

# Technical Ability



Our Fredrikstad Seafoods Facility

Nordic Aquafarms operates the largest RAS tanks in the world – 144 feet in diameter

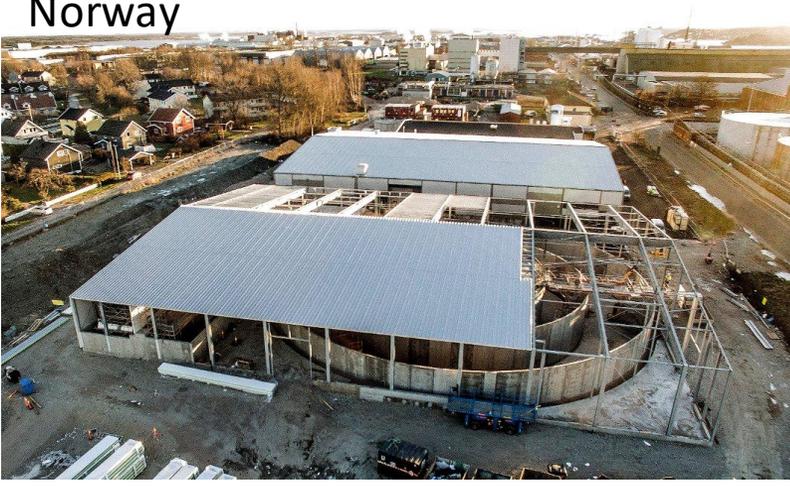


- 3 such tanks in the Nordics
- No major incidents
- No disease outbreaks
- No escapes

There are RAS farms all over the Norwegian coastline



RAS facilities are popping up all over the world – we have followed all of them



The most experienced ones are expanding



### Danish Salmon to build new facility and double production

News by **Andreas Witze** - 4 June 2019



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### Atlantic Sapphire building USD 350 million land-based salmon farm in Miami

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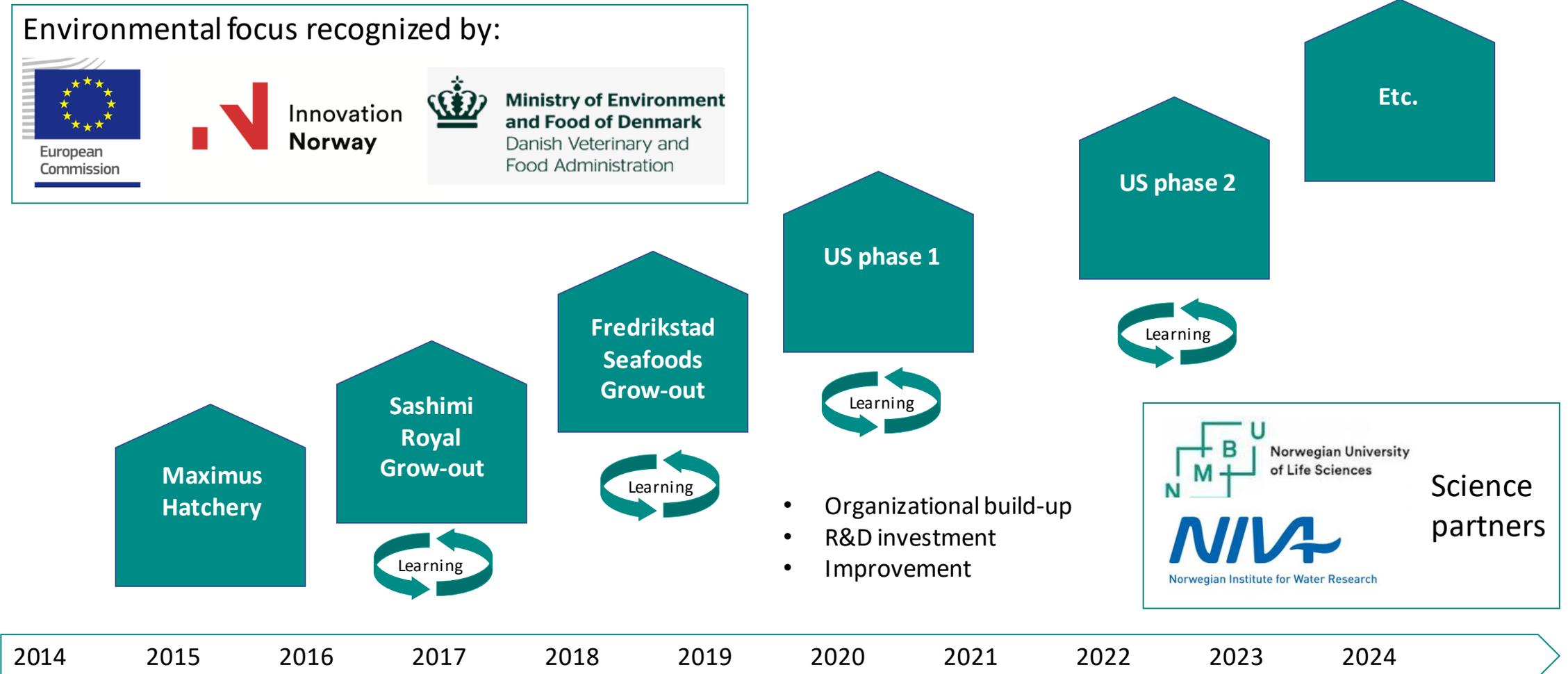
### Kingfish Zeeland expanding into US with Maine RAS facility

By **Cliff White**  
May 8, 2019

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# NAF approach - step by step scaling up with learning curve and investment



## Expansion rates in the RAS market

- NAF is pursuing a moderate scaling rate based on starting point

Sample company	Starting capacity	First expansion	Scaling rate
Atlantic Sapphire	750 mt	10,000 mt	13X
Danish Salmon	1000 mt	2000 mt	2X
Whole Ocean	0 mt	5000 mt	-
Superior fresh	100 mt	1000 mt	10X
<b>Nordic Aquafarms</b>	<b>3000 mt</b>	<b>10,000 mt</b>	<b>3X</b>

The seafood products we produce are top quality ASC certified



## US management team – established in the past year

**Erik Heim**

*President*



**Ed Cotter**

*Project Director*



**Brenda Chandler**

*CFO*



**Marianne Næss**

*Commercial Director*



**David Noyes**

*CTO*



### Corporate staff (NO)



**Bernt-Olav Røttingsnes**

*CEO*



**Lars Henrik Haaland**

*CFO*

### Engineering management (NO&DK)



**Ketil Fjeld**

*Engineering Director*



**Mikkel K. Thomsen**

*Chief of RAS Design and  
Danish Office Team Leader*

### Production management (NO,DK&US)



**Roger Fredriksen**

*Plant Director, FS*



**Cathal Dinneen**

*Production Lead, FS & US*



**Claus Rom**

*Production Director, SR*

## High-lights of some key staff



**Ivar Warrer-Hansen**  
**NAF DK**

Has spent his entire career working with RAS systems. He is considered one of the leading experts in the world with many projects behind him.



**Ketil Fjeld**  
**NAF AS**

35 years experience as project manager In large commercial construction projects.



**Brenda Chandler**  
**NAF Inc**

Long financial career in the semi-conductor industry, real estate, treasury, and risk management.



**Marianne Naess**  
**NAF Inc**

Was responsible for distribution and sales of 40 % of medicines in Norway before moving to US. Extensive experience with FMCG goods and regulated products.



**Roger Fredriksen**  
**NAF AS**

36 years in aquaculture operation management roles. Has worked With salmon, halibut, lobster, and more.

# Our US team – first stage of hiring



**John Hessler**  
Maine



**Carter Cyr**  
Maine



**David Noyes**  
Maine



**Margaret Kneeland**  
Maine



**Brenda Chandler**  
Maine



**Ed Cotter**  
Connecticut



**Cathal Dinneen**  
Ireland



**Marianne Naess**  
Norway



**Erik Heim**  
US/Norway



**Jacki Cassida**  
Maine

# Belfast Production Director – Cathal Dinneen

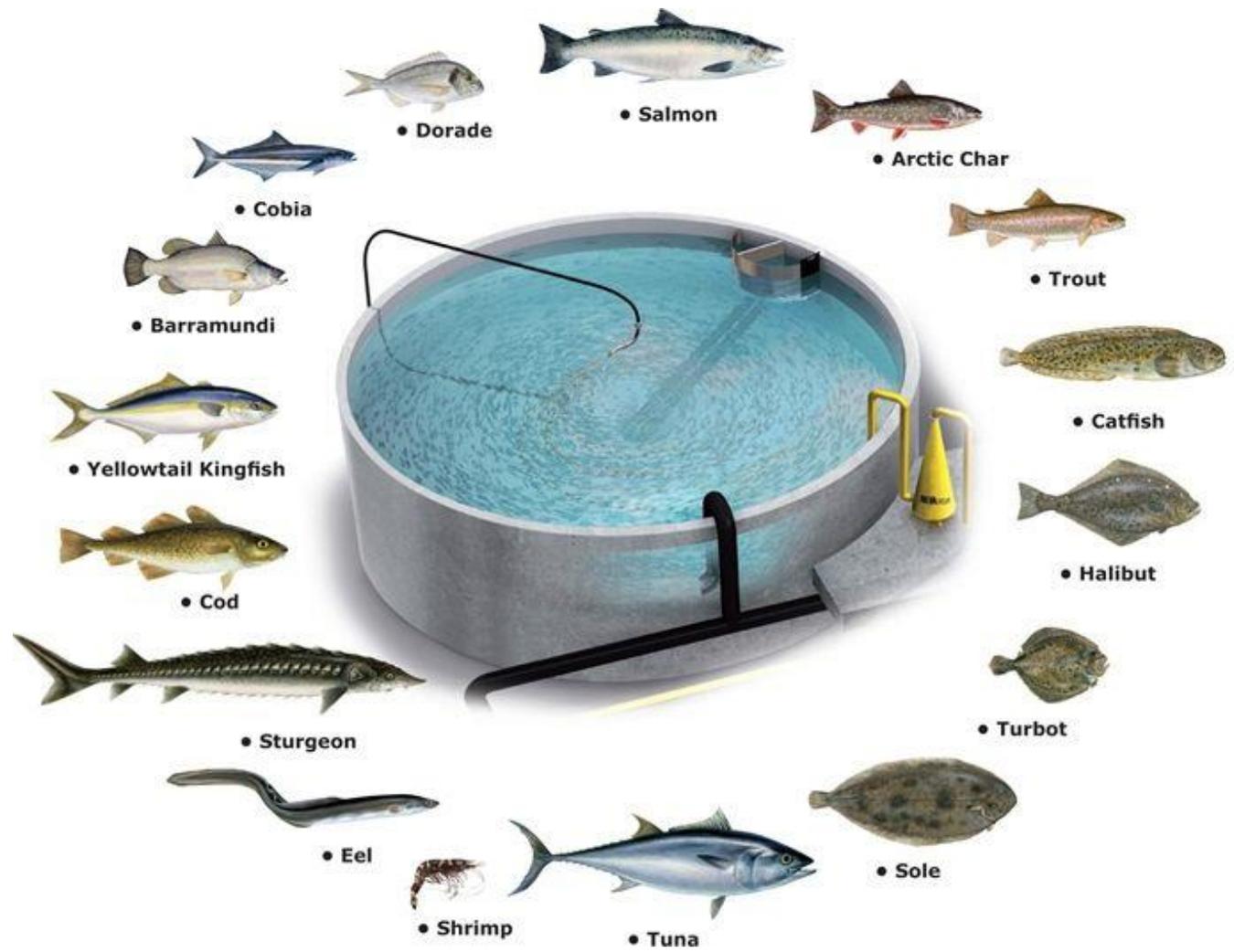


M.Sc. & B.Sc. in Aquaculture. More than 25 years' experience with land-based farming technologies, developing production management systems and building capable teams. Worked throughout Ireland, the UK, Iceland, Canada & Norway growing a variety of species, including brown trout, rainbow trout, arctic char, salmon, turbot and halibut.

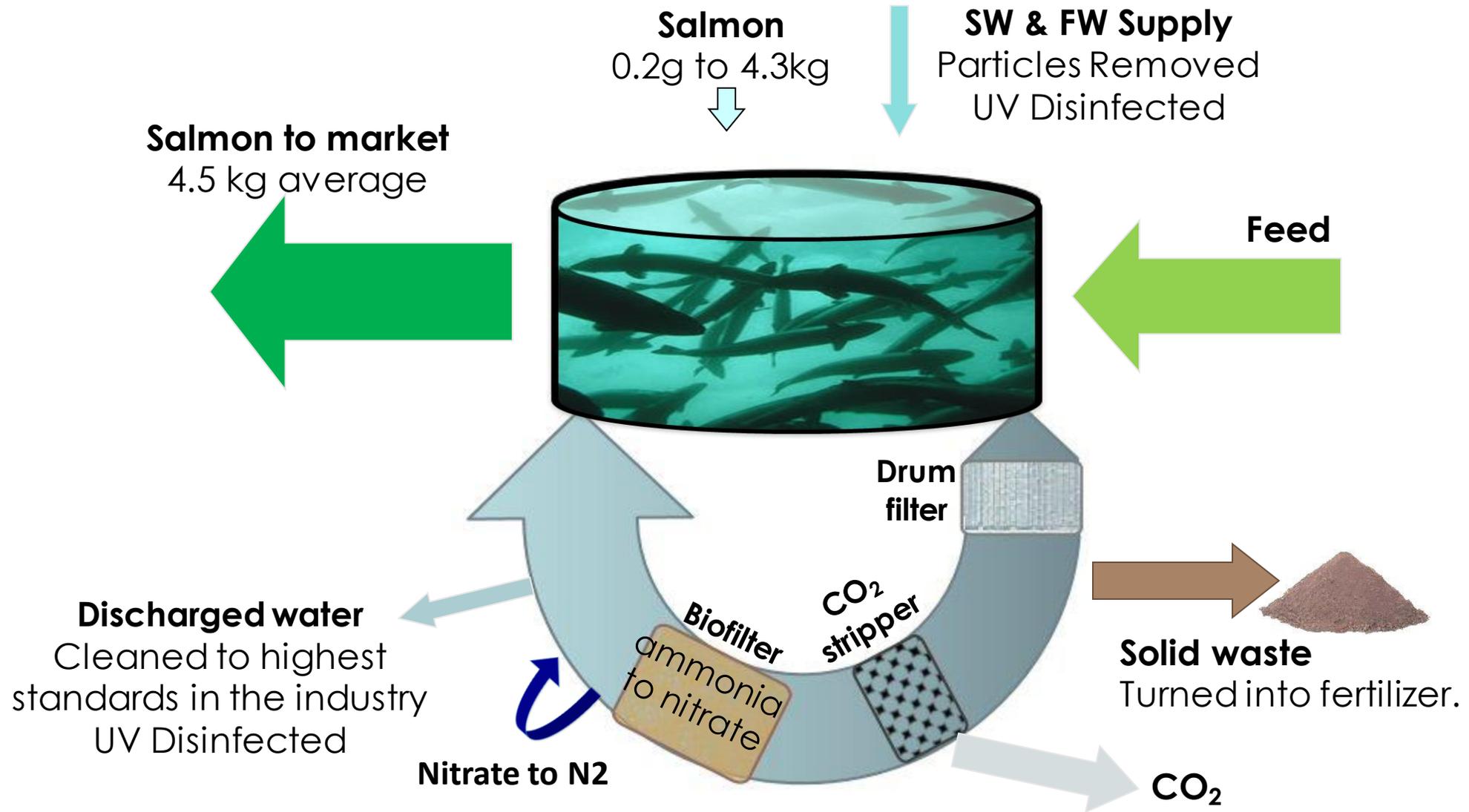
**Cathal Dinneen**  
Production Director



RAS Technology  
is tried and  
tested & is used  
all over the  
world today



# RAS (Recirculating Aquaculture System)



Almost all salmon produced today start their life in land-based systems but typically get transferred to cages in the sea at about 100g . But – expansion in the sea is quite limited.



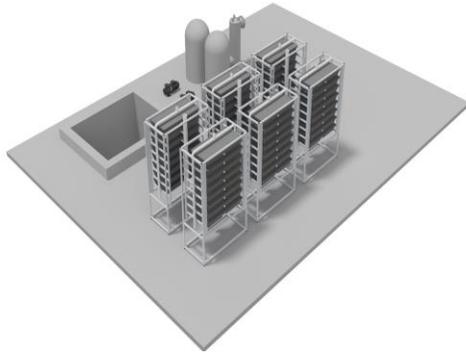
Smoltification

To Sea



### Incubation System

1.8m Eggs bimonthly  
(2 mts)



### Nursery System

75m<sup>3</sup> Tanks  
0.2g to 5g (3 mts)



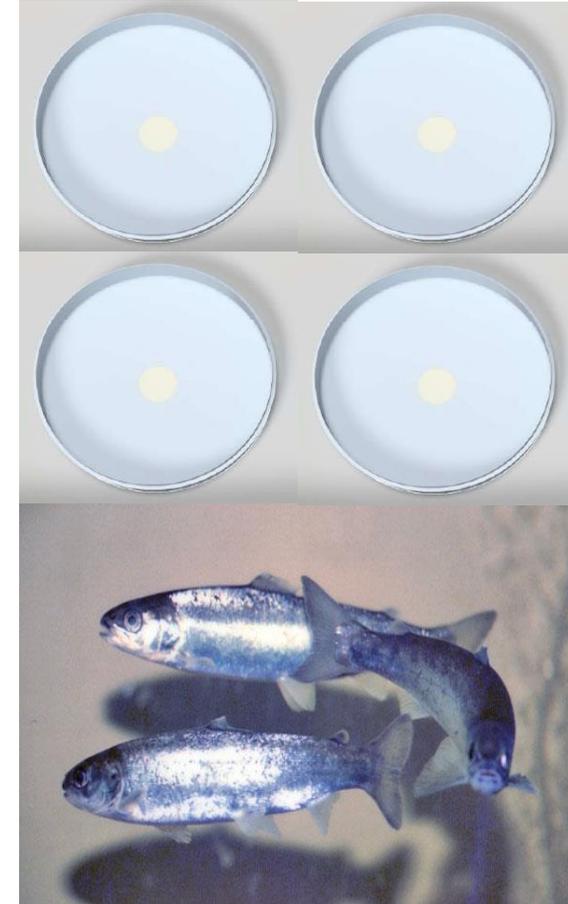
### Parr System

350m<sup>3</sup> Tanks  
5g to 55g (3.5 mts)

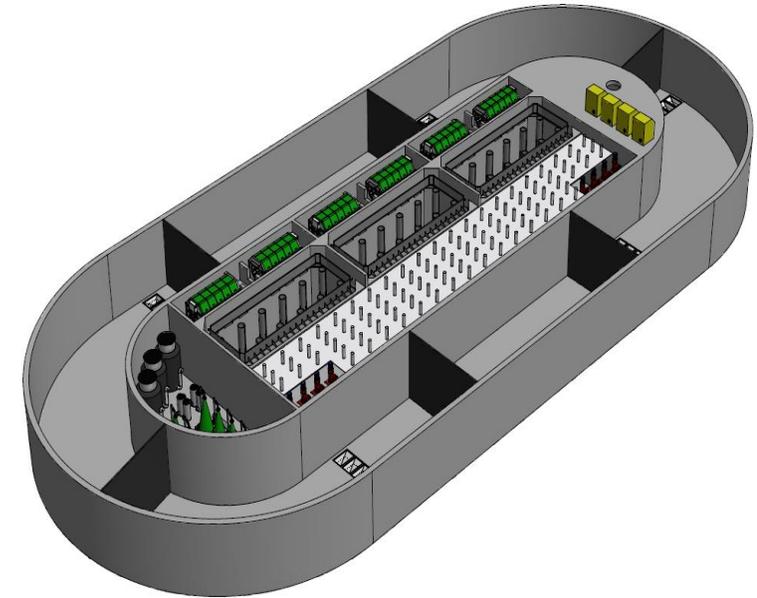
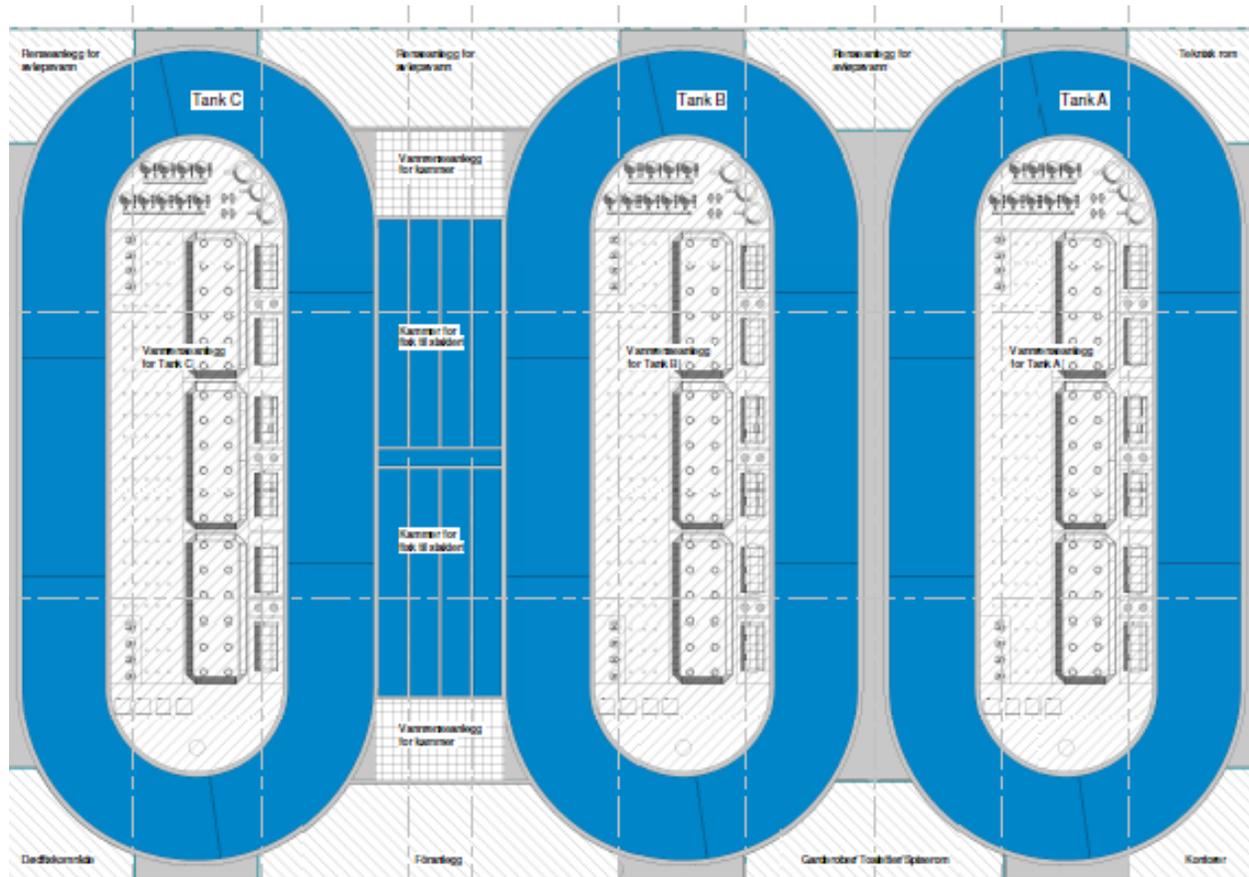


### Smolt System

700m<sup>3</sup> Tanks  
55g to 150g (3.25 mts)

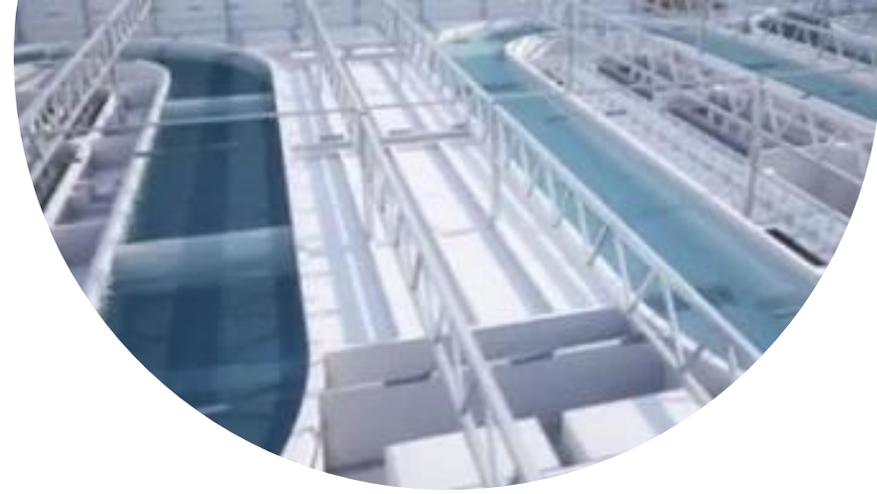


150g salmon are grown all the way to 8-9 lbs market size on land in large state of the art tanks



**1 x 8500m3 Post Smolt (7mts)**  
 100k #/mt (150g to 1900g)

**2 x 8500m3 Ongrowing tanks (5mts)**  
 Split from Post Smolt (1900g to 4.5kg)

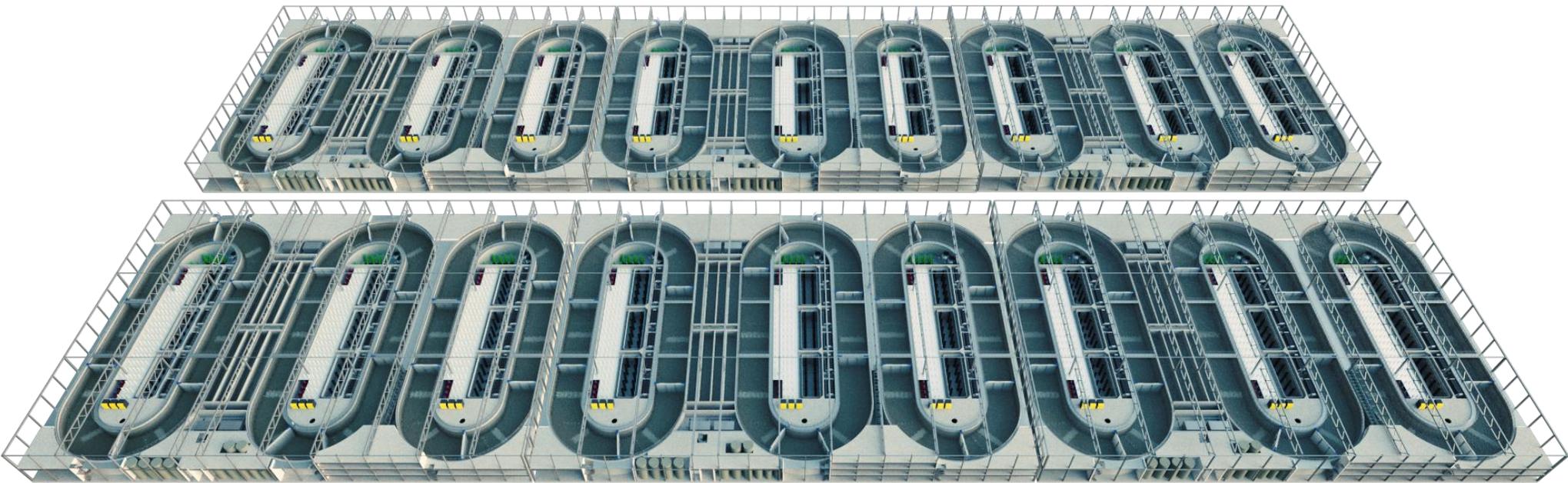


## Ground-breaking Modular D-Tank Systems

- Allows us to create optimal conditions 24/7
- High standards of animal welfare.
- Healthy fish - no antibiotics and pesticides
- Better performance
- Unlike sea farms, our waste can be captured
- Industry leader on environmental standards
- Effectively disconnected from the “wild” environment means fish cannot escape & greatly reduced disease risks
- Greater control = reduced business risks



Our designs are scalable – enabling flexibility for different locations



# US engineering Director – Ed Cotter

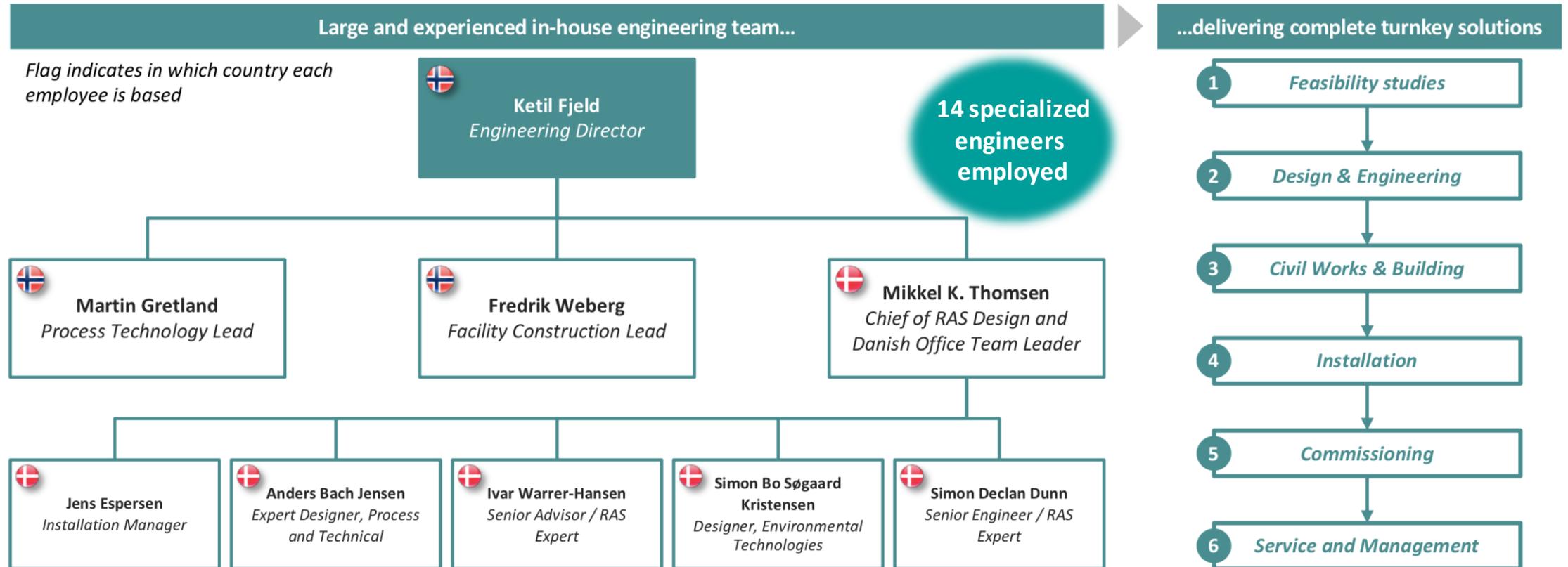


**Edward Cotter**  
Project Director

B.Sc. in Ocean Engineering from the University of Rhode Island. Nearly 20 years of experience in planning, design, and construction of capital projects including coastal work and complex science, hospital, and higher educational facilities. Lead consulting project manager for University of CT campus infrastructure upgrade projects as well as new building developments.

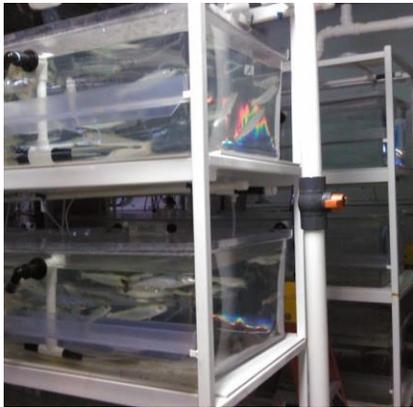


# Our in-house design team is one of the most experienced in the industry – experience from many projects in the past decade





**David Noyes**  
CTO



Triplicate BSL II  
systems UMAHL

## US Chief Technology Officer – David Noyes

10 years RAS aquaculture experience building, operating, and maintaining systems for more than 20 commercially valuable species to include abalone, eel, lobster, salmon, trout, and yellowtail  
Two decades of engineering and construction experience.

University of Maine Aquaculture Research Institute and Animal Health Lab: Research Assistant  
Jackson Lab Transgenic Genotyping Services: Genotyper  
Acadia Harvest RAS yellowtail and black sea bass producer: Operations Manager, Systems Lead  
USDA National Cold Water Marine Aquaculture Center salmonid and research and breeding  
Maine Army National Guard: NCOIC, Belfast detachment, Platoon Sergeant, engineering, project management, logistics, electronics and communication.



<https://umaine.edu/cooperative-aquaculture/facilities/>



Over 50 expert resources have been involved in the permitting work

Nordic Center  
of excellence



**Ed Cotter**  
Project Director



**John Hessler**  
Project Engineer

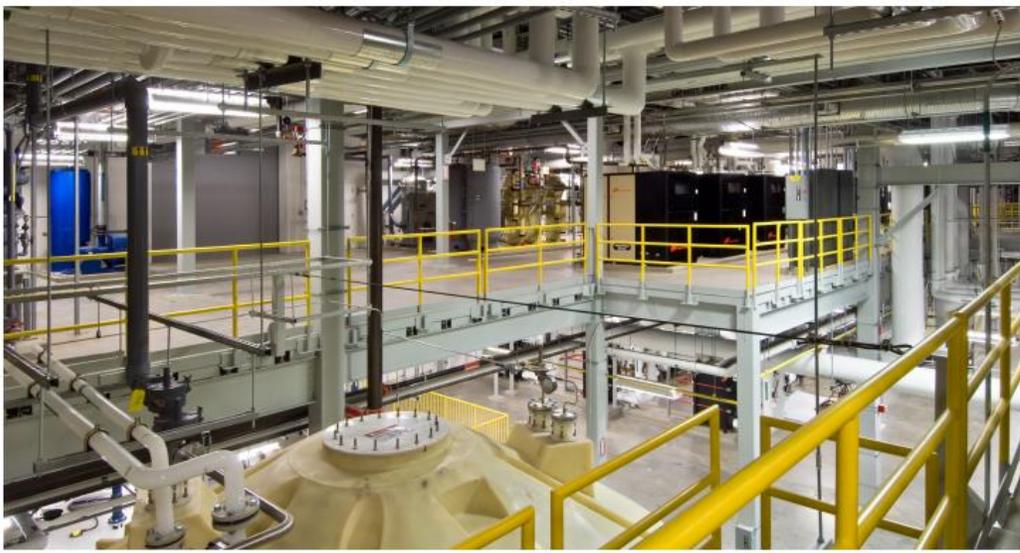


**David Noyes**  
CTO

Development partners in Maine



ATTORNEYS AT LAW



GE Healthcare Manufacturing Facility  
North Greenbush, New York



MGMC Alford Center for Health  
Augusta, ME



UMaine Alford Wind & Wave Ocean Engineering Laboratory  
Augusta, ME

# Construction Planning and Management

## CIANBRO

- ♻️ Intake/Discharge pipe installation
- ♻️ Saltwater pump station
- ♻️ History of successful heavy civil & marine projects
- ♻️ Local Maine General Contractor

## Gilbane

- ♻️ Upland site Construction Manager
- ♻️ Procurement of local trade contracts
- ♻️ Industry leader in Safety and Sustainability
- ♻️ Landry/French local Maine partner





**PROJECT SIZE:**  
207,000 SF

**CONSTRUCTION COST:**  
\$200,000,000 Estimated

**COMPLETION DATE:**  
December 2020

**DELIVERY METHOD:**  
CM at-Risk

**CLIENT REFERENCE:**  
Serena Bodner  
Senior Manager, Capital Projects  
Alnylam Pharmaceuticals  
617-682-4332  
sbodner@alnylam.com

**ARCHITECTURAL/  
ENGINEERING  
REFERENCE:**  
Michael Stevens  
Project Manager  
Jacobs Engineering  
Group, Inc.  
610-238-1100  
Michael.stevens@jacobs.com

**Alnylam Pharmaceuticals, Biopharmaceutical Manufacturing Facility**

**#5** Domestic Building Manufacturing  
*Engineering News-Record (ENR) 2017*

**#8** Food & Beverage Builder  
*Engineering News-Record (ENR) 2017*

*In the past 10 years, Gilbane has worked on*

**60** PROCESS PROJECTS totaling  
**\$2** BILLION  
**4** MILLION SF

**125** Gilbane has built over **125** Manufacturing Facilities in the U.S.



**The Jackson Laboratory for Genomic Medicine**

**PROJECT SIZE:**  
175,000 SF

**CONSTRUCTION COST:**  
\$95,000,000

**COMPLETION DATE:**  
October 2014

**DELIVERY METHOD:**  
Program Management

**CLIENT REFERENCE:**  
John Fitzpatrick  
The Jackson Laboratory  
207-288-6000  
John.fitzpatrick@jax.org

**ARCHITECTURAL REFERENCE:**  
Jim Childress, Partner  
Centerbrook Architects and Planners  
860-767-0175  
childress@centerbrook.com

**ENGINEERING FIRM(S) REFERENCE:**  
Thomas St.Denis, P.E.  
President I BVH Integrated Services, P.C.  
860-286-9171  
Tom St. Denis <tomS@BVHis.com>





# CIANBRO



Richard J Wenning  
Ramboll  
Portland ME  
Environment & Ecology Specialist

**RAMBOLL**

## **I. Capabilities Relevant to NAF-Belfast Project**

- Aquatic ecologist; ecotoxicologist
- Chemical threshold limits in fresh/marine water and sediments
- Consequences of mercury and related contaminants in marine ecosystems
- Environmental impact assessment
- Penobscot Bay and coastal ecosystem structure and function
- Risk Assessment
- Sediment management

## **II. Recent Project Deliveries**

- Dredging and dredged material disposal for federal navigation channel maintenance and improvement at the Searsport Terminal
- Mercury consequences to marine biota/habitats in Penobscot River and Bay
- Options for construction of an in-water CAD for dredged material disposal with Maine DOT and USACE New England District
- Permitting review @ Belfast - ocean discharge impact; groundwater withdraw; and beneficial use of fish processing material
- Revision of USACE national CWA Section 404 Inland Testing Manual and MPRSA Section 103 Ocean Testing Manual

# Conclusion on capabilities

- Highly experienced senior production staff from RAS and net pens
- World-class inhouse design and engineering expertise
- Large local, national and international interest for future jobs in Maine
- Rock solid Construction Management partners