



# ACIG

## Intelligent fish farming

NATHAN PYNE-CARTER  
CEO

24<sup>TH</sup> MARCH 2022

# AQUACULTURE'S 3 MULTI MILLION-POUND PROBLEMS



## 1 SEALICE & PREDATION

Farms have no connected means to track predation levels and efficacy of lice treatments

## 2 ACCURATE BIOMASS DATA

Farms have no connected means to assess, manage and judge the efficacy of lighting and feeding regimes on fish growth

## 3 HUMANE SLAUGHTER

Farms have no connected means to assess, manage and judge the welfare benefits of improved slaughter solutions

# WELFARE IMPROVING TECHNOLOGIES IN KEY CUSTOMER ACCOUNTS

Electrification and digitization brings farmers insight and visibility to stakeholders

PROTECT



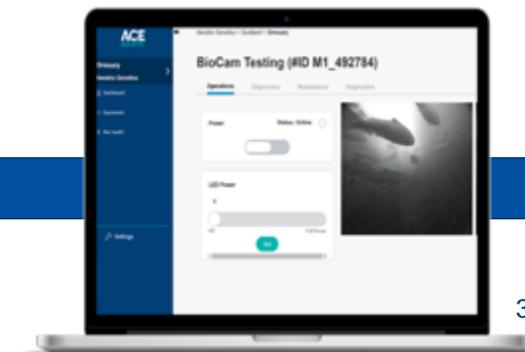
GROW



HARVEST



DATA



3



# THE PROBLEM OF SEALICE

# THE PROBLEM



Norway, Chile, UK and North America are **85%** production of salmon – all regions have severe lice issues



Sea lice costs on average **€1.15Bn/year** to the industry



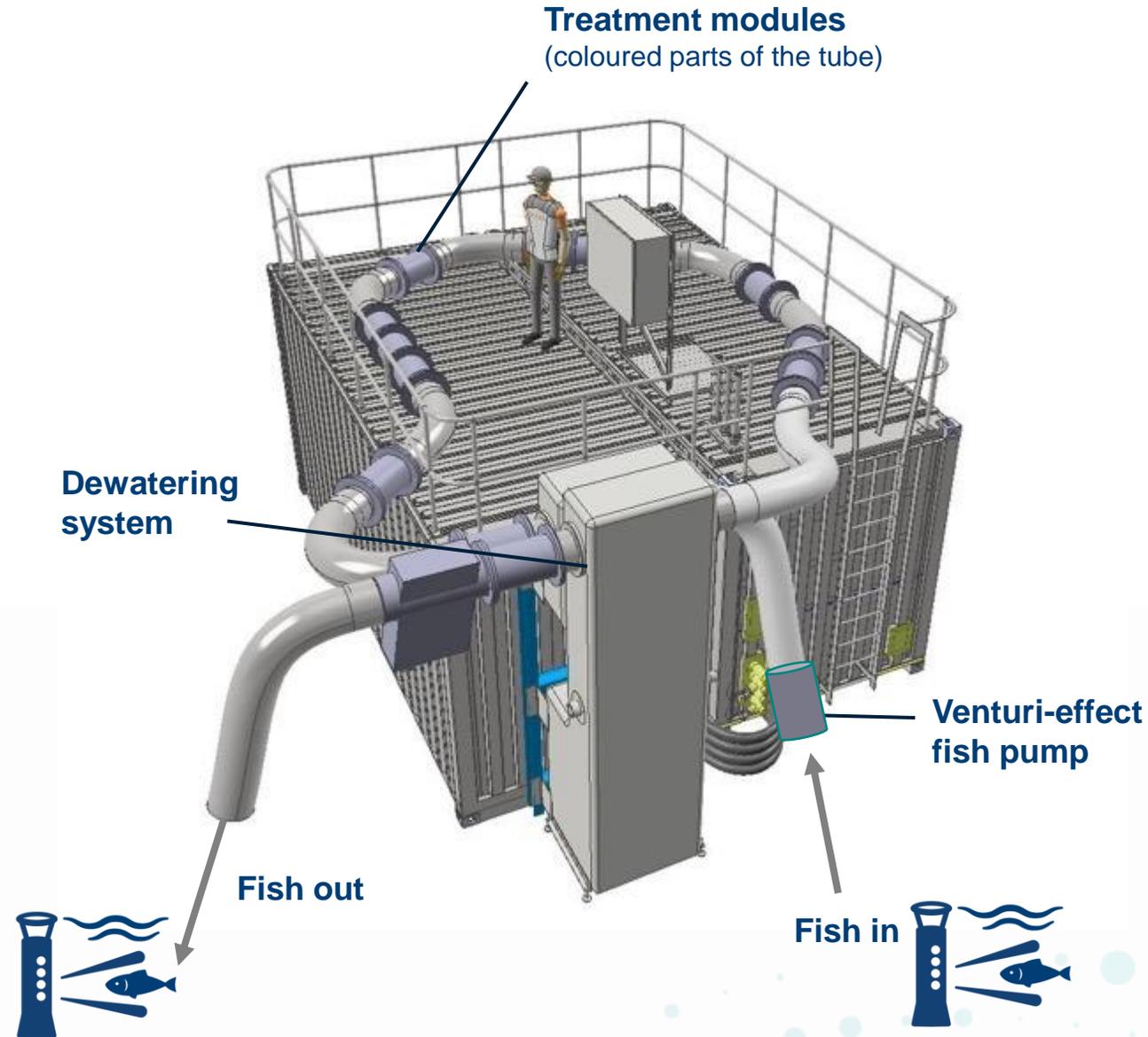
Current technologies **negatively impact welfare** of fish (Norwegian Food Safety Authority) and chemical treatments (e.g. Hydrogen peroxide) have led to widespread **resistance** in lice



In **2019**, Norway, Chile, Scotland and Canada spent **€653m** on lice control measures. Fish Health Inspectorate (2020) 2017-2019, over **2.6 million fish mortalities** included 'treatment' in the explanation



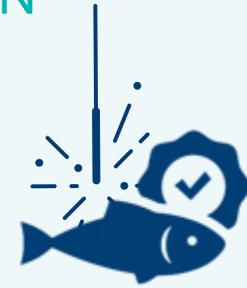
# THE SOLUTION



## UNIQUE DESIGN



Low pressure pump



Low pressure waterjets



Low voltage electric fields



Lice cameras

# USER BENEFITS

- ① Highly efficient
- ② High fish welfare
- ③ Flexible, containerized
- ④ Low-cost
- ⑤ Sustainable
- ⑥ Connected & Validated





# THE PROBLEM OF PREDATION

# THE PROBLEM



## Seal shooting

No longer permissible to shoot seals, unless they are trapped in nets.



## The impact of predation

The salmon killed by seals would have fetched a market price of **£12,253,743** in 2020 and a further **£8,436,987** in the **eight months of 2021** to end of August, a total lost revenue of **£20,690,730** (Fish site Nov 2021)

NO PERFECT SOLUTIONS

DESPITE IMPROVED TECHNOLOGIES



Double nets



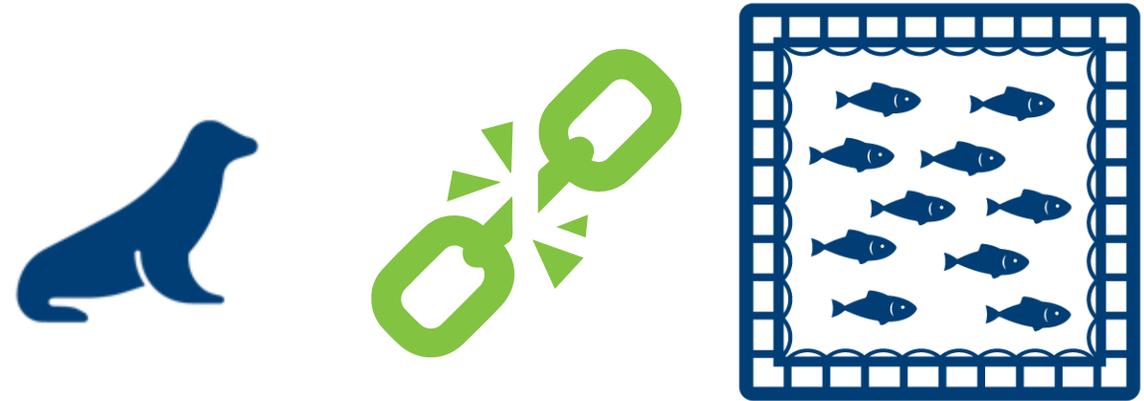
Reinforced Nets



Traditional Acoustic barriers



**OUR SOLUTION:**  
**BREAK THE**  
**CYCLE OF**  
**PREDATION**



Learning can be reversed through conditioned avoidance behaviours

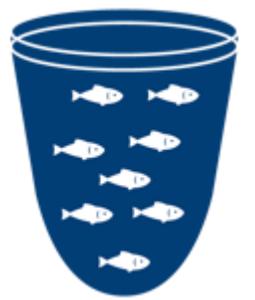
**STARTLE RESPONSE**  
**ACOUSTIC & ELECTRIC**

# INTELLIGENT TOOLS

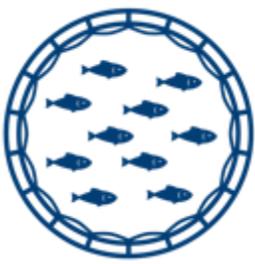
## LONG TERM EFFECTS



**A** E-FENCE



**A** E-NET



**A** E-FISH

**E.S.R.**

Low Duty Cycle (on/off periods)	Low Average Volume (source energy level)	Low Frequency (pitch)

**A.S.R.**

**A** MID

**A** LOW



# ACE INTELLIGENT DETERRENTS



**E.S.R.  
E-Fence**



**A.S.R.  
Low  
Frequency**



**E.S.R.  
E-Fish**

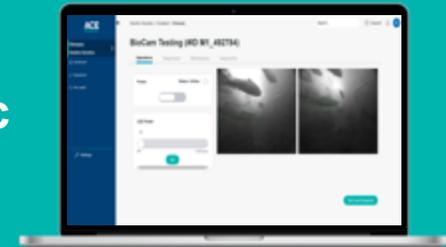


**A.S.R.  
Mid  
Frequency**



**TRIGGER  
A.I Camera**

**Ace Aquatec  
Portal**





# THE PROBLEM OF INACCURATE BIOMASS DATA

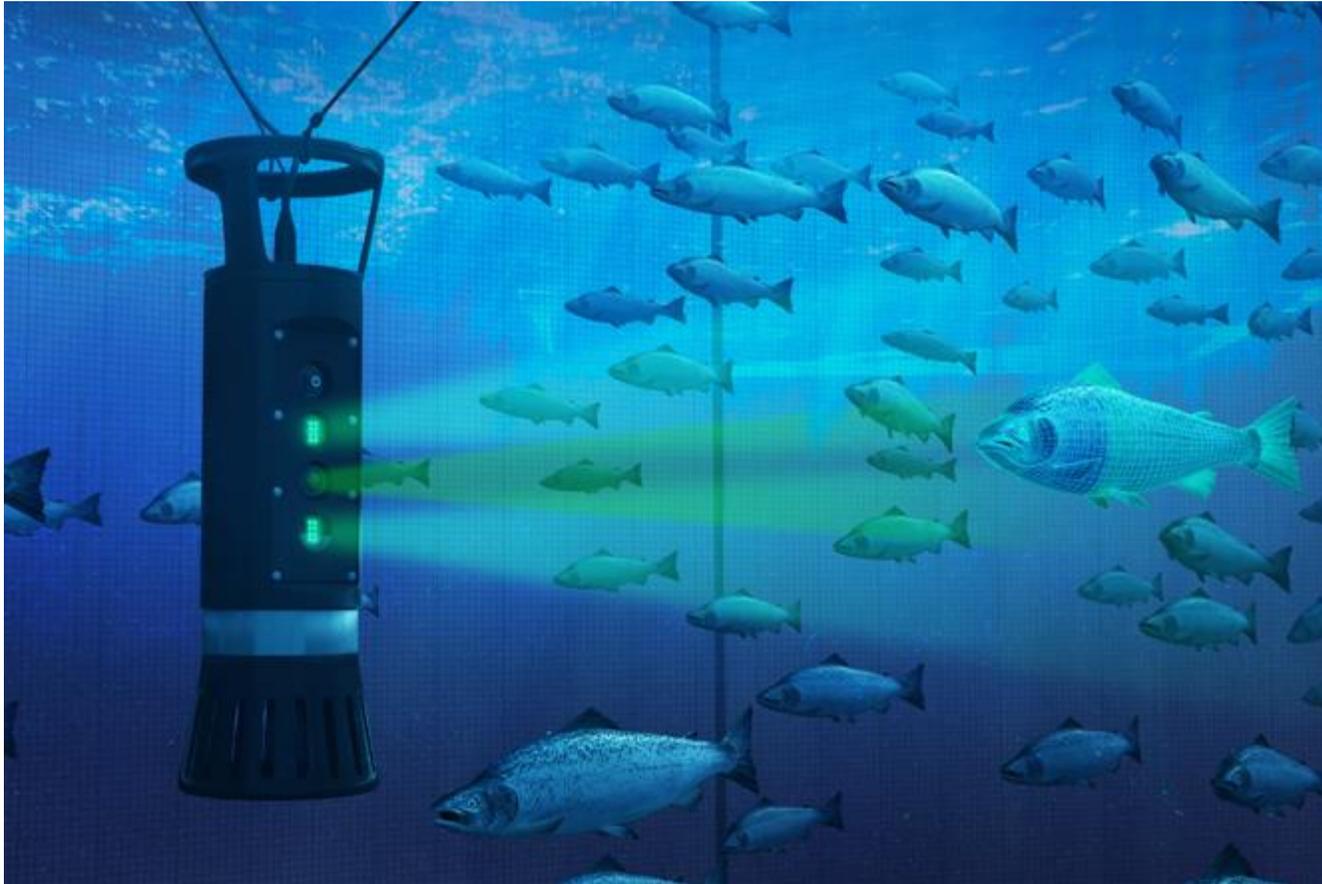
# THE PROBLEM

## Fish data

- ① **£11.4B** – top four countries' economies.  
Scotland 2019 **13%** of the harvest was lost.
- ② Hand weighing is around **95% accurate**,  
Vaki frames are variable
- ③ Poor Data: **40%** of mortalities have no listed cause of death.

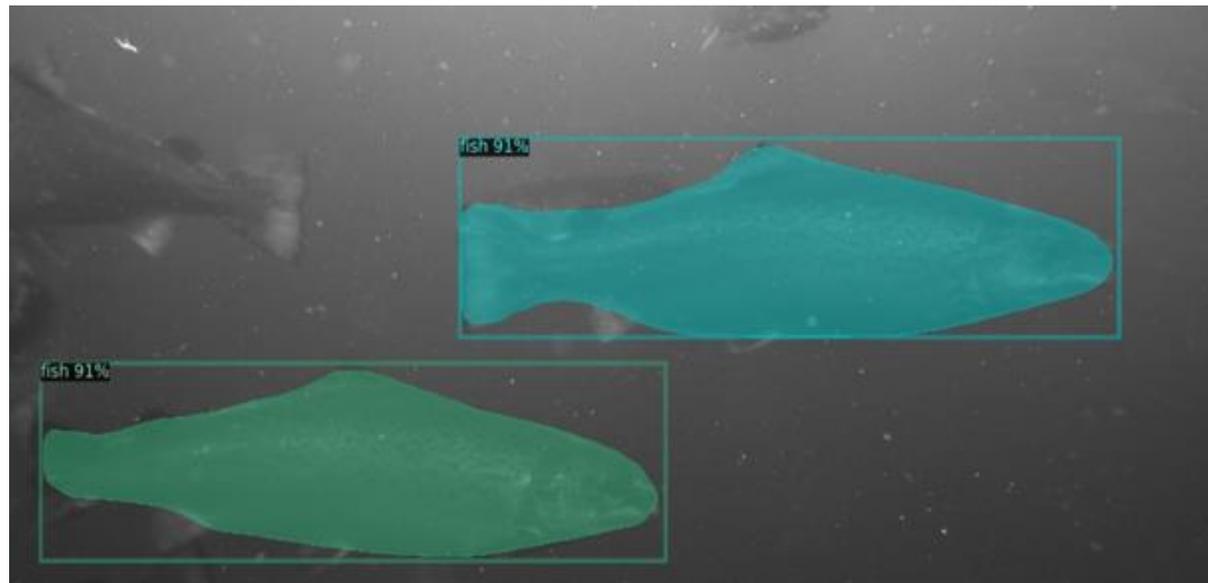
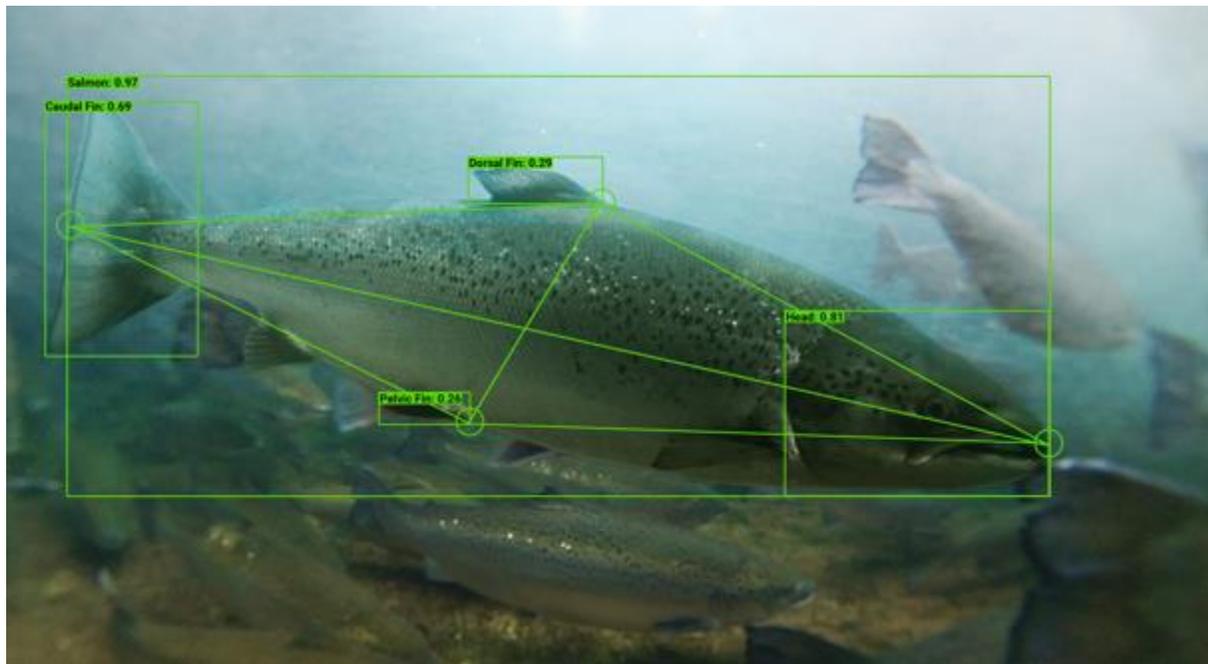


# THE SOLUTION

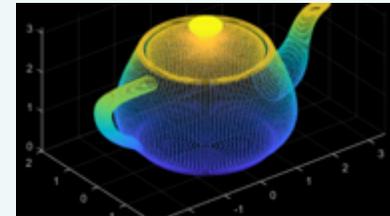


## How the Ace-Biomass works

- ① Stereo triangulation  
Cloud point of cloud
- ② A.I. tags the fish  
Segmentation determines the contours.
- ③ Accurate weight distribution  
Accurate weight averages



## How it's unique



Underwater point of cloud



Auto tagging of fish

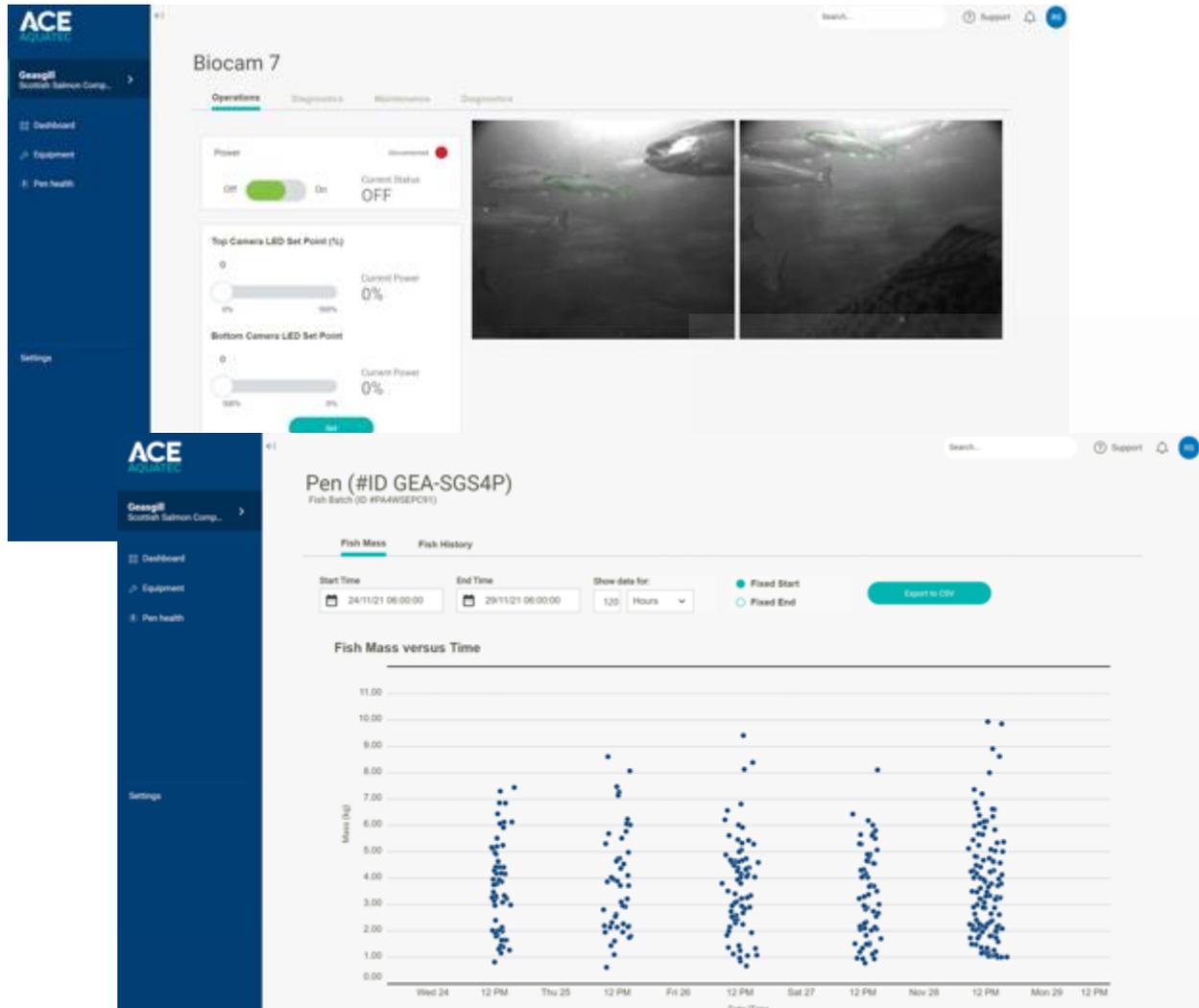


insights via portal



Data from cage to harvest

# THE PORTAL



## How the Portal works

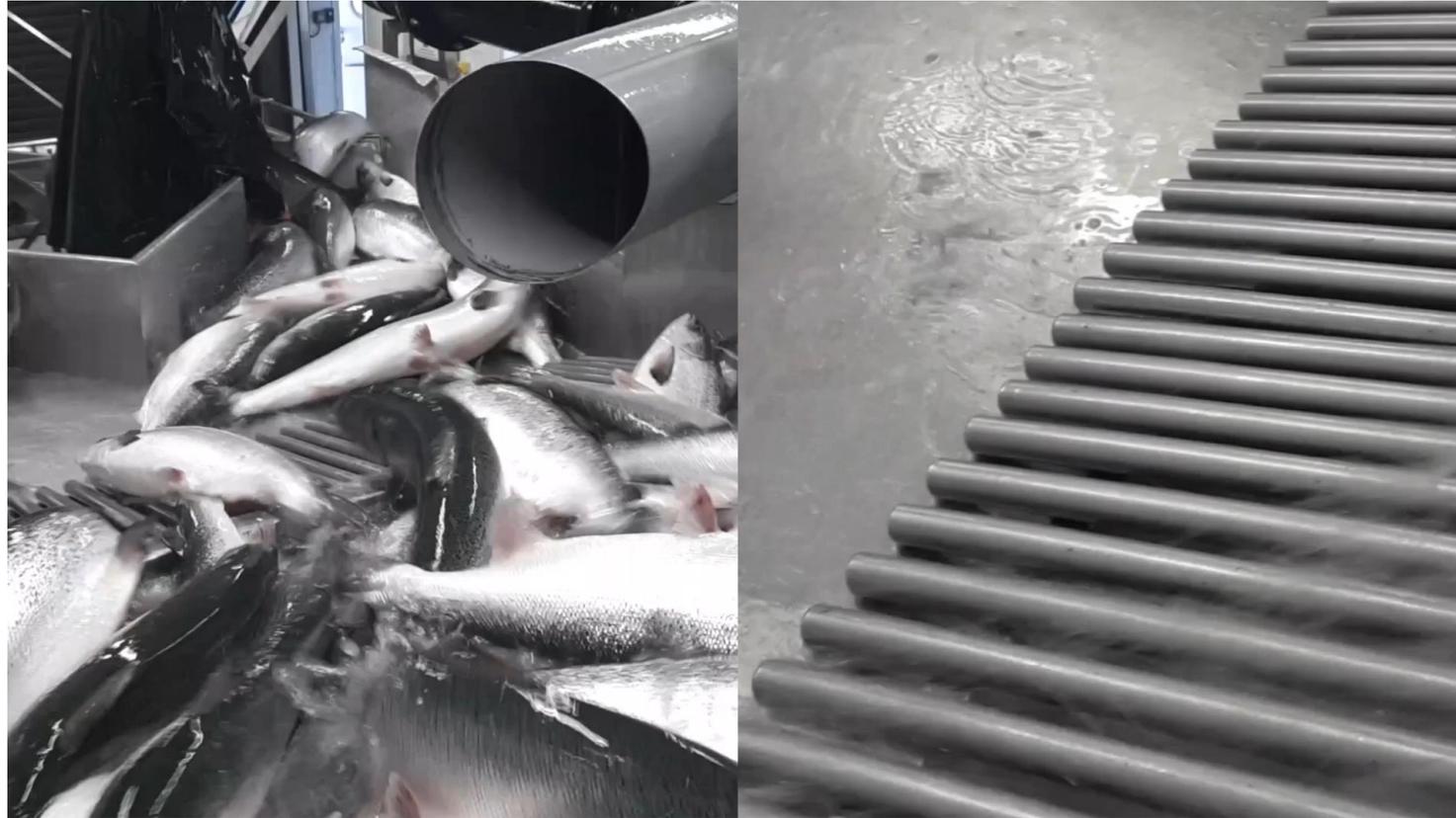
- ① Edge machine learning
- ② Heights, length and weight.
- ③ Weight trends for cage, site or company.



# THE PROBLEM OF INHUMANE SLAUGHTER

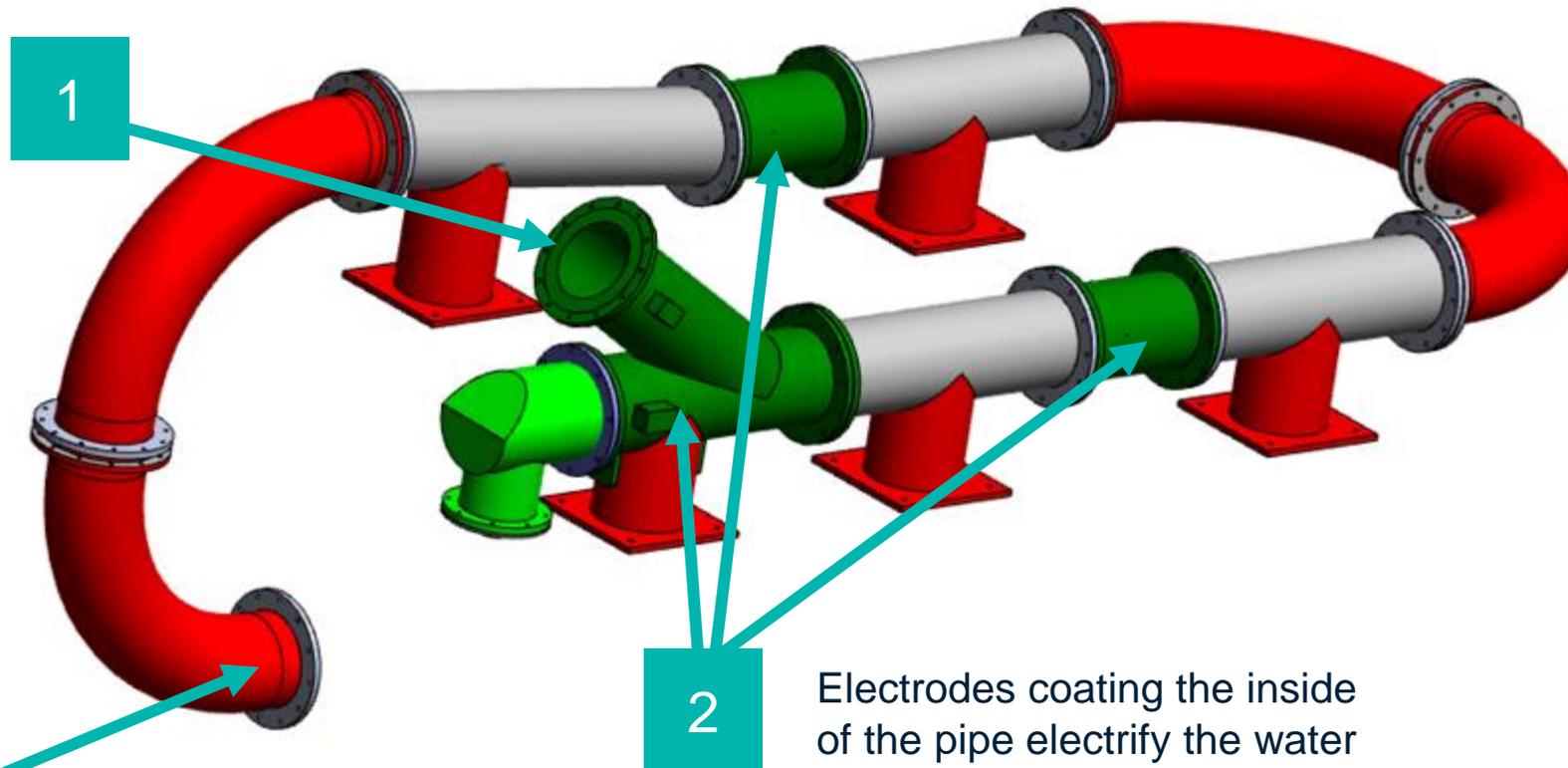
# STUNNING PROBLEMS

## Stress & Variability



# HOW IN-WATER ELECTRIC STUNNING WORKS

Fish are pumped into the stunning pipeline



Fish exit to ice or a bleeding table

Electrodes coating the inside of the pipe electrify the water

# OUR INNOVATIONS REDUCE RISK AT HARVEST



# FOUR KEY BENEFITS

with animal welfare at the heart



## QUALITY

Low stress and minimal handling improves texture, shelf life, and fish welfare.

## RELIABILITY

No moving parts avoids costly breakdowns and regular replacements.



## EFFICIENCY

High processing speeds and reduced handling could double your harvest capacity.

## SAFETY

Reduced fish stress ensures easier handling and improved staff safety.



# SOLVING CRITICAL AND **TIMELY PROBLEMS**

Buyers	Farmers	Pressure
 Humane slaughter	 No solution	<div data-bbox="1735 472 2405 658">    </div> <p data-bbox="1717 701 2364 851">ASC, BAP, HAS, EU, supermarkets, NGOs (Compassion in world farming)</p> <p data-bbox="1717 896 2015 943">Supermarkets</p> <p data-bbox="1717 1025 2193 1122">Freedom Foods, ASC, BAP,</p>
 Accurate biomass	 Imperfect solution	
 No parasites	 Imperfect solutions	
 Bycatch	 No solution	

# THANK YOU

REIMAGINING SUSTAINABLE AQUACULTURE