THE CONSERVATION FUND

The Conservation Fund Freshwater Institute

Shepherdstown, WV

RESEARCH TEAM

Christopher Good
John Davidson
Scott Tsukuda
Travis May
Curtis Crouse
Anna DiCocco
Natalie Redman
Megan Murray
Christine Lepine
Laura Bailey
Brian Vinci

The Conservation Fund Freshwater Institute

The Research Council of Norway

Gordon and Betty MOORE FOUNDATION

USDA

TIDEScanada

Atlantic Salmon Federation

HERRICK FOUNDATION

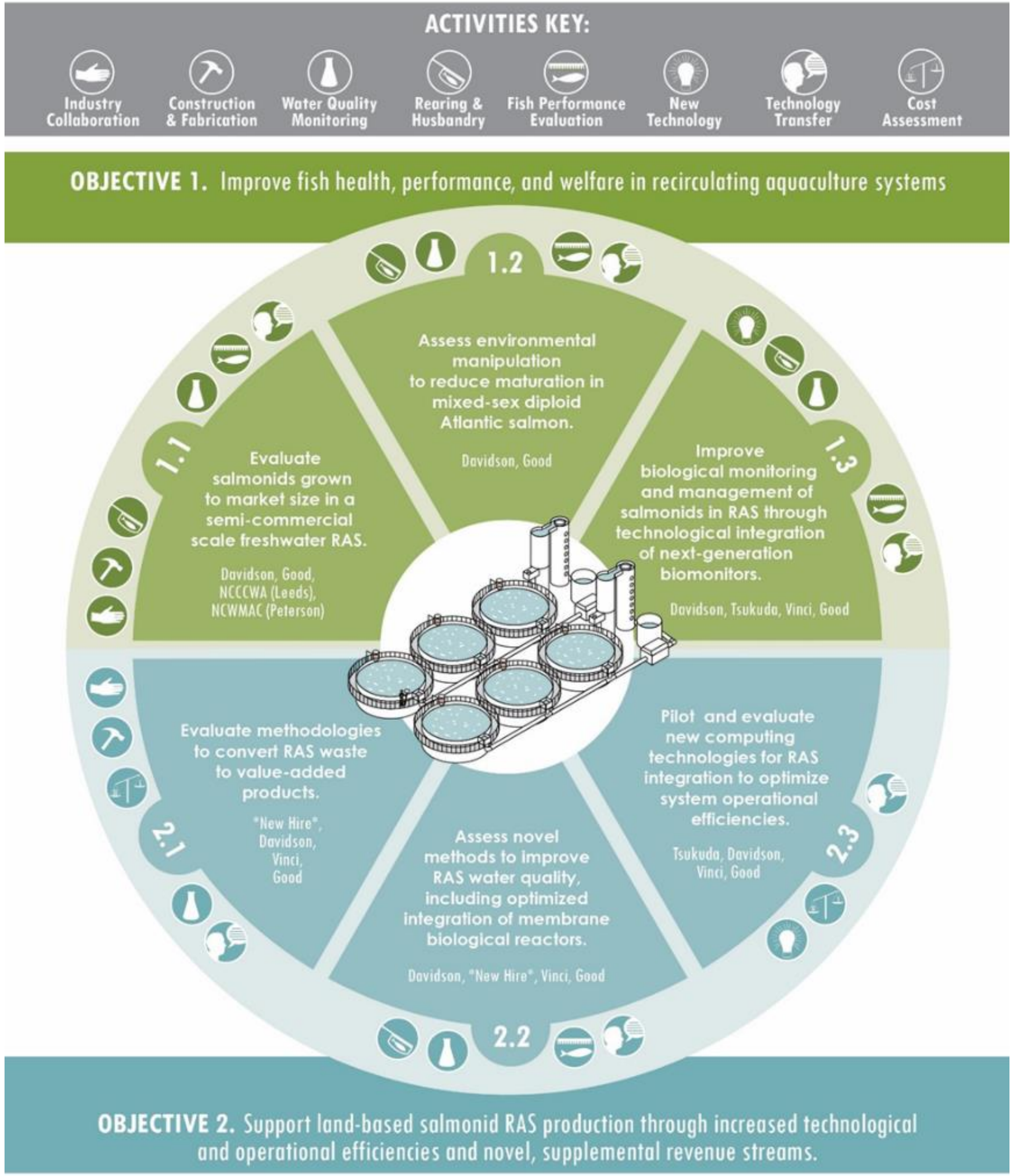
SalmoBreed

CtrlAQUA

THE CONSERVATION FUND

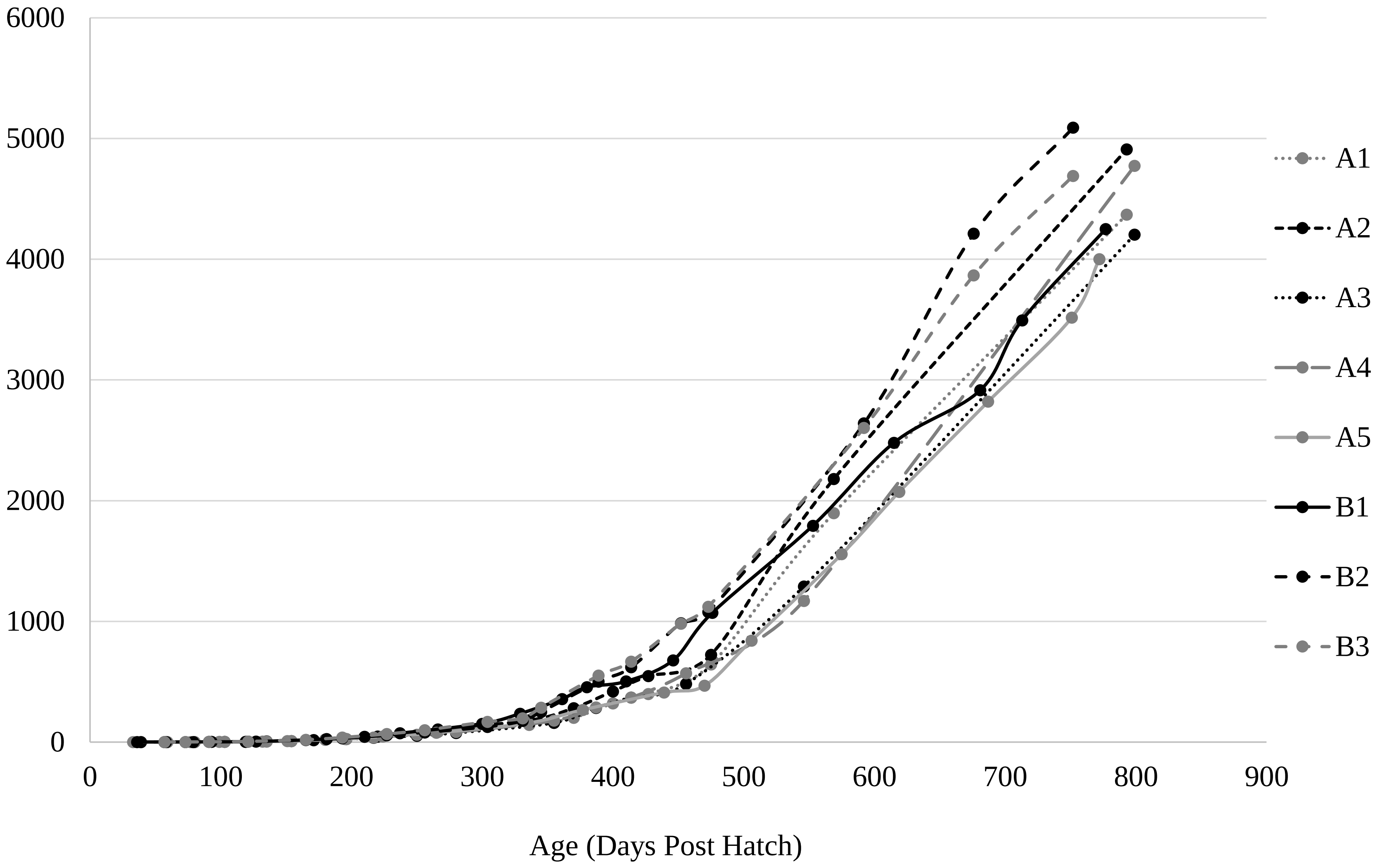
USDA-ARS 2020 - 2024

1. Salmonid growth trials
2. Reduce maturation
3. Next-generation biomonitoring
4. Precision aquaculture
5. Improve water quality (MBRs)
6. Waste-to-value



Atlantic salmon growout trials

Atlantic salmon growout trials



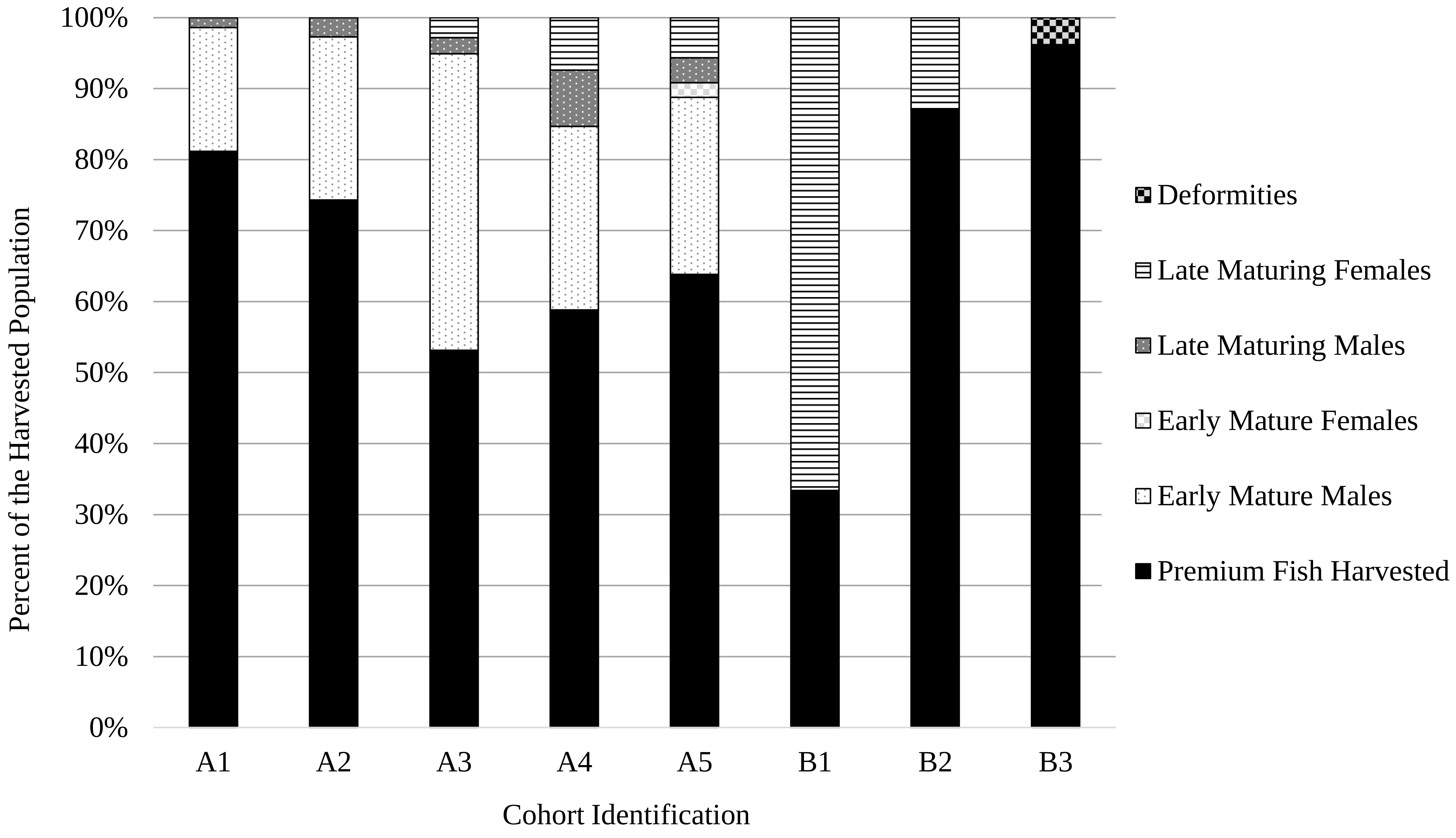
Major Challenge: Grilsing

Up to 80% of male salmon mature early

Maturation

- Decreased growth and feed conversion
- Reduced fillet yield
- Reduced product quality
- Increased susceptibility to opportunistic infections

Atlantic salmon growout trials



Maturation in Atlantic salmon

Sexual maturation in *S. salar*:

A highly flexible process, influenced by

- Water temperature
- Feed intake
- Nutrition
- Lipid reserves
- Growth rate
- Stock genetics
- **Photoperiod**

JOURNAL OF THE
WORLD AQUACULTURE SOCIETY
Vol. 47, No. 5
October, 2016
doi: 10.1111/jwas.12342

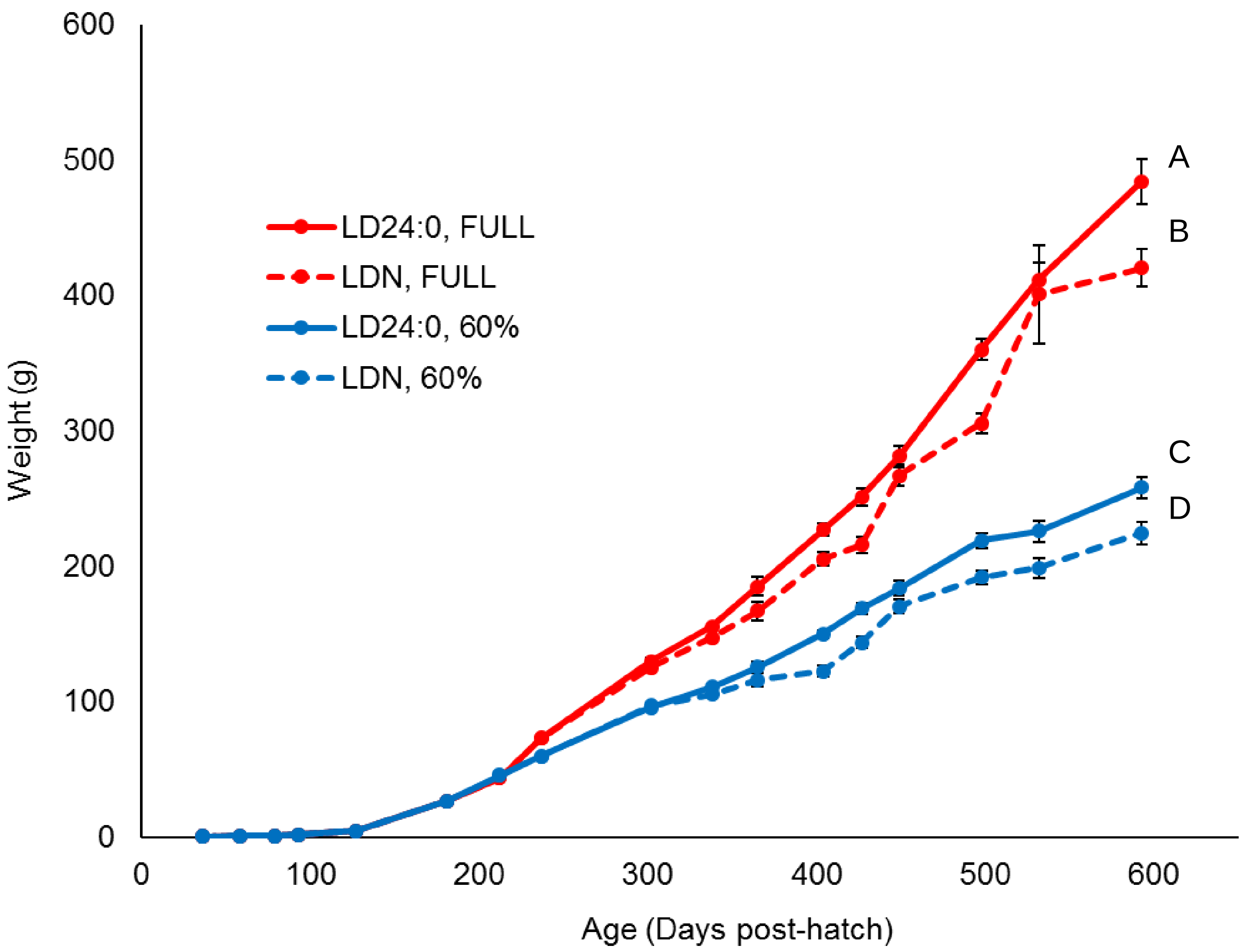
A Review of Factors Influencing Maturation of Atlantic Salmon, *Salmo salar*, with Focus on Water Recirculation Aquaculture System Environments

Christopher Good[1] and John Davidson

The Conservation Fund's Freshwater Institute, 1098 Turner Road, Shepherdstown, West Virginia 25443, USA

PHOTO II: photoperiod & feeding rate

Growth performance in 0.5 m³ tanks prior to transfer:



ANOVA	
Treatment	p-value
Photoperiod	0.0002
Diet	<0.0001
Photoperiod x Diet	0.3239

Initial phase in 0.5 m³ tanks demonstrated significant effects of both photoperiod and dietary restriction.

No maturation observed at this point

Reduced diet in general resulted in poor condition factor

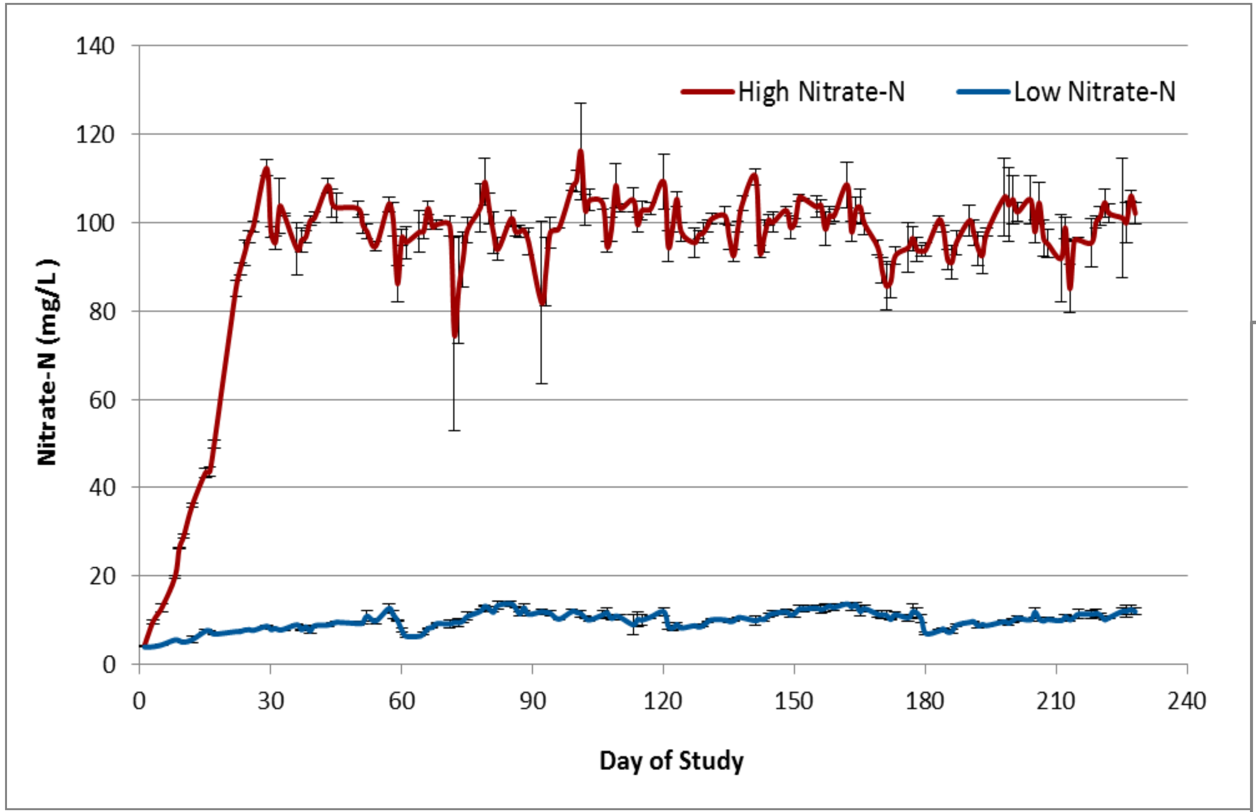
Salmon fin clipped according to treatment and transferred to a single 10 m³ PRAS tank for growth to 1,000 g

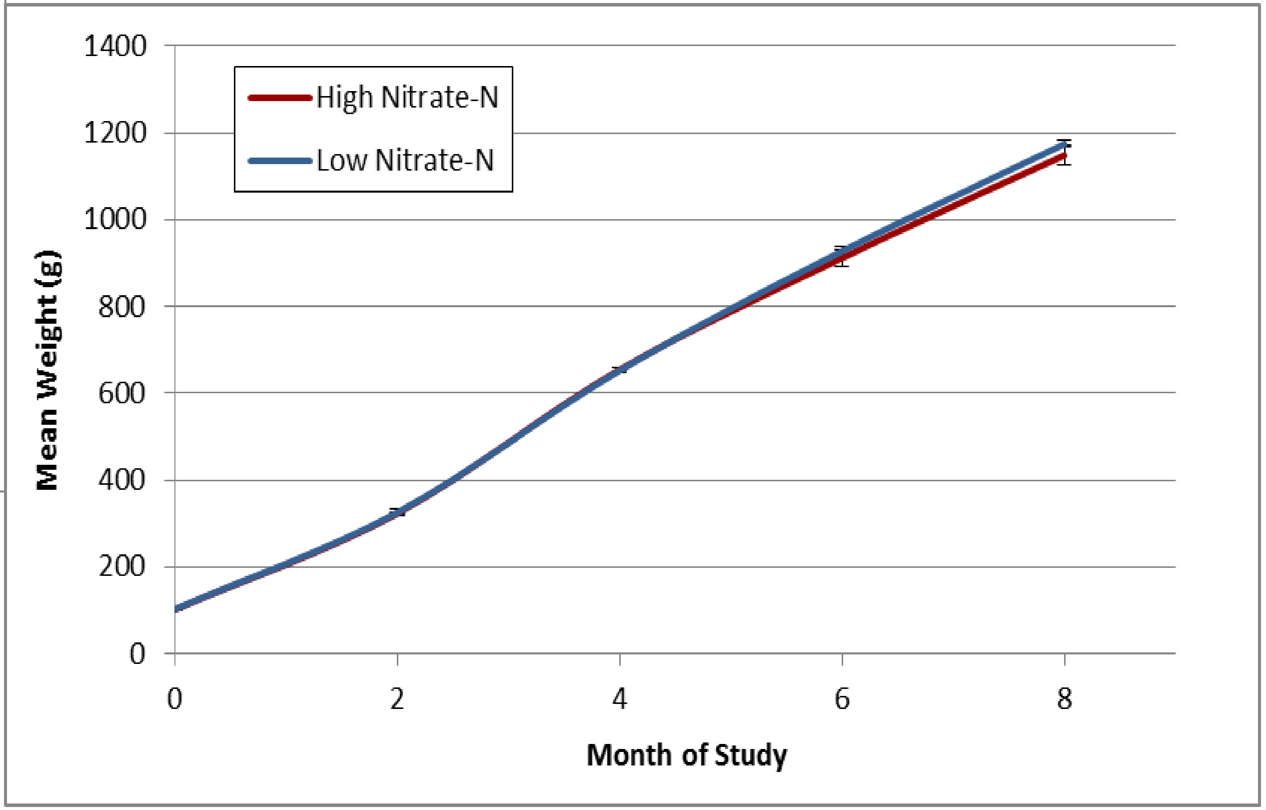
PHOTO III: S_0 winter & ploidy

	Diploid		Triploid	
	S_0	No S_0	S_0	No S_0
Weight (kg) [b]	5.24 ± 0.06	5.16 ± 0.11	4.67 ± 0.14	4.73 ± 0.13
Length (cm)	69.7 ± 0.43	69.6 ± 0.46	68.8 ± 0.74	68.7 ± 0.38
Condition Factor (K) [b]	1.54 ± 0.02	1.52 ± 0.01	1.41 ± 0.02	1.44 ± 0.02
Deformities (%) [b]	0.00	0.00	15.9 ± 2.59	16.1 ± 2.51
Maturation (%) [b]	12.4 ± 2.41	10.5 ± 1.93	0.00	0.00

Superscripts indicate significant ($p<0.05$) effects of S_0 (a) and/or ploidy (b)

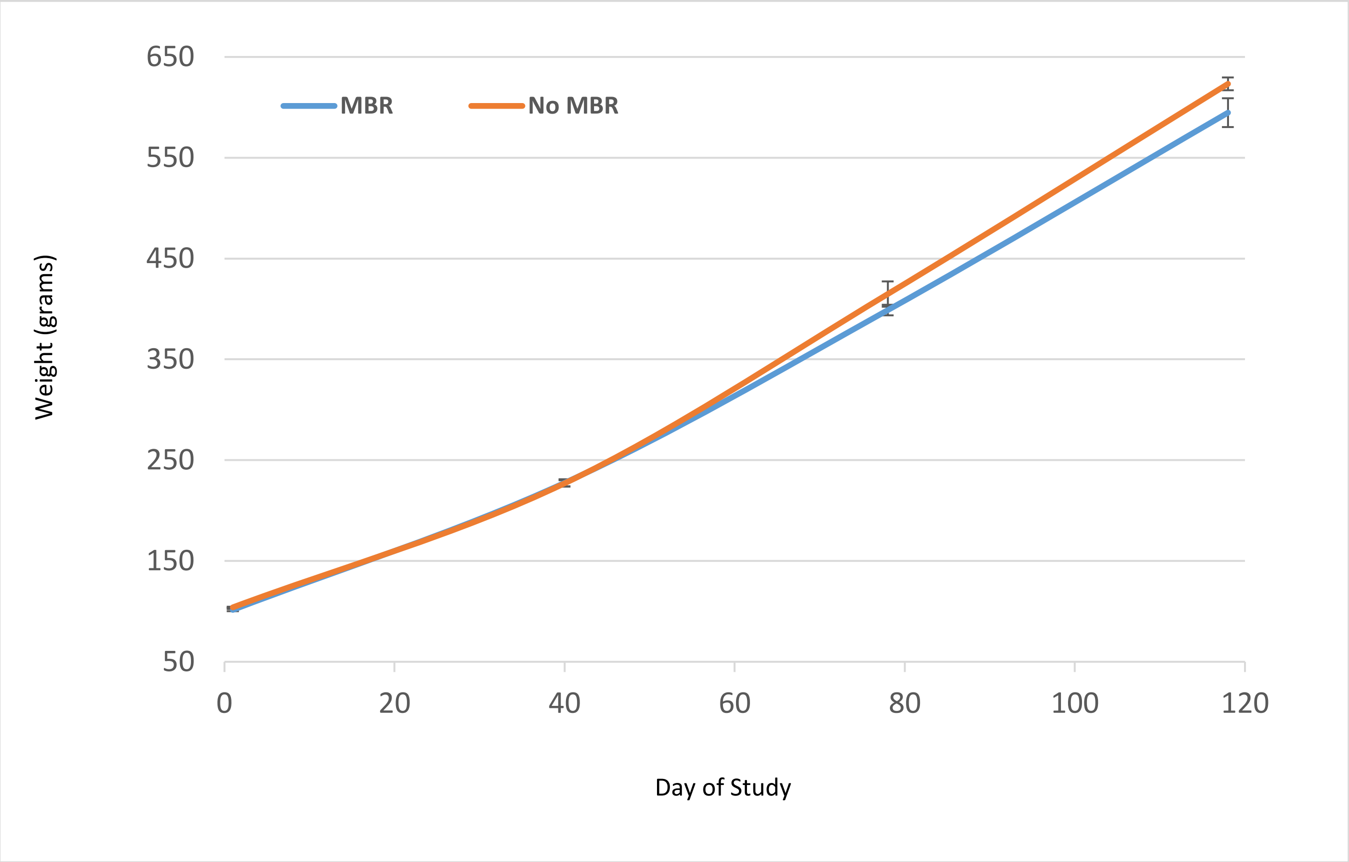
Evaluating Nitrate Limits for Post-smolt Atlantic Salmon

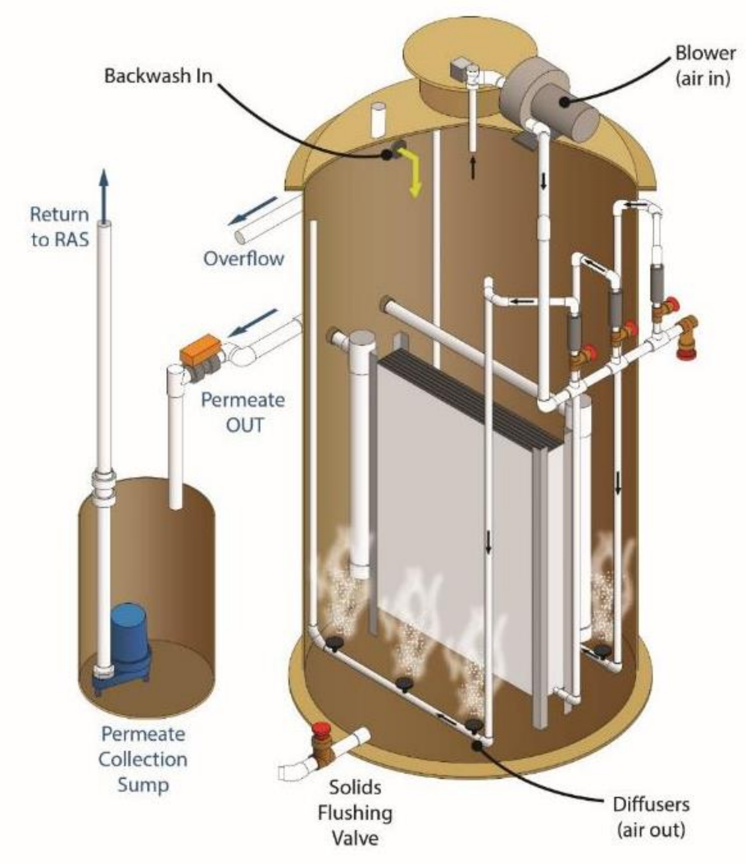




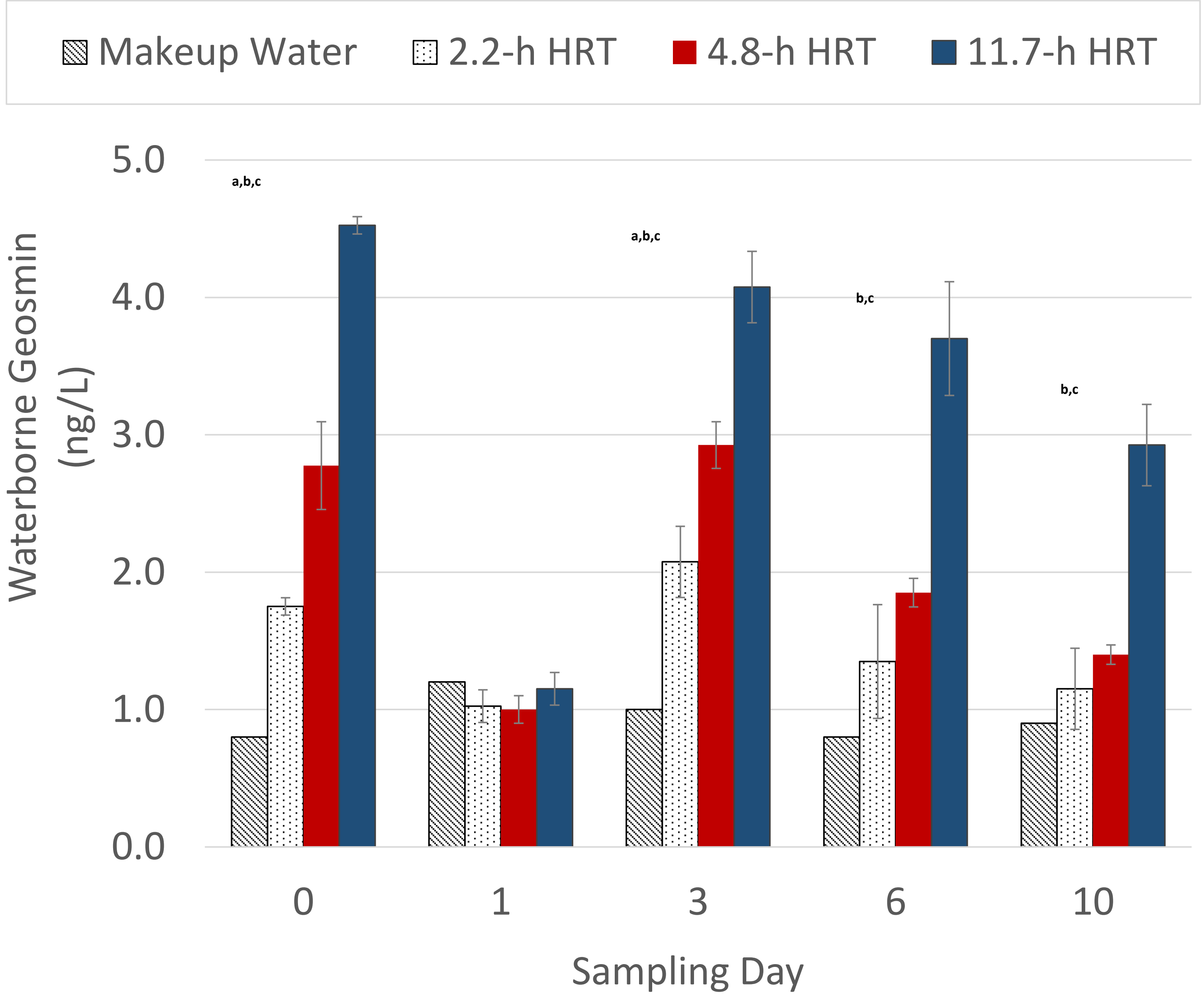
MBRs

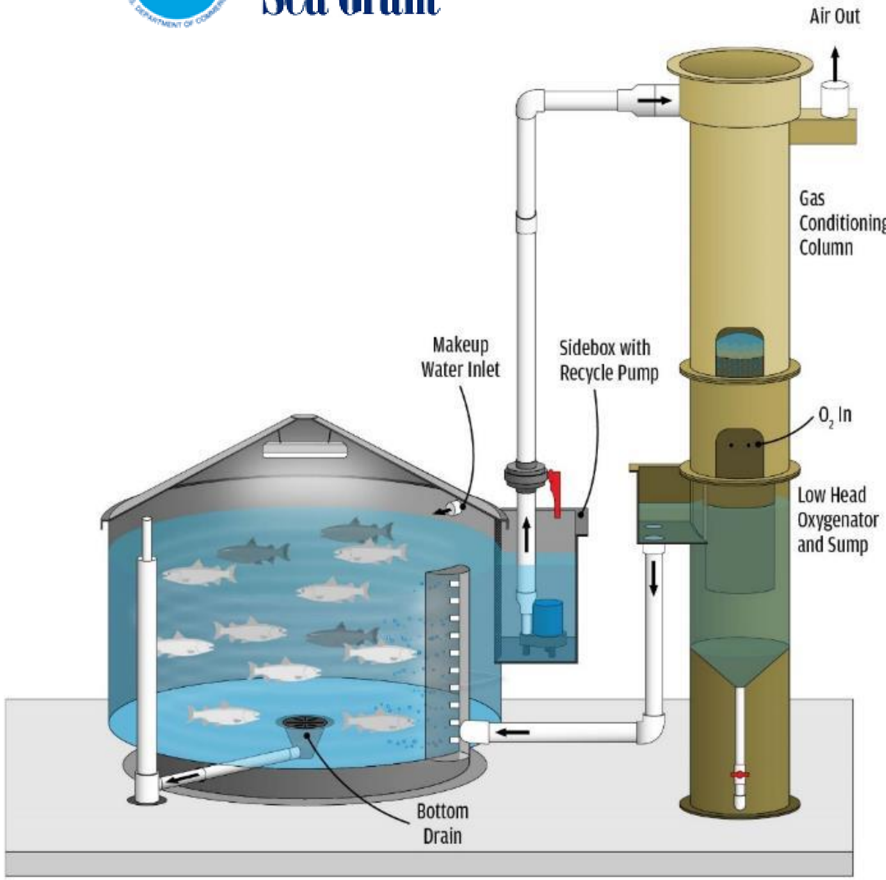
- MBRs are high-tech waste treatment technologies that balance microbial populations that support denitrification, nitrification, and biosolids digestion
- Fine pore membranes (≤ 0.2 µm) produce a "clean" high-quality permeate suitable for return to RAS
- MBRs were integrated within the recycle loop of three RAS to evaluate effects on rainbow trout performance, water quality, and water use





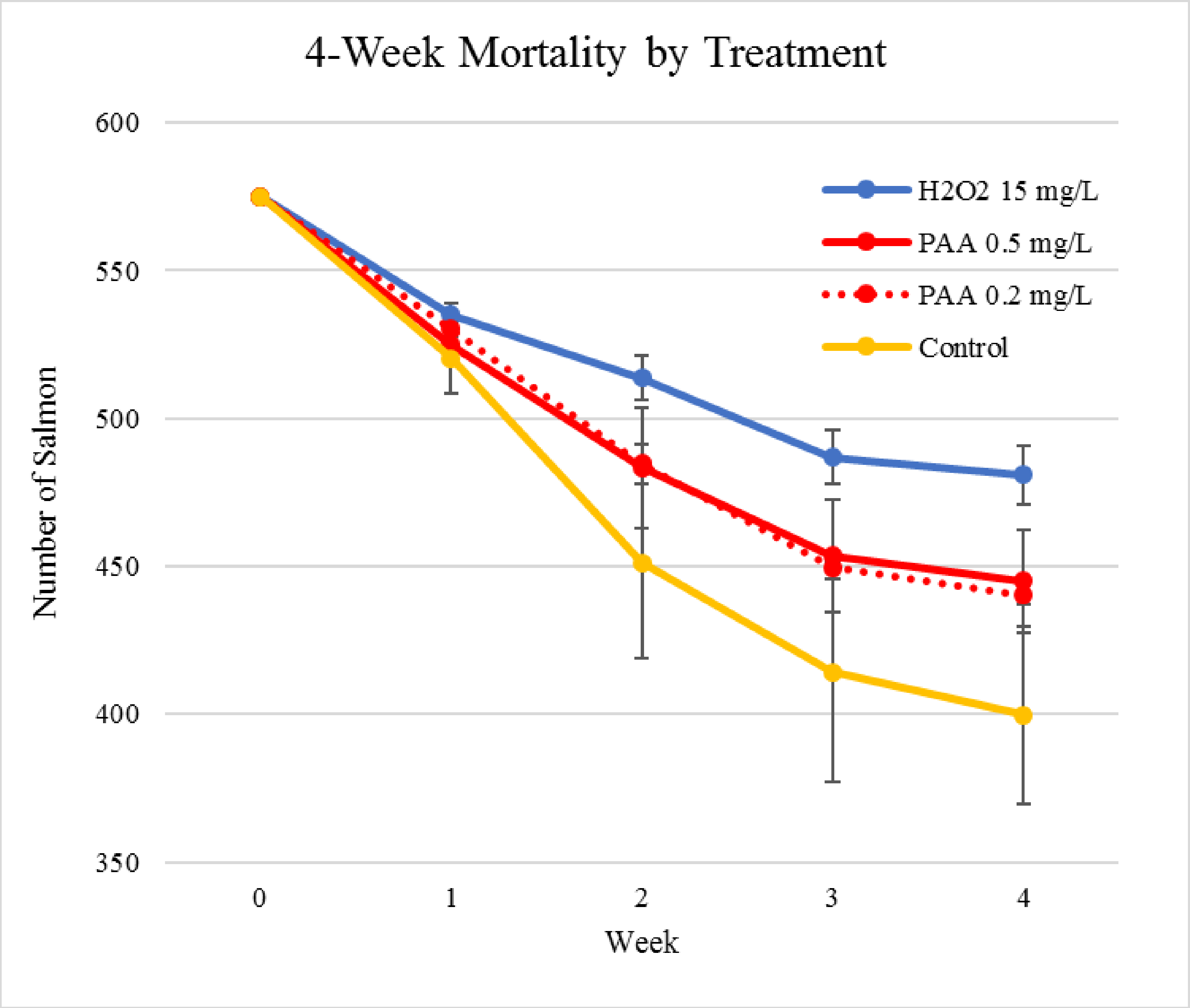
Optimizing Depuration of Market-Size Atlantic Salmon





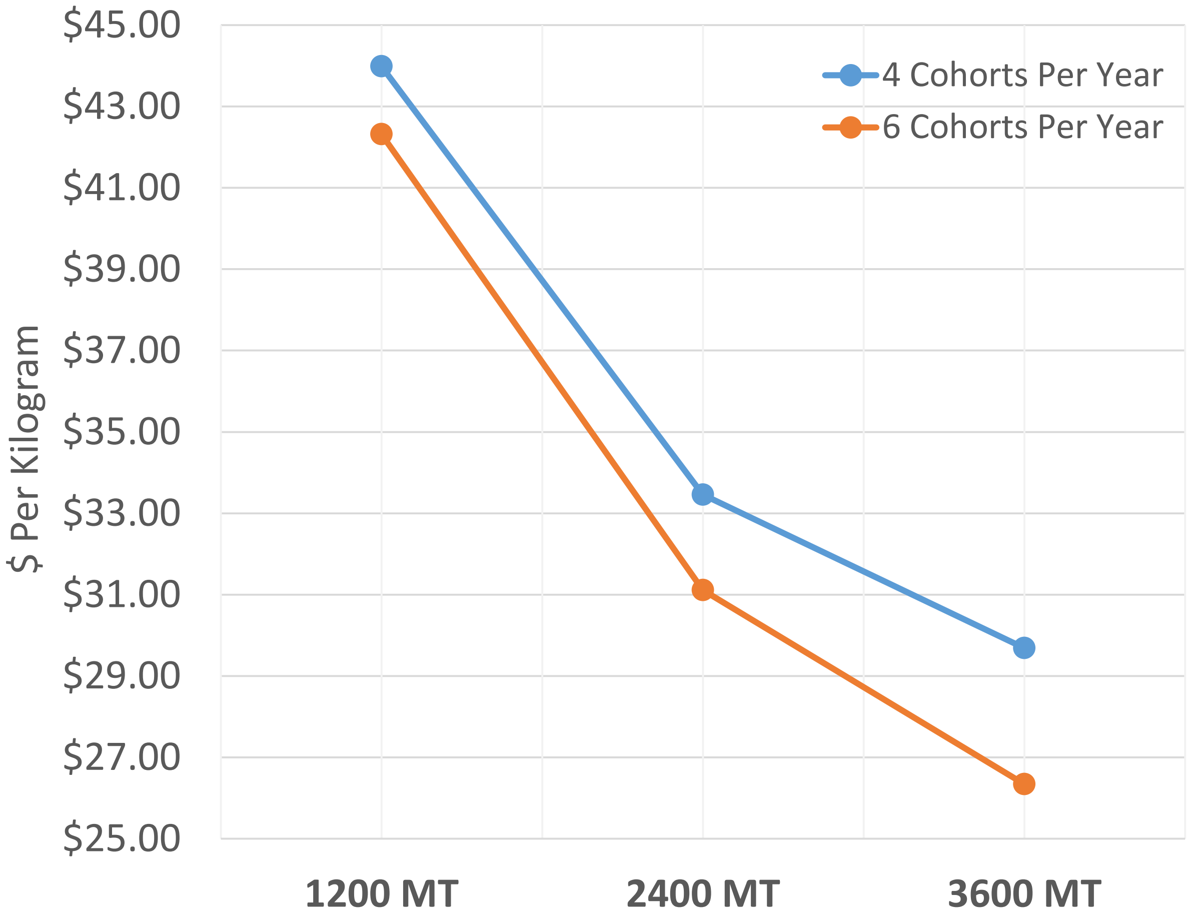
The Conservation Fund

Saprolegniasis in Fry



NOAA Sea Grant

RAS Economies of Scale



4 Cohorts Per Year		
System	**$/Kg**	**%**
1200 MT	$43.99	100%
2400 MT	$33.46	76%
3600 MT	$29.69	67%

6 Cohorts Per Year		
System	**$/Kg**	**%**
1200 MT	$42.32	96%
2400 MT	$31.11	71%
3600 MT	$26.34	60%

Acknowledgements