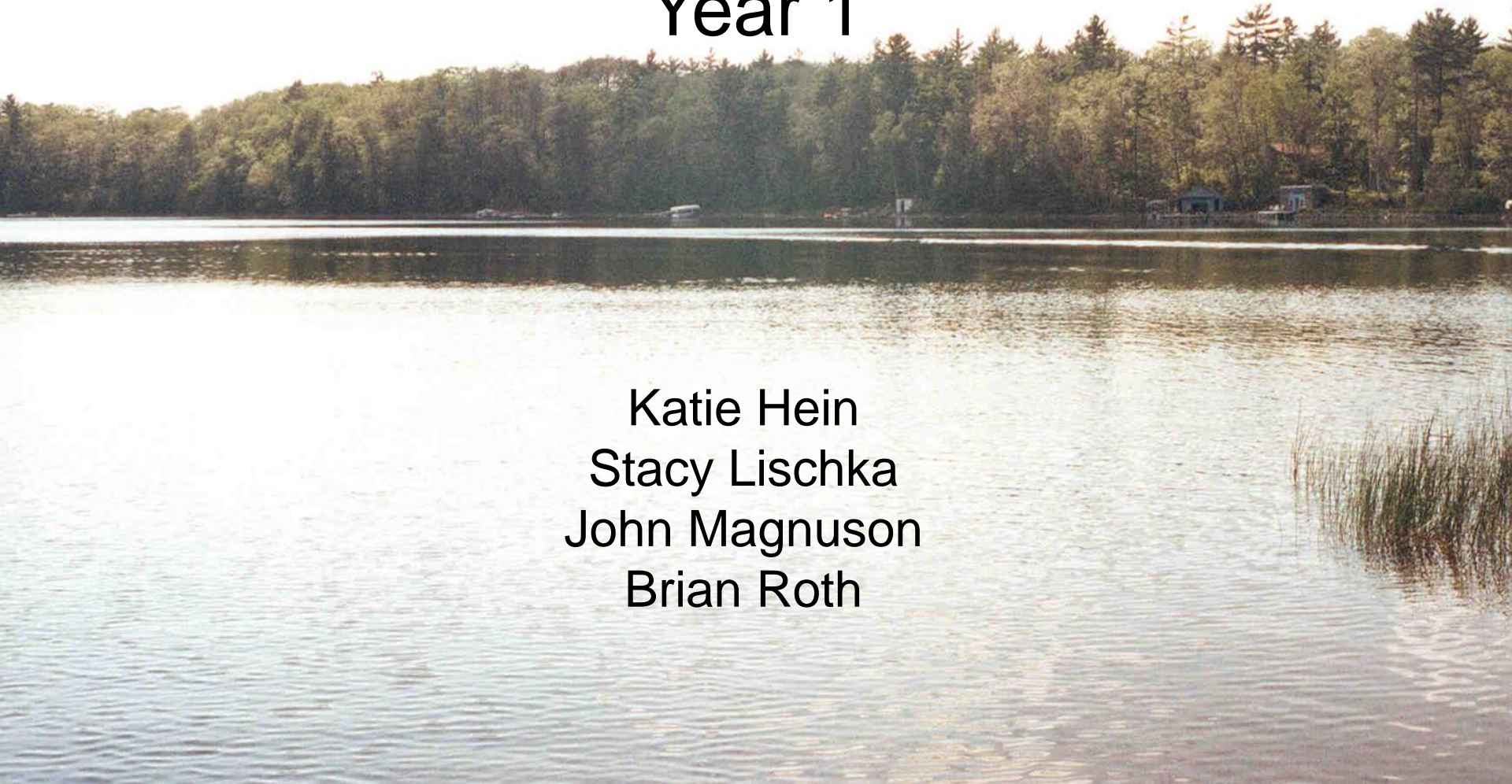


The Removal of Rusty Crayfish and Rainbow Smelt from Sparkling Lake: Year 1

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Stacy Lischka
John Magnuson
Brian Roth



Acknowledgements

- John Magnuson
- Jim Kitchell
- Stacy Lischka and Katie Hein
- Steve Gilbert and the WDNR
- Tim Kratz
- Adam Ray
- Many others.....

Why Remove These Species?

- Rainbow Smelt (*Osmerus mordax*)
 - Cisco (*Coregonus artedii*) have been extirpated in Sparkling Lake
 - Yellow perch are nearly extirpated
 - Walleye do not reproduce
- Rusty Crayfish (*Orconectes rusticus*)
 - Macrophytes are at low abundance
 - Pumpkinseed (*Lepomis gibbosus*) abundance is extremely low
 - Harm yellow perch reproduction (?)

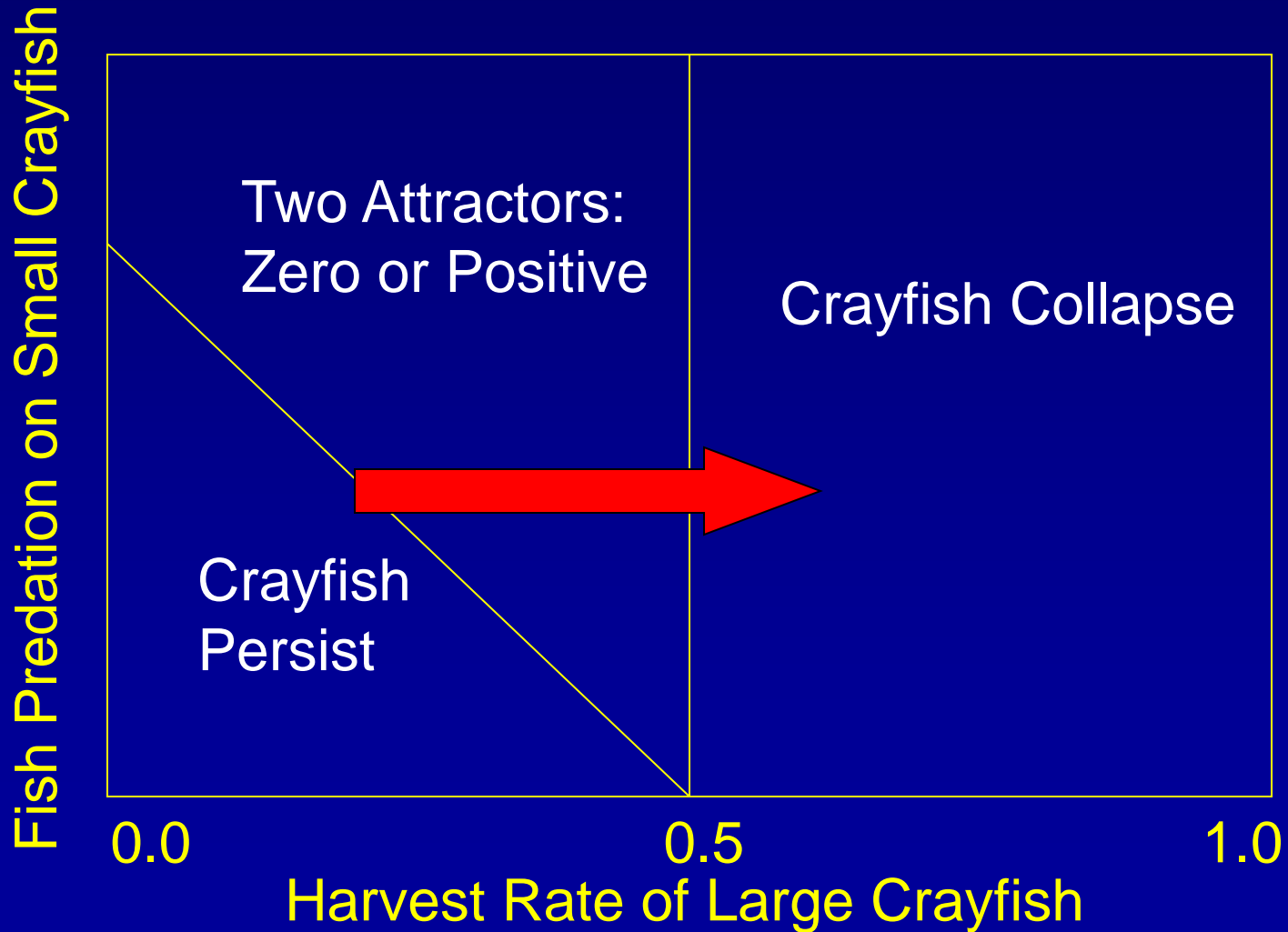
Goals of the Sparkling Lake Exotic Species Removal

- To cause a collapse of rainbow smelt and rusty crayfish populations
- Explore the removal of rainbow smelt and rusty crayfish as a time and cost-effective remediation effort
- Study the response of the lake ecosystem to the removal

Removal Theory

- Two-tiered approach to halt reproduction
- Crayfish
 - Actively remove adults
 - Passively remove juveniles
- Smelt
 - Actively remove adults
 - Actively and passively remove juveniles

Crayfish Removal Theory



Ecosystem Response Variables

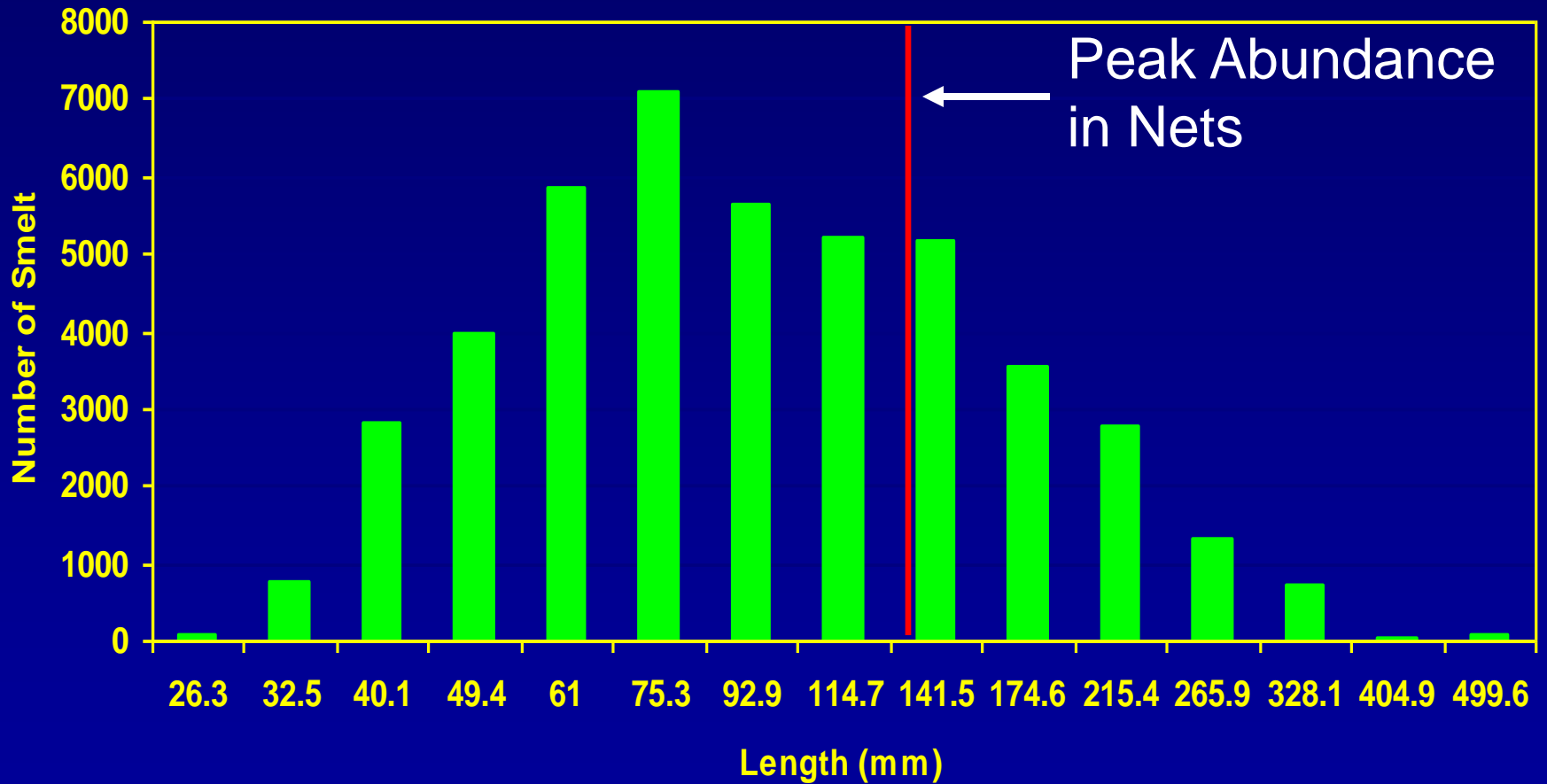
- Crayfish and smelt populations
- Macrophyte Abundance/Species Composition
- Predator Diets/Food Web
- Fish Abundance (particularly YOY fish)
- Snail Abundance

Methods of Removal

- Smelt
 - Gillnet juveniles
 - Fykenet and seine adult spawners
 - Alter fishery regulations to increase predation on juveniles

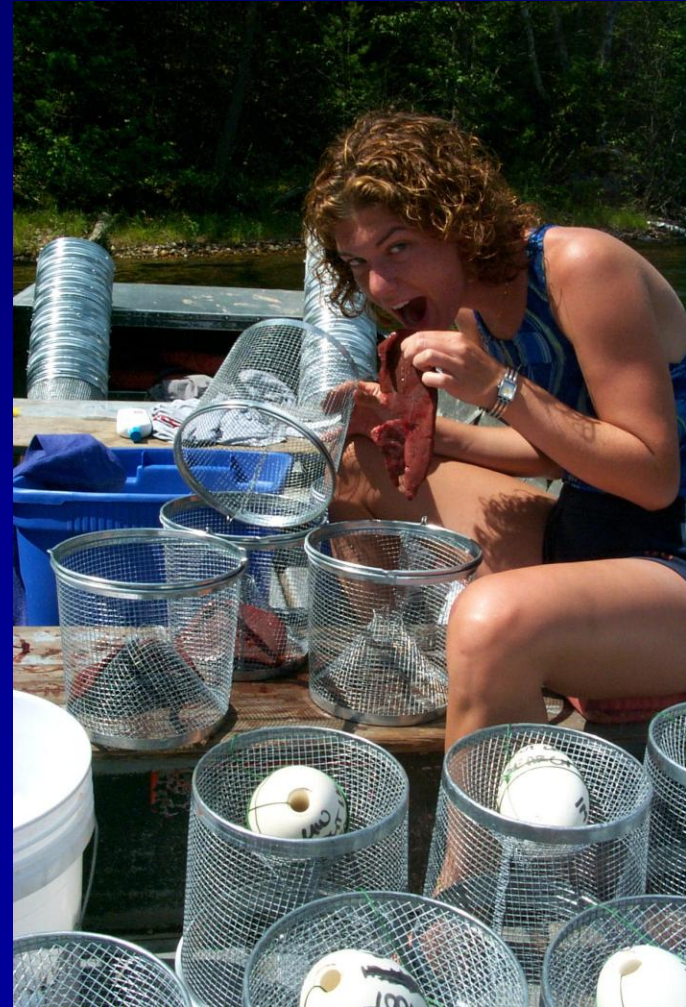


Smelt Size Distribution in Sparkling Lake

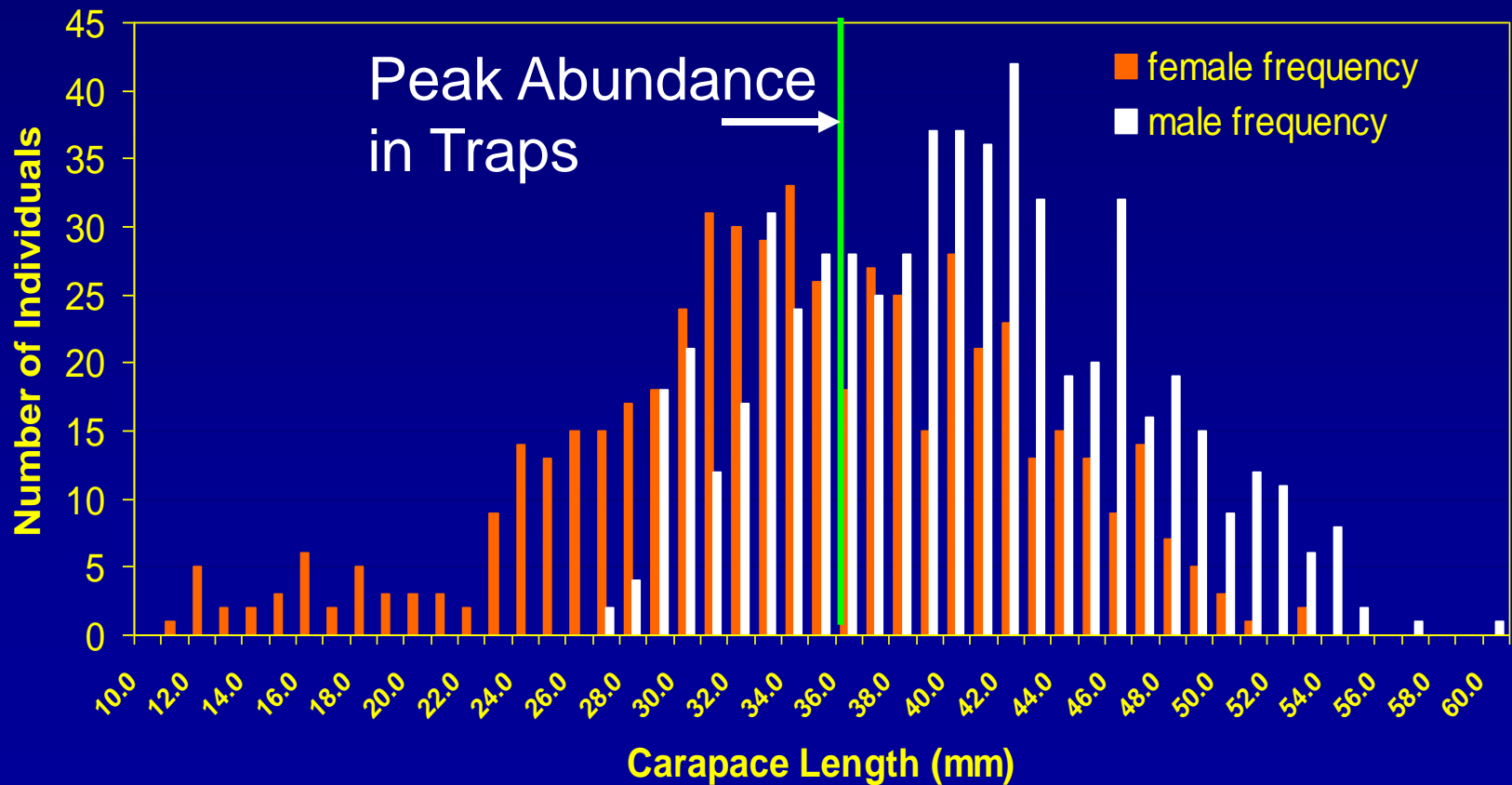


Methods of Removal

- Crayfish
 - Trap adults
 - Alter fishery regulations to increase predation on juveniles



Crayfish Size Distribution in Sparkling Lake



Removal Progress

- Smelt:
 - Population Estimate: Sonar Echogram
 - 45,148
 - Removed 9,383 smelt in 2 weeks
- Crayfish
 - Population Estimate: Modified Schnabel
 - 22,014 ADULTS
 - Removed 11,174 crayfish in 2 weeks

Predators in Sparkling Lake



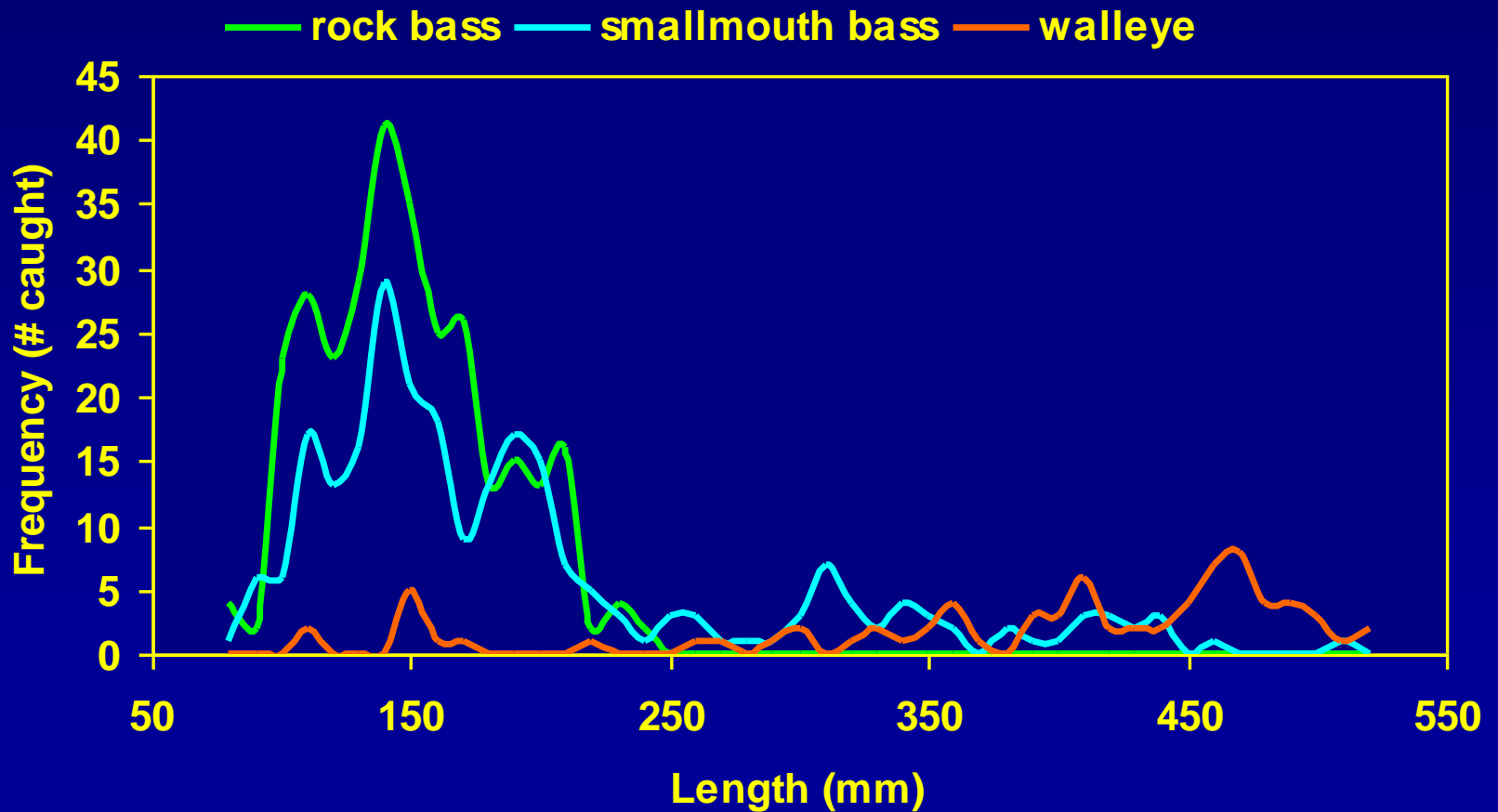
Fishery Regulation Changes (WDNR)

- Increase the abundance of important crayfish and smelt predators in Sparkling Lake
 - Increase predation on juvenile life stages
- Smallmouth bass minimum size limit
 - Increase from 14 to 18 inches
- Walleye minimum size limit
 - Increase from 15 to 26 inches

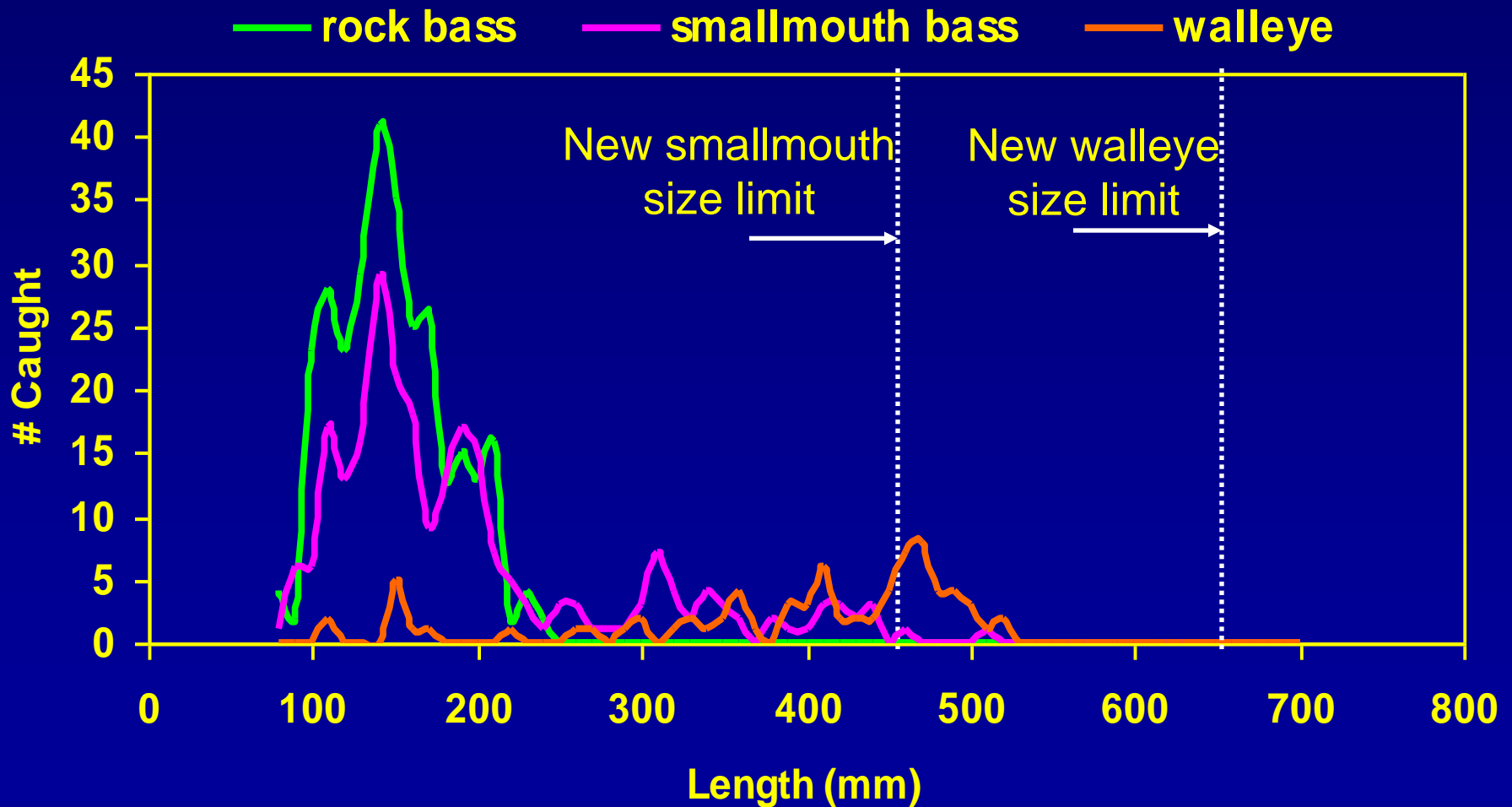
Predator Abundance: 2001

- Modified Schnabel Multiple Catch, Multiple Recapture
 - Smallmouth bass: 1,248
 - Rock Bass: 1,972
 - Walleye: ??? (At least 400)
 - Yellow perch: ??? (we only caught 4)
 - Pumpkinseed: ??? (we only caught 4)

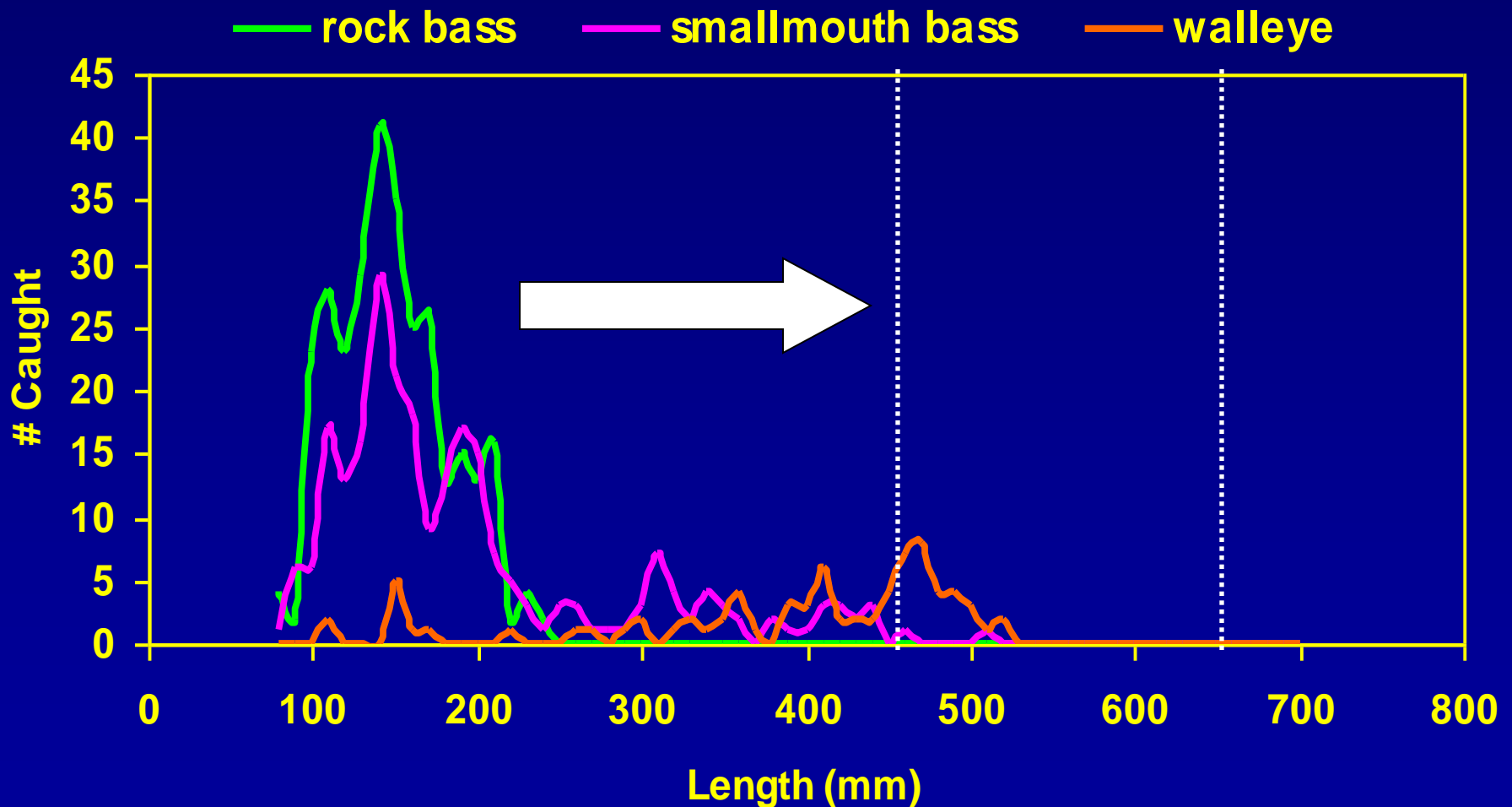
Length-Frequency of Fish Caught Last Summer



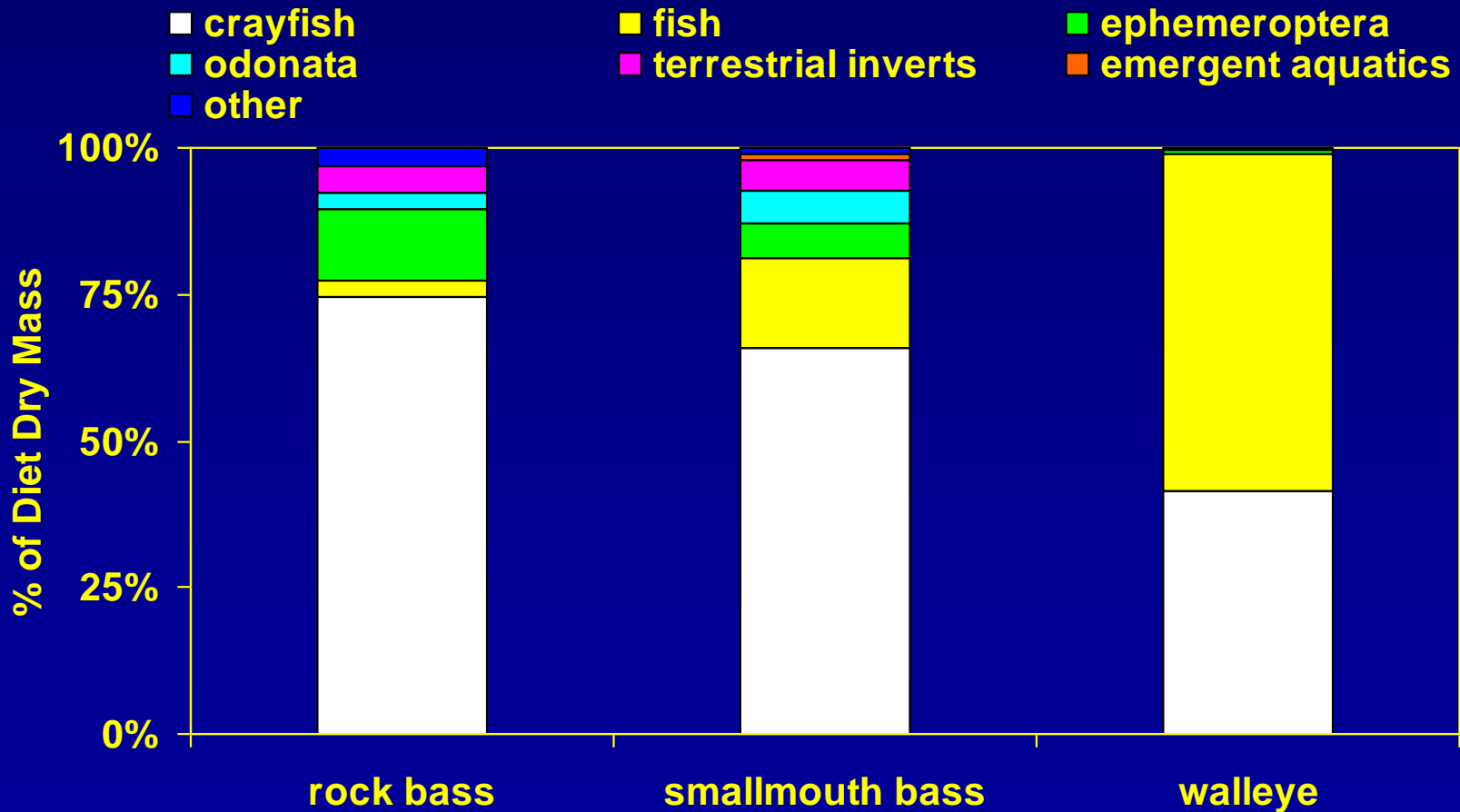
Changes in Fishery Regs



Changes in Fishery Regs



Predator Diets: Summer 2001



How will Fish Reg Changes Affect Smallmouth Bass Predation?:

- 358mm (722g)=~1,250g
crayfish, 418g smelt
- 427mm (1203g)=~1,300g
crayfish, 440g smelt



How will Fish Reg Changes Affect Walleye Predation?:

15"=381mm 26"=660mm

- 389mm (582g)=~250g crayfish, 762g smelt
- 427mm (626g)=~240g crayfish, 727g smelt
- 443mm (752g)=~320g crayfish, 953g smelt
- 475mm (933g)= 375g crayfish, 1,126g smelt
- Bigger? Wow...

Future Directions

- Smelt
 - Stacy Lishka will head removal bouts that will occur every 2 weeks for 14 consecutive days.
 - Population estimates in between removal bouts
 - DNR plans to stock adult walleye into Sparkling Lake this year

Future Directions

- Rusty Crayfish Removal
 - Attempt to “step-up” removal
 - Focus on southern end of the lake
 - Data Intensive or Removal Intensive?

Challenges to the Crayfish Removal

- Can fish predation substantially reduce the number of juveniles that reach adulthood?
- How does shelter affect the possibility of an alternate state?
- How will the loss of crayfish affect desirable prey species?

Challenges to the Smelt Removal

- How will reducing the density of smelt affect their reproductive capacity?
- Will predators help cause a collapse in the population?
- How will the smelt removal affect desirable prey species?

