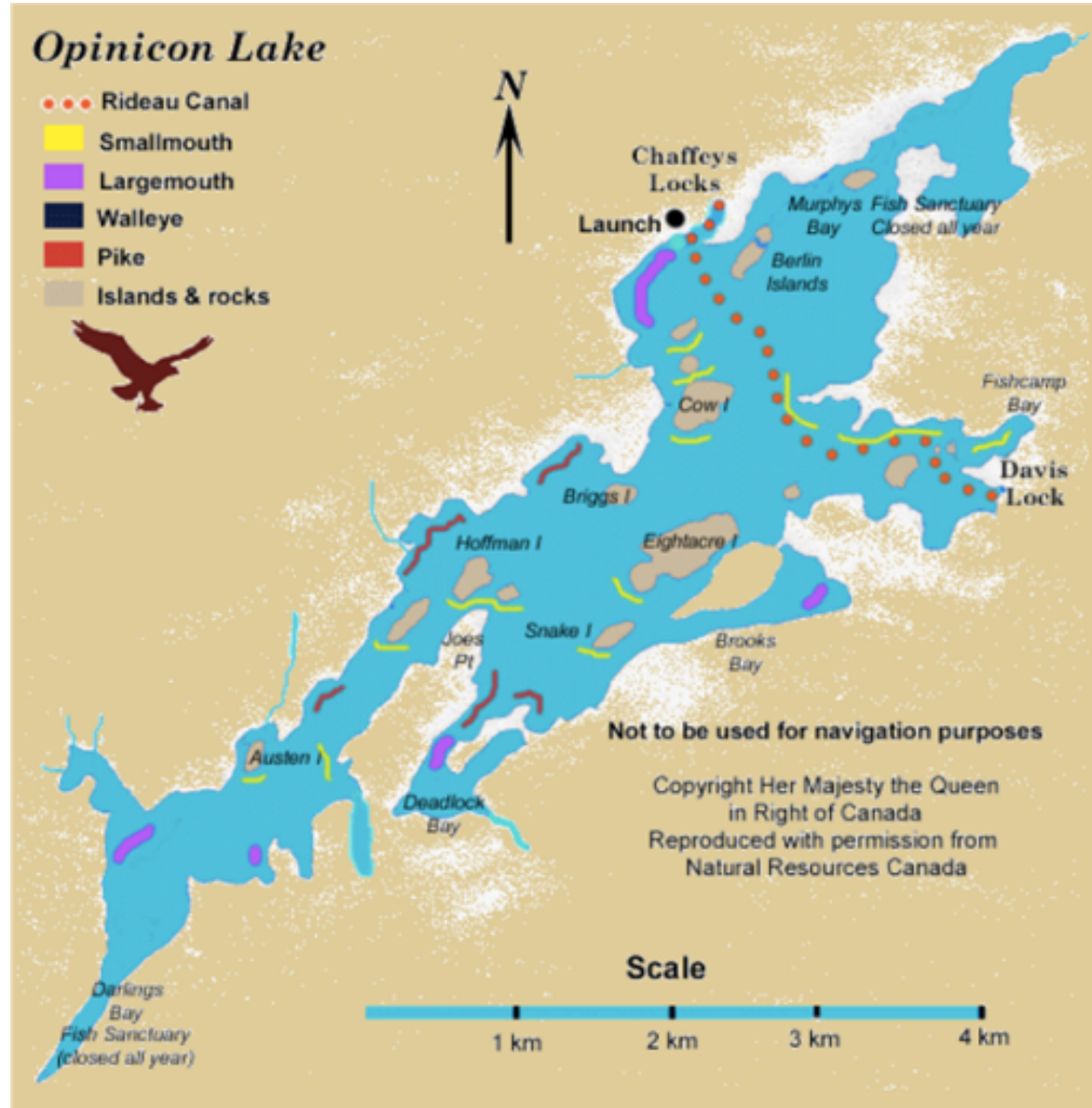
MILLS LAKE



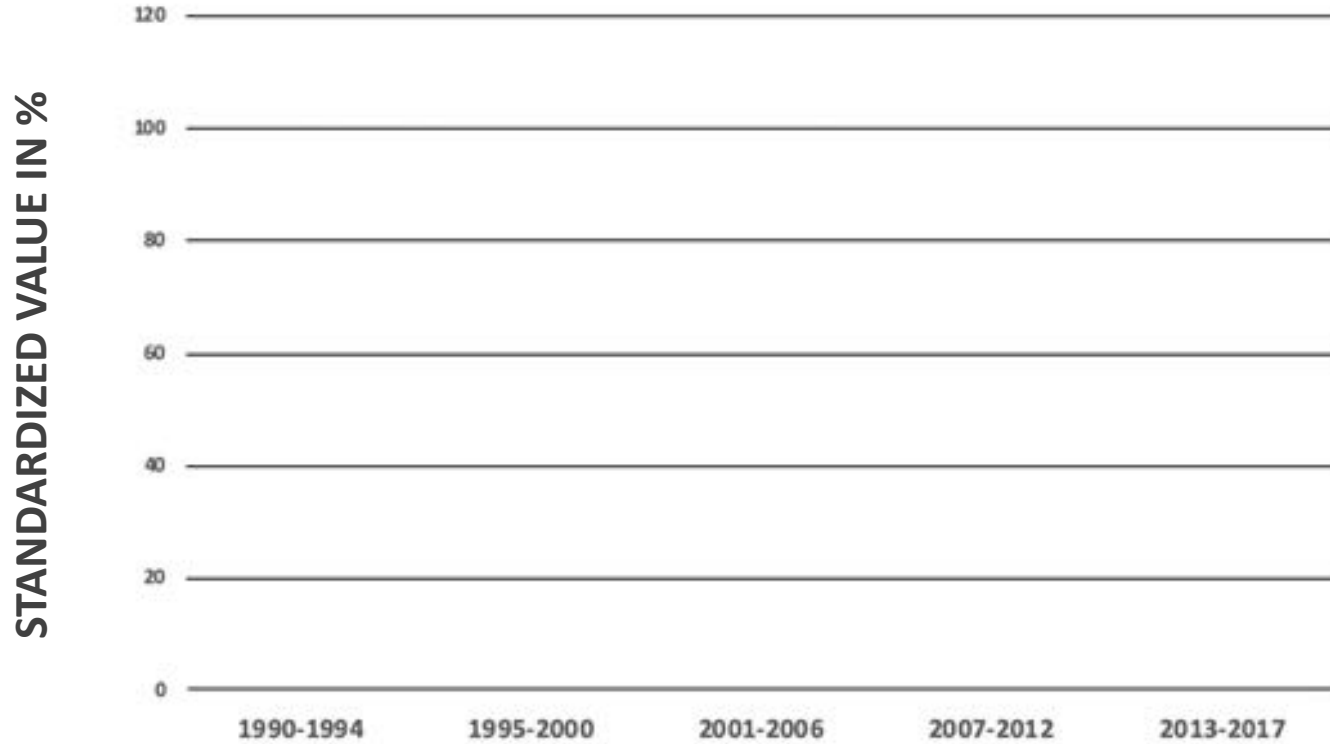
RESULTS: Angling Impact on Recruitment - All Lakes



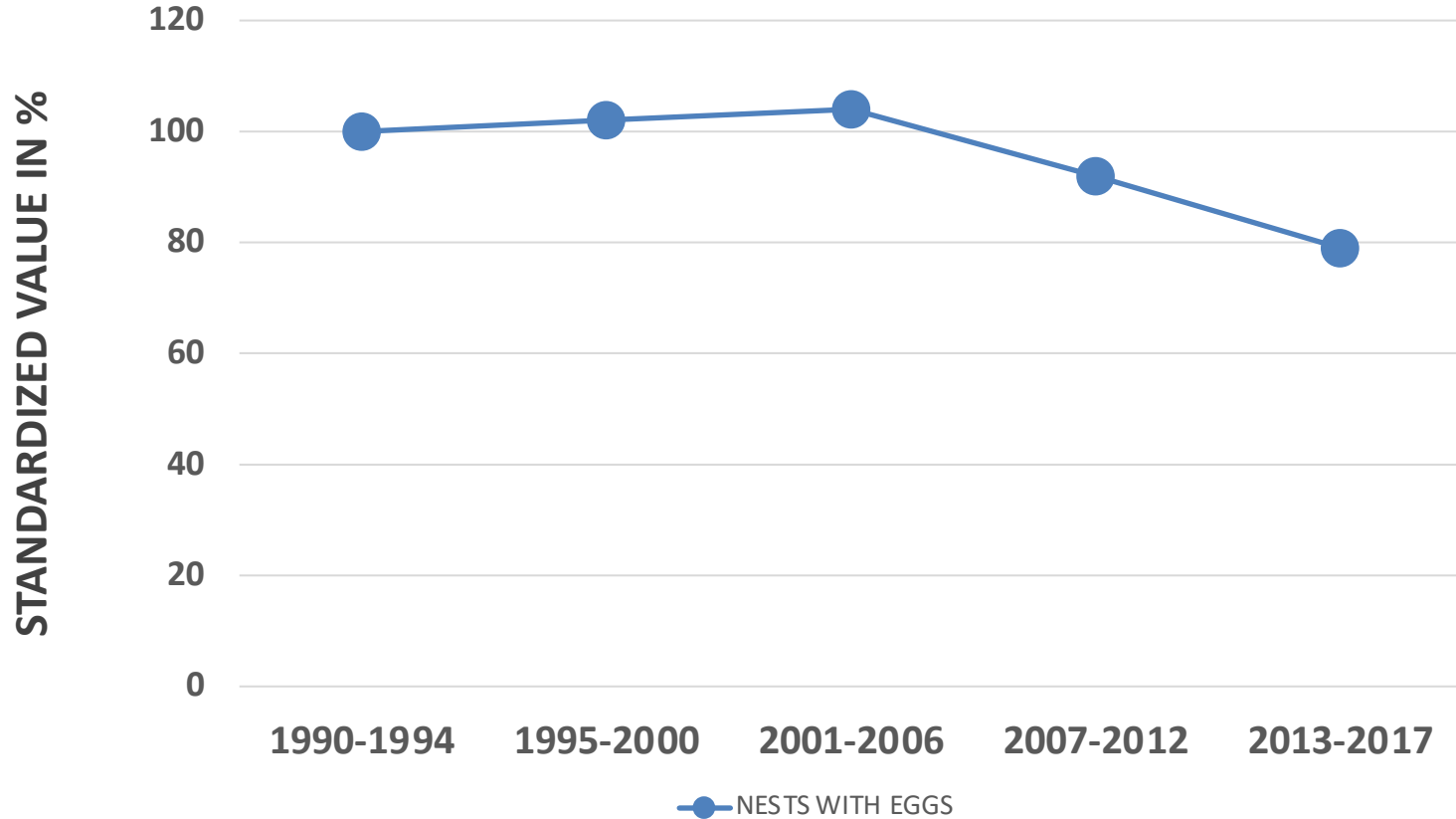
IS THERE EVIDENCE THAT THIS LEVEL OF IMPACT IS ACTUALLY HAPPENING IN OUR PUBLIC LAKES?



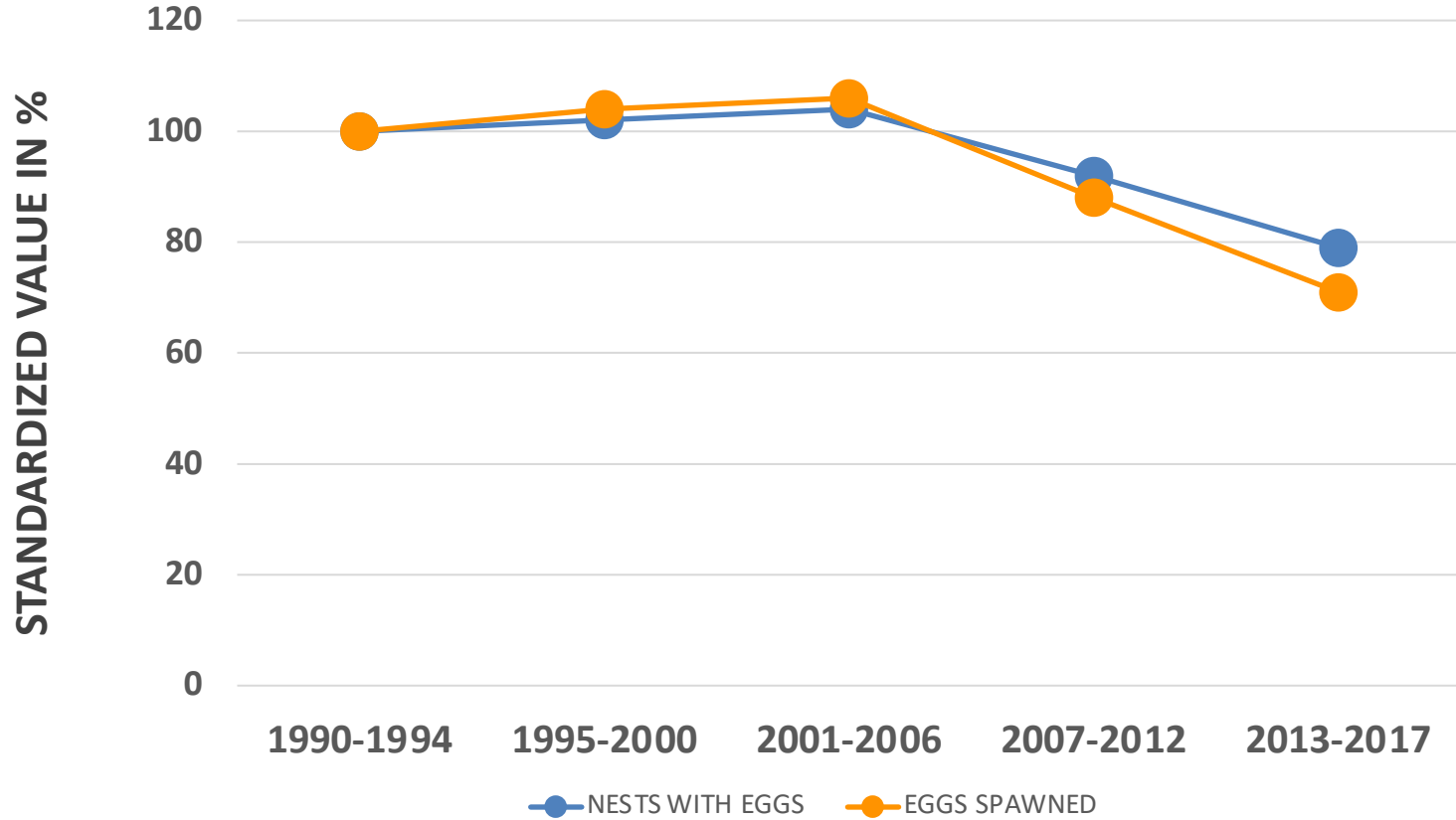
BASS REPRODUCTION IN LAKE OPINICON



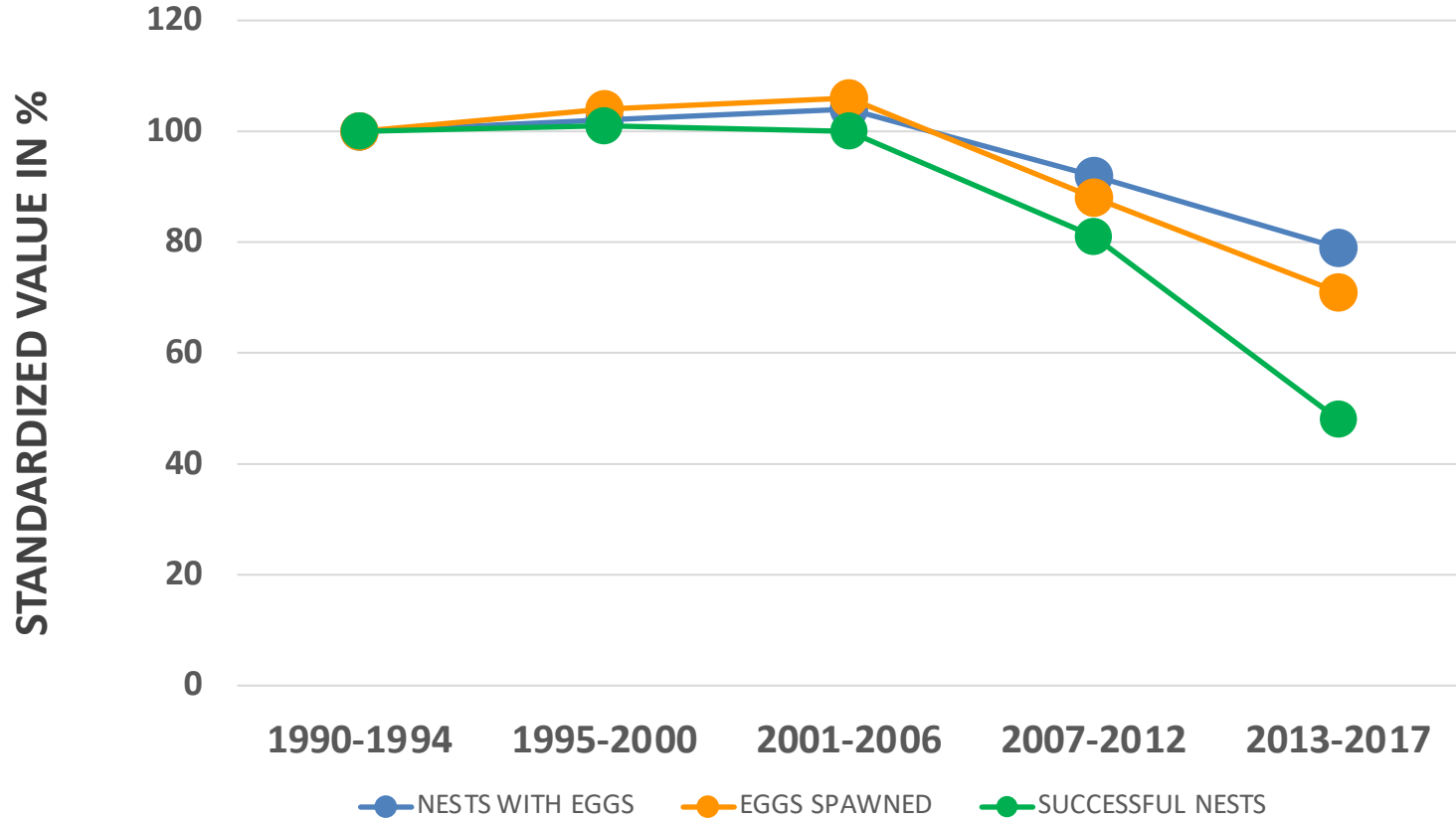
BASS REPRODUCTION IN LAKE OPINICON



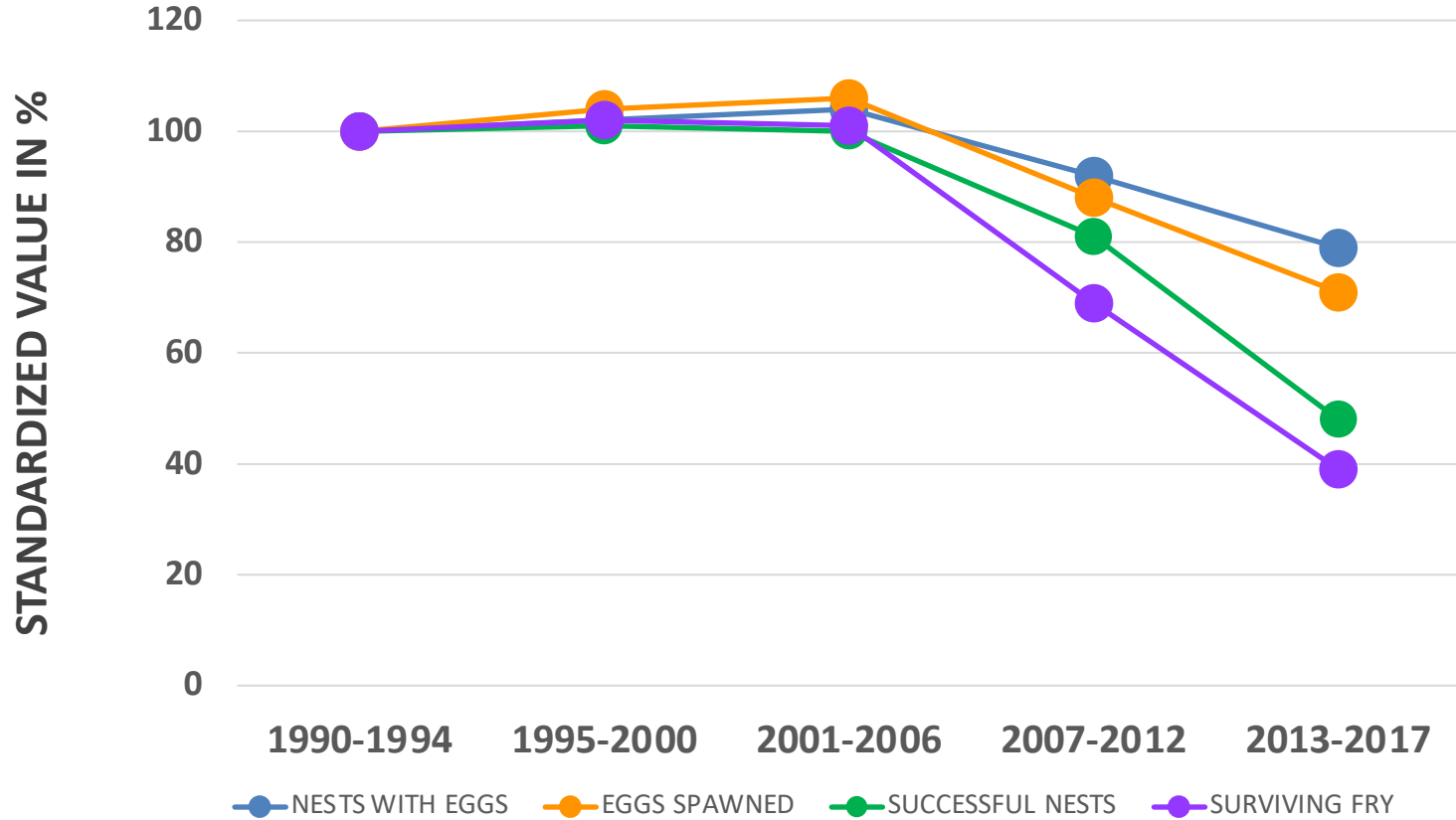
BASS REPRODUCTION IN LAKE OPINICON



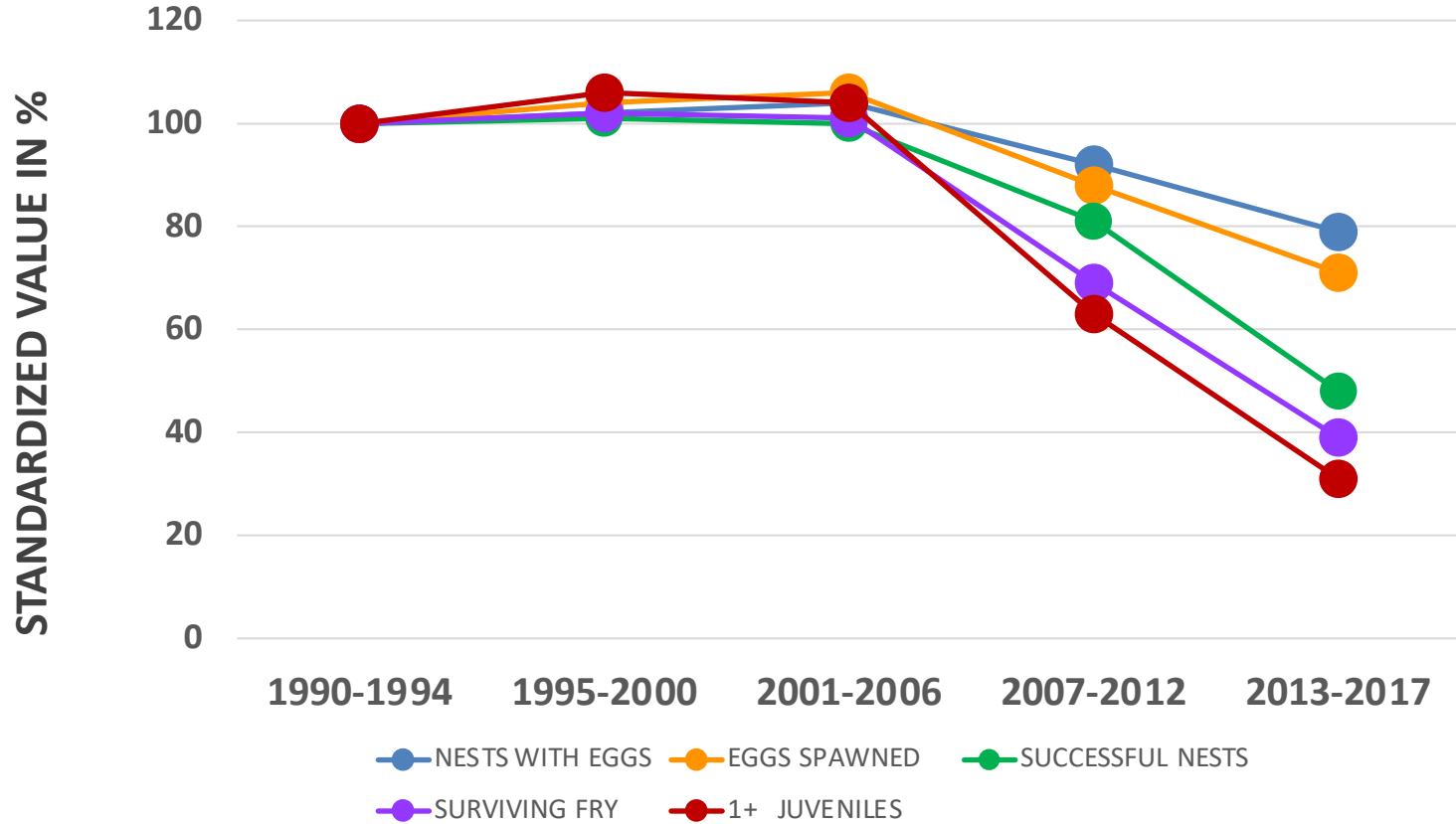
BASS REPRODUCTION IN LAKE OPINICON



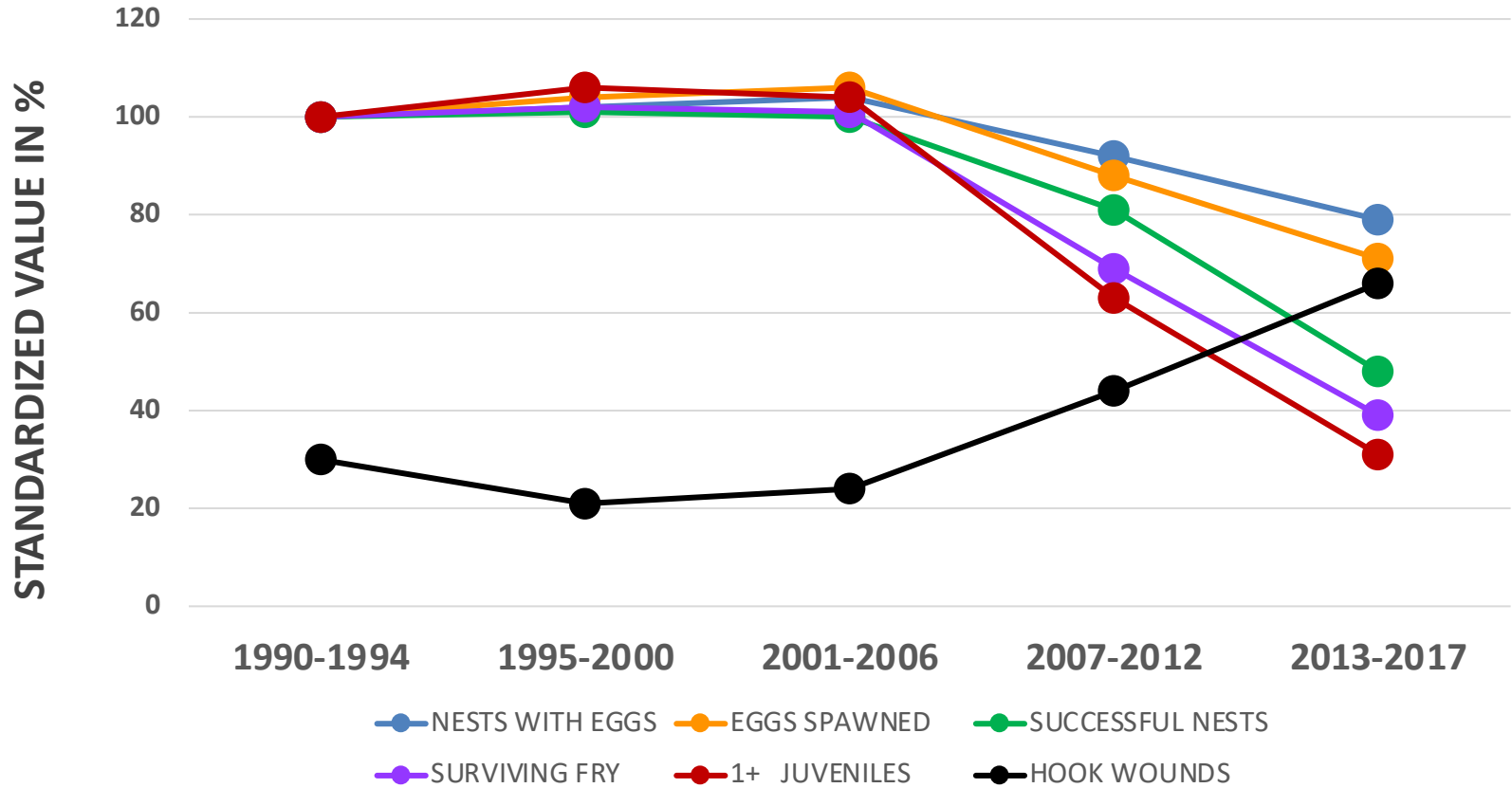
BASS REPRODUCTION IN LAKE OPINICON



BASS REPRODUCTION IN LAKE OPINICON



BASS REPRODUCTION IN LAKE OPINICON

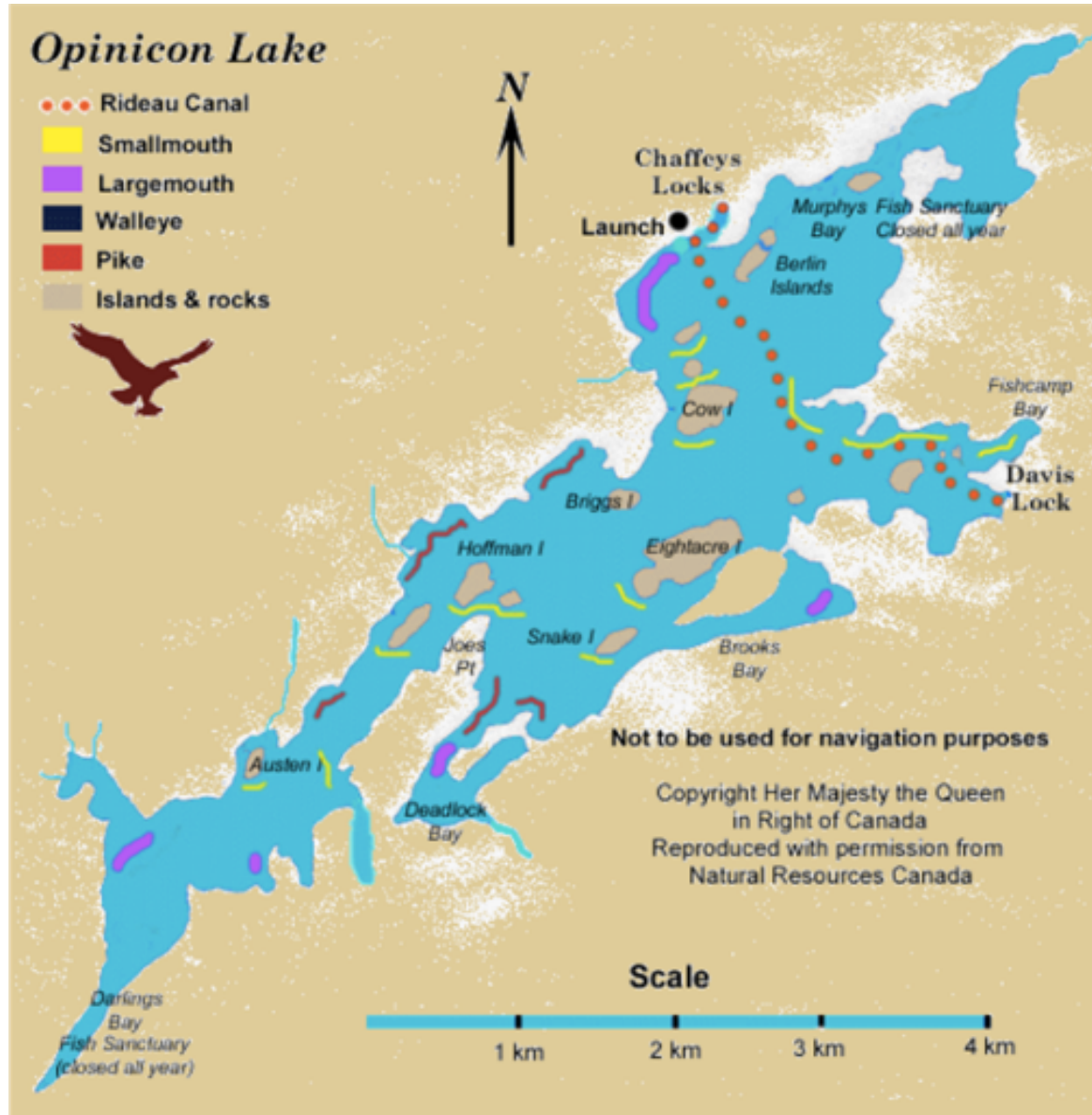




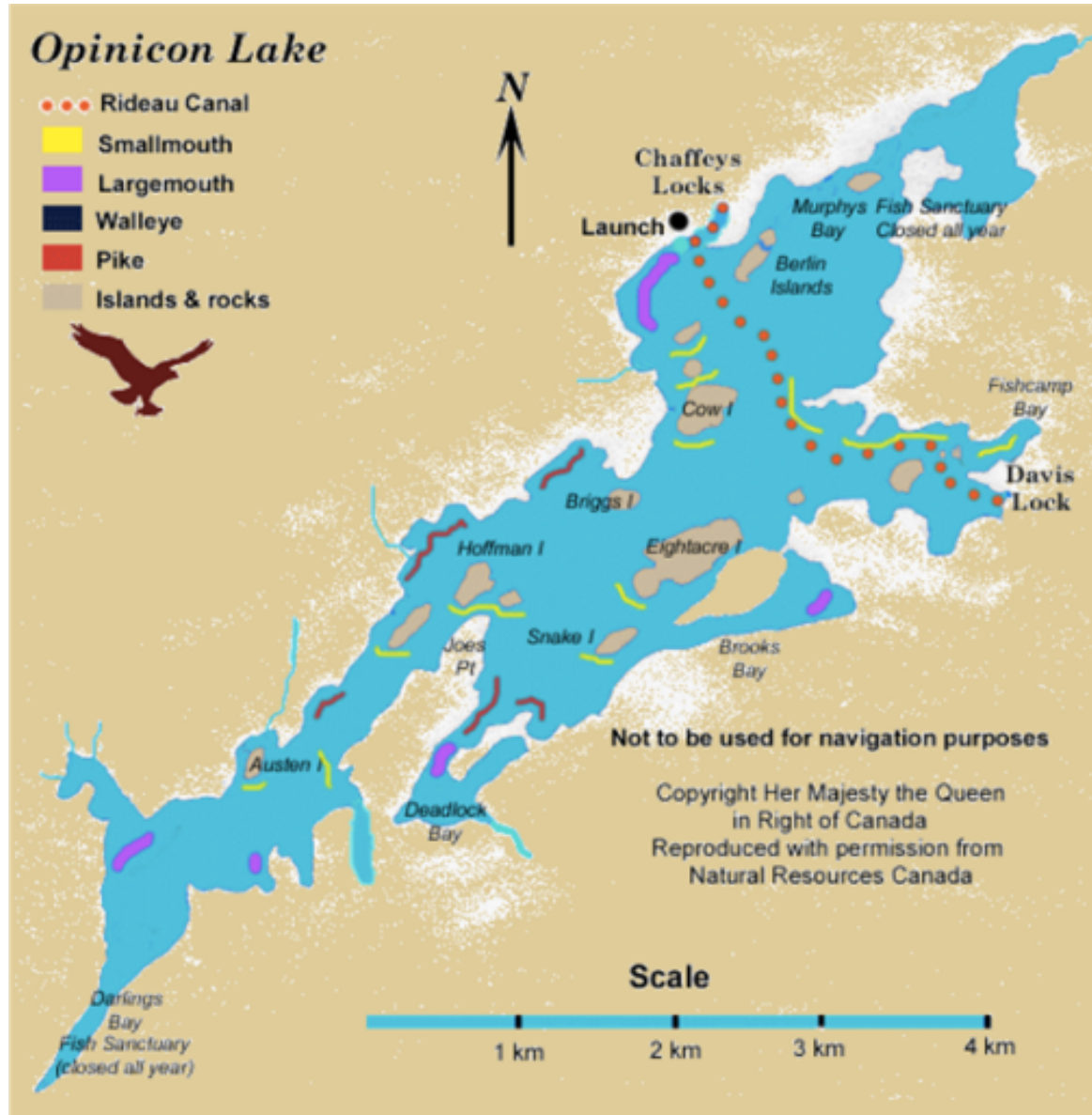
**FAILED
REGULATORY
PROTECTION**

**RAMPANT
PREDATION
ABANDONMENT**

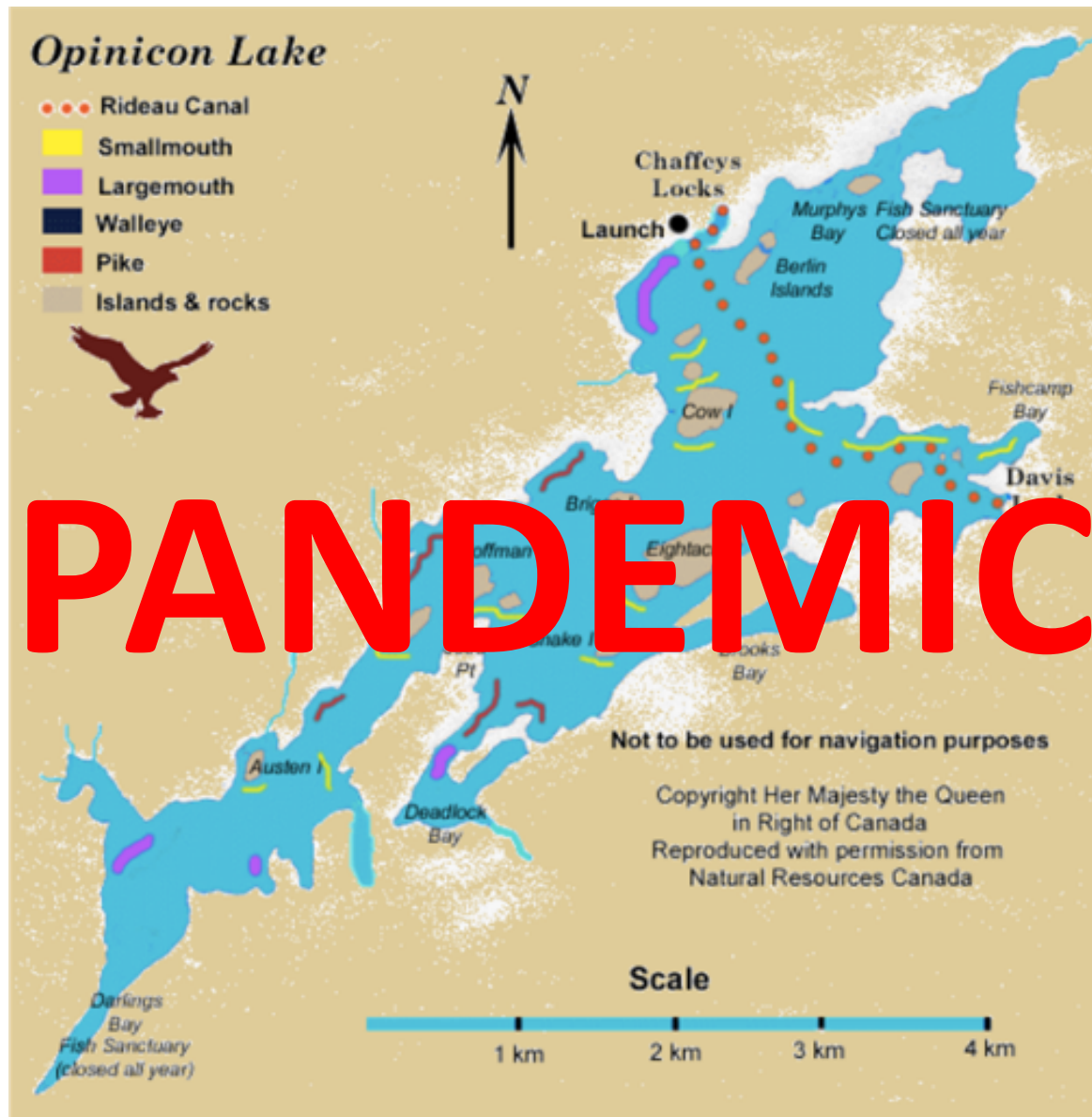
SOLUTION: NOT A CLOSED SEASON

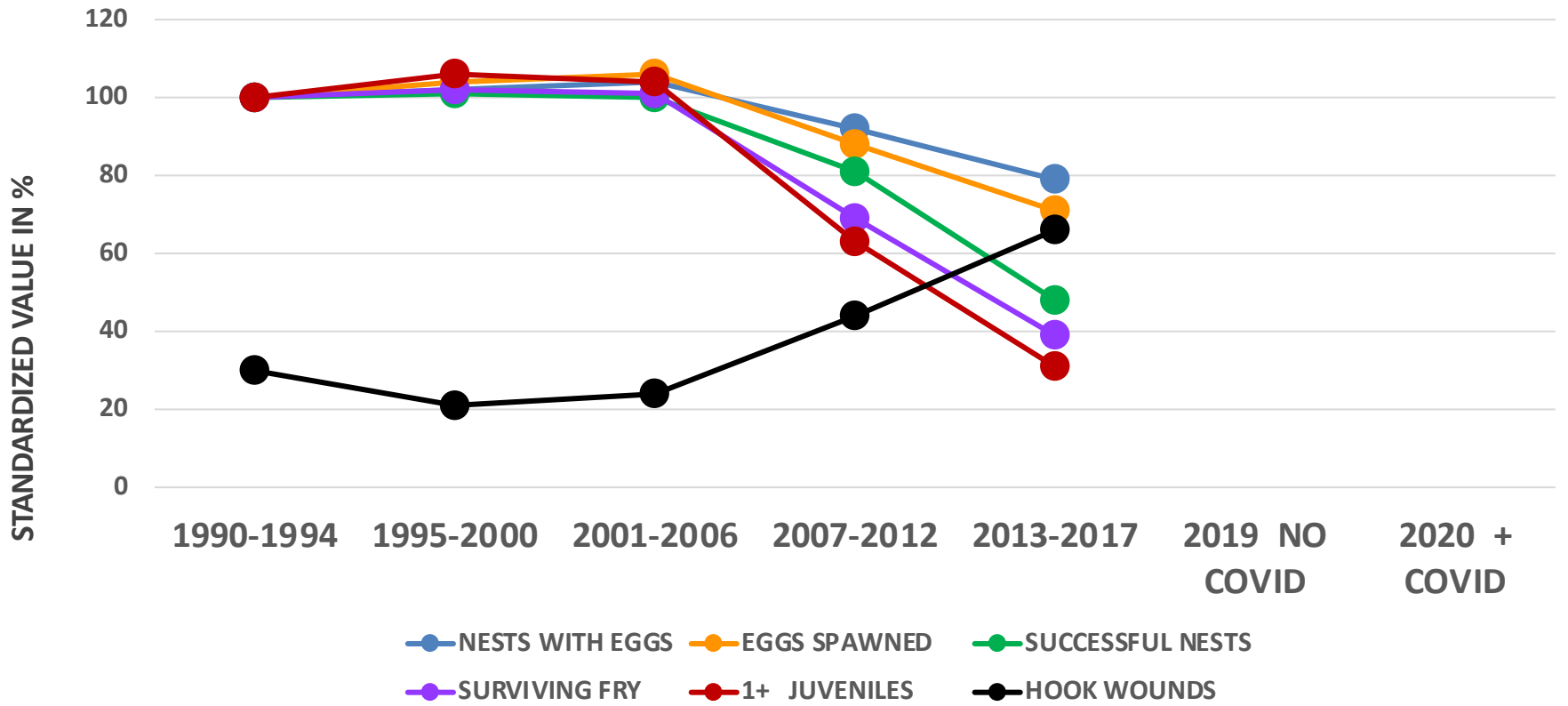


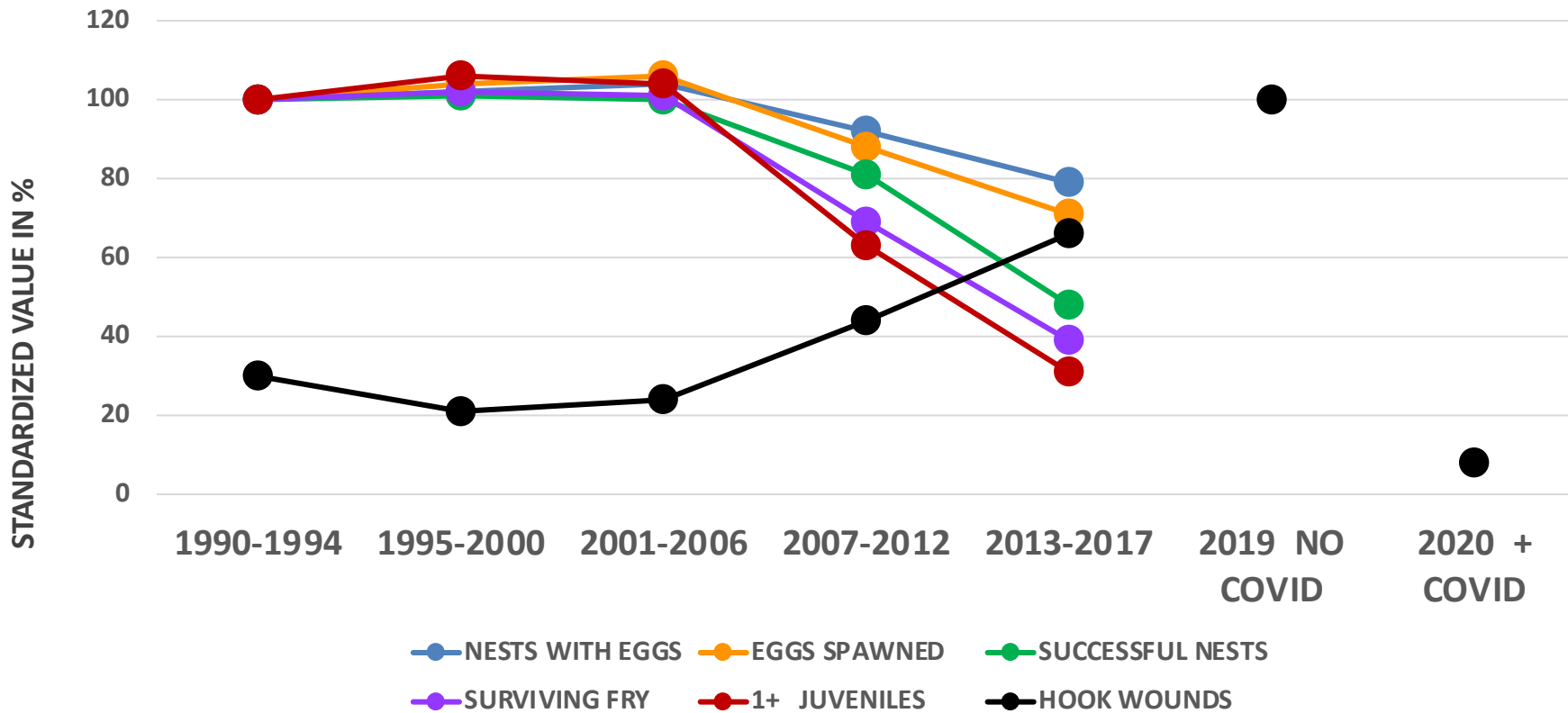
SOLUTION: BASS SPAWNING SANCTUARIES

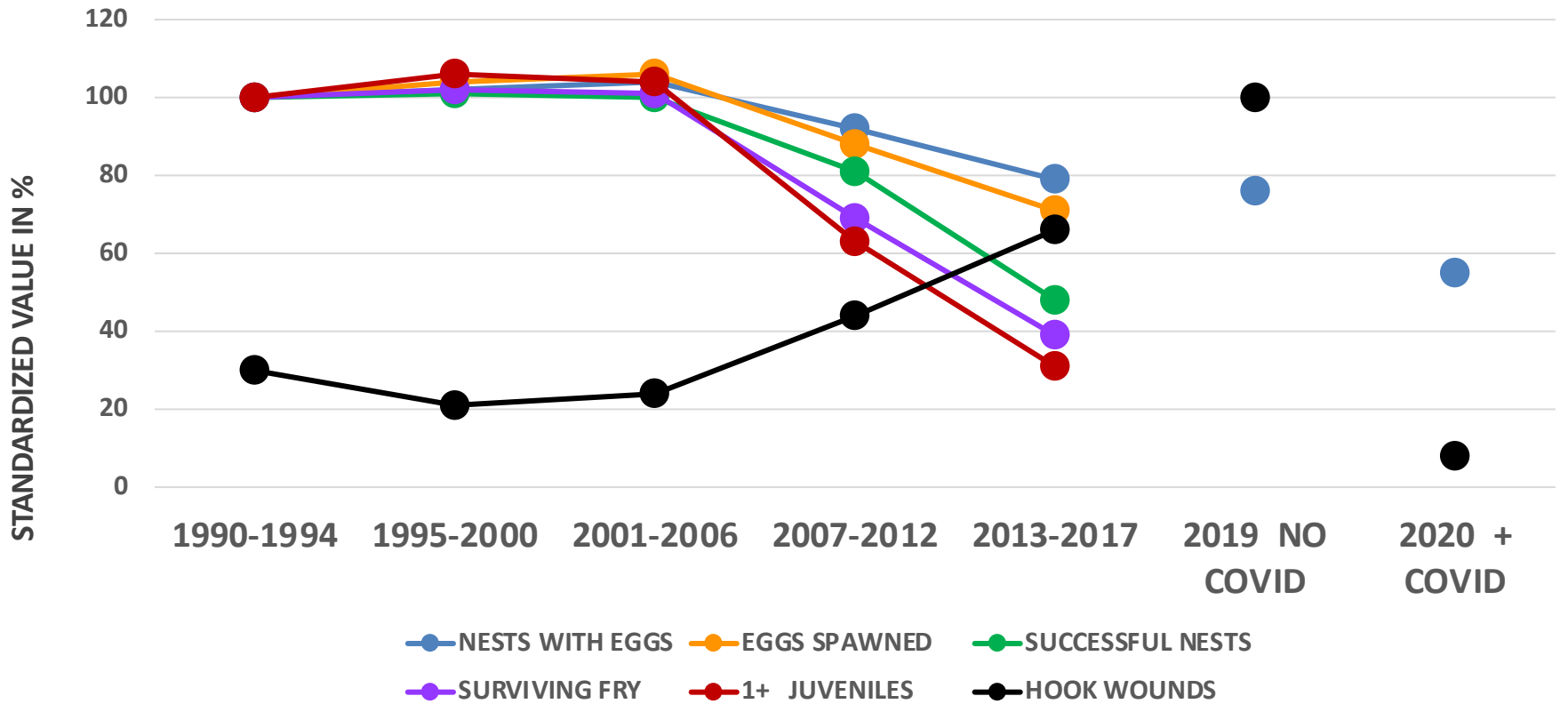


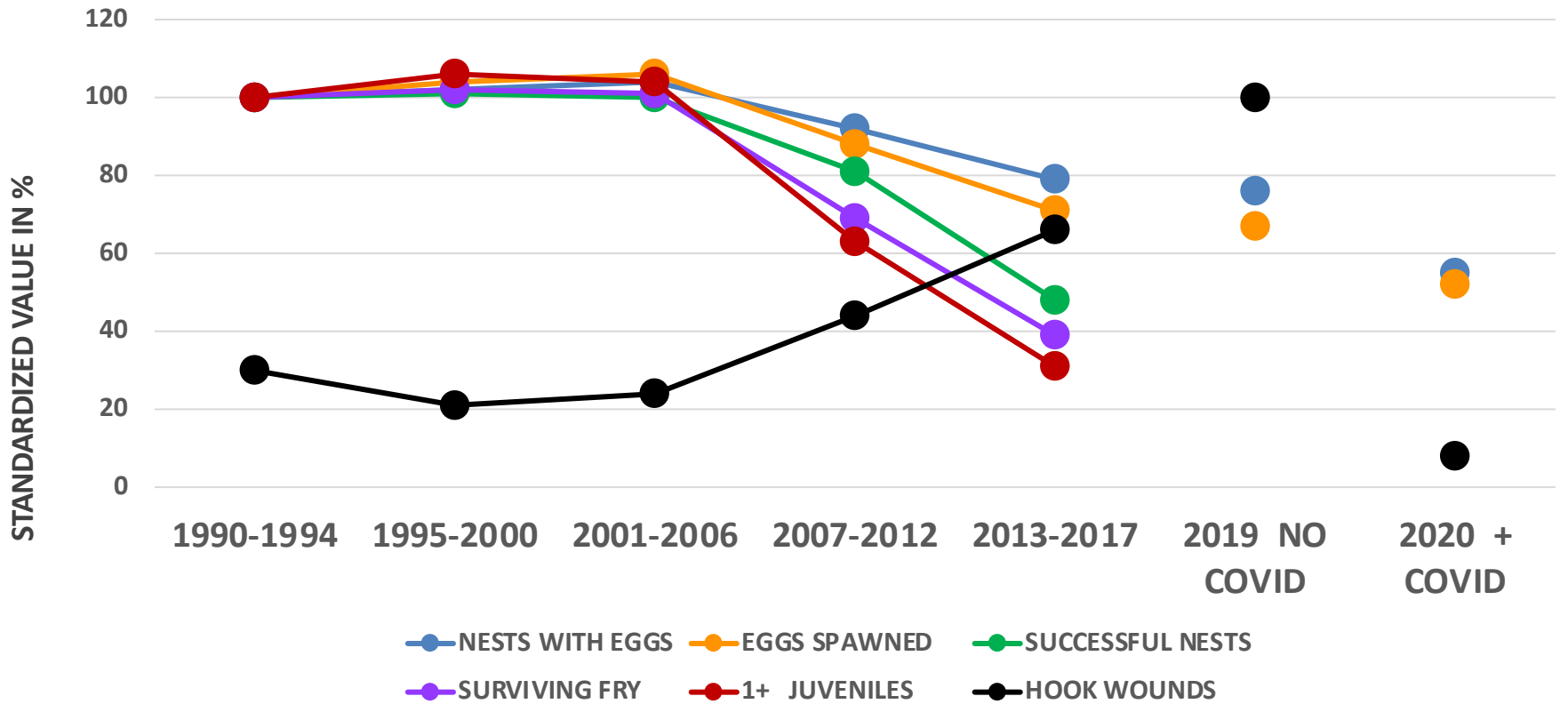
SOLUTION: BASS SPAWNING SANCTUARIES

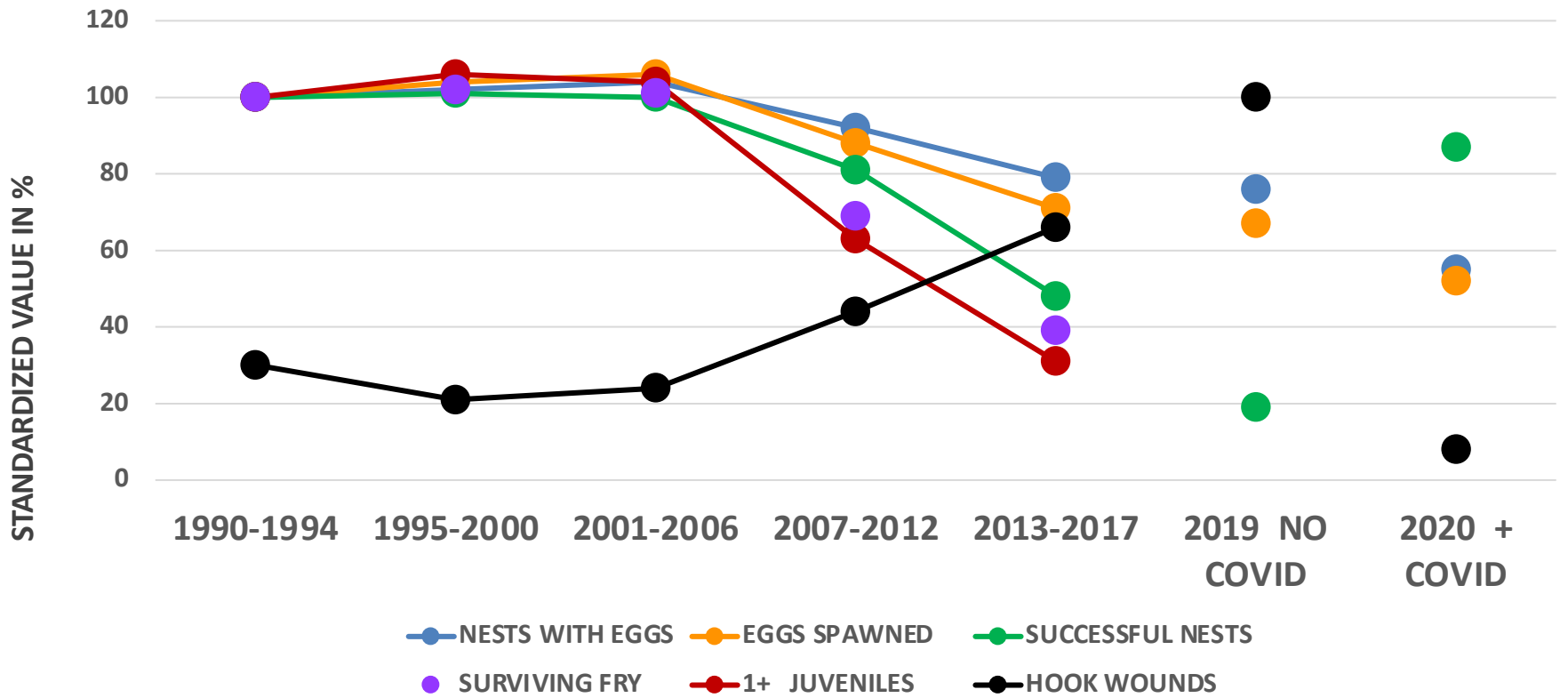


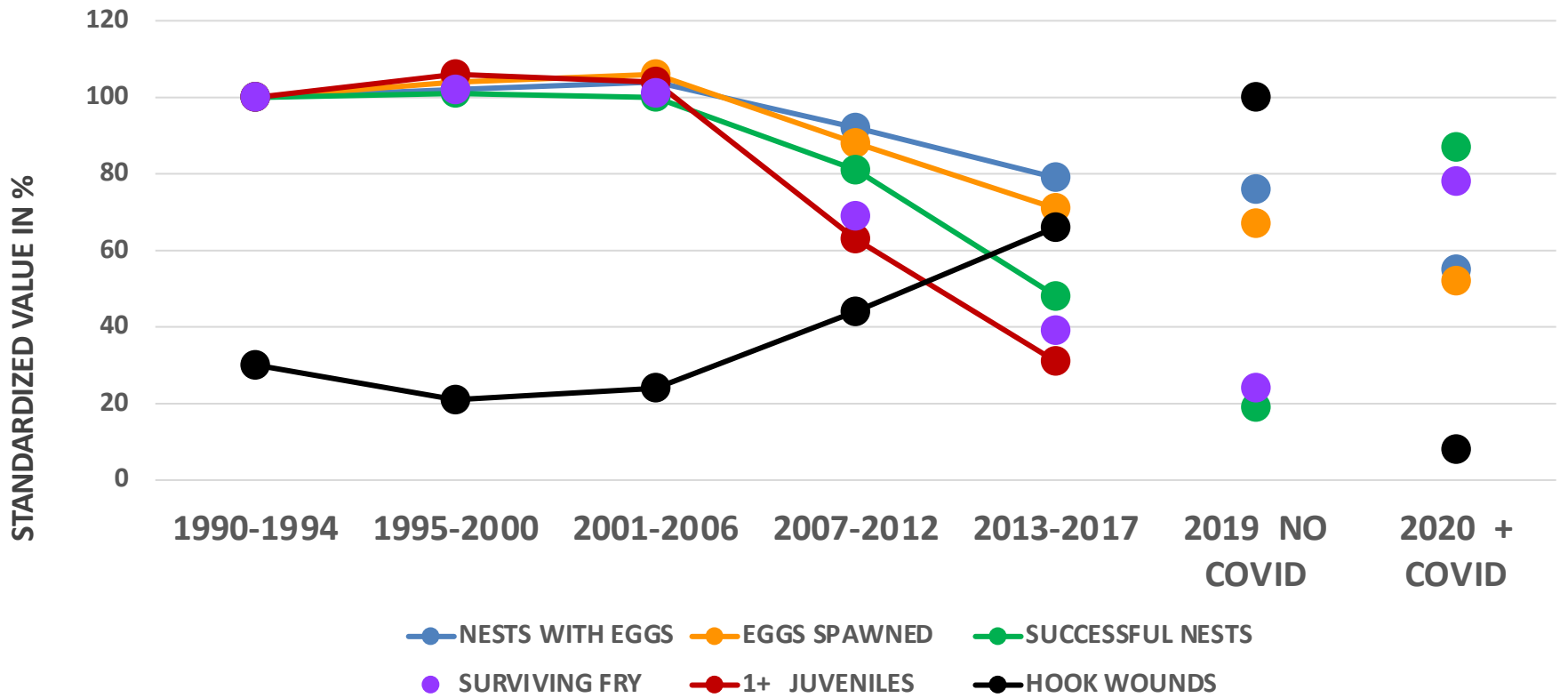


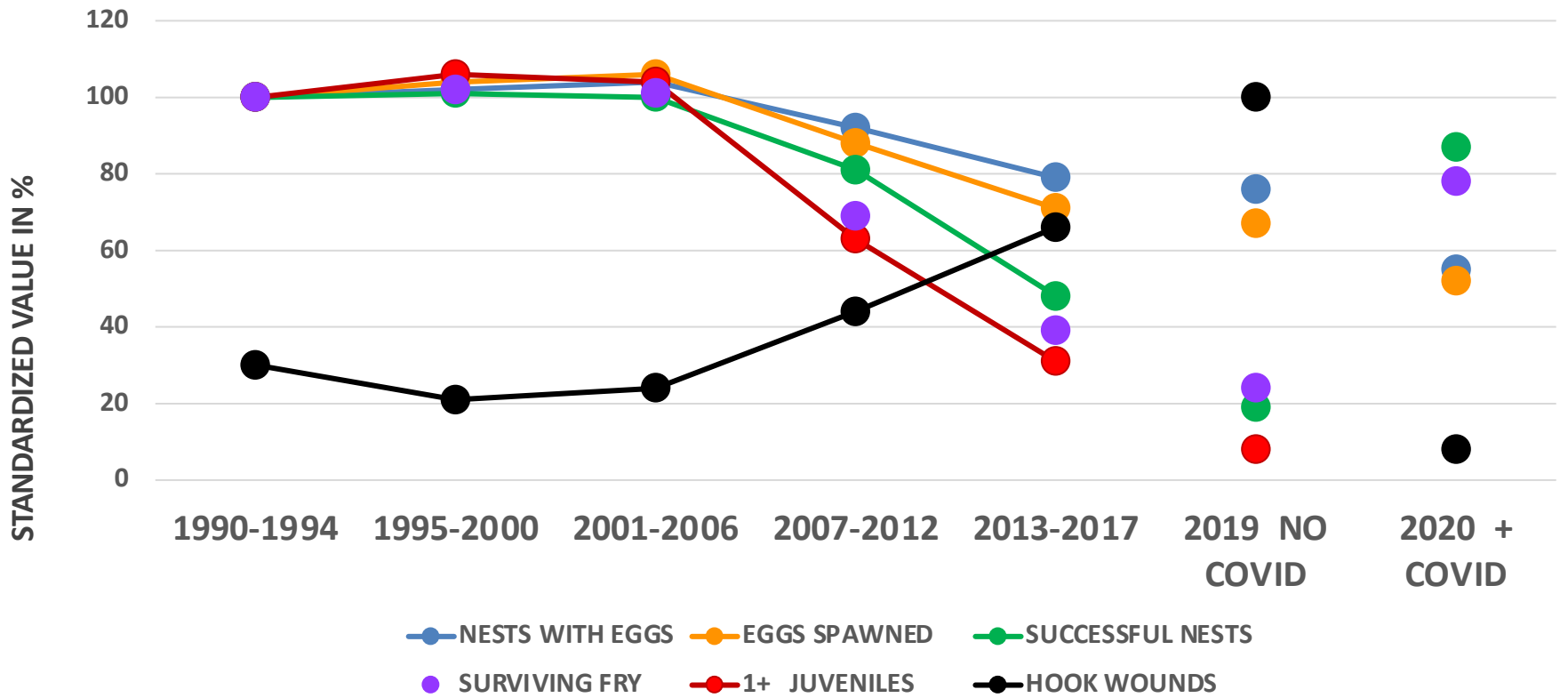












NEXT STEP?

A CONTROLLED PILOT STUDY

TWO STUDY LAKES:

OPINICON LAKE
INDIAN LAKE

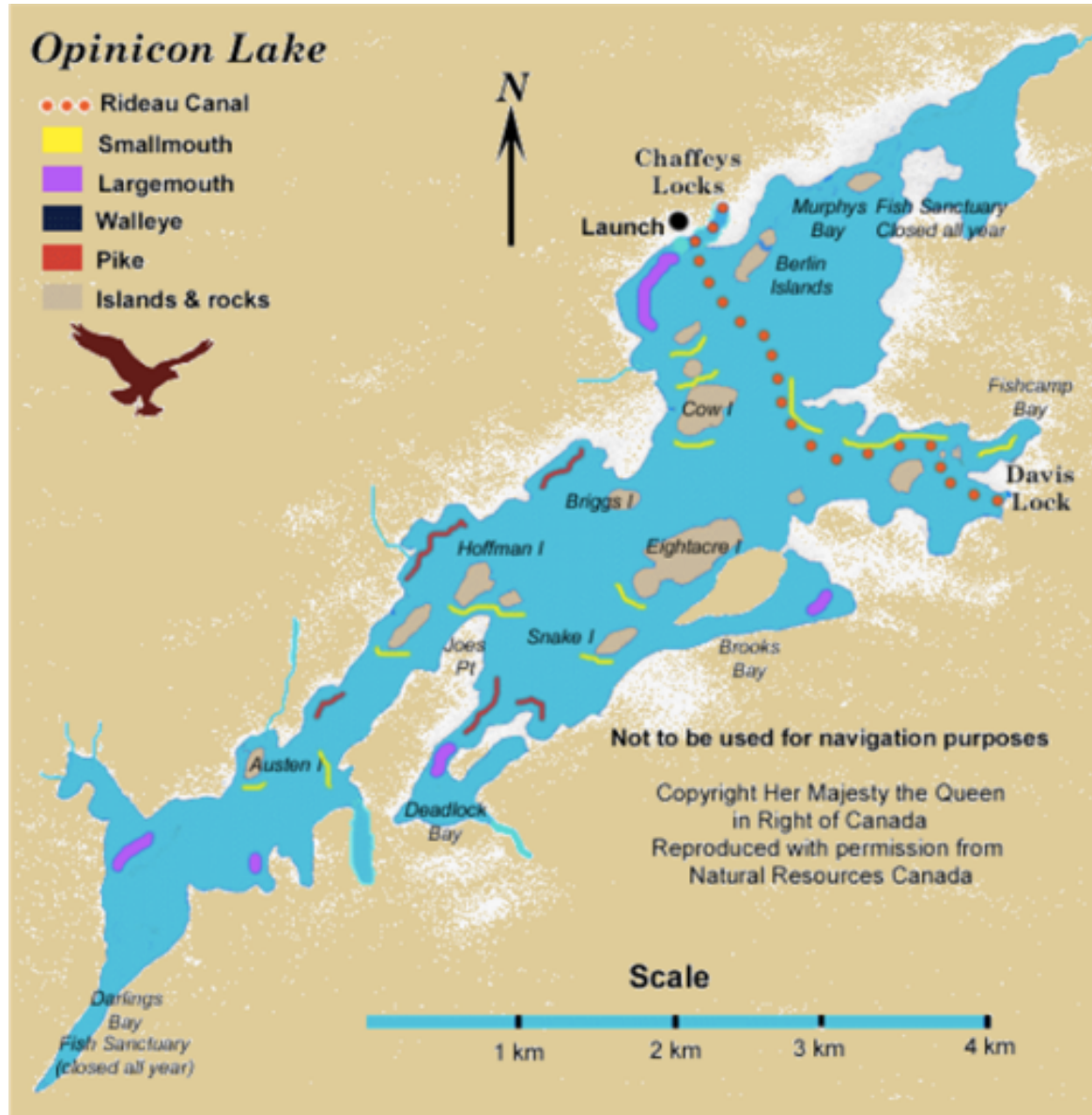
BACI DESIGN:

BEFORE = 2019/2022-3

AFTER = 2024-26



SOLUTION: BASS SPAWNING SANCTUARIES



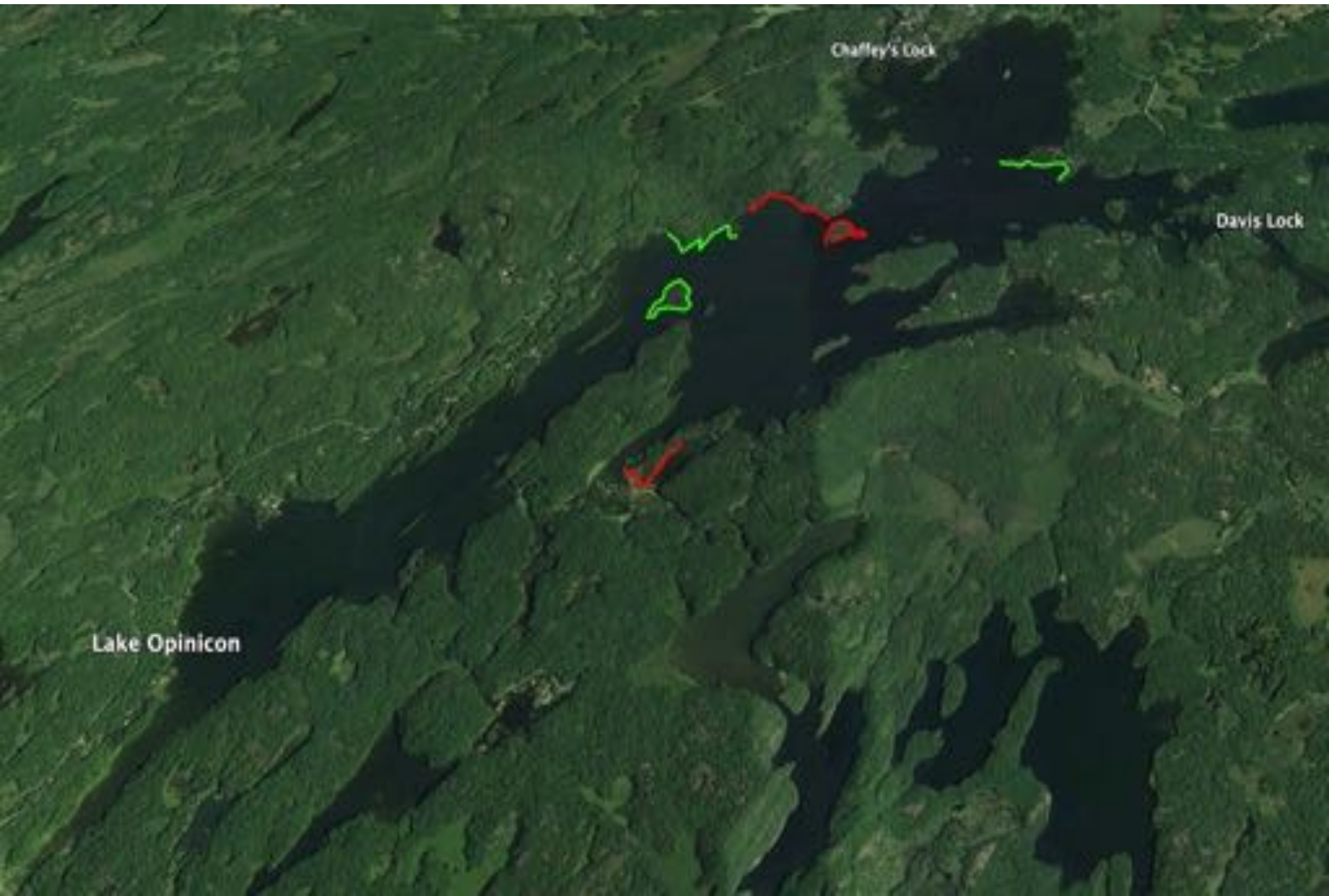
LAKE OPINICON





POTENTIAL BSS SITES FOR LAKE OPINICON

SNORKELING TRANSECTS TO MONITOR SPAWNING



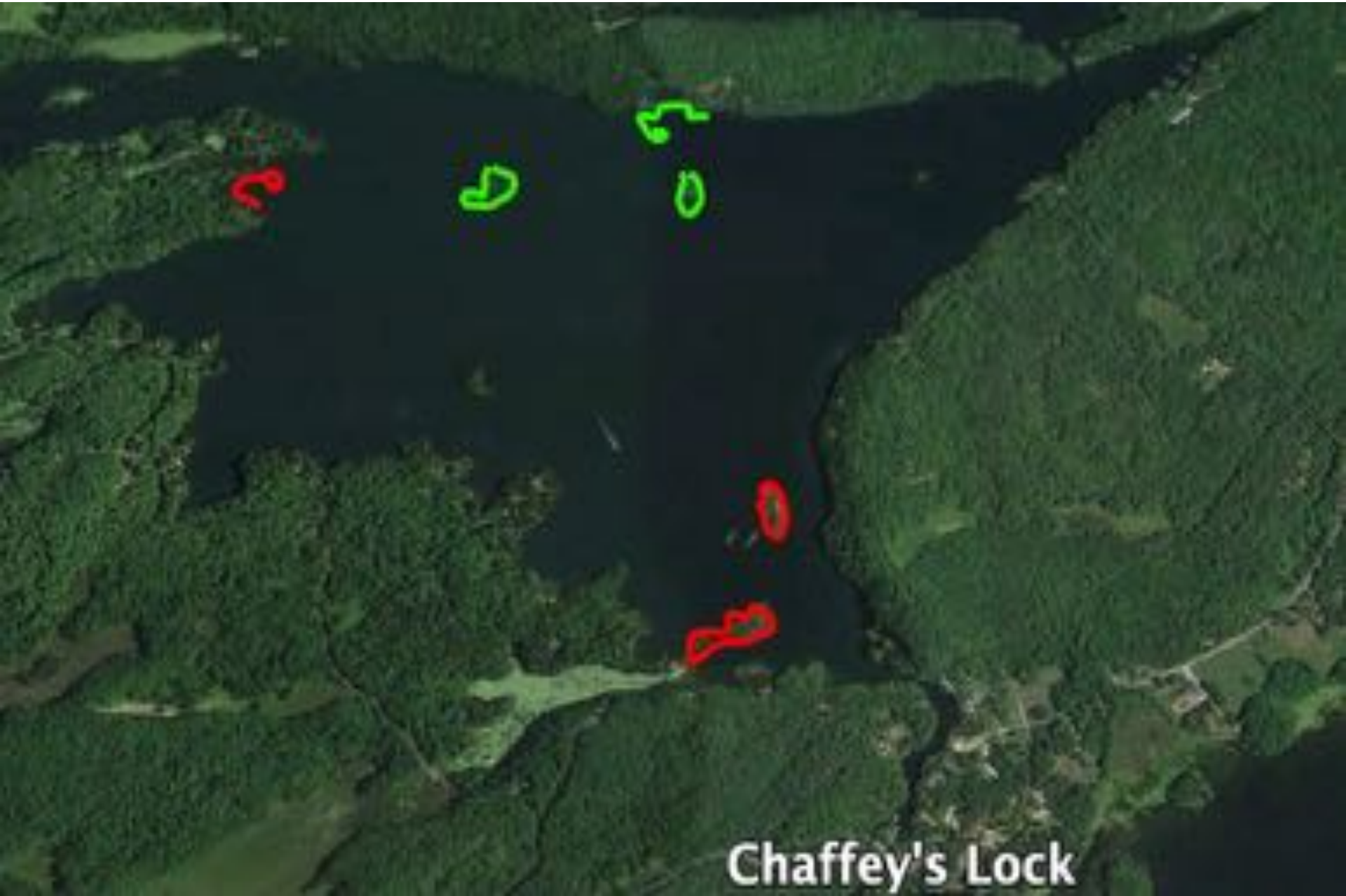
INDIAN LAKE



POTENTIAL BSS SITES FOR INDIAN LAKE



SNORKELING TRANSECTS TO MONITOR SPAWNING



Chaffey's Lock

NEXT STEP?

A CONTROLLED PILOT STUDY

TWO STUDY LAKES:

**OPINICON LAKE
INDIAN LAKE**

BACI DESIGN:

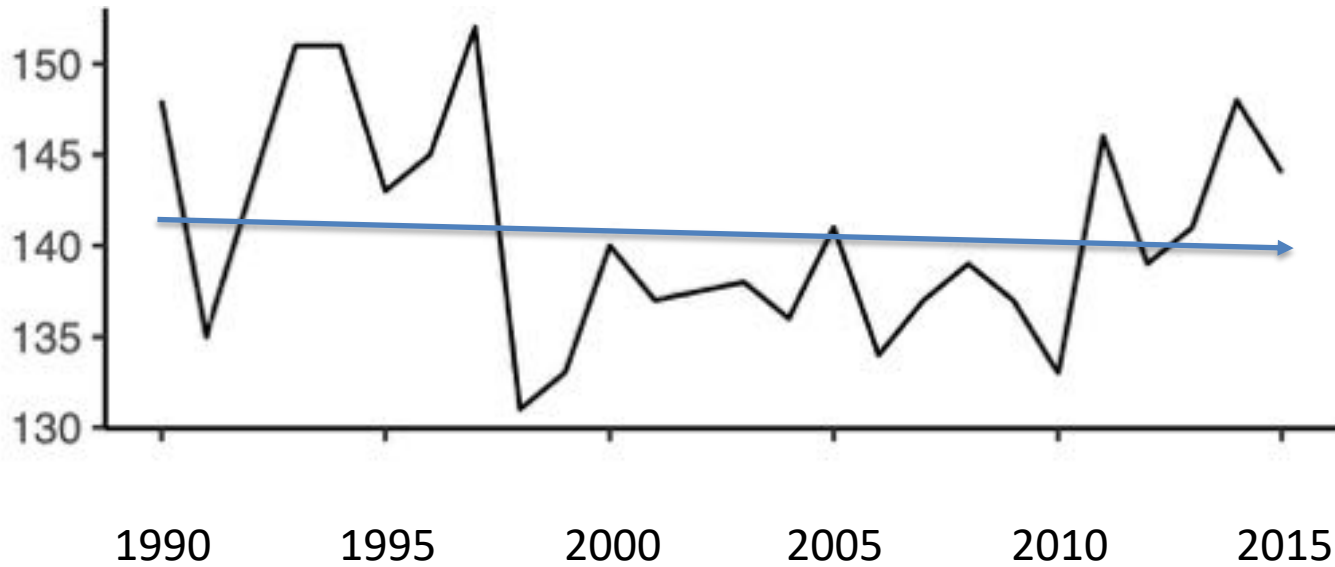
BEFORE = 2019/2022-3

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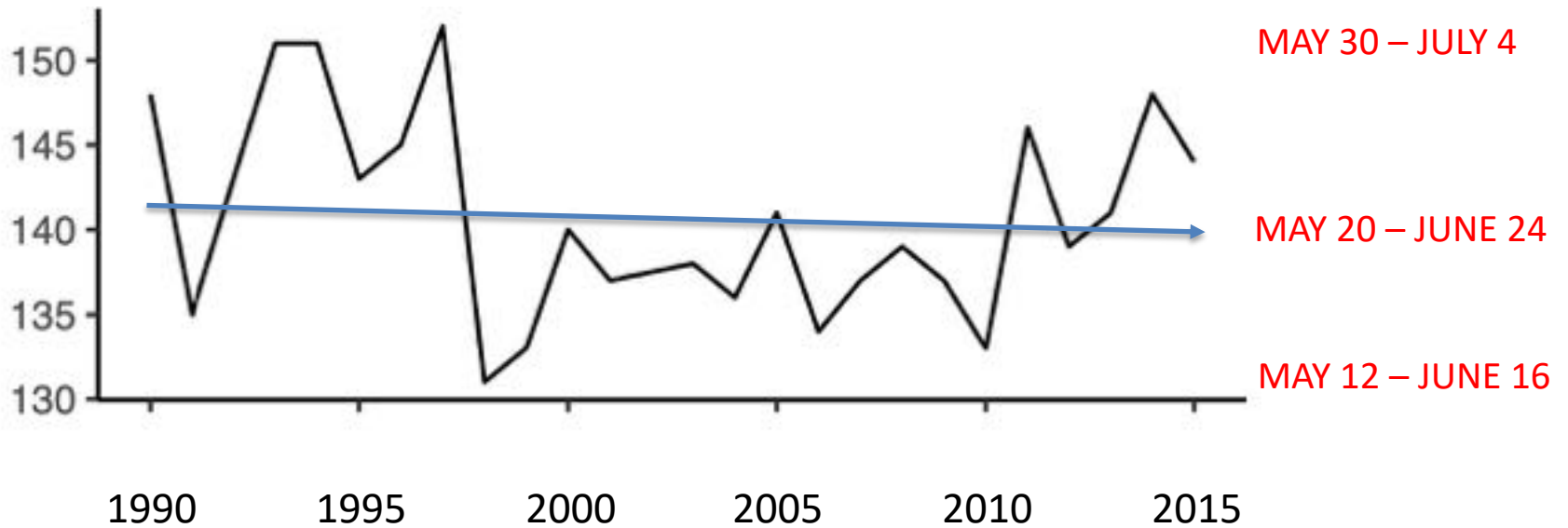
**ADEQUATE SIGNAGE
EDUCATION/OUTREACH
RESEARCH TEAM
LEGALLY RECOGNIZED BSS**



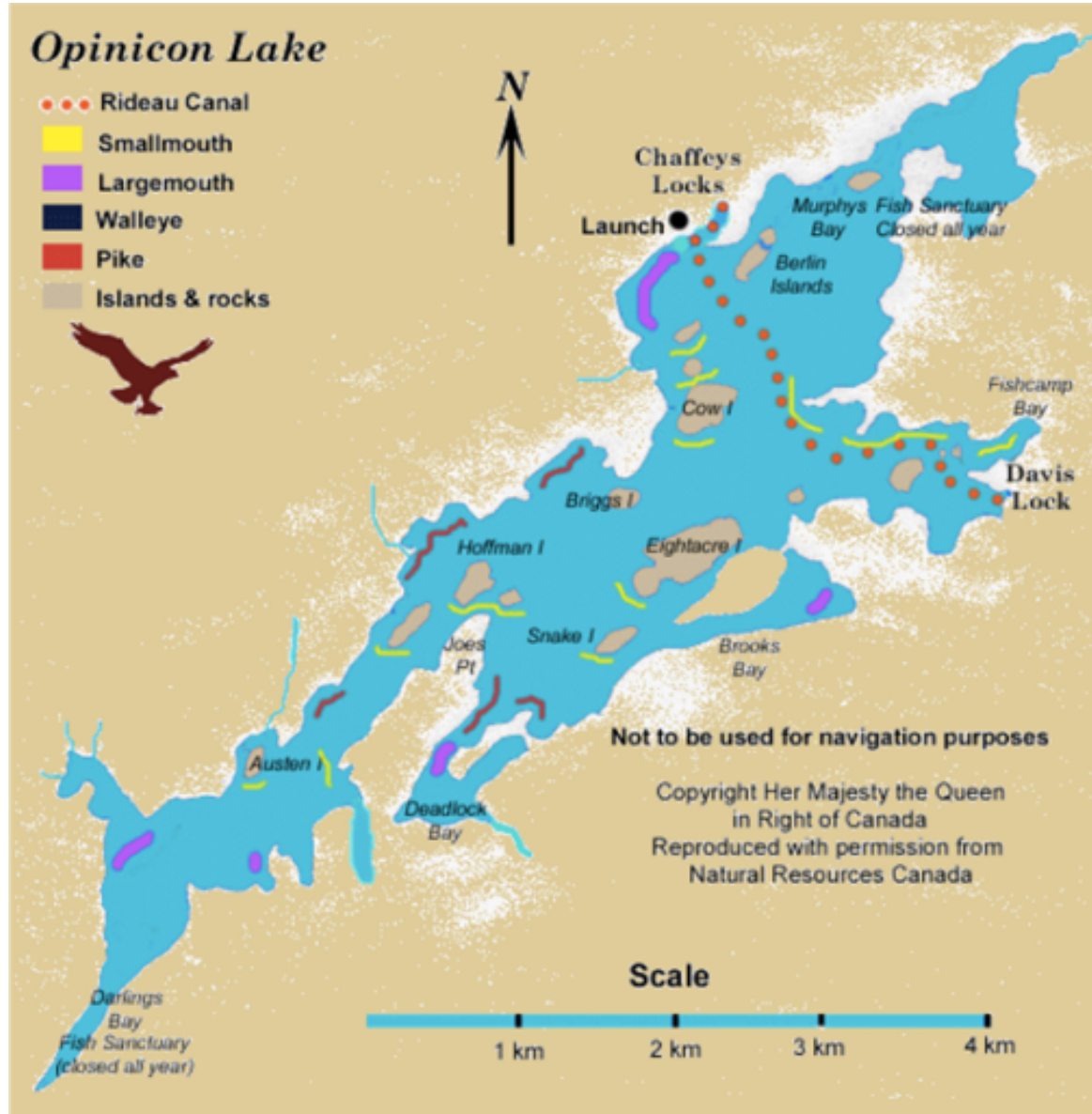
HISTORICAL TRENDS IN DATES OF FIRST SPAWNING AND INDEPENDENCE



HISTORICAL TRENDS IN DATES OF FIRST SPAWNING AND INDEPENDENCE



OPTIMUM SOLUTION: BASS SPAWNING SANCTUARIES
EFFECTIVE OPENING DAY = JULY 1
CATCH AND RELEASE ALLOWED OUTSIDE BSS



LONG-TERM CONSERVATION STRATEGIES

