

# **Intensive Production of Walleye (*Sander vitreus*) and Hybrid Walleye in a Recycle Water System Utilizing a Domestic Broodstock**

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# Objectives

- The UWSP-Northern Aquaculture Demonstration Facility (Bayfield, WI) conducted a three year pilot project to evaluate and demonstrate commercially available new technologies for producing purebred and hybrid walleye for stocking and food fish.
- The project consisted of different areas including:
  - Intensive production and seasonal advancement of captive walleye and sauger broodstock.
  - Production of large walleye (>300mm)(12inch) on commercial feed for NR stocking.
  - Production of hybrid walleye to food market size(454g)(1.0 pd) using intensive rearing and recirculation systems.





# Captive Broodstock

Winter period  
Coldbanking





# Seasonal Advancement of Spawning

## *Hormone Injection Method*

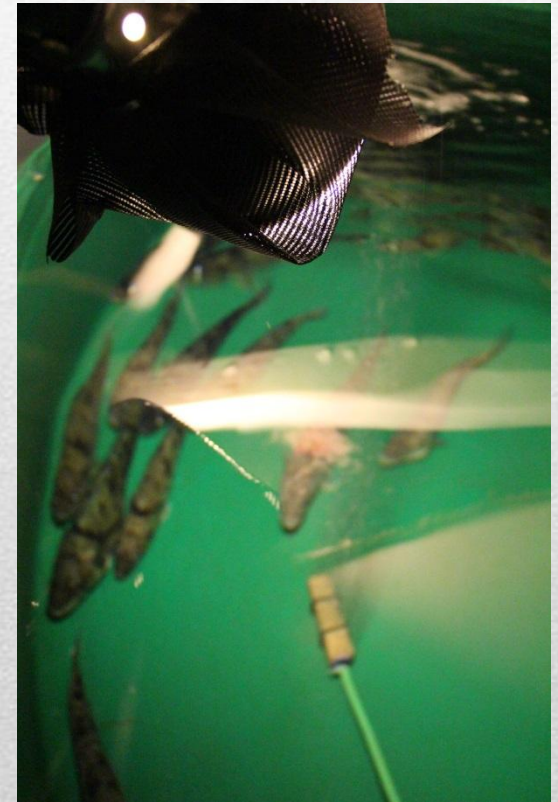
- Manipulate water temperature
- Human Chorionic Gonadotropin (hCG) Hormone
- 2 injections: 3-5 days apart
- Females 500 IU/Kg
- Males 350 IU/Kg



# Out of Season Spawning

## *Photoperiod and Water Temperature Manipulation*

- Manipulate Water Temperature and Photoperiod
- Overhead Lighting, Water Chiller and Boiler
- Start August- set eggs- Early winter spawn(Feb)
- Extend spawn into June





# Materials and Methods

## *Incubation*





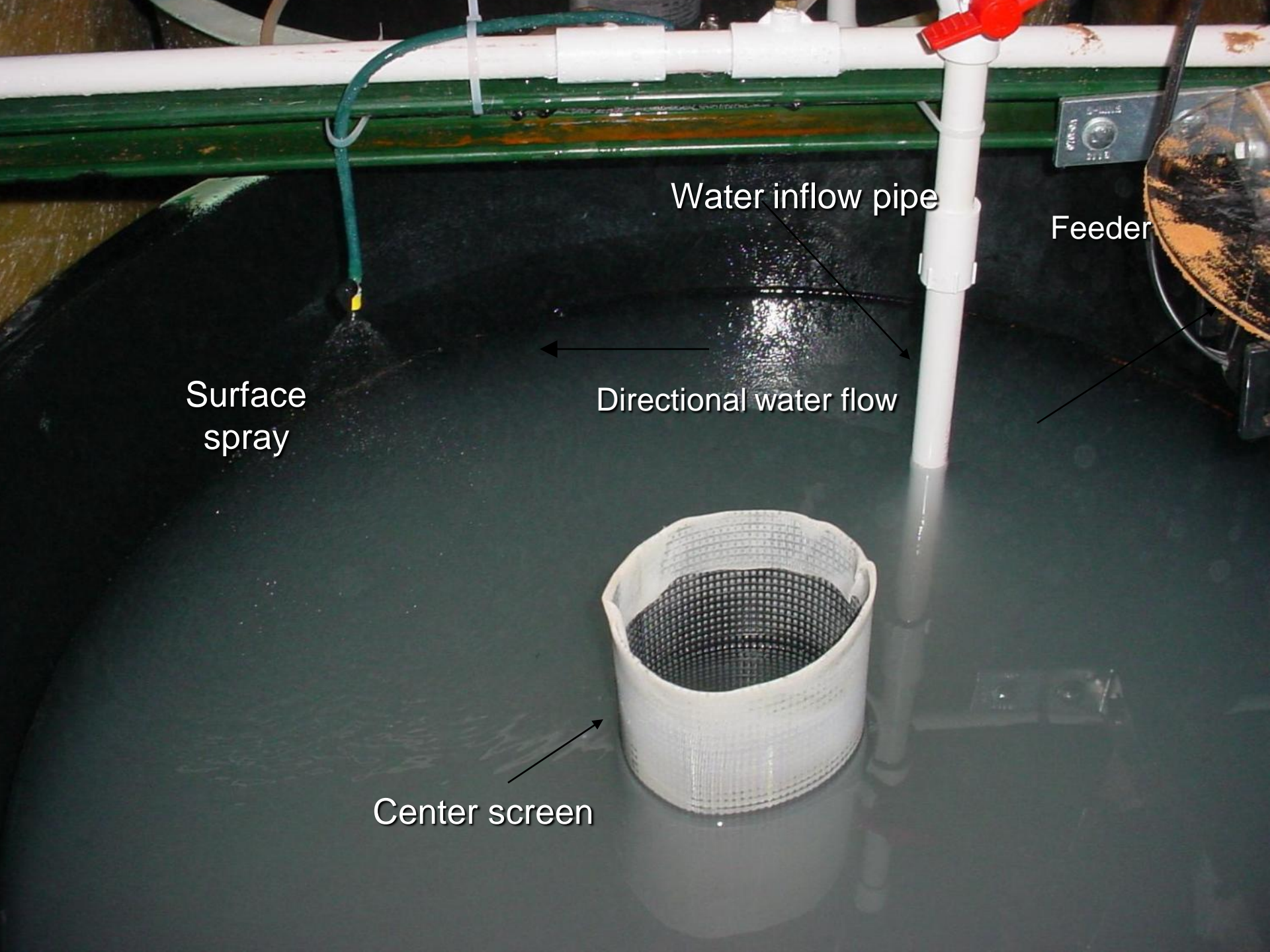
# Materials and Methods

## *Experimental Tank Setup for Phase I-II Intensive Rearing*

- 240 L (60 gal) round tanks
- Sidewalls painted black
- Gray bottom
- Adjustable lighting
- Directional flow-thru  
20°C(70°F) water (2-8 lpm)
- Clay(old mine #4)(50-80 NTU)
- 24 hr feeders
- Surface spray
- Removable screens
- Daily cleaning system







Water inflow pipe

Feeder

Surface  
spray

Directional water flow

Center screen



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B1

B2

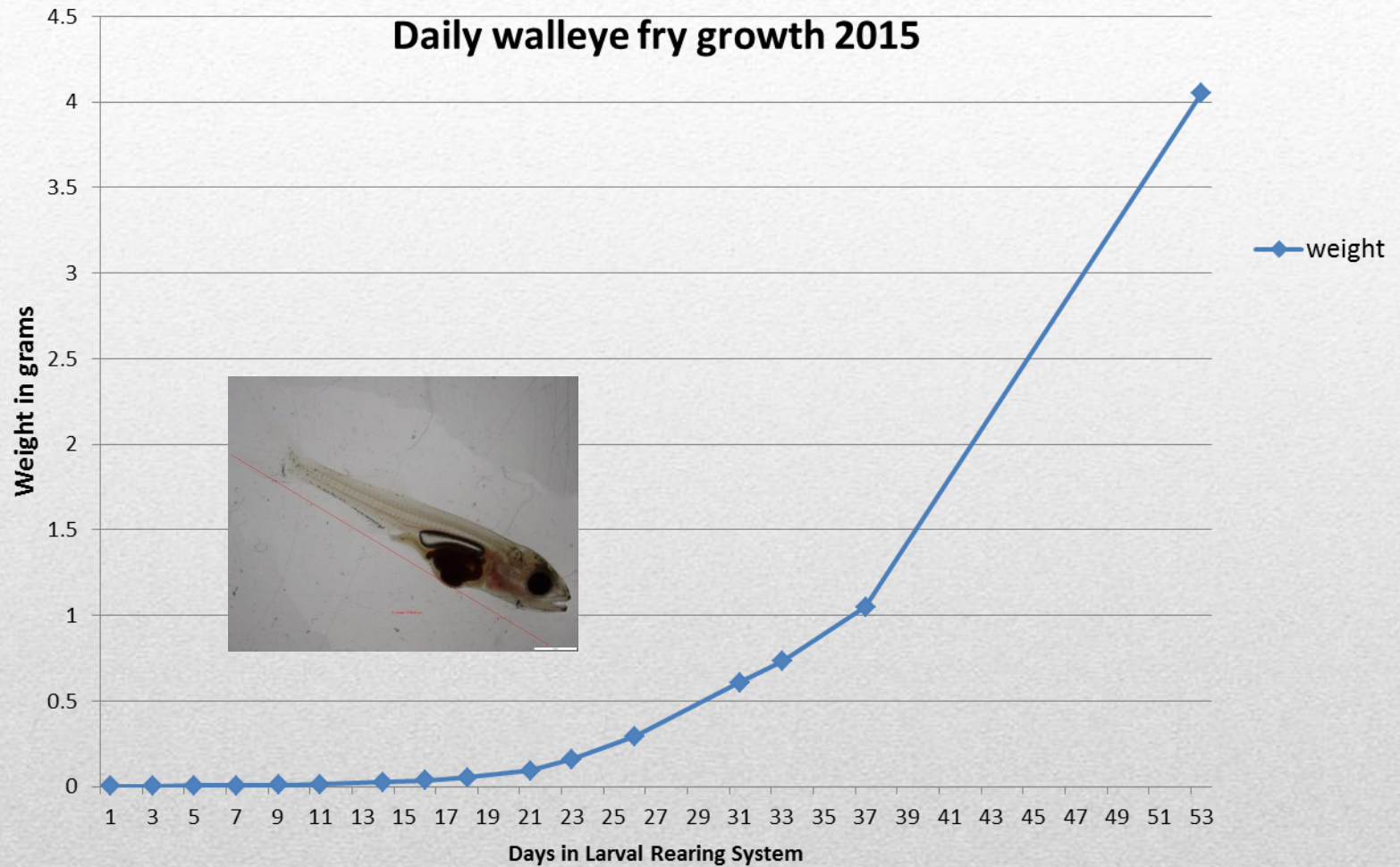
C1

C2

1.0 mm

Otohime fry feed  
200 -1400 m

Nelson Silvercup  
walleye grower  
1.0mm





# Materials and Methods

## *Recycle System Used For Phase III-IV Intensive Growout*

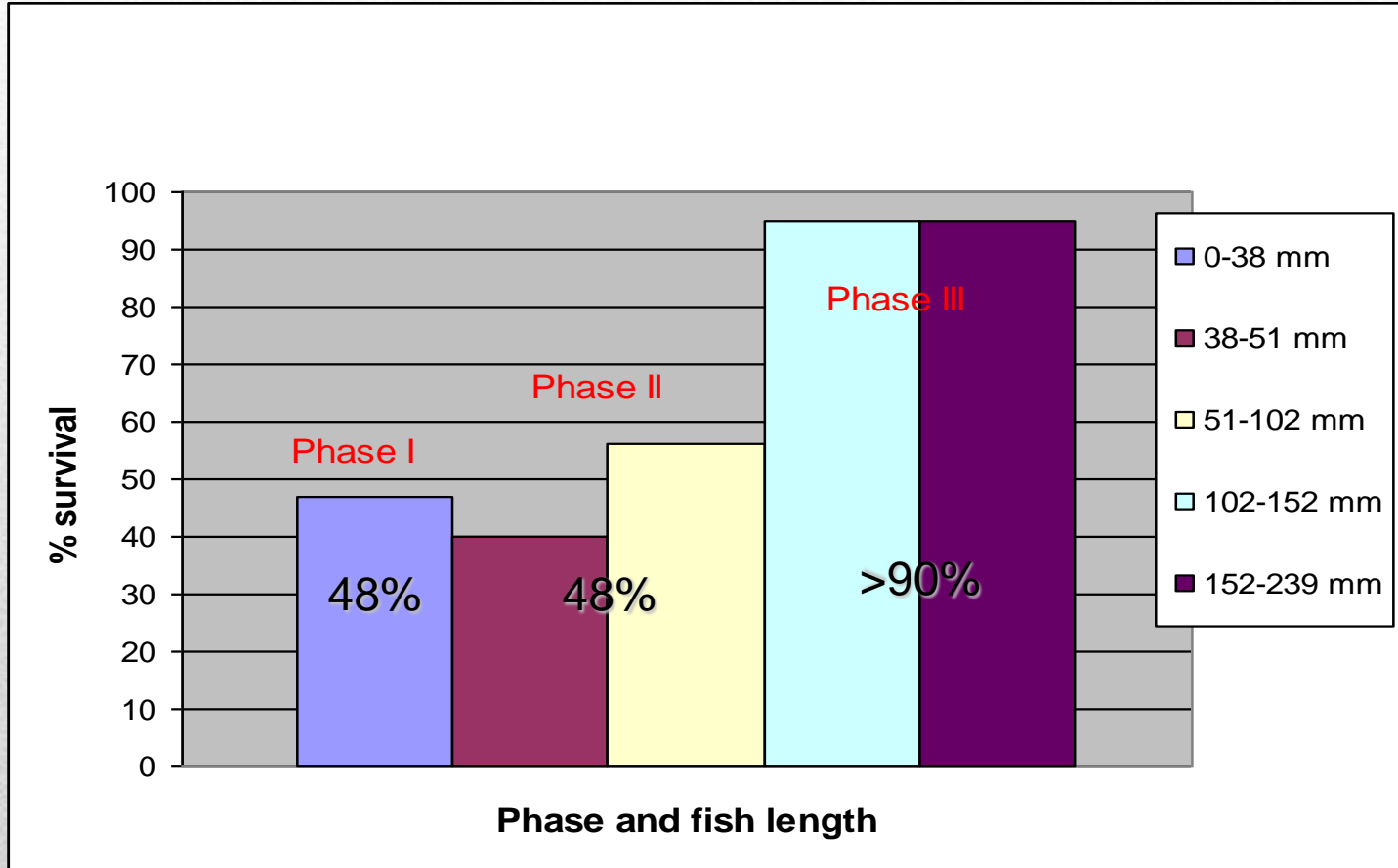
### RAS Parameters:

- 53,000 L water capacity
- 33 m<sup>3</sup> tank culture space
- Fluidized sand biofilter
- Drum Filter
- Dual drain circular tanks
- Oxygen cone
- In sump electric heater
- 23°C (74°F) Water temp.



# Results

## *Overall Survival Percentages Intensive Rearing*





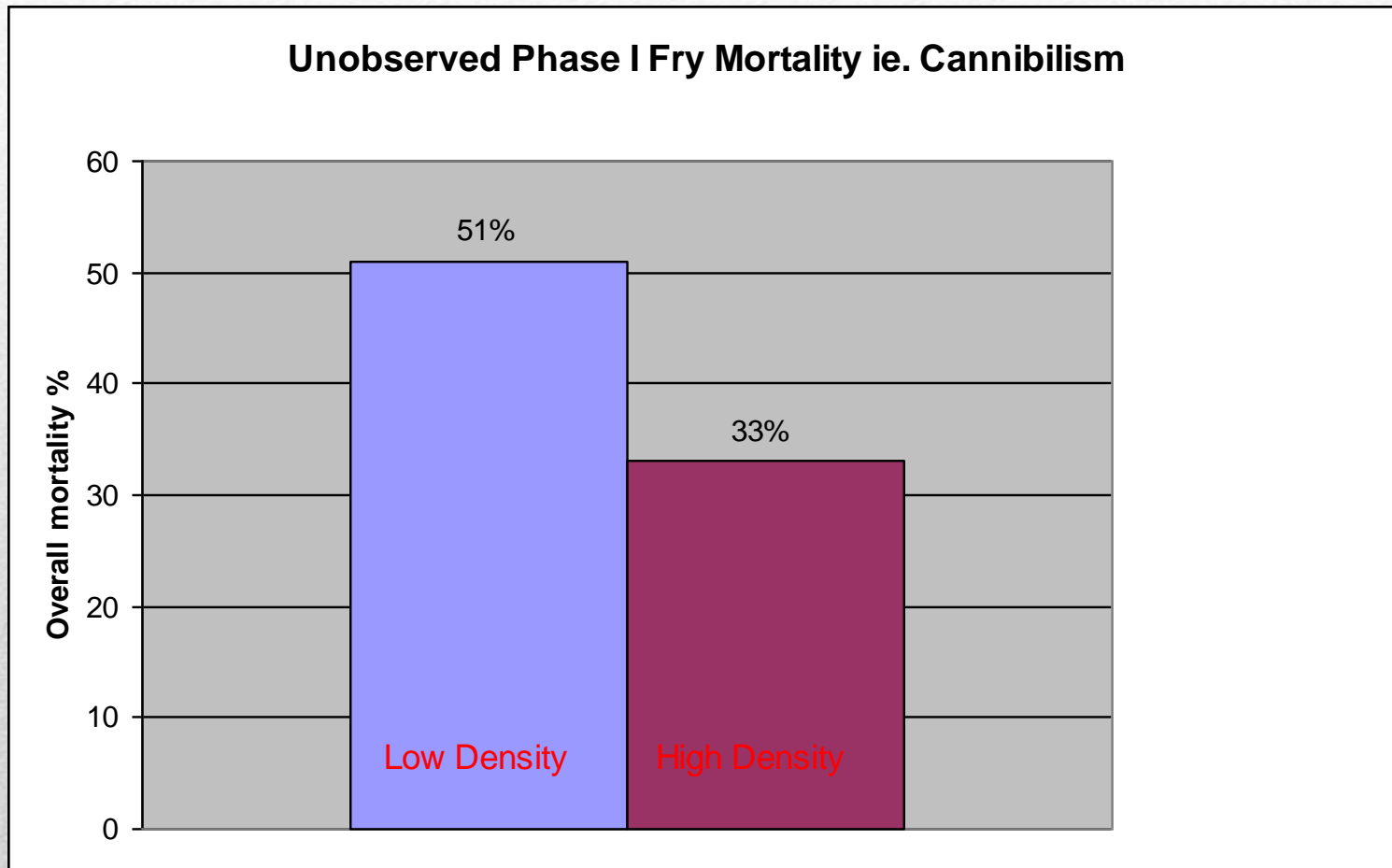
# Walleye/Hybrid Walleye: Cannibalism

- Starts immediately
- Unobserved mortality
- Can account for low survival rate in ponds and in indoor tanks



# Results

## *Phase 1- Fry Culture*

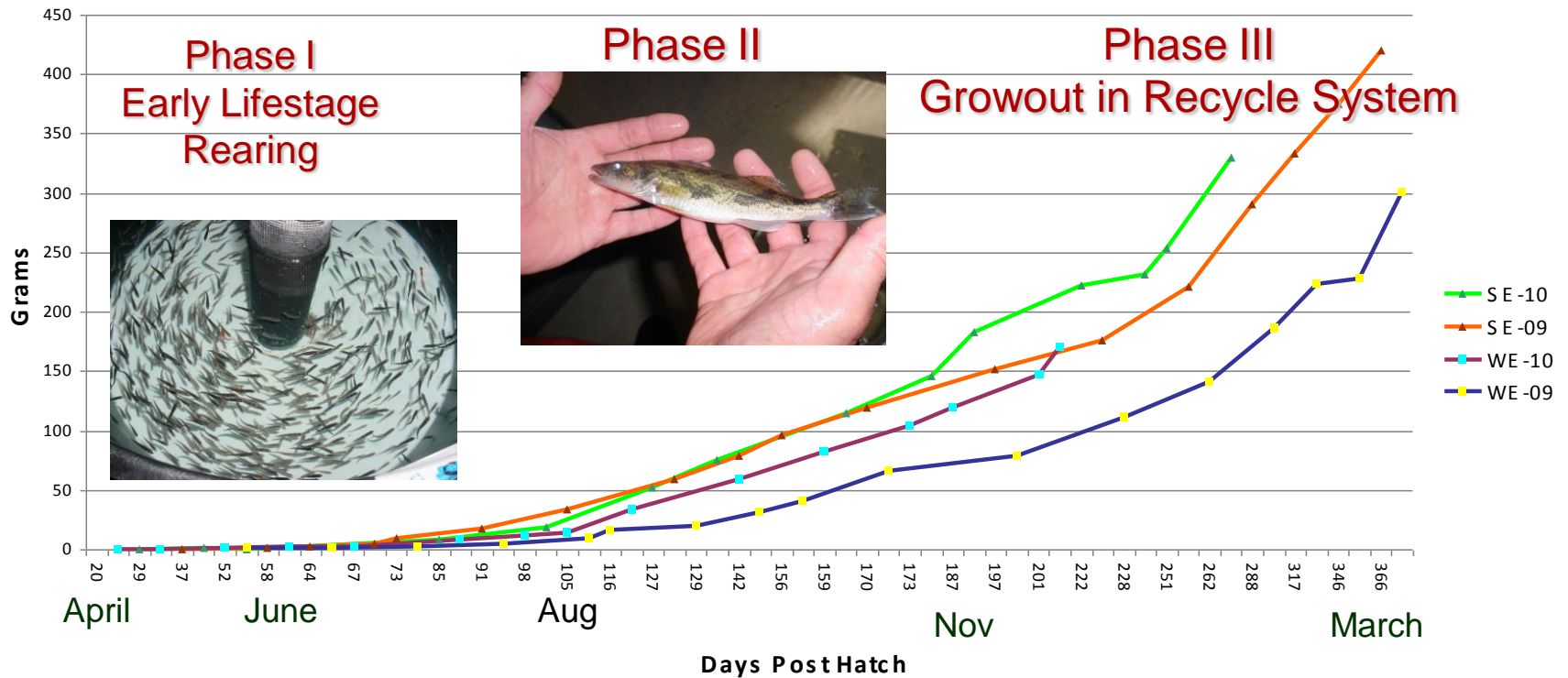




# Results

## *Growth Rates*

Hybrid Walleye vs Purebred Walleye Growth in Weight





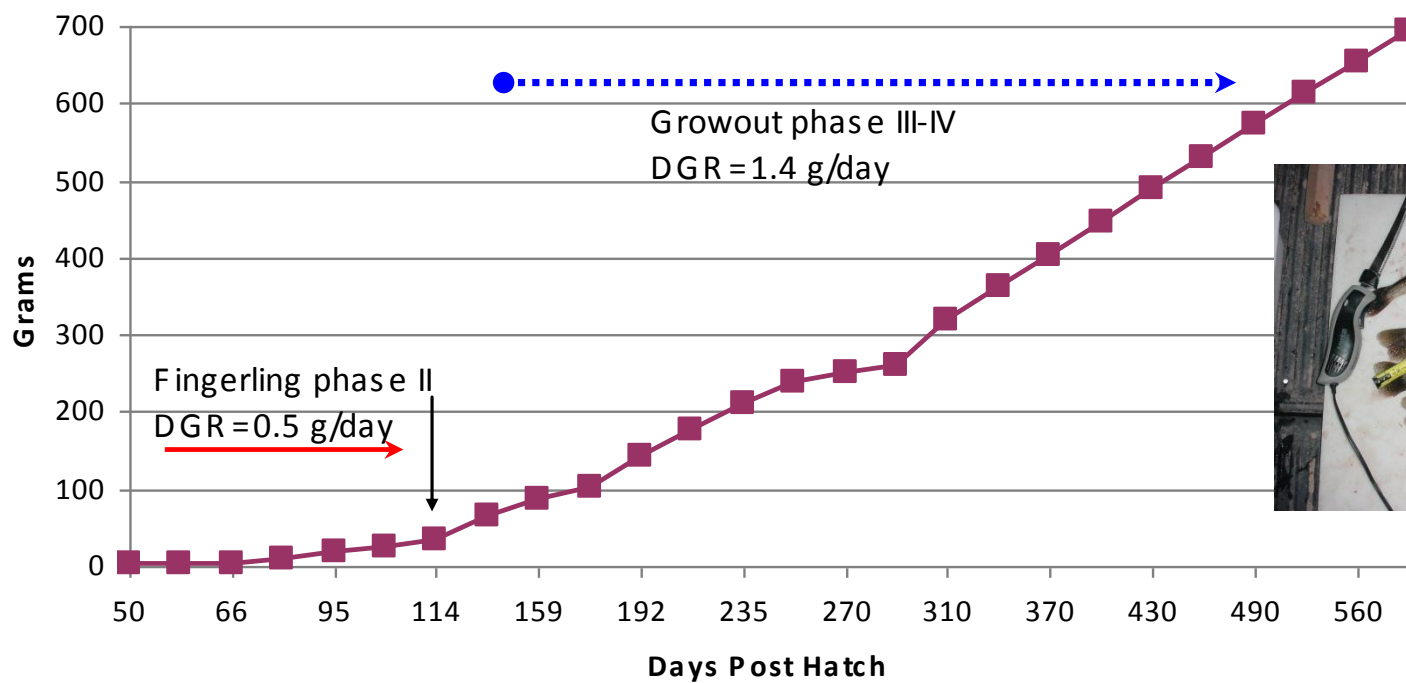
1 year old Hybrid Walleye (1.0kg)



# Results

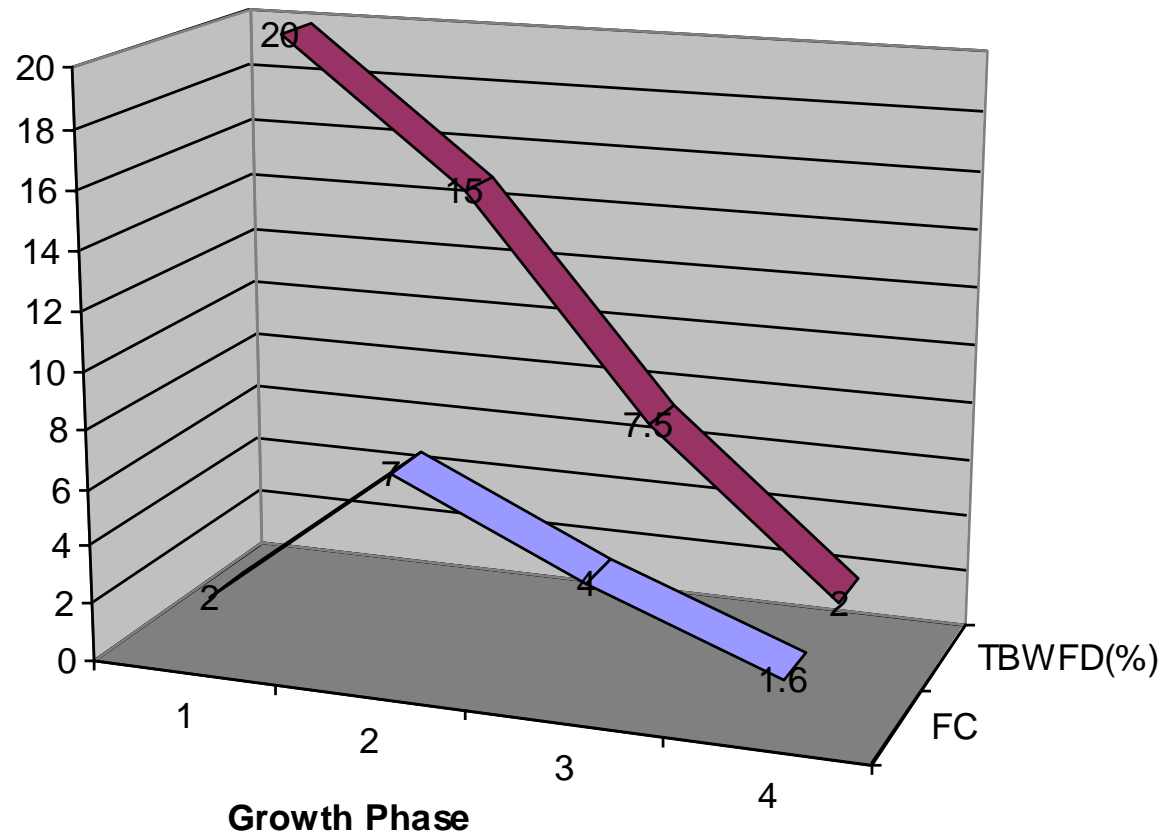
## *Extended Growout Growth Rates*

Weight gain of Hybrid Walleye Reared in Recycle System at 23 C



# Results

Hybrid Walleye Feed Rates and Conversion Ratio





# Conclusion

- Walleye and hybrid walleye can be successfully reared indoors utilizing captive broodstock, early advanced spawning, incubation, and rearing techniques
- Processing yields of >50% and initial marketing studies indicate good aquaculture potential and high demand for hybrid walleye as food fish.





# Acknowledgements

We would like to thank Alan Johnson at the Rathbun Fisheries Research Center in Iowa for all his assistance and guidance. We would also like to acknowledge the efforts of NADF technicians Lance Bresette, Nate Martin. Dr. Chris Hartleb (Director) and Jim Held (Extension) have also provided assistance and guidance throughout this project.

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QUESTIONS????????????????

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