





Top Selling Items
Internet Payments

Skinless Walleye
(10lbs)

\$145.00

Walleye
Filletts (11lbs)

\$135.00

Rainbow Trout
(10lbs)

\$98.00

Fresh Bluegill
 11lbs Only \$150
[Click Here](#)

Fresh Water Fish Sampler
 6 lbs \$88

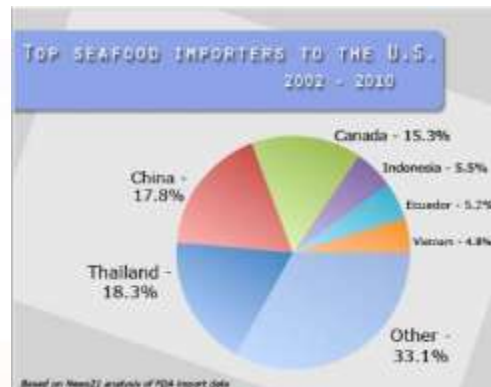
Fresh Perch
 11lbs Only \$185
[Click Here](#)

Fresh Crappie Fillets
 11 Pounds
 Only \$160
[Click Here](#)

Domestic Aquaculture Potential

(Reuters) - Aquaculture output is expected to rise 33 percent over the next decade helping to meet the world's growing demand for fish as healthy and nutritious food gains popularity while fishing stagnates, the United Nations' food agency said on Monday.

Farmed Fish To Exceed Wild Fish In Human Consumption By 2018, FAO Says



Tainted Seafood Reaching U.S., Food Safety Experts Say

■ While most U.S. seafood is imported, no more than 2 percent is inspected.



Partnership Success



Wisconsin fish farm gets grant to study hybrid walleye

Story Comments

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Posted: Wednesday, August 22, 2012 9:18 am

0 comments

Northside Enterprises of Black Creek will receive nearly \$100,000 from a U.S. Department of Agriculture grant to find more efficient ways to put Wisconsin captive-raised walleyes on the market.

The two-phase project will test the newest technologies for producing large purebred walleye fingerlings in recirculating aquaculture systems and ponds for autumn stocking, and then will use those technologies to produce egg-to-plate hybrid walleye—walleye crossed with sauger—in a one-year time frame.

Studies in Iowa and Wisconsin have shown that hybrid walleyes grow faster than purebreds and taste virtually identical to purebreds. They also found that walleye fry can be successfully raised in tanks using only pelleted foods, and that spawning walleye can be advanced by at least two months in the spring using environmental and hormonal manipulations.

The USDA grant comes from the Small Business Innovation Research program. Phase I will be conducted collaboratively by Northside and the UW-Stevens Point Northern Aquaculture Demonstration Facility, which has begun raising captive walleye and sauger brood fish to supply the eggs and milt to continue this research.

Northside Enterprises, Black Creek, WI



University of Wisconsin-Stevens Point

Edible Success

Northside Enterprises, Black Creek



University of Wisconsin-Stevens Point

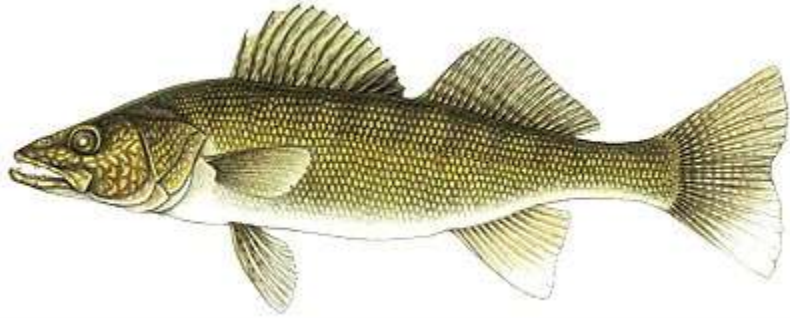
Intensive Production of Hybrid Walleye (*Sander vitreum* x *S. canadense*) in a Recycle Water System

Gregory Fischer, Facility Operations Manager

**University of Wisconsin-Stevens Point
Northern Aquaculture Demonstration Facility**

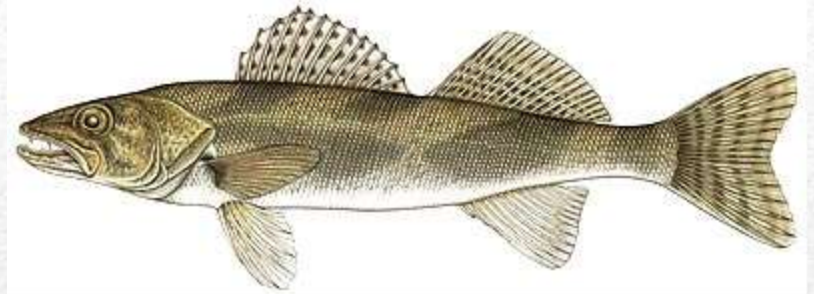


Sander vitreum



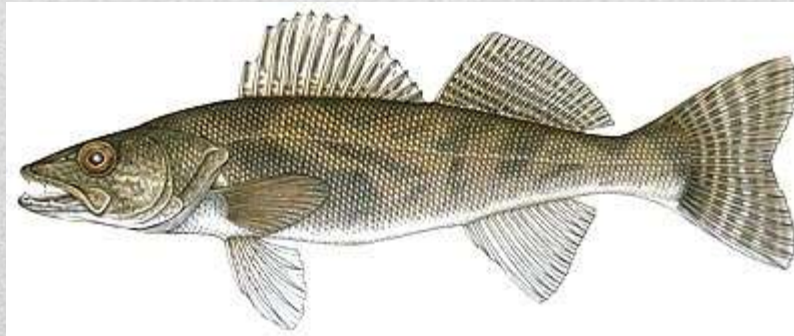
Female Walleye

Sander canadense

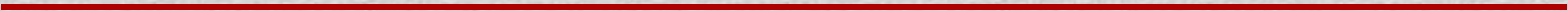


Male Saugeye

X



Hybrid Walleye (Saugeye)



Why Hybrid Walleye(Saugeye)???

Hybrid walleye have many characteristics suitable for aquaculture production:

- Ability to rear and spawn broodstock intensively and out of season.
- Ability to do entire rearing cycle intensively on commercial feeds.
 - High growth rates and good feed conversions.
 - Existing markets and good prices (\$10-12 lb).
 - Potential for aquaponics.





Yellow perch



Purebred walleye



Hybrid walleye



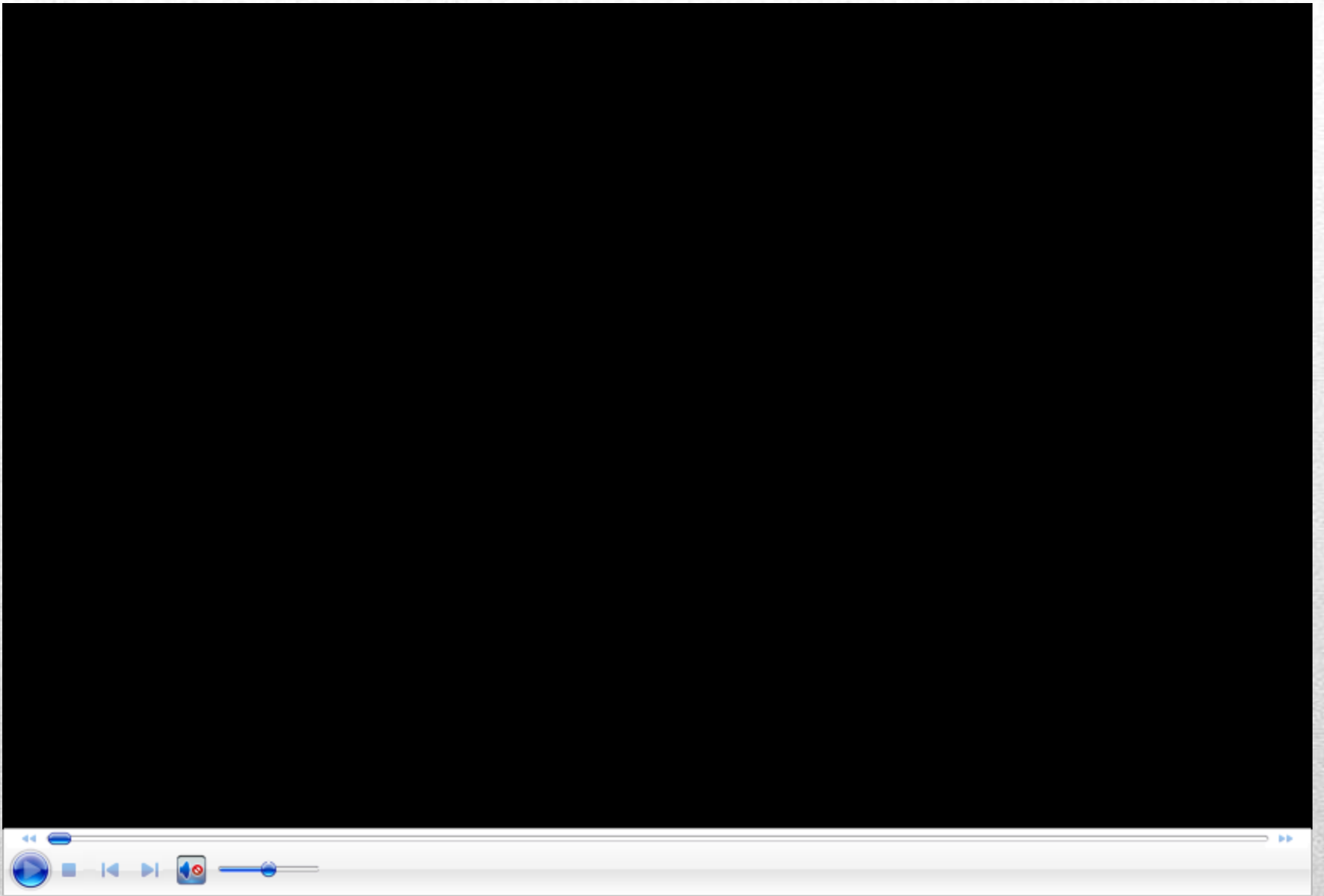
ALL: 114 days old reared in recycle water system

Captive Broodstock











Egg Chemical Treatment



Fry Enumeration

Jensorter Fry Counter



XperCount Fry Counter



Early Fry Rearing Room





New Fry Rearing Room

Materials and Methods

Experimental Tank Setup for Phase I-II Intensive Rearing

- 230 L (60 gal) round tanks
- Sidewalls painted black
- Gray bottom
- Adjustable lighting
- Directional flow-thru
20°C (70°F) water (2-6 lpm)
- Clay (old mine #4)
- 24 hr feeders
- Surface spray
- Removable screens
- Daily cleaning system





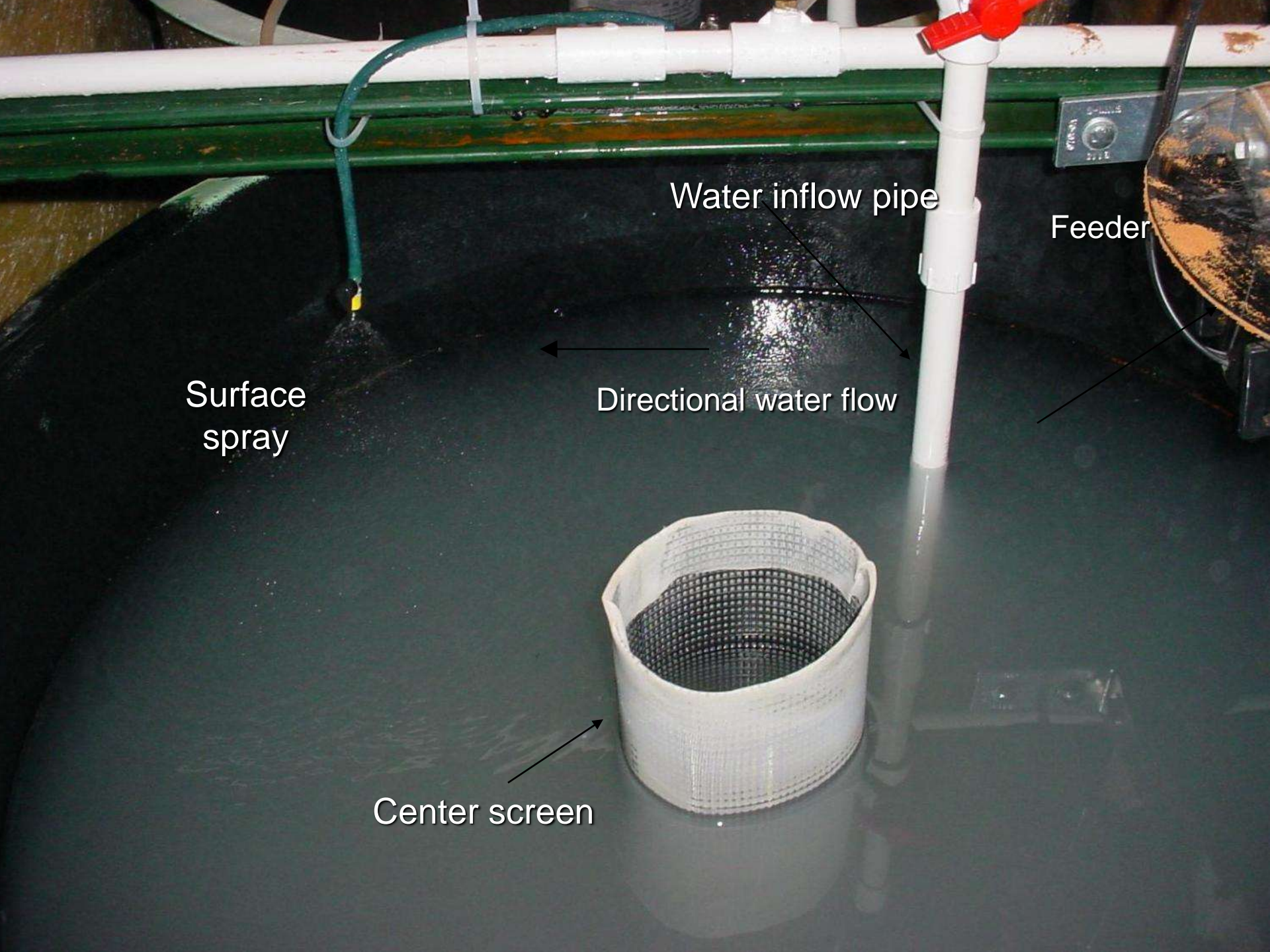
HYDRO COMPOSITES, L.L.C.

11Dx13P DEEP WATER DREDGE TANK

DESCRIPTION

DATE	BY	CHKD	APP'D
08/13/14	13/14		

2



Water inflow pipe

Feeder

Surface spray

Directional water flow

Center screen



SE

2216

Turbid



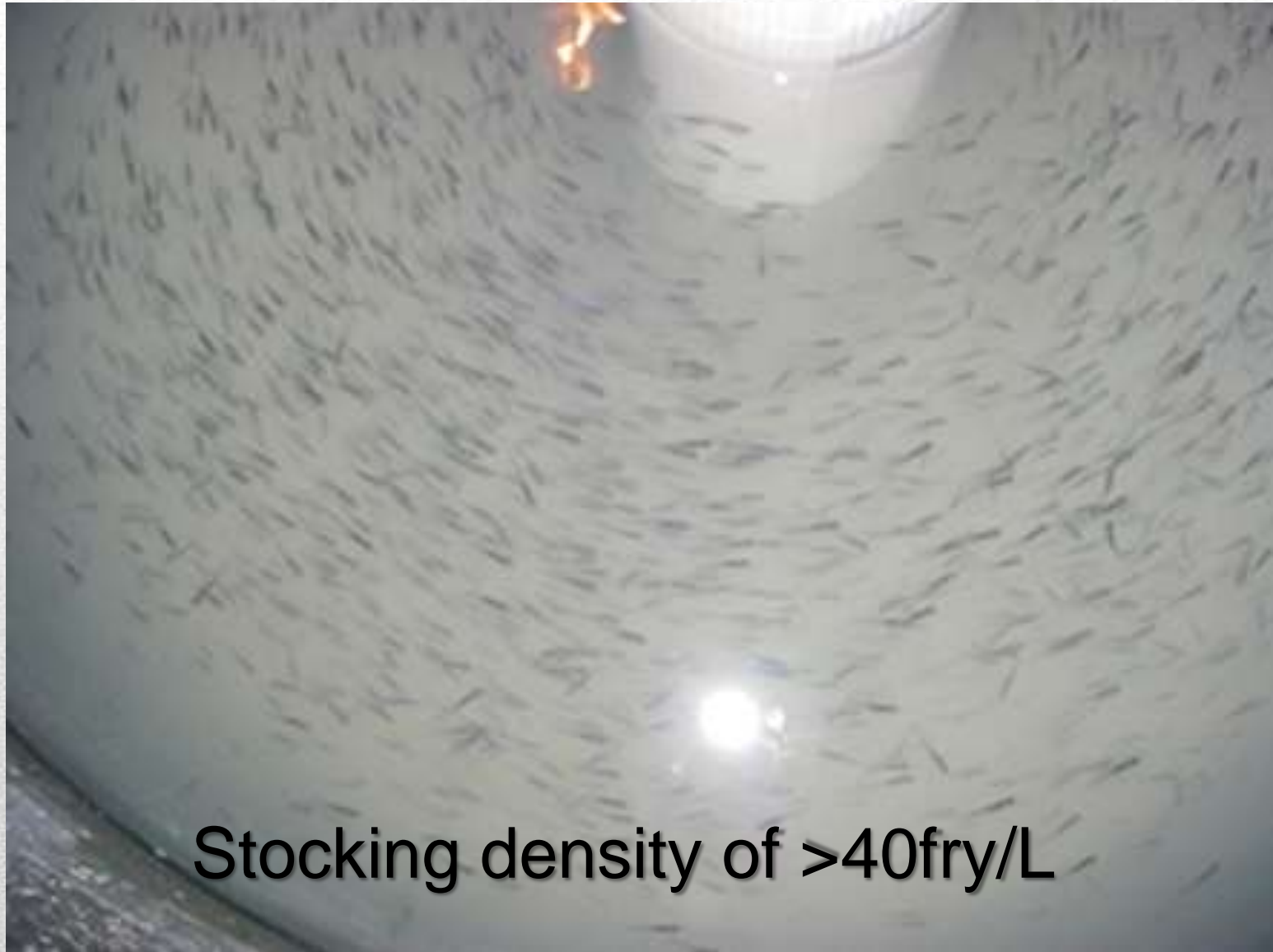
Not Turbid



Turbidity

- Adjustable Peristaltic pump
- Kentucky Clay- Old Mine #4
- 50-80 NTUs





Stocking density of >40 fry/L



10,000 fry per tank

Note screen size and turbidity level (lowered for picture)

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Otohime fry feed
200 -1400 m

Nelson Silvercup
walleye grower
1.0mm

Homemade 24 hour fry feeder



Home-Made Automatic Feeder Pricing

\$59.99- Intermatic 24 Hour Mechanical Time Switch

\$4.89- Cord

\$2.18 per feeder-Plexi-glass (\$34.99/16 per sheet)

\$1.00- Wood

\$5.99- Plastic Welder Epoxy

\$0.75- 1 ½" Schedule 40 PVC cap

\$0.70- 1" Schedule 40 PVC cap

\$0.50- Plastic Bolt

\$0.78 per feeder- Door Sweep (\$5.49/7 per one 36" long piece)

\$1.00- Steel unistrut

\$3.00- Additional hardware (steel bracket, nuts, bolts, paint)

Total= about \$81.00

Fry Feed



Adjusted daily based on survival

Tank Cleaning



Note: excess feed and clay around center drain

Tank Cleaning

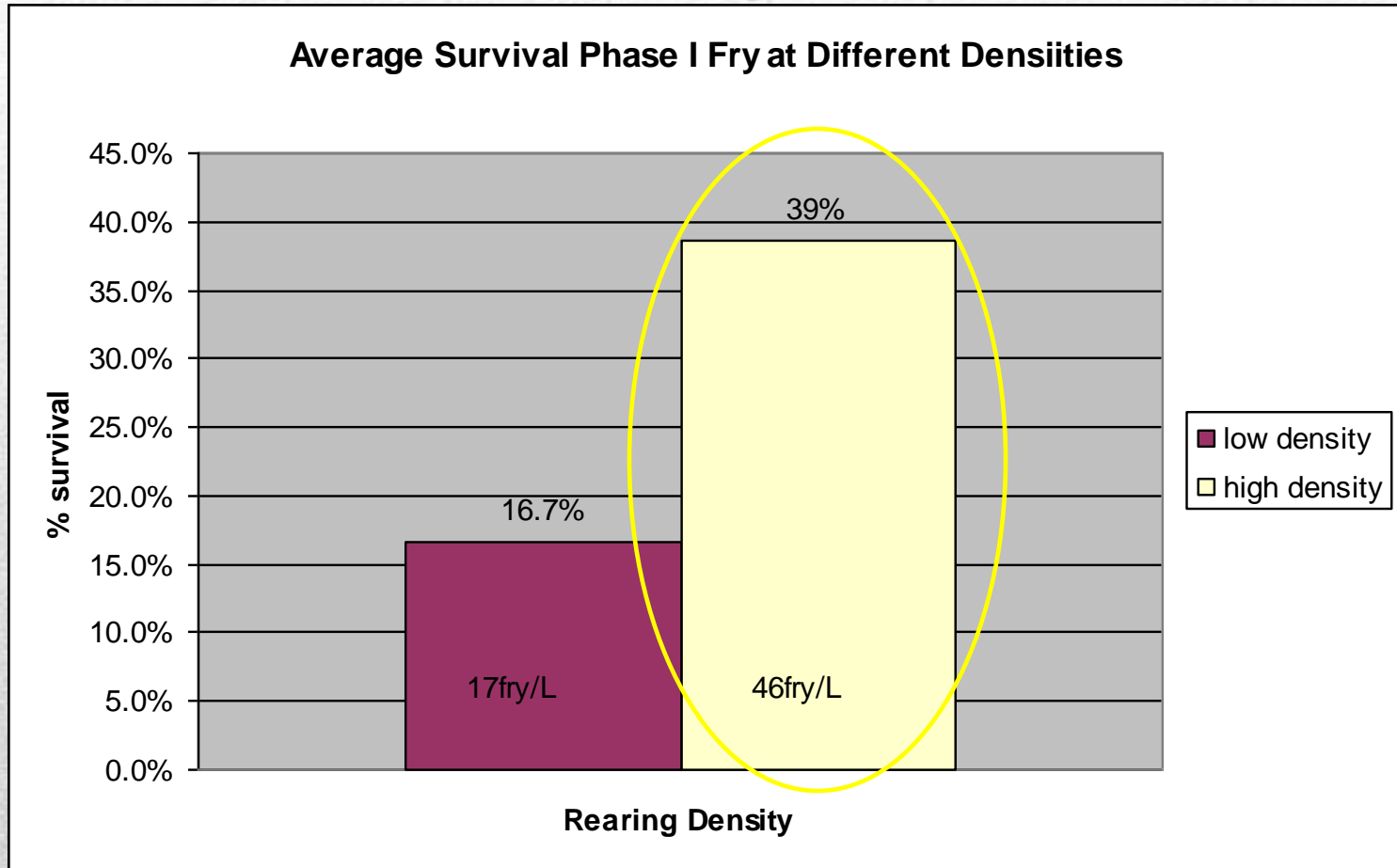


Counting Mortality



Results

Phase I-Fry Culture



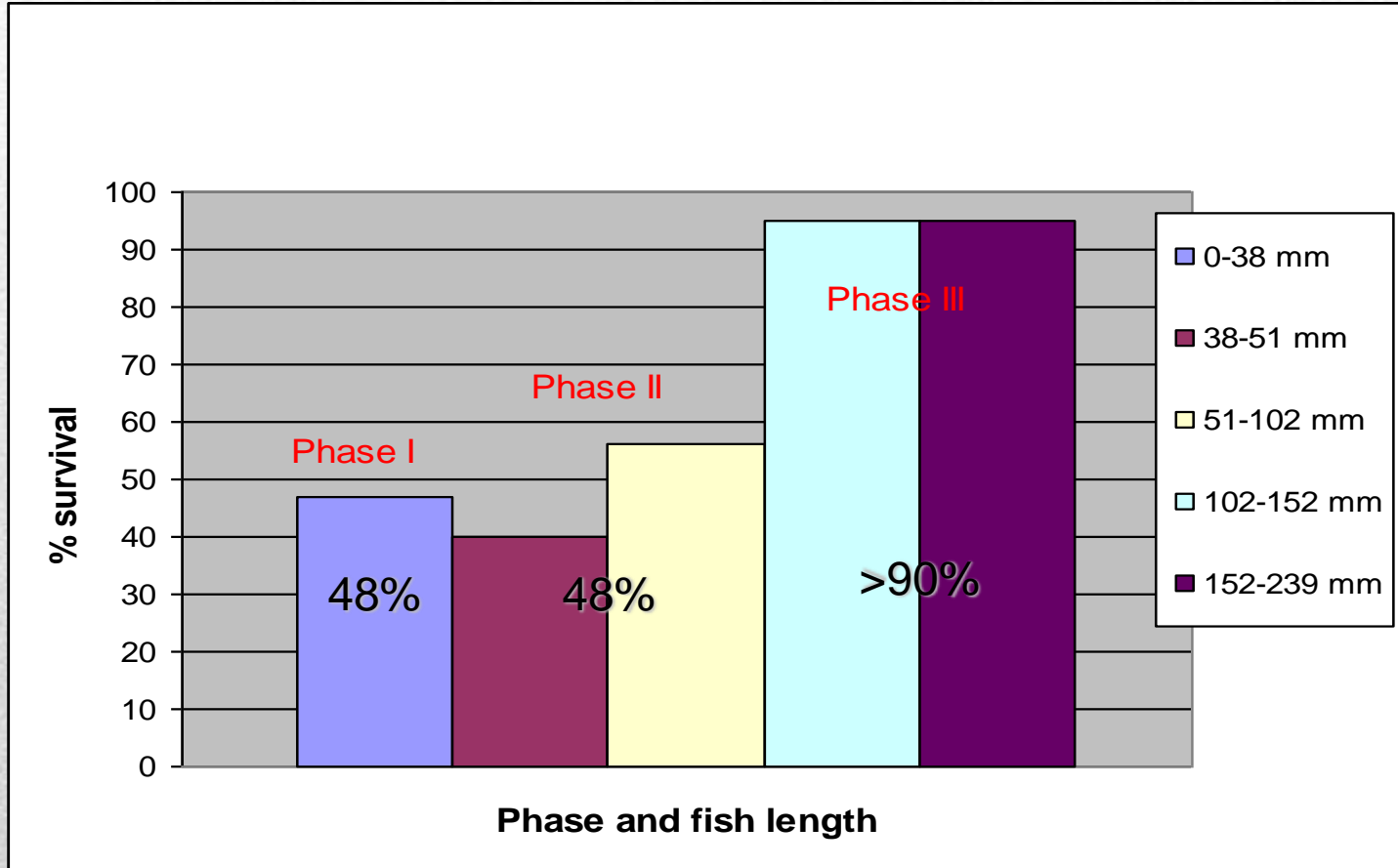
Cannibalism



Unobserved mortality as high as 50%

Results

Overall Survival Percentages Intensive Rearing





Note: Density, turbidity and larger screen size

Transition Feeding onto Commercial grower diets

- Palatability or taste issues
- Adding taste enhancers ie Krill
 - Mixing diets





Note: density, turbidity, and fin condition
50-100 mm fish going into RAS for growout

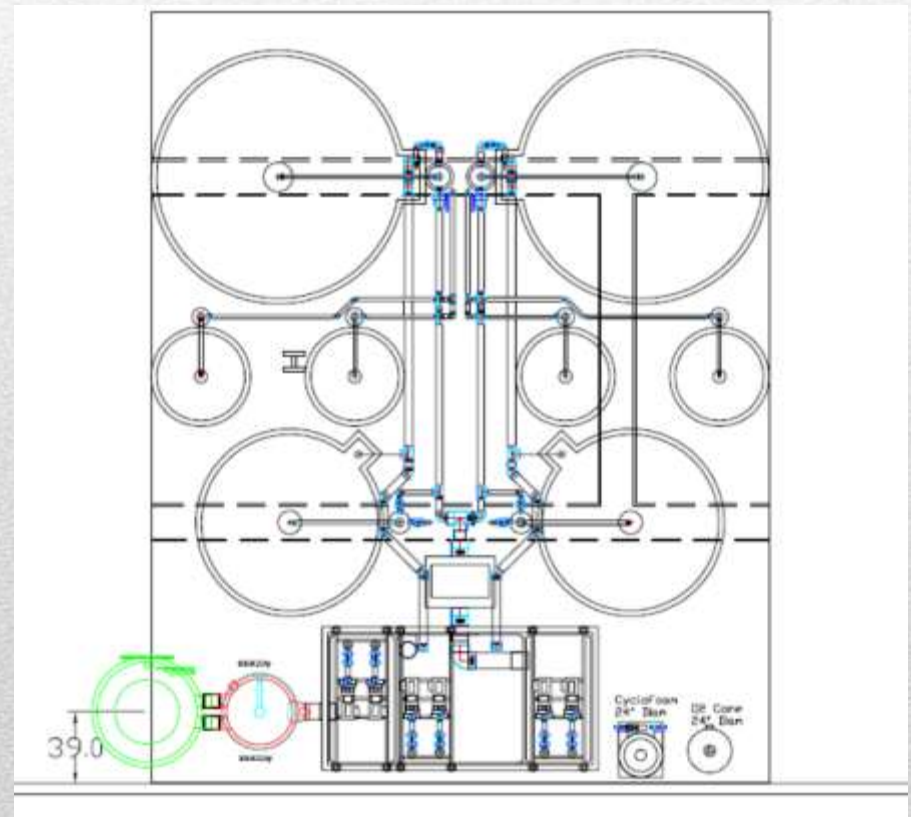
Materials and Methods

Recycle System Used For Phase III-IV Intensive Growout

RAS Parameters:

- 53,000 L water capacity
- 33 m³ tank culture space
- Fluidized sand biofilter
- Drum Filter
- Dual drain circular tanks
- Oxygen cone
- In sump electric heater
- 23°C (74°F) Water temp.
- 24hr In Tank Lighting

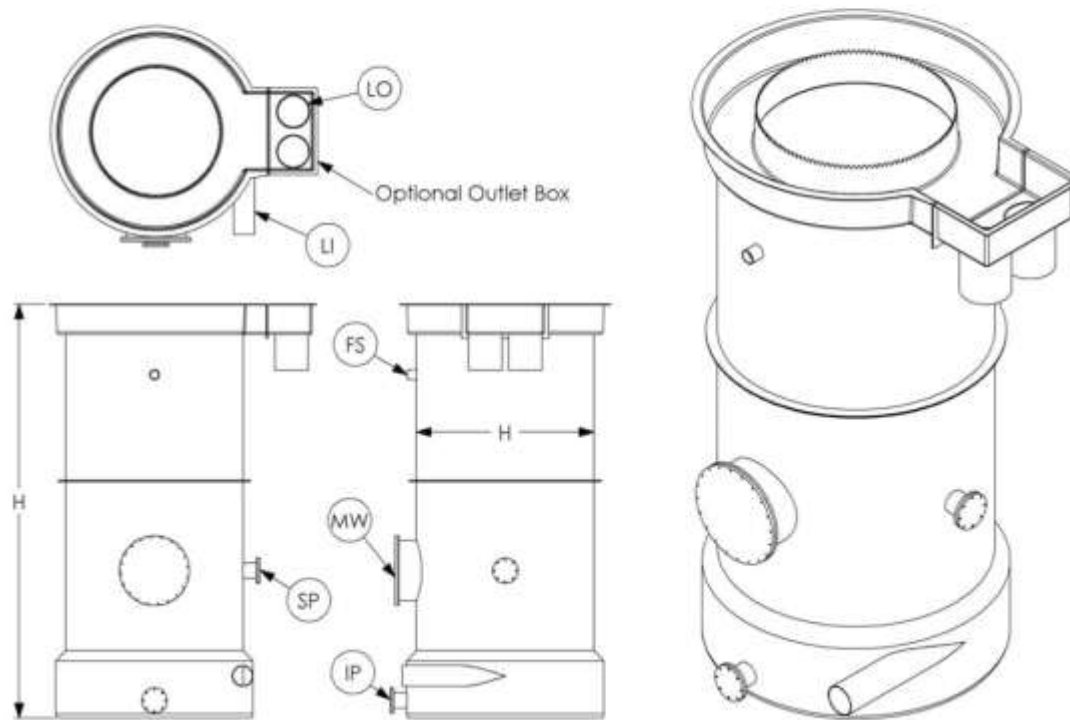
RAS Overview





MARINE BIOTECH®

CycloBio® Fluidized Bed Biofilter



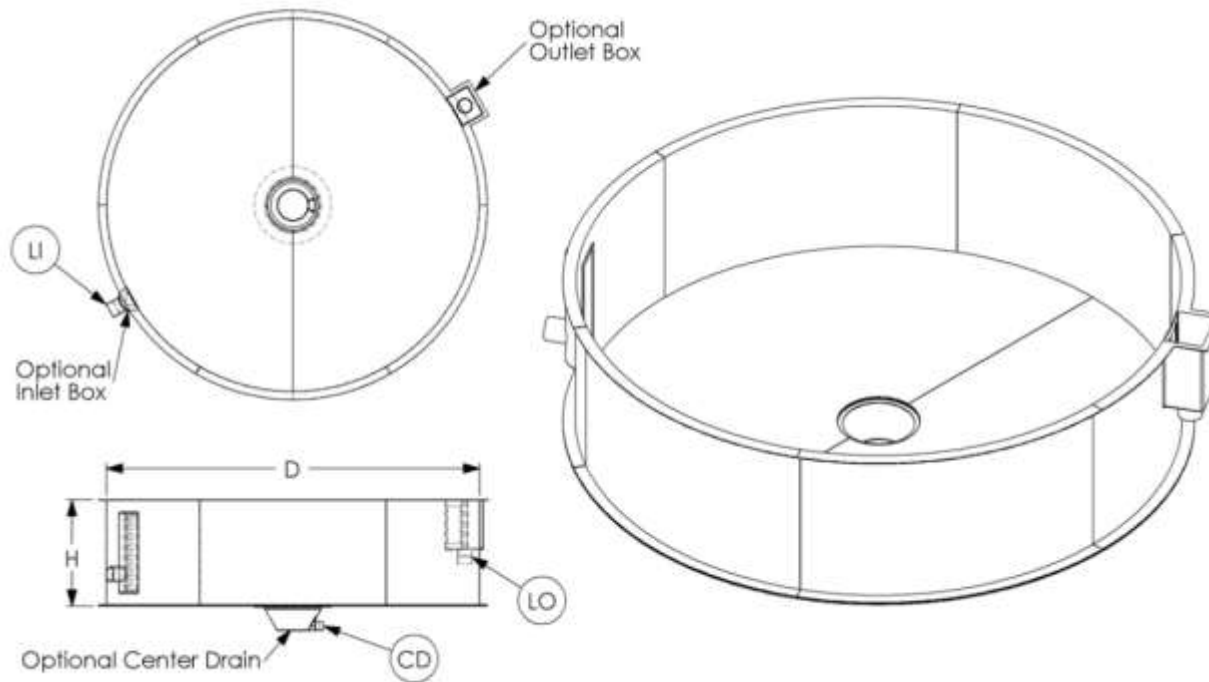
Cyclonic Sand Biofilter and Degassing Column



MARINE BIOTECH®



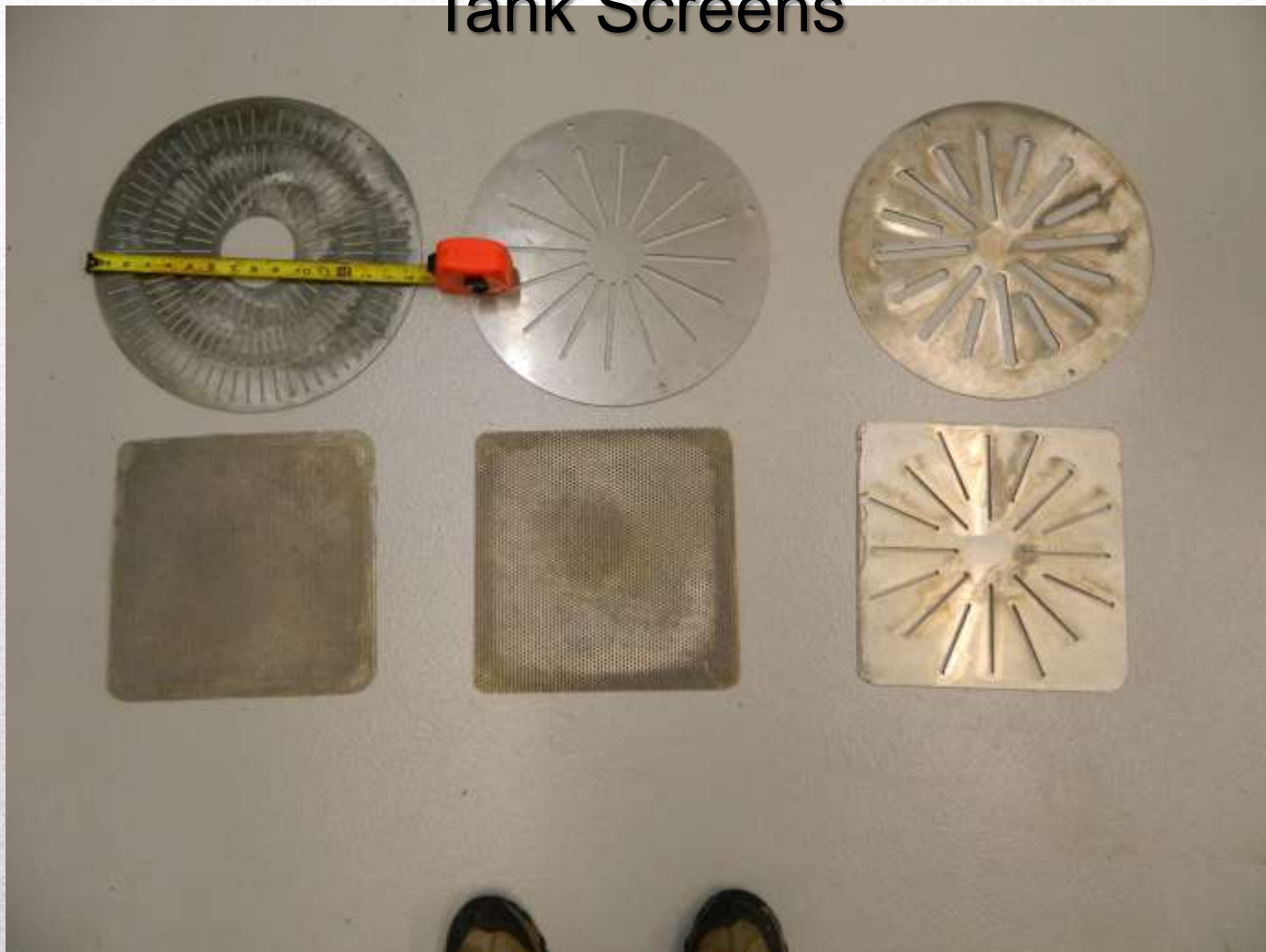
Culture Tanks - Multi-Piece (Panels)



Duel Drain Cornell Style Fiberglass Rearing Tanks



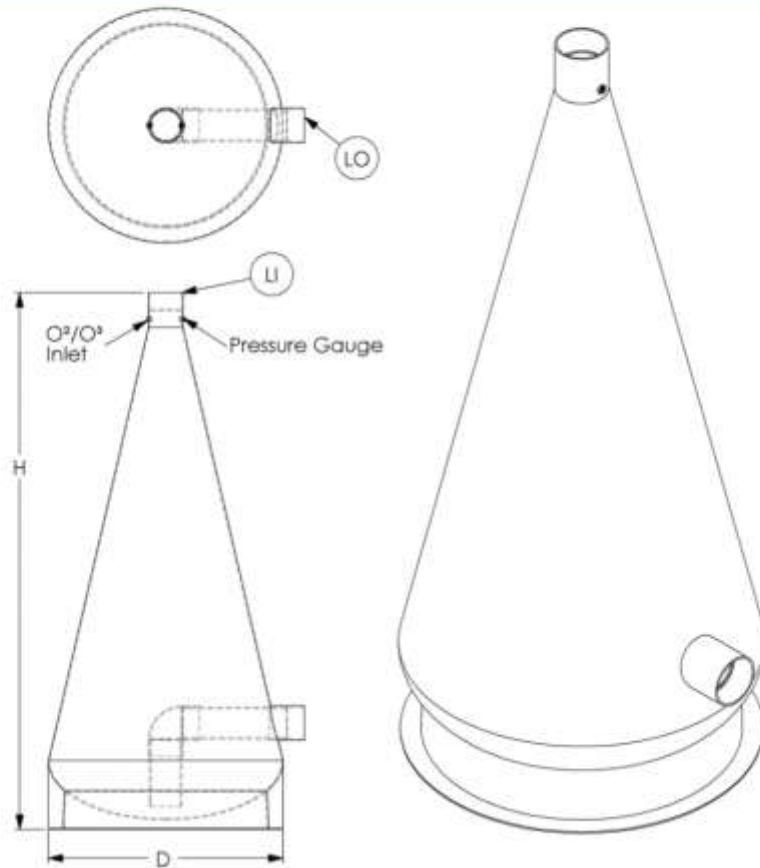
Tank Screens



MARINE BIOTECH[®]



Oxygen and Ozone Contact Cones





Sump with Recirculation Pumps



WARMWATER RAS SYSTEM PARAMETERS

Temp: 70F -20C

Oxygen: >5.0mg/L

TDGP: <102%

CO₂: <20mg/L

pH: 6.5-8.0

Alkalinity: 150-400 mg/L

TSS: <20mg/L

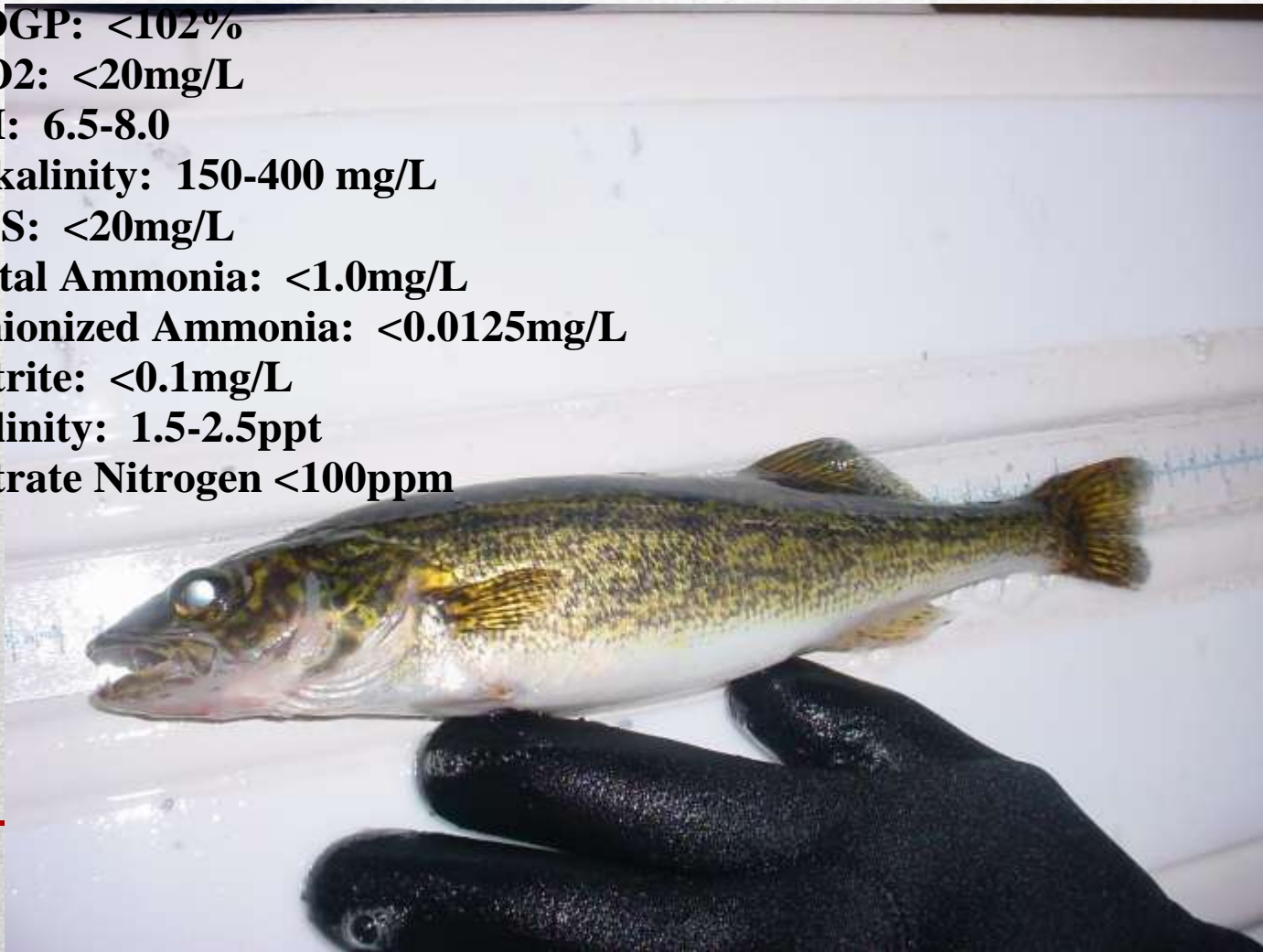
Total Ammonia: <1.0mg/L

Unionized Ammonia: <0.0125mg/L

Nitrite: <0.1mg/L

Salinity: 1.5-2.5ppt

Nitrate Nitrogen <100ppm



In Tank Lighting for Growout





INCHES

1

2

Hamilton

MONTV

METRIC

1

2

3

4

5

6



Grading







KAUKAU
D.P.V.

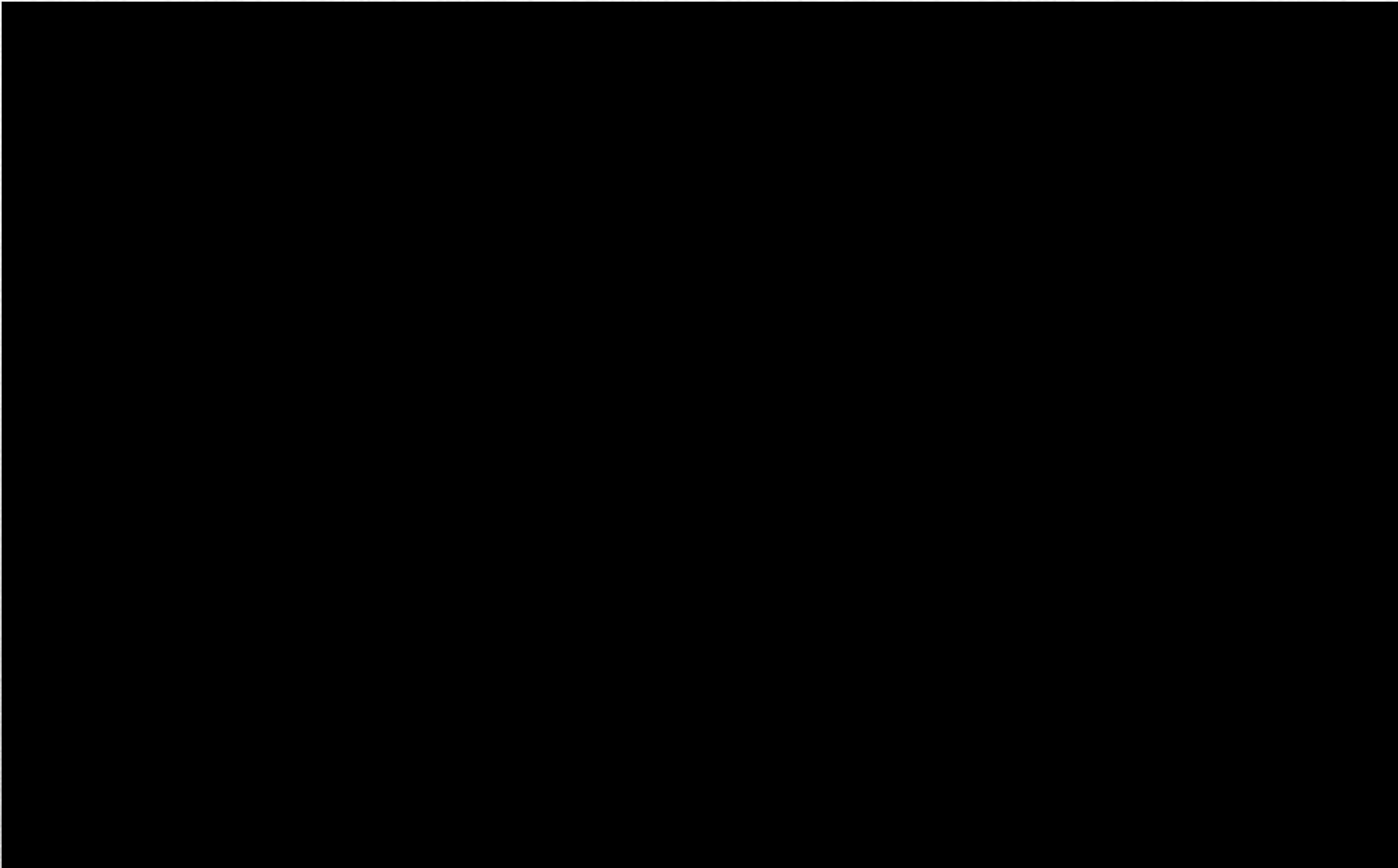
ASTM D1705, CMA 1137, 2



Results

Overall Hybrid Walleye Survival Percentages
Intensive Rearing-4 years of data

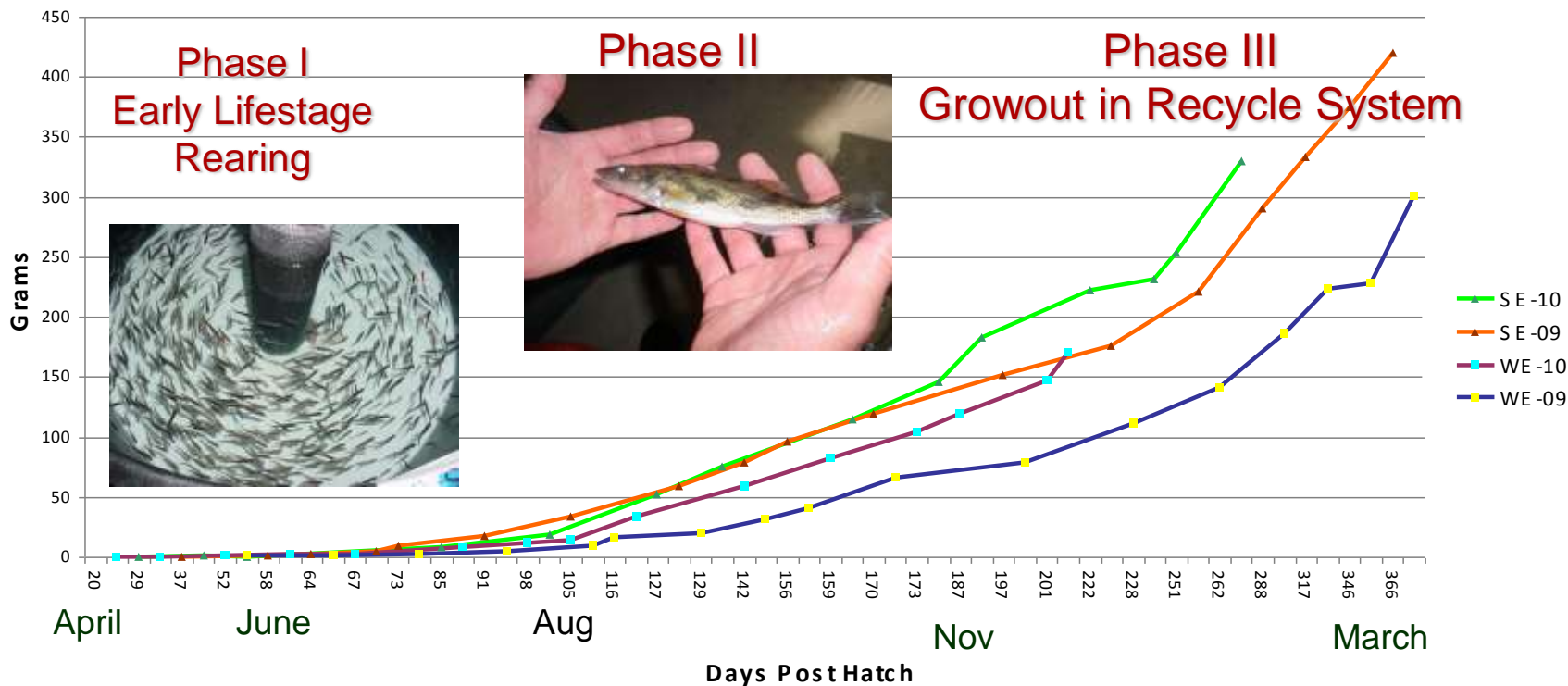
Year	Phase 1	Phase II	Phase III
2009	55%	43%	92%
2010	46%	50%	93%
2011	39%	53%	92%
2012	43%	64%	90%
Average	46%	53%	92%



Results

Growth Rates

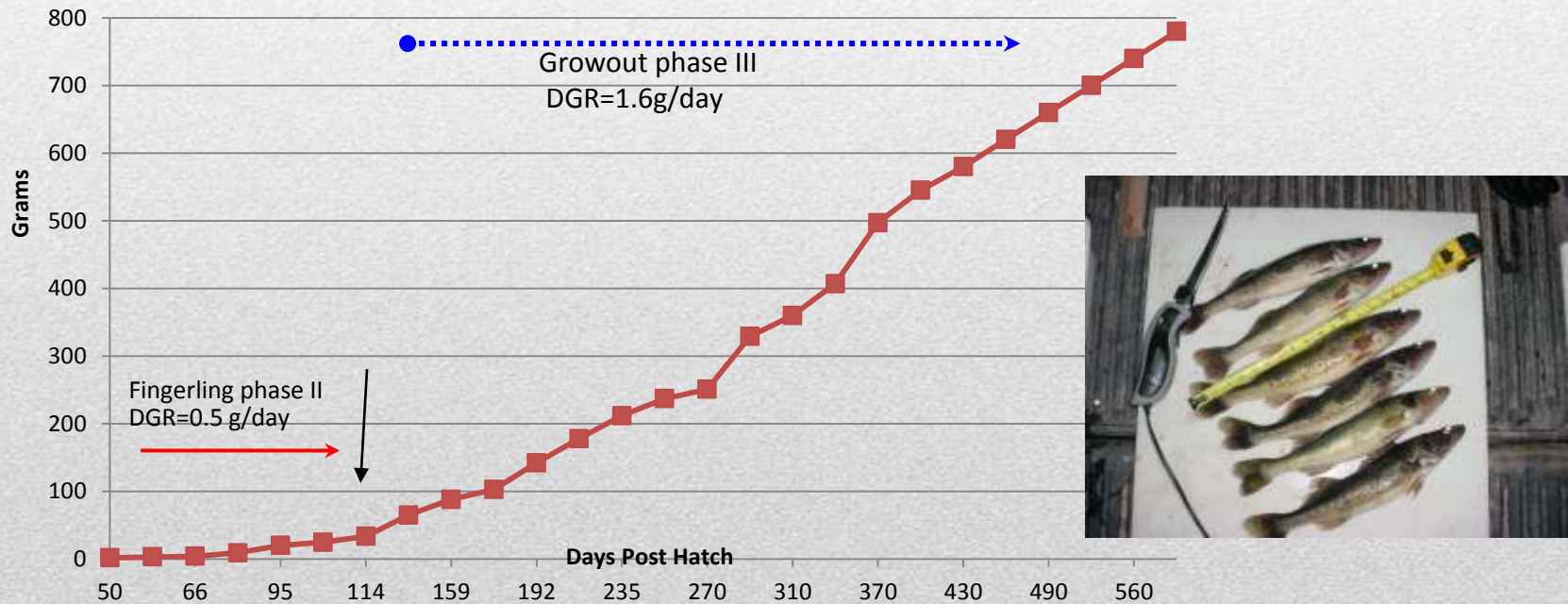
Hybrid Walleye vs Purebred Walleye Growth in Weight



Results

Extended Growout Growth Rates

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





1 year old Hybrid Walleye (1.0kg)

Results

Observed Feed Rates and Conversion %

Phase	TBWFD(%)	FC
Phase I	20	2
Phase II	15	7
Phase III	7.5	4
Phase IV	2	1.6



Recycle System Water Quality Operating Parameters

Tank Density: 34 kg/m³

Parameter	Average Value
Temperature (°C)	23
Dissolved oxygen (mg/L)	>7.0
pH	7.7
Carbon dioxide (mg/L)	6.8
Total ammonia nitrogen (mg/L)	0.011
Nitrite nitrogen (mg/L)	0.061
Calculated unionized nitrogen (mg/L)	0.0003
Total suspended solids (mg/L)	2
Alkalinity (mg/L)	151



Results- Fillet Info



Fillet Yield : 45 - 50% Scaled, Skin on, Hand filleted

Fillet Market price: \$\$10-12.00/ lb

Consumer Reports-Taste Tests

A+



Conclusions

- Walleye and hybrid walleye can be successfully raised indoors using early advanced spawning, incubation, and rearing techniques.
- Initial data suggests that growth rates of hybrid walleye are higher than purebred walleye



Commercial Intensive Production Recommendations

- Phase I

High density/short time frame in tank

Water Temperature: 20°C

Density: 30 days @ 46 fry/L

Feed: Otohime

TBWFD: >20% @ 24hr

Turbidity: 50-100 NTU

*Grade in tank every week as soon as possible from Phase I-III.

- Phase II

Water Temperature: 20°C

Density: 10 days @ 4 fish/L

Feed: Nelson SC Walleye Grower

TBWFD: >15% @ 24hr

Turbidity: 25-50 NTU



Intensive RAS Production Recommendations

- Phase IIb-Intensive Culture
 - Water Temperature: 20-24°C
 - Density: 4 fish/L
 - Feed: Nelson SC WG
 - TBWFD: 6-10% @ 24hr
- Phase III -Growout
 - Water Temperature 23-24°C
 - Density: 60kg/m³
 - TBWFD: 1.5-2.0% @ 24hr
 - Feed: Nelson SC WG

Acknowledgements

- Alan Johnson, Rathbun Fisheries Research Center, Iowa
- NADF Facility staff Kendall Holmes, Lance Bresette, Nate Martin.
- Dr. Chris Hartleb (NADF Director) and Jim Held (UW-Extension)
- Dr. Jeff Malison (retired), UW-Madison Aquaculture Program
- Dr. Steve Summerfelt, Conservation Fund Freshwater Institute, W. VA.
- Dr. Robert Summerfelt (retired), Iowa State University

This project was supported by an Agricultural Development & Diversification grant through the Wisconsin Department of Agriculture, Trade and Consumer Protection and thru funding supplied by USDA-SBIR Funding Phase I and II.

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<http://aquaculture.uwsp.edu>
gfisher@uwsp.edu

**Never Give up or
Did I bite off more than I can handle**



