

Environmental conditions and equipment at aquaculture sites

Aqua Ice Conference Reykjavik 2018

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Global reach – local competence



150+

years

100+

countries

100,000+

customers

12,500

employees

Iceland
Harstad
Bodø
Sandnessjøen
Trondheim
Kristiansund
Molde
Ålesund
Ulsteinvik
Måløy
Florø
Bergen
Haugesund
Stavanger
Kristiansand
Sandefjord
Høvik

DNV GL footprint in seafood



Assurance

GlobalGAP, ASC Salmon, Food Safety Food Fraud, Sustainability, Climate, HMS, Supply Chain, Traceability, Risk Management



Technical

Product Assurance, Site Certification, Class, Environment, Risk Management, Software, Analysis and Simulations



Alliances and Innovation

Future Spaceship Earth
Big Data, SFI Exposed
Joint Industry Projects



Aquaculture - competencies

Operative experience	Technical aquaculture services	Seafood /Food safety	DNV GL stations and laboratories
	NS 9415, NS 9416, NS 9410 Inspection: Fish farms reports, certificates, mooring Certification: Cage net, fleet, float collar Analysis: wawe, net, ice, current	ASC Salmon ASC CoC Global Gap ISO 22, FSSC BRC ISO 9 -14- 18	
20 employees working as auditors or inspectors with previous experience from aquaculture	12 employees (NS 9415 and NS 9416) + Environmental biolaboratory	300 employees globally 15 employees in Norway	Local, Regional, Global
+ DNV GL research: Positon paper aquaculture	+ DNV GL maritime & offshore competence <ul style="list-style-type: none"> • Concrete, steel, composite • Offshore design, construction • Hydraulics • Flow & Piping systems • Geology • Environment and BioRisk 	+ External auditors External specialists	+ Colleague network <ul style="list-style-type: none"> • Inspection • Surveying • Testing • Risk assessment

Equipment at sites

Withstand environmental loads

An industry that improves

- Equipment – 1960 and 2018
 - Net (Old “technology”)
 - Cages – steel and plastic, square and circular (wooden in the 60-80s)
 - Barges – steel, concrete, fiberglass (from 1980s)
 - Mooring equipment

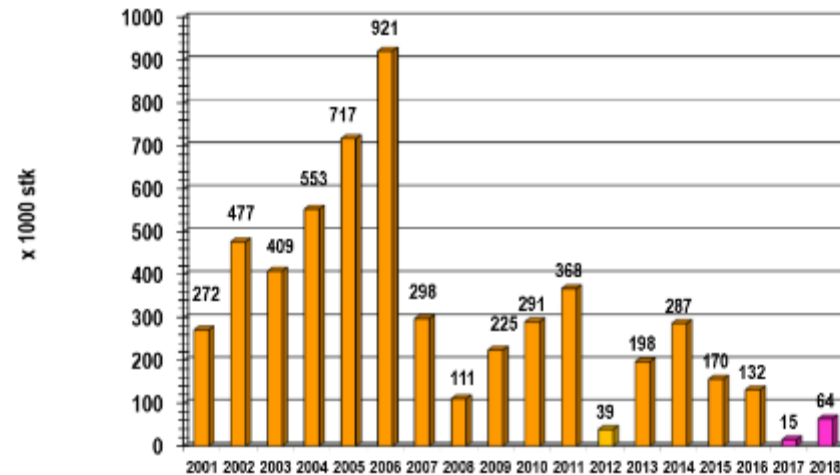


Why prevent “fish escape”?

- Escaped farmed salmon have negative consequences for wild strains of salmon
- Escaping fish is “bad for business”
- Escaping fish leads to loss of reputation
- Since establishment of NYTEK regulations in Norway the increasing trend of Fish Escape has been reversed

Rømming av laks 2001-2018

Oppdretternes innmeldte rømmingstall
pr. 28.02.2018

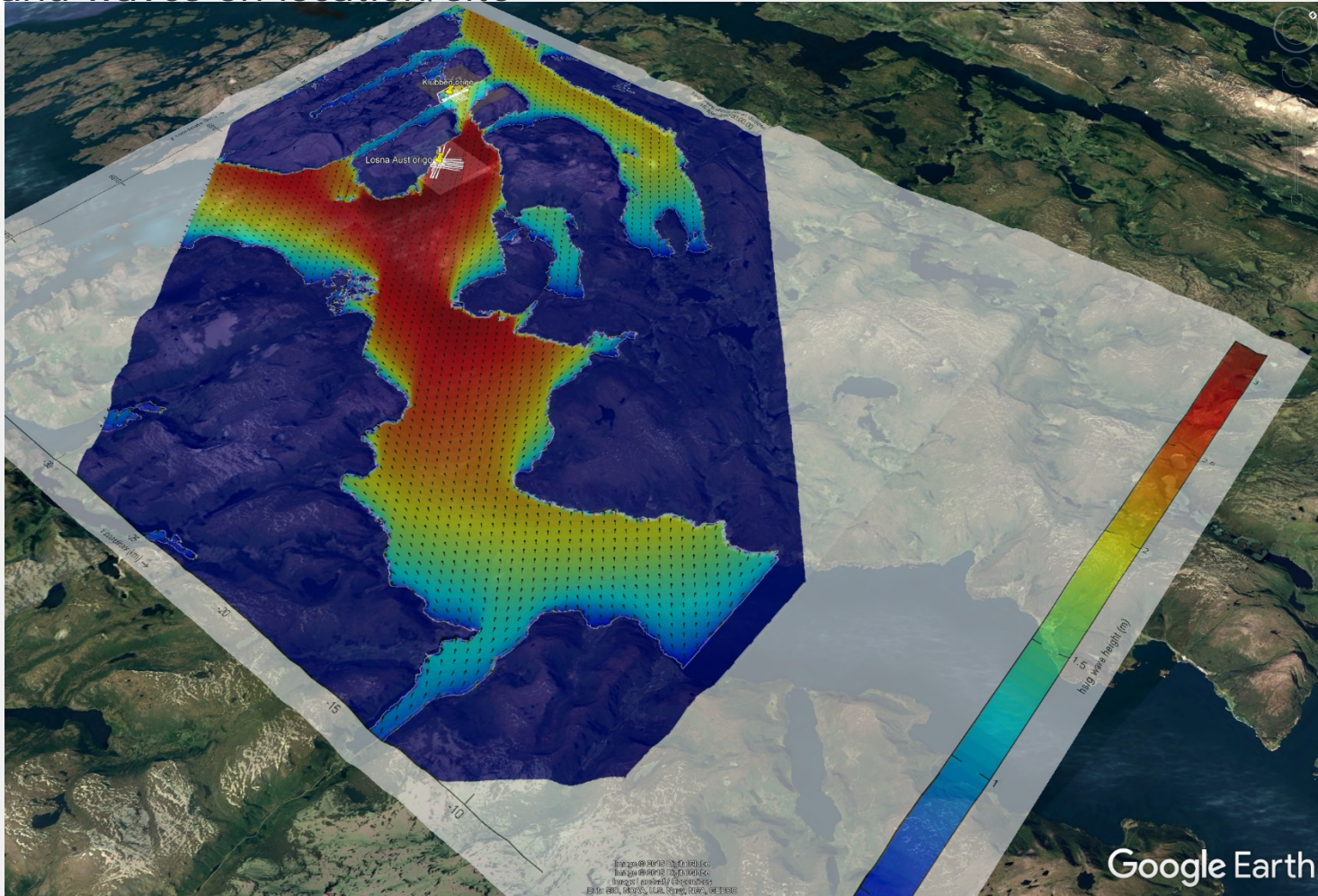


The future - on a technical perspective

- Exposed locations
- New concepts – on land and at sea/ocean, over and under the surface
- New technology
- Bigger units
- Larger scale
- Big data
- Digitalization – feed stations central

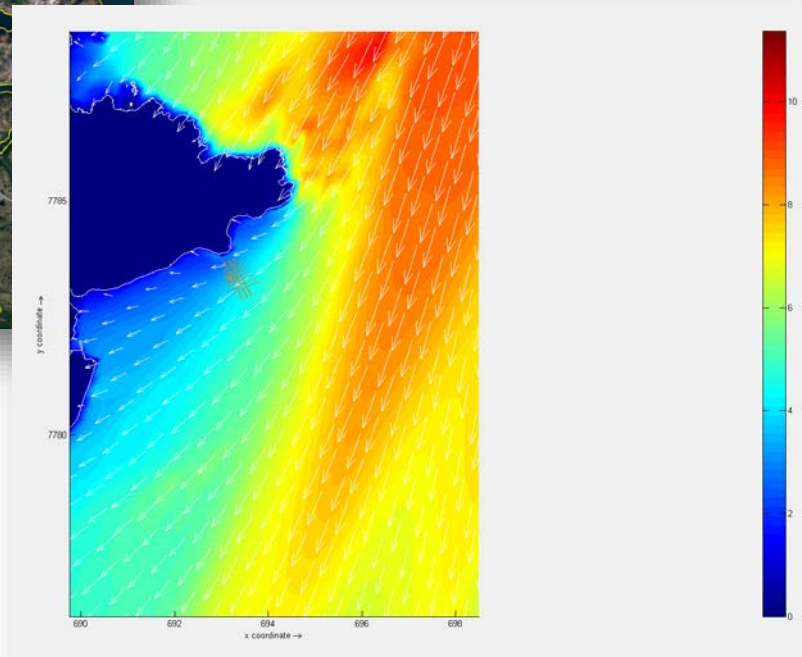
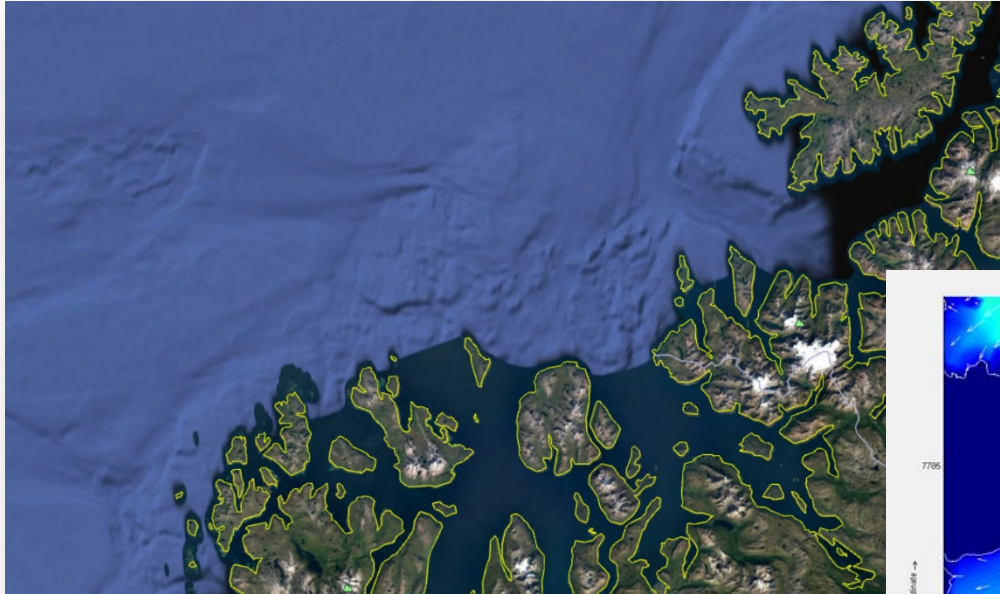
Locations

- Wind and waves on location/site



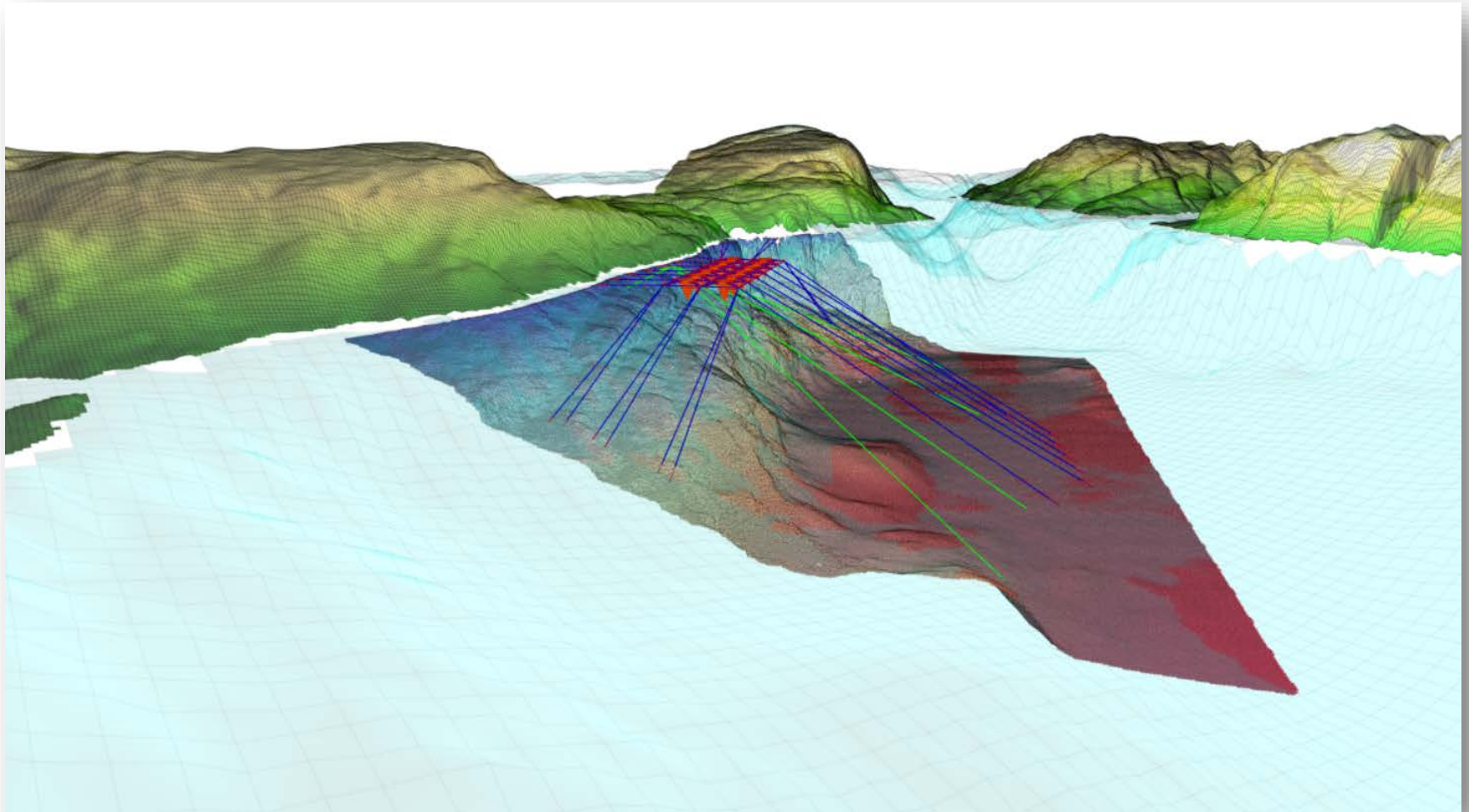
Locations

- Exposed locations – wind and waves



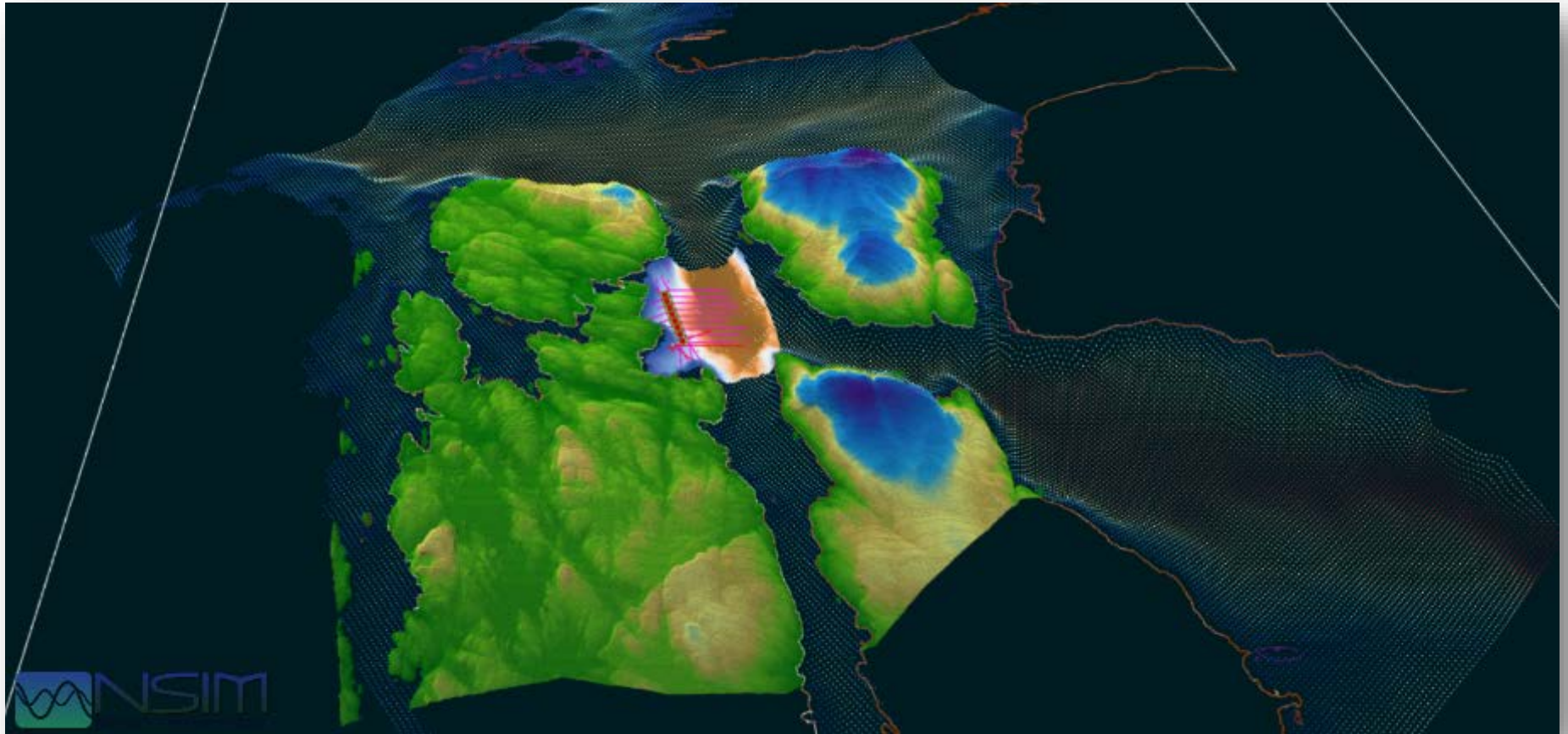
Locations

- Bathymetry



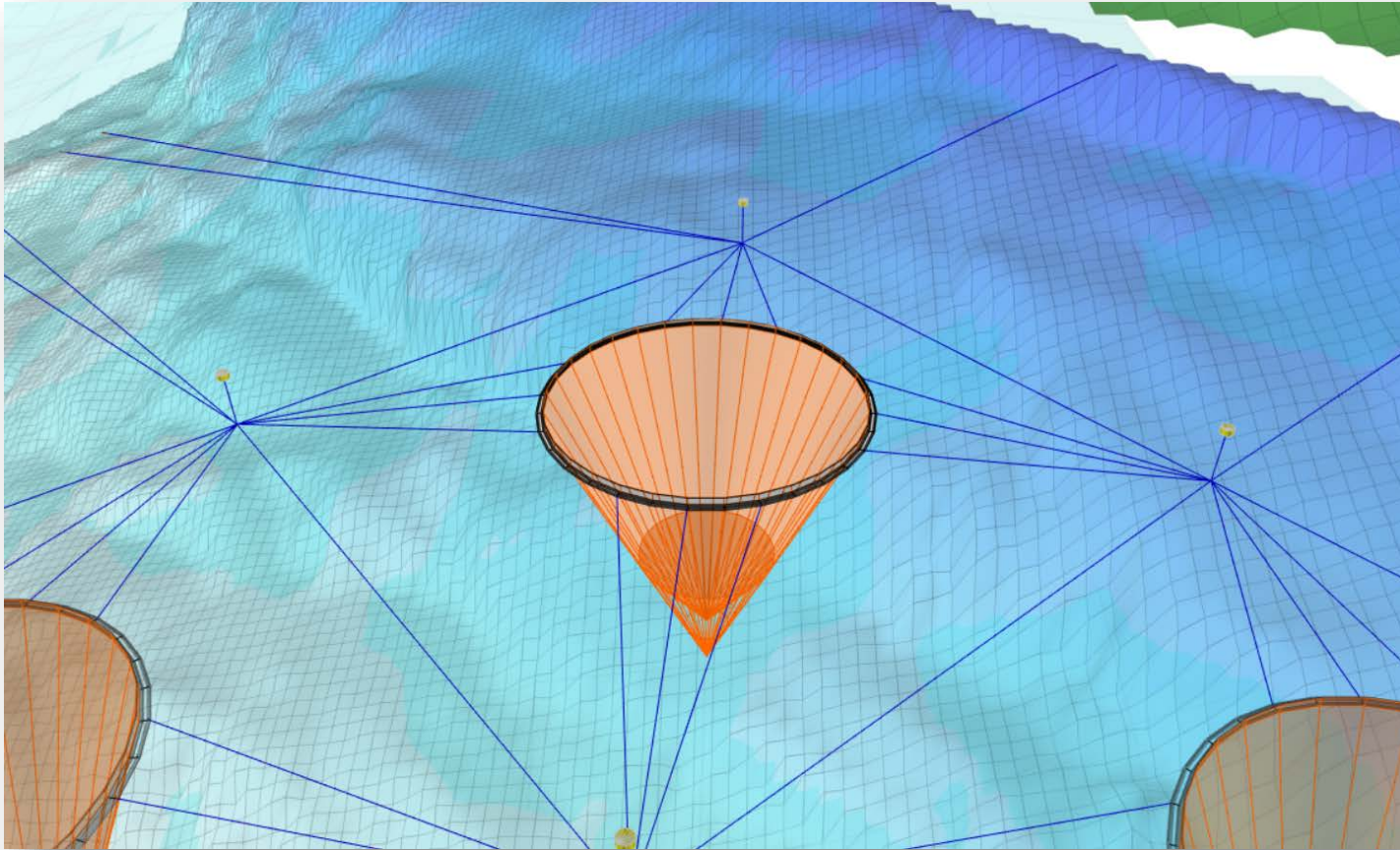
Locations

- Current



Locations

- Capacity main components
- Secondary equipment



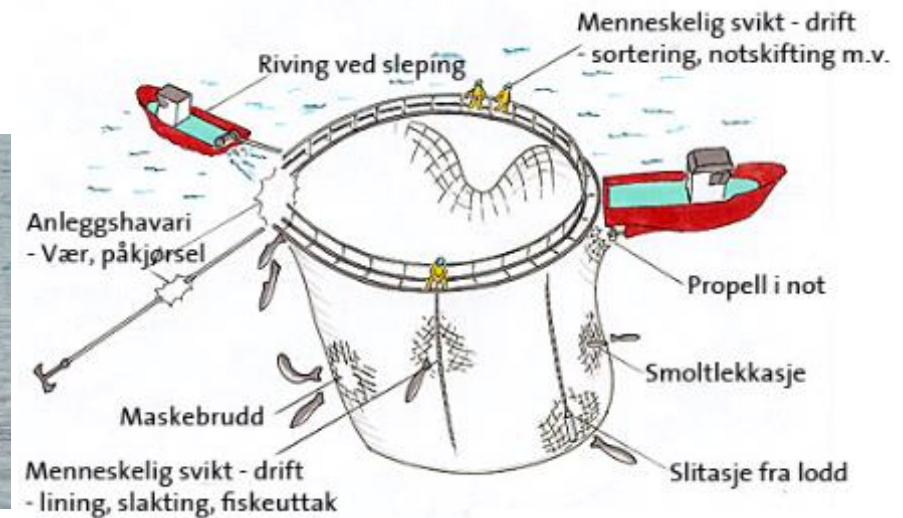
Safety – well vessels / other vessels

- Larger vessels
- Environmental conditions when moored to a fish farm
- Net and propeller
- Fish handling – e.g lice
- Barges



Safety - site

- Lighthouse sectors
- Markings
- Correct equipment
- Net is vulnerable – cleaning, operational
- Handling of net and cages
- Environment - capacity



Thank you

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