Er laksen egnet for fremtidens klima i Norge?

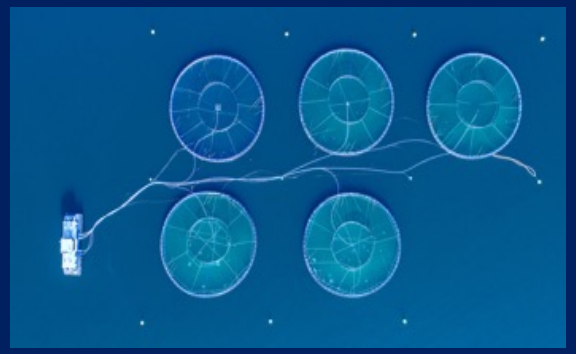
Elisabeth Ytteborg
Seniorforsker, Nofima

FHF dialogmøte, klima
Gardermoen 5. Mai 2026

Nofima

GLOBAL SKALA

NATIONAL SKALA



LOKAL SKALA

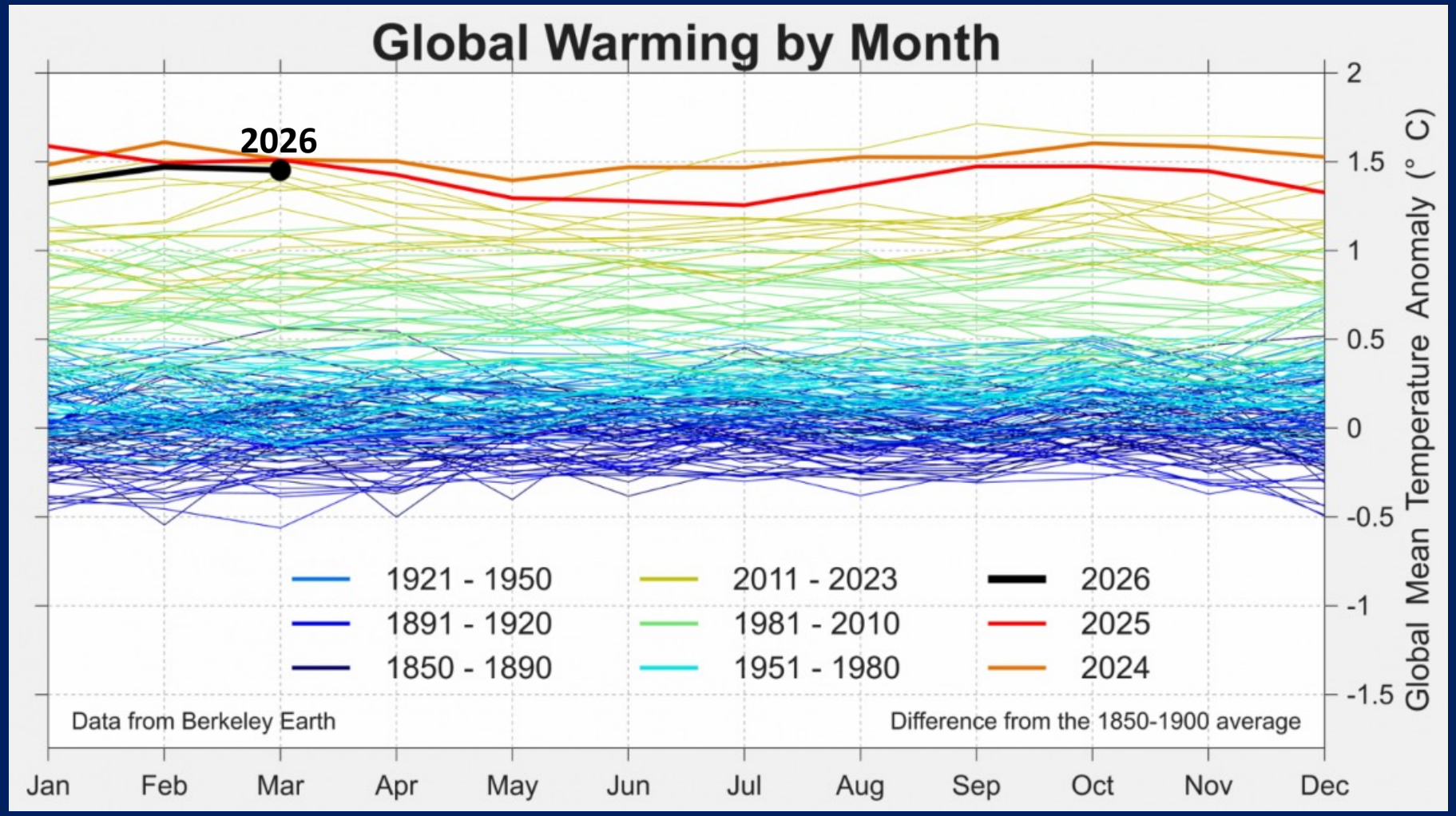
FISKEHELSE

13 CLIMATE ACTION

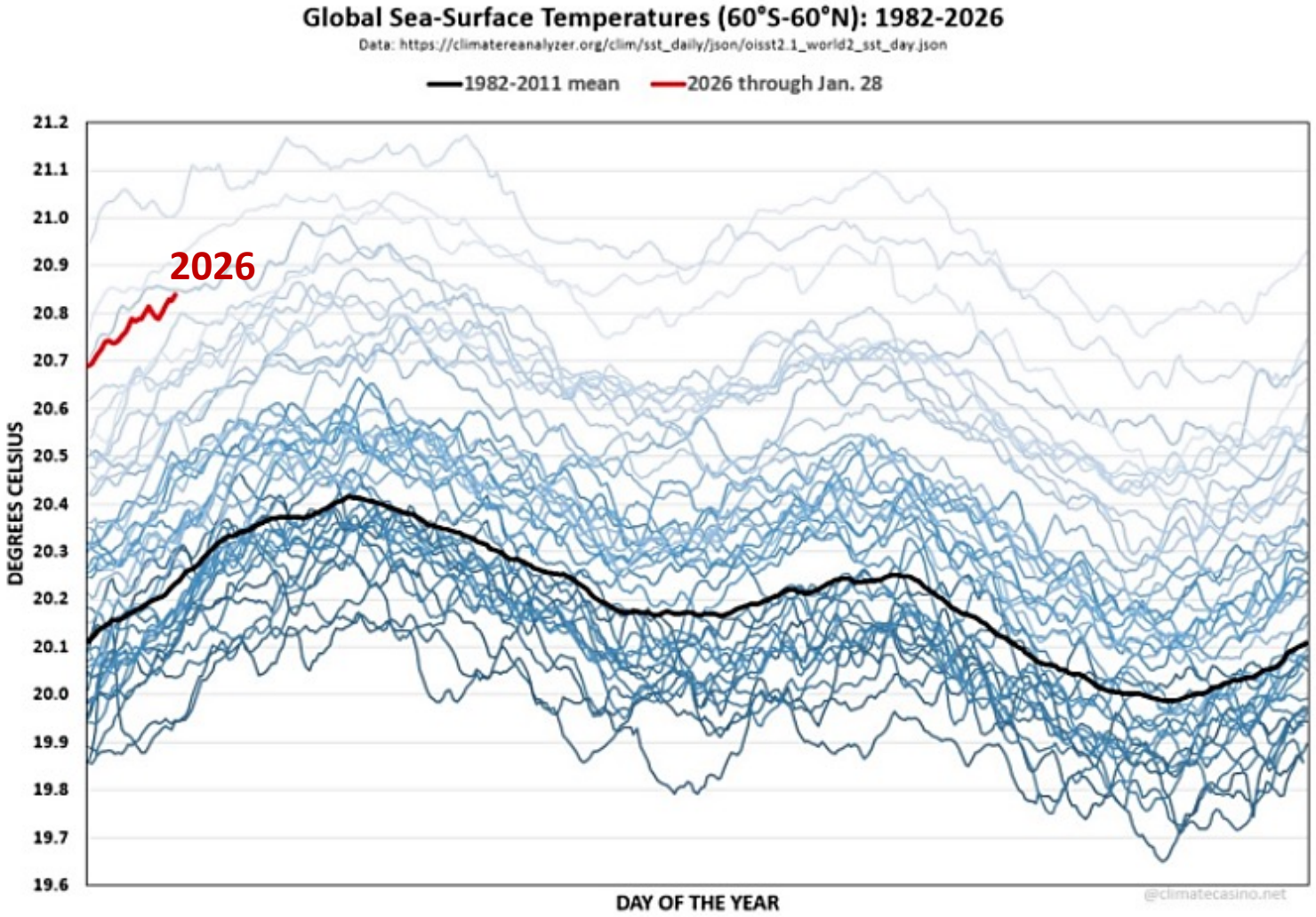
Nødvendig med umiddelbare tiltak for å bekjempe klimaforandringer og samtidig redusere konsekvensene av disse

FN, 2015

Temperatur: Verden

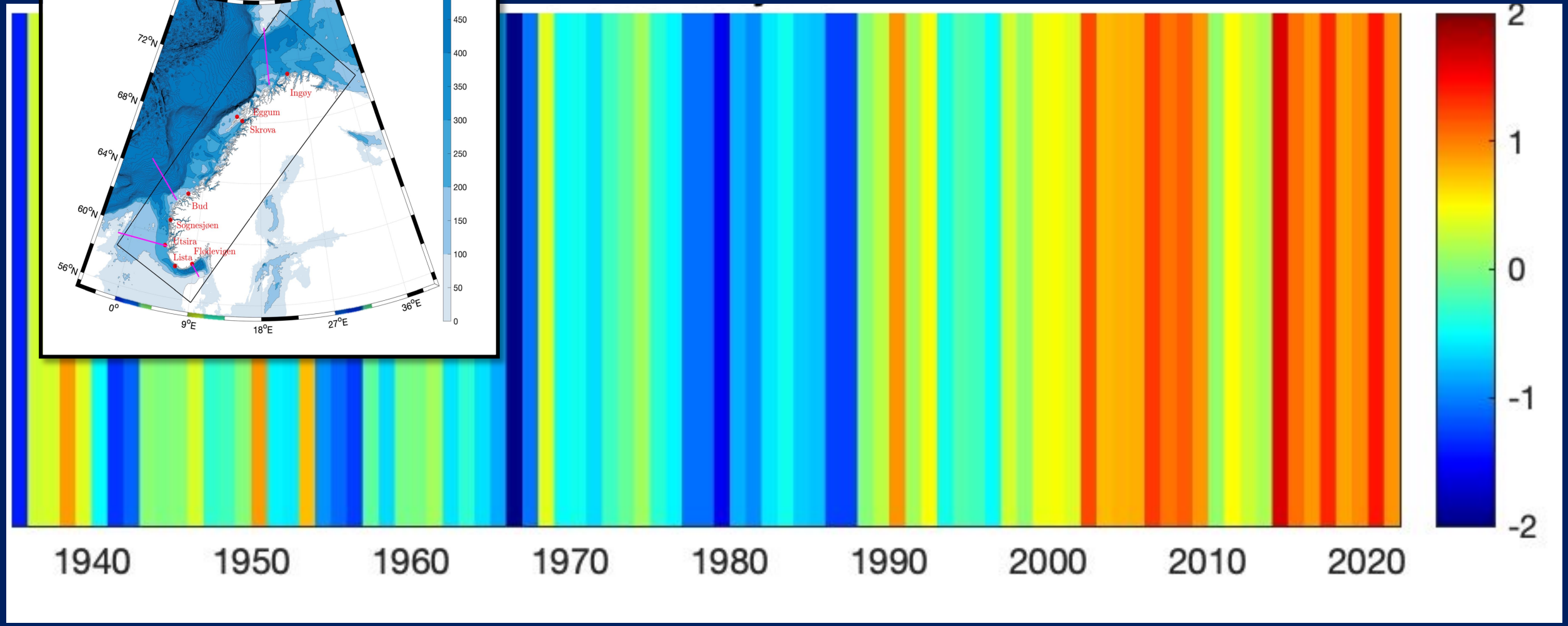


Temperatur: Havet



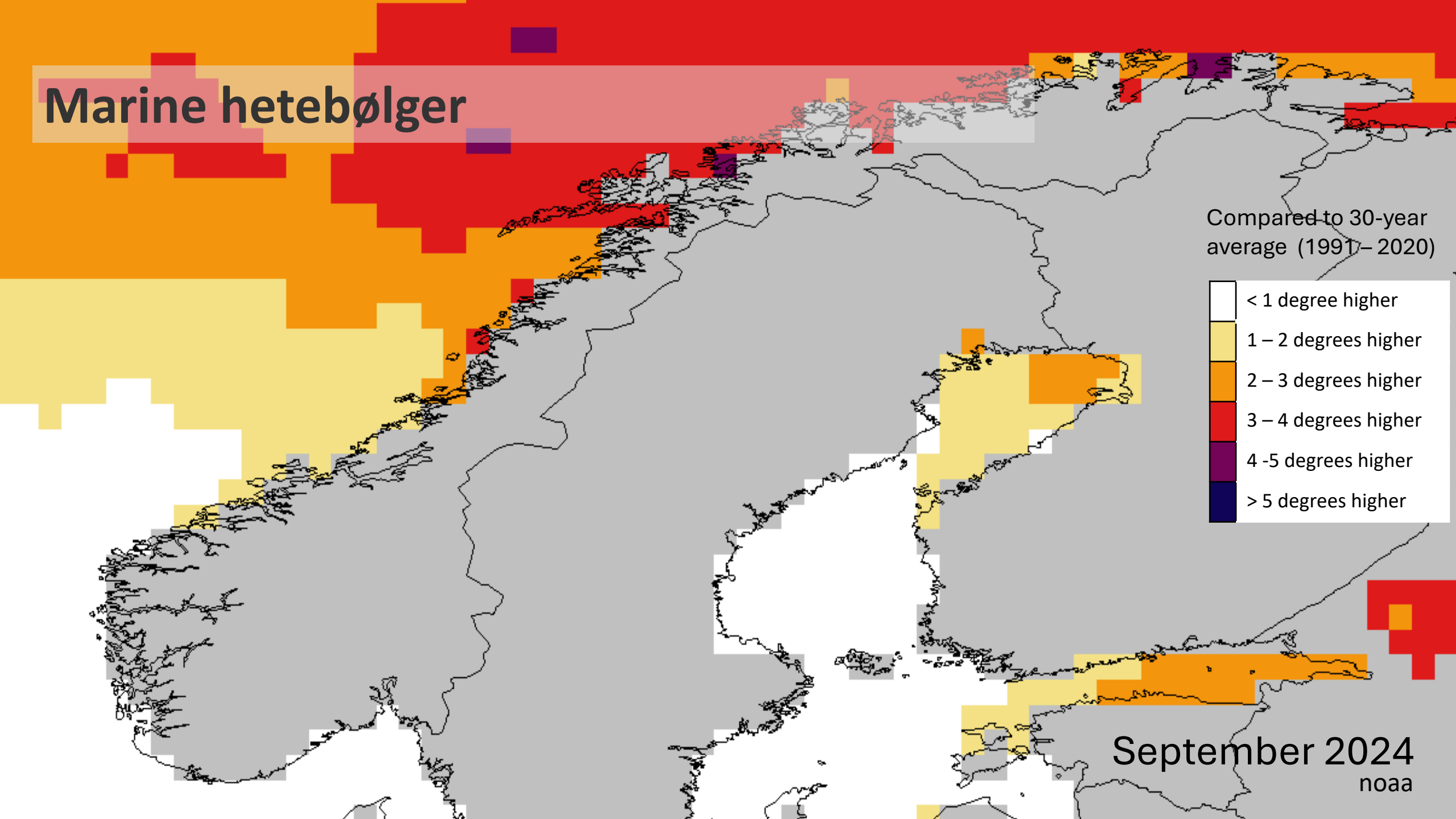
Global sea surface temperatures are currently the fourth highest ever recorded for this time of year and El Niño will push them even higher this year, say scientists. / bne IntelliNews

Norge: Sjøtemperaturene har økt 1-2°C



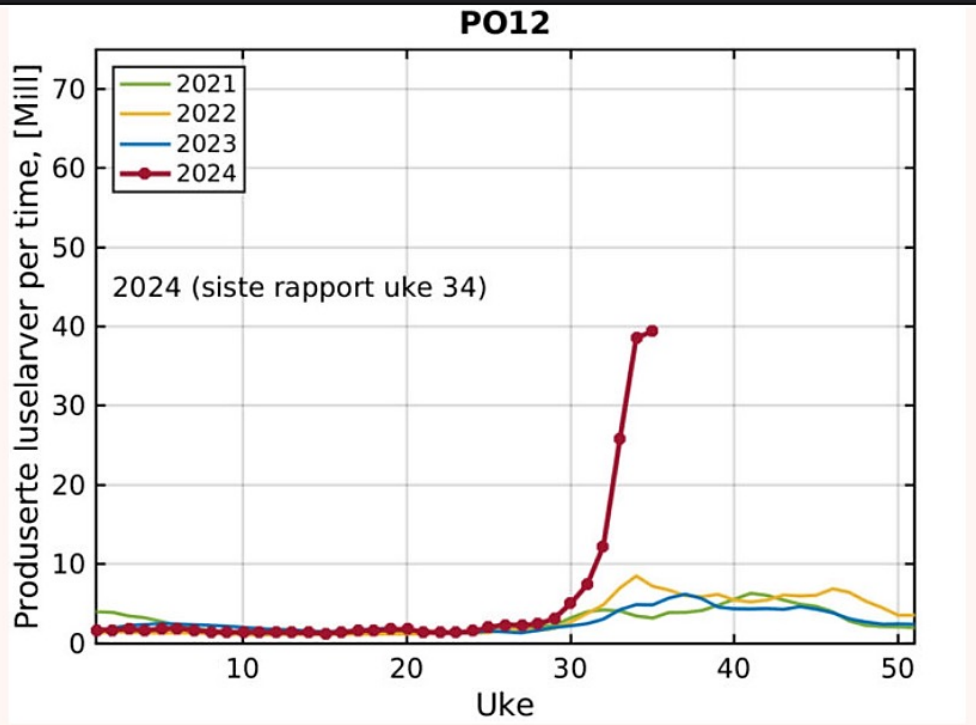
Havforskningsinstituttet, forskning.no 2025

Marine hetebølger



Luseeksplosjon

SalmonBusiness ABOUT US JOBS NEWSLETTER FACEBOOK TWITTER



‘Explosive’ increase in sea lice numbers hits Northern Norway

12 September 2024

by Editorial Staff

Compared to 30-year average (1991 – 2020)

- < 1 degree higher
- 1 – 2 degrees higher
- 2 – 3 degrees higher
- 3 – 4 degrees higher
- 4 -5 degrees higher
- > 5 degrees higher

September 2024

noaa

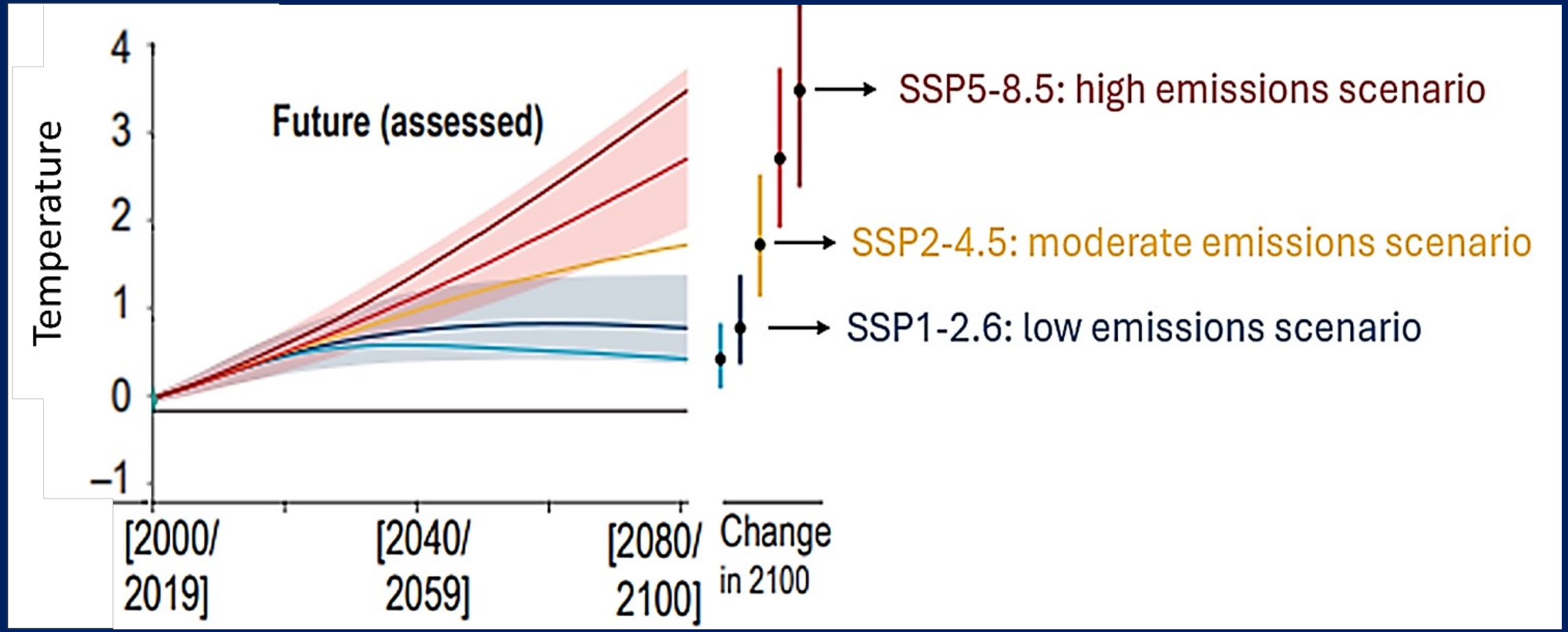
Ny normal?

Norway's sea lice crisis: prepare for "new normal", says Sjømat Norge CEO

As marine heatwave provokes sea lice "explosion" in Northern Norway this summer, Geir Ove Ystmark warns the industry needs to prepare for similar incidents in future.

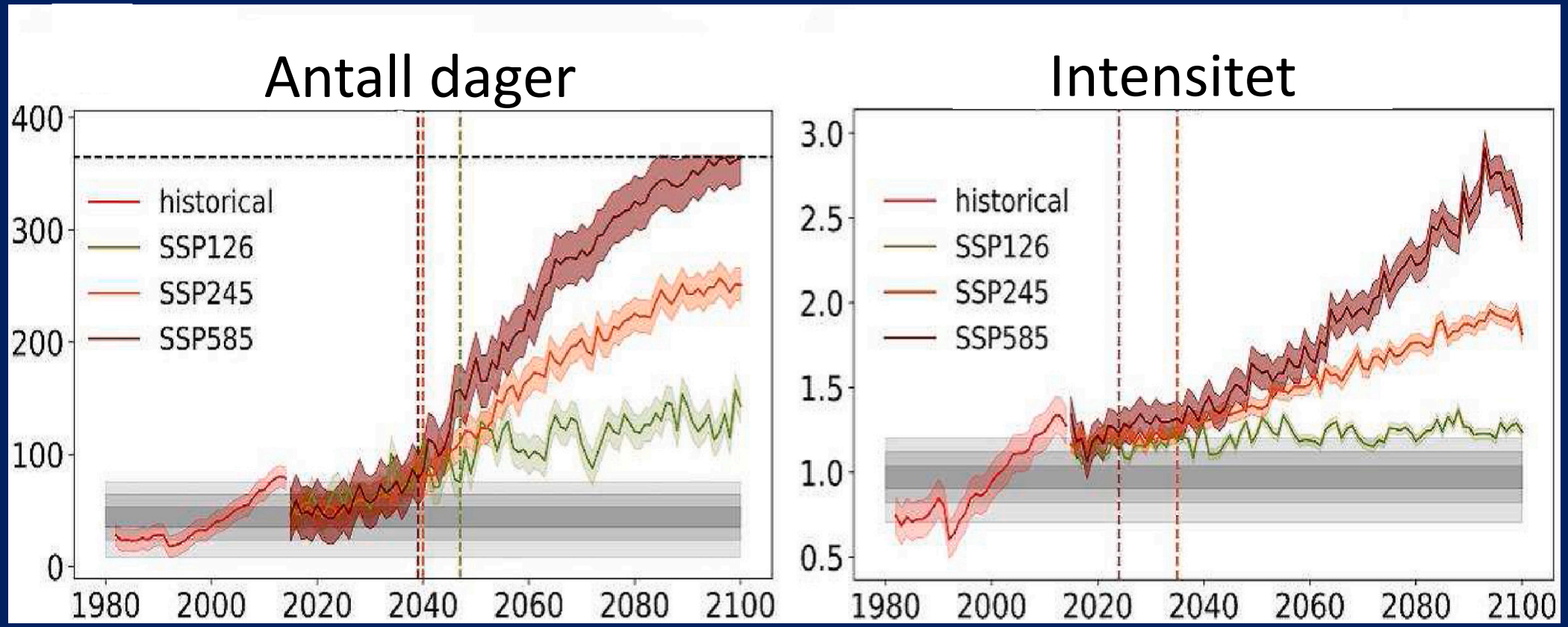
"Temperatures this summer are 4-5 degrees above normal. It has created an extraordinary situation that we are very concerned about... temperature changes are coming faster than we have predicted," said Sjømat Norge CEO, Geir Ove Ystmark.

Fremtidens klima avhenger av klimagassutslipp



Source: IPCC, 2021: Climate Change 2021

Marine hetebølger vil øke i lengde og intensitet



Qiu et al., 2021

CLIMATE WEATHER

Is a Super El Niño Coming in 2026? Here's What Scientists Are Saying

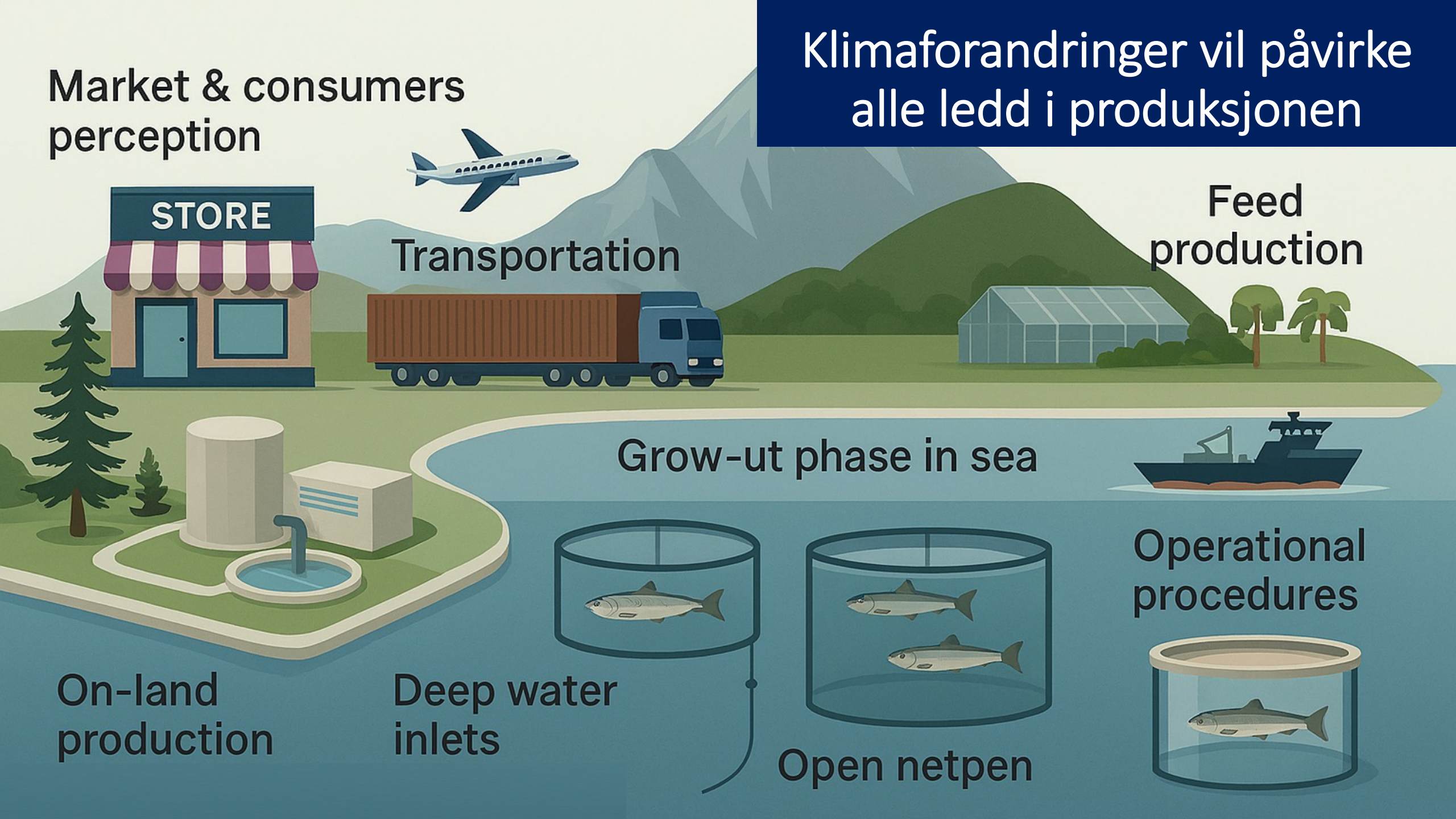
by Simmone Shah
REPORTER

APR 11, 2026 12:35 AM CET

A large wave breaks in the Pacific Ocean off the coast of La Jolla on Dec. 31, 2023 in San Diego, California. *Kevin Carter—Getty Images*


99°
Yakima
96°
Missoula
99°
Billings
101°
Medford
106°
Boise
104°
Salt Lake City
115°
Redding
101°
Reno
111°
Sacramento
110°
Fresno
115°
Las Vegas
108°
Page
110°
Bakersfield
116°
Phoenix
111°
Palm Springs
Tucson
@public_citizen
THIS IS THE HOTTEST SUMMER OF MY LIFE
THIS IS THE COLDEST SUMMER
OF THE REST OF YOUR LIFE

Klimaforandringer vil påvirke alle ledd i produksjonen



Klimaforandringer vil påvirke alle ledd i produksjonen

PLOS CLIMATE

RESEARCH ARTICLE

Insight into real-world complexities is required to enable effective response from the aquaculture sector to climate change

Lynne Falconer[1]*, **Trevor C. Telfer**[1], **Angus Garrett**[2], **Øystein Hermansen**[3], **Eirik Mikkelsen**[3], **Solfrid Sætre Hjøllo**[4,5], **Bruce J. McAdam**[1], **Elisabeth Ytteborg**[3]

1 Institute of Aquaculture, University of Stirling, Scotland, United Kingdom, **2** Seafish, Edinburgh, United Kingdom, **3** Nofima, Tromsø, Norway, **4** Institute of Marine Research, Bergen, Norway, **5** Bjerknes Centre for Climate Research, Bergen, Norway

* lynne.falconer1@stir.ac.uk

OPEN ACCESS

Citation: Falconer L, Telfer TC, Garrett A, Hermansen Ø, Mikkelsen E, Hjøllo SS, et al. (2022) Insight into real-world complexities is required to enable effective response from the aquaculture sector to climate change. PLOS Clim 1(3): e0000017. https://doi.org/10.1371/journal.pclm.0000017

Editor: Johanna Johnson, James Cook University, AUSTRALIA

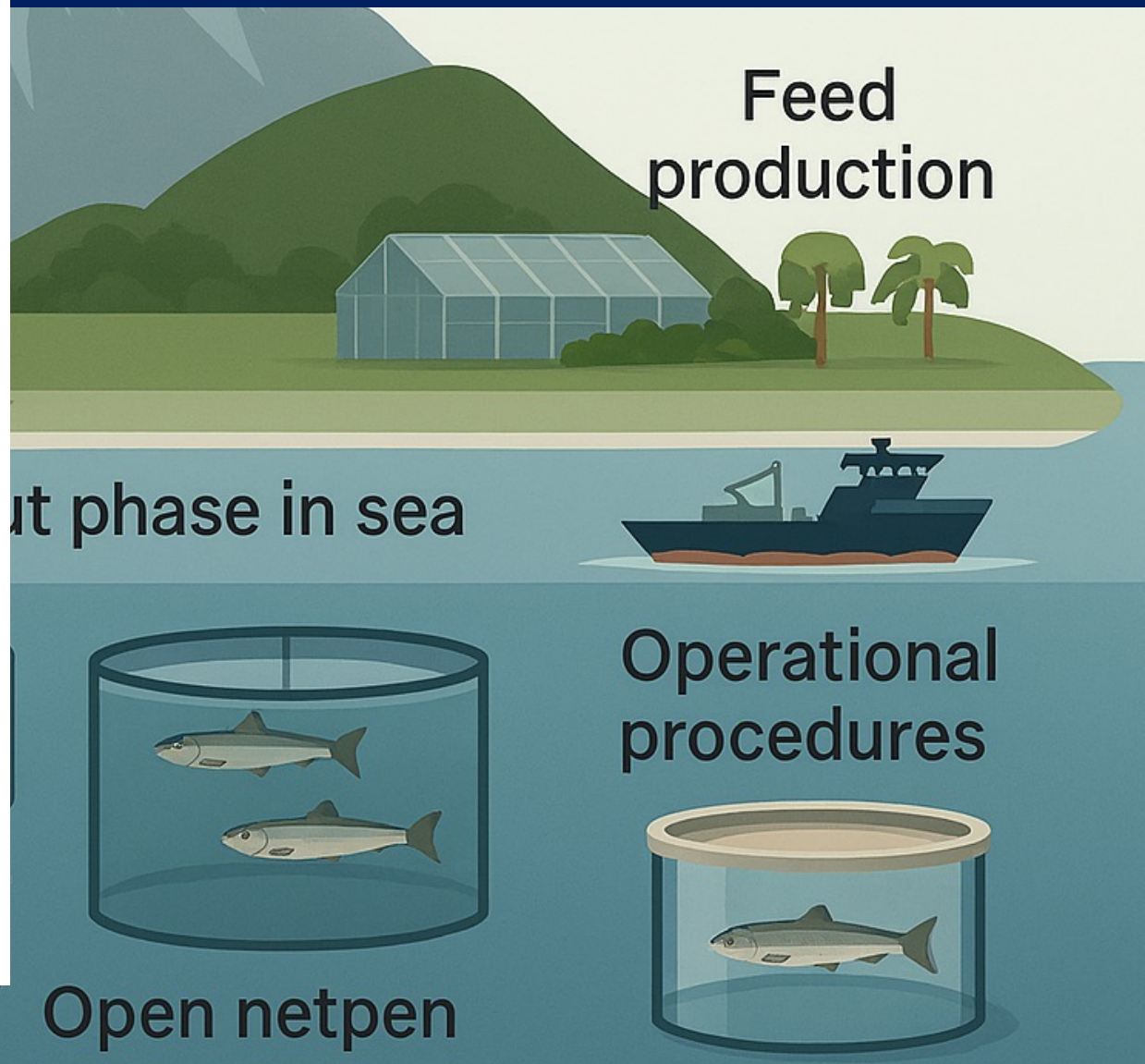
Received: July 17, 2021

Accepted: January 5, 2022

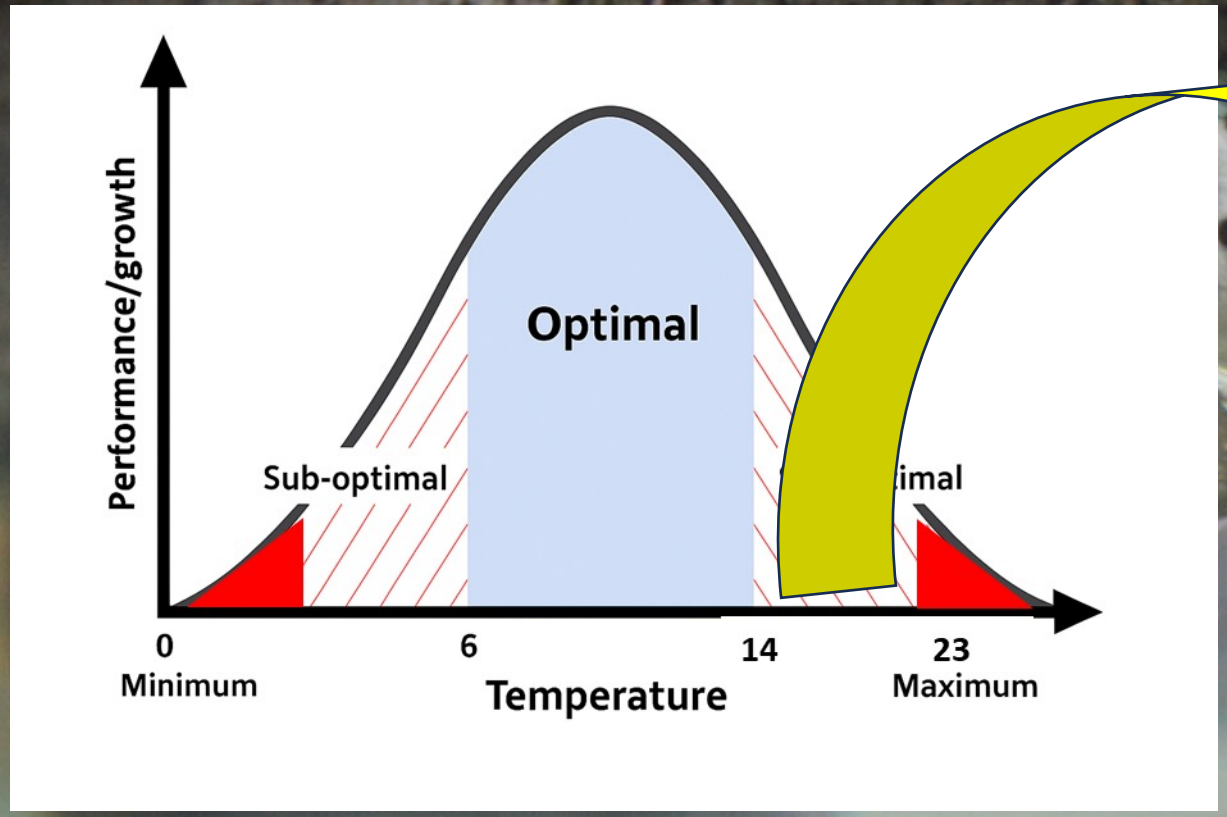
Published: March 1, 2022

Abstract

This study demonstrates how a comprehensive knowledge base can be used by the aquaculture industry, researchers, and policymakers as a foundation for more targeted and detailed climate change impact analysis, risk assessments and adaptation planning. Atlantic salmon (*Salmo salar*) production in Norway was used as a case study and to illustrate the need to consider impacts from multiple stressors across different production stages and the wider supply chain. Based on literature searches and industry news, a total of 45 impacts and 101 adaptation responses were identified. Almost all impacts were linked to multiple climate stressors, and many adaptation responses can be used for a range of impacts. Based on the research, a move towards more targeted and detailed assessments is recommended. This can be facilitated through a strong knowledge base, further research to address complexities, and better communication between all stakeholders. The results also demonstrate the need for more climate change research that reflects the challenges that the aquaculture sector faces, where multiple stressors and the range of impacts across production stages and the wider supply chain are included. Highlighting the wide range of stressors, impacts and adaptation responses provides a more holistic understanding of the real-world complexities that aquaculture producers face. This again could facilitate adoption of more effective responses to climate change needed to maintain or increase production sustainably.

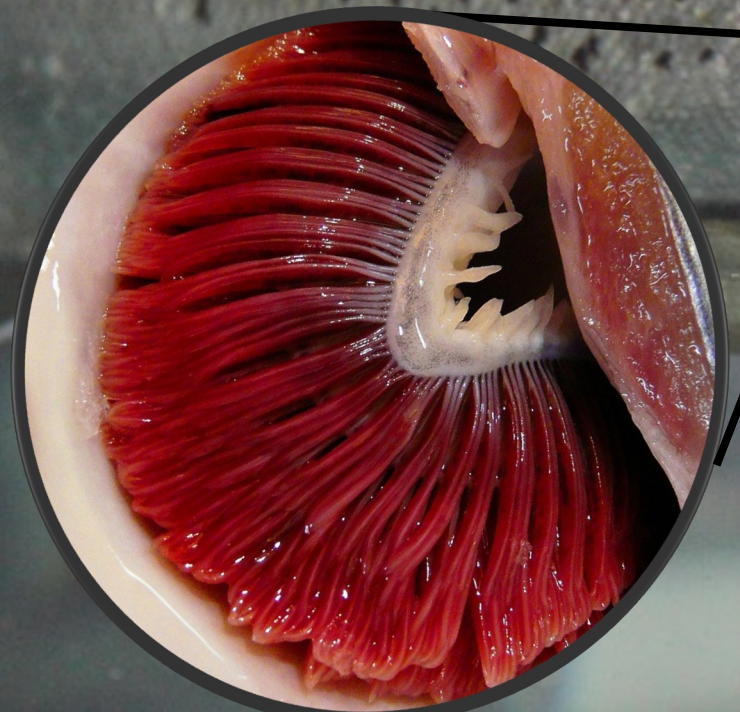


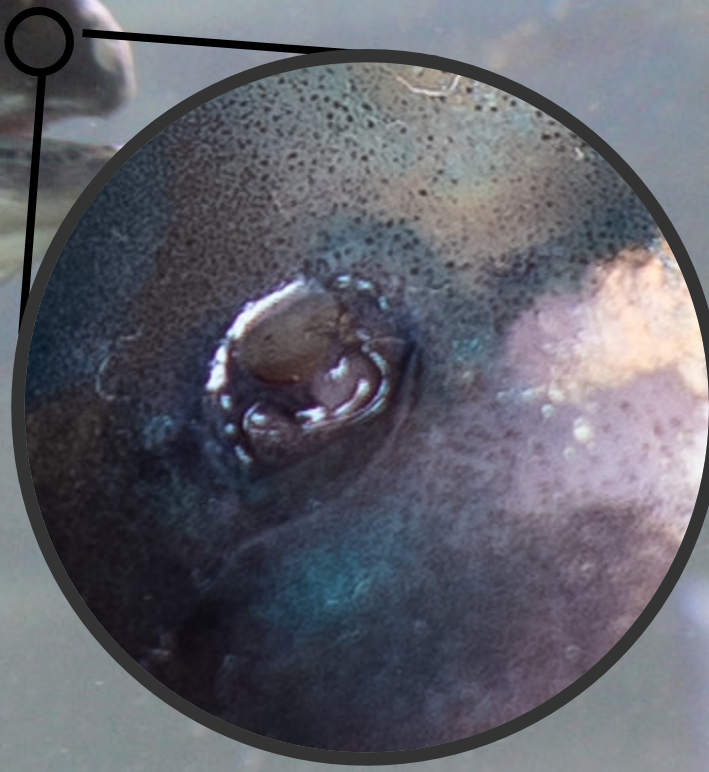
Økte temperaturer påvirker fisken



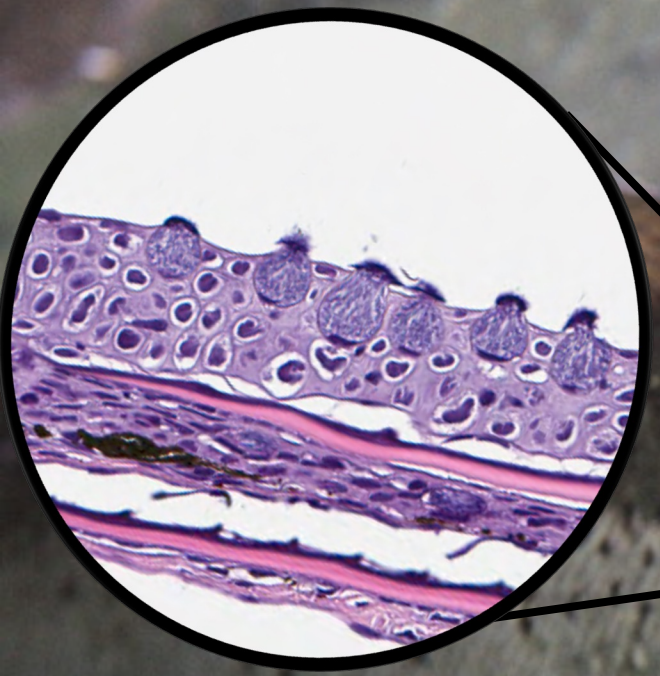
17 °C

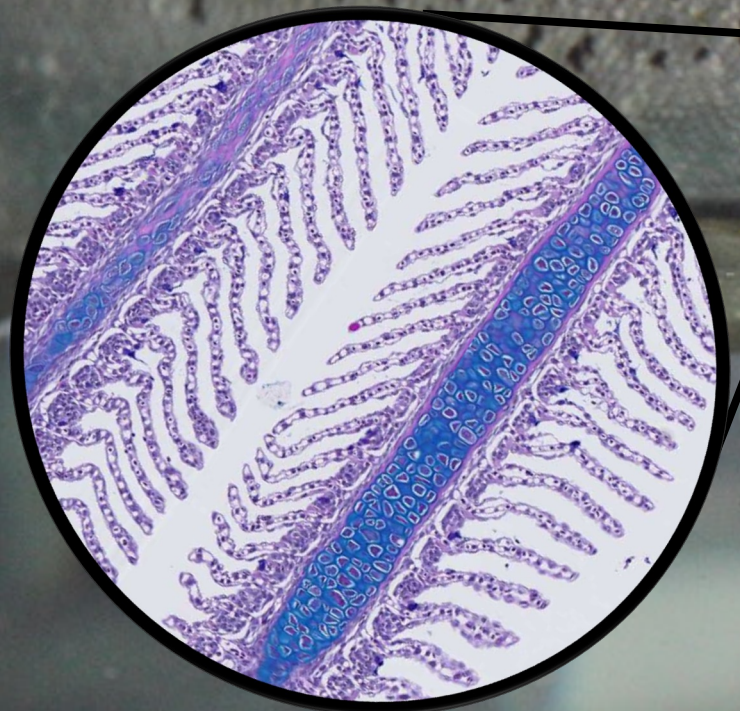
Viktige organer påvirkes…



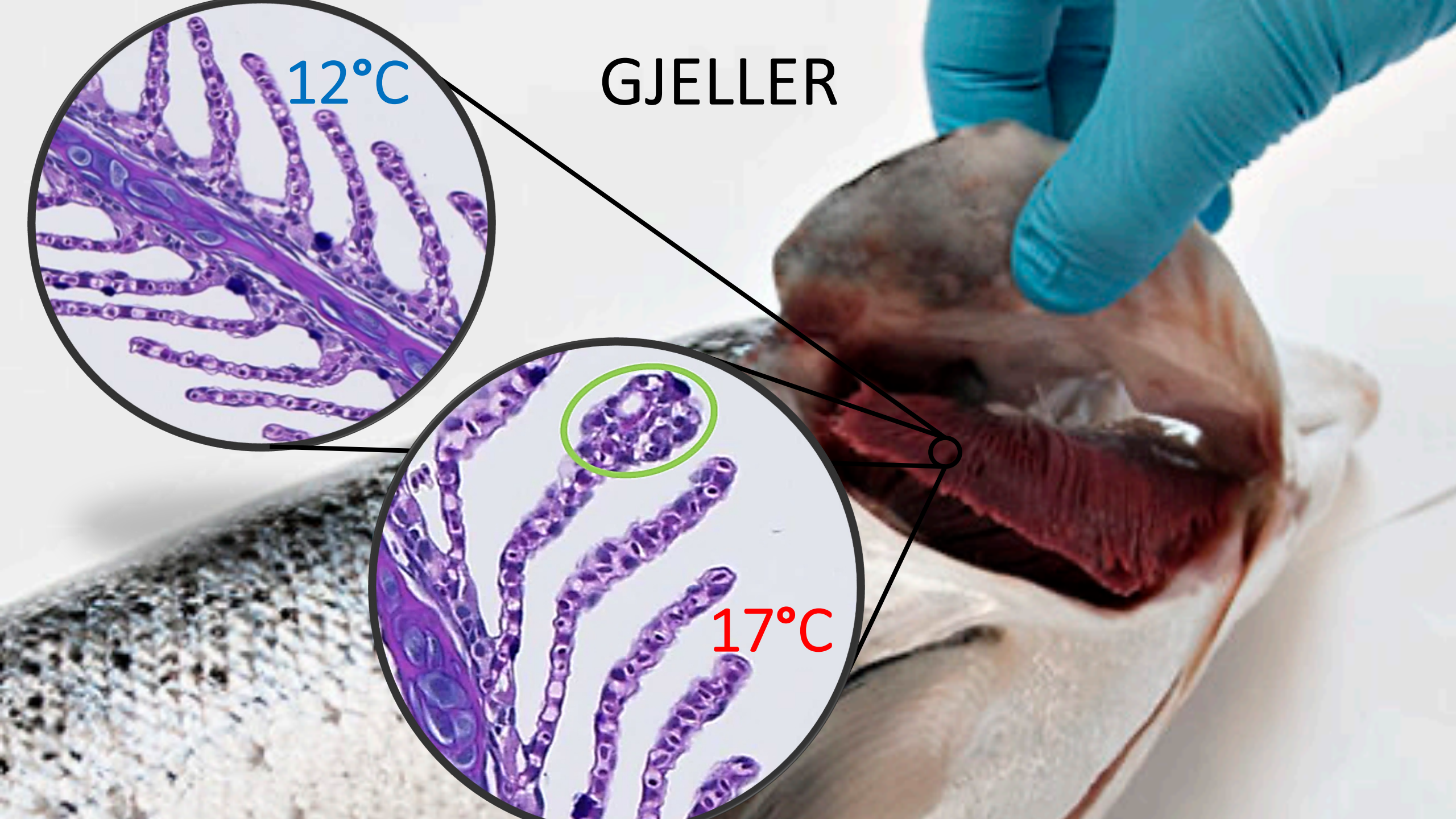


Viktige organer påvirkes…

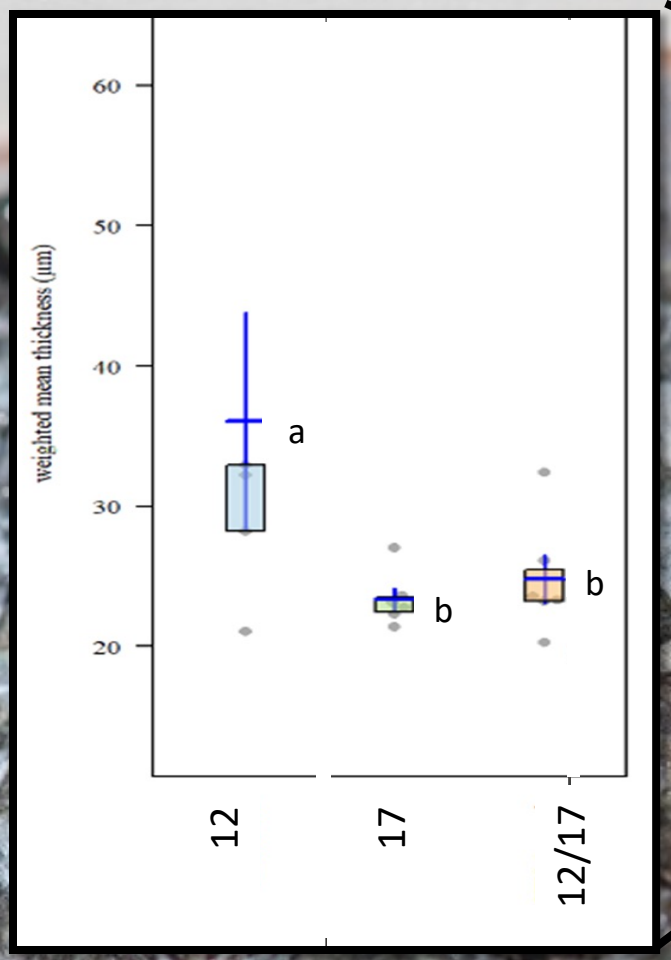


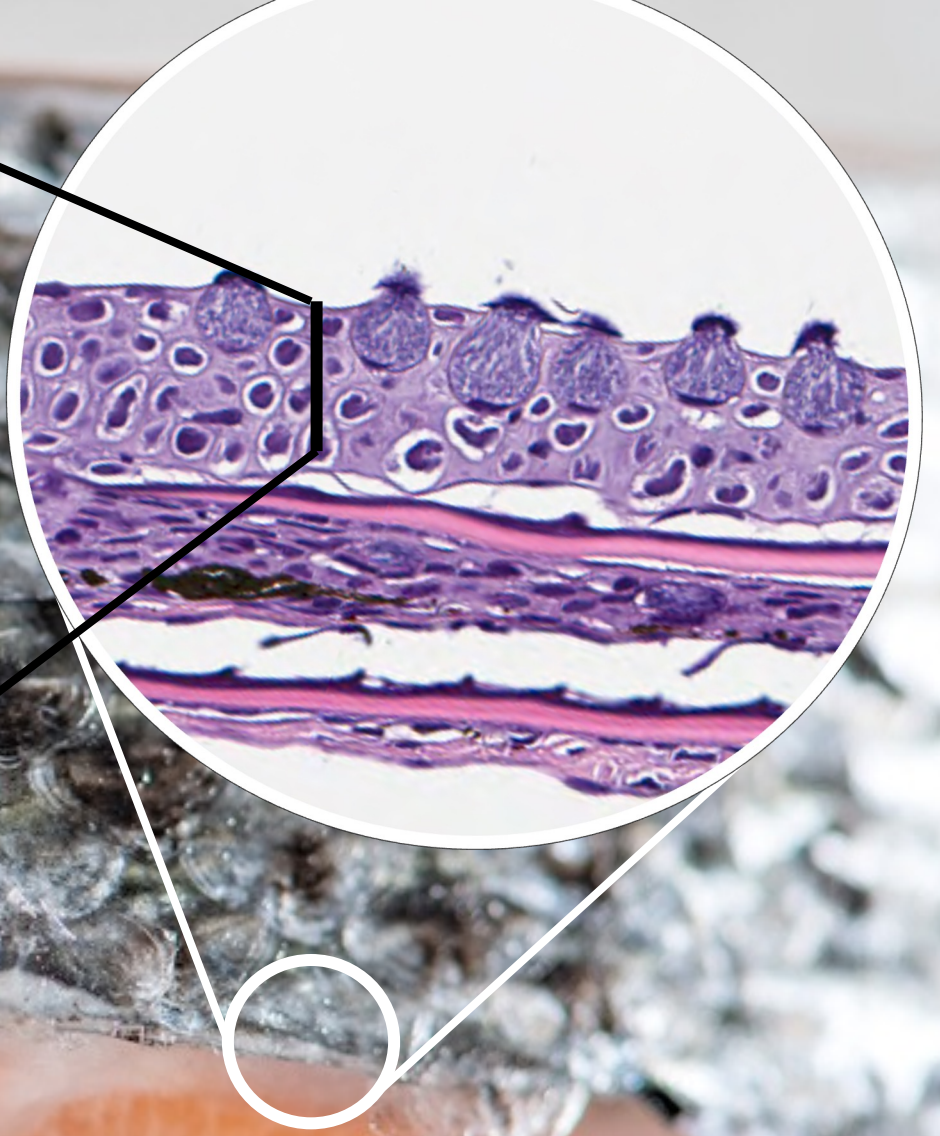



…og fisken blir
mindre robust.


GJELLER
12°C
17°C

SKINN





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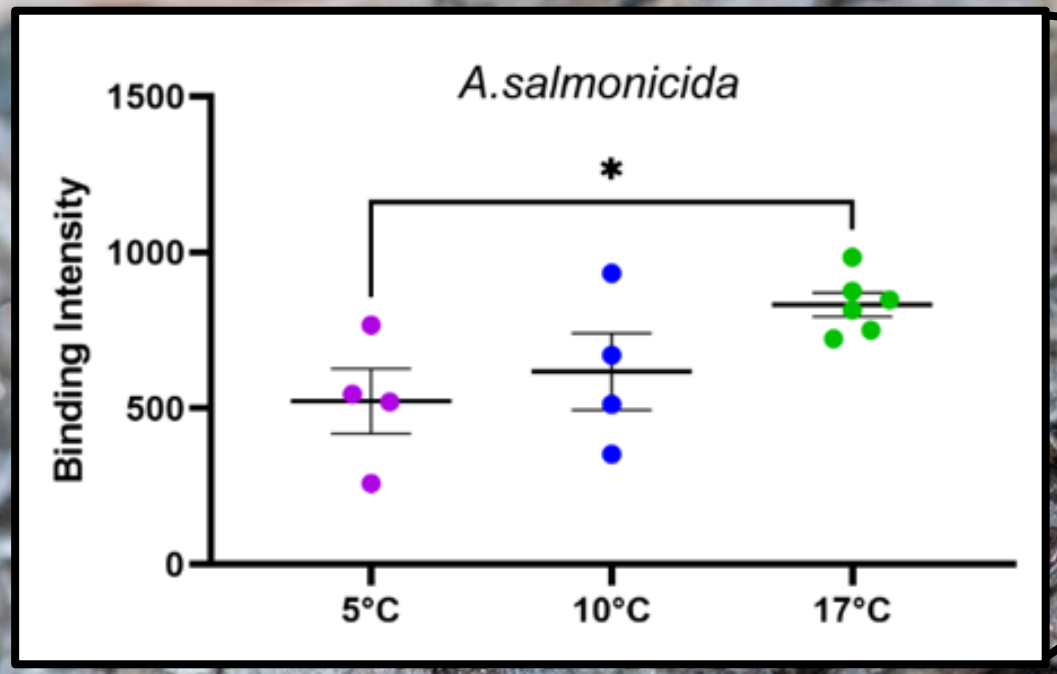

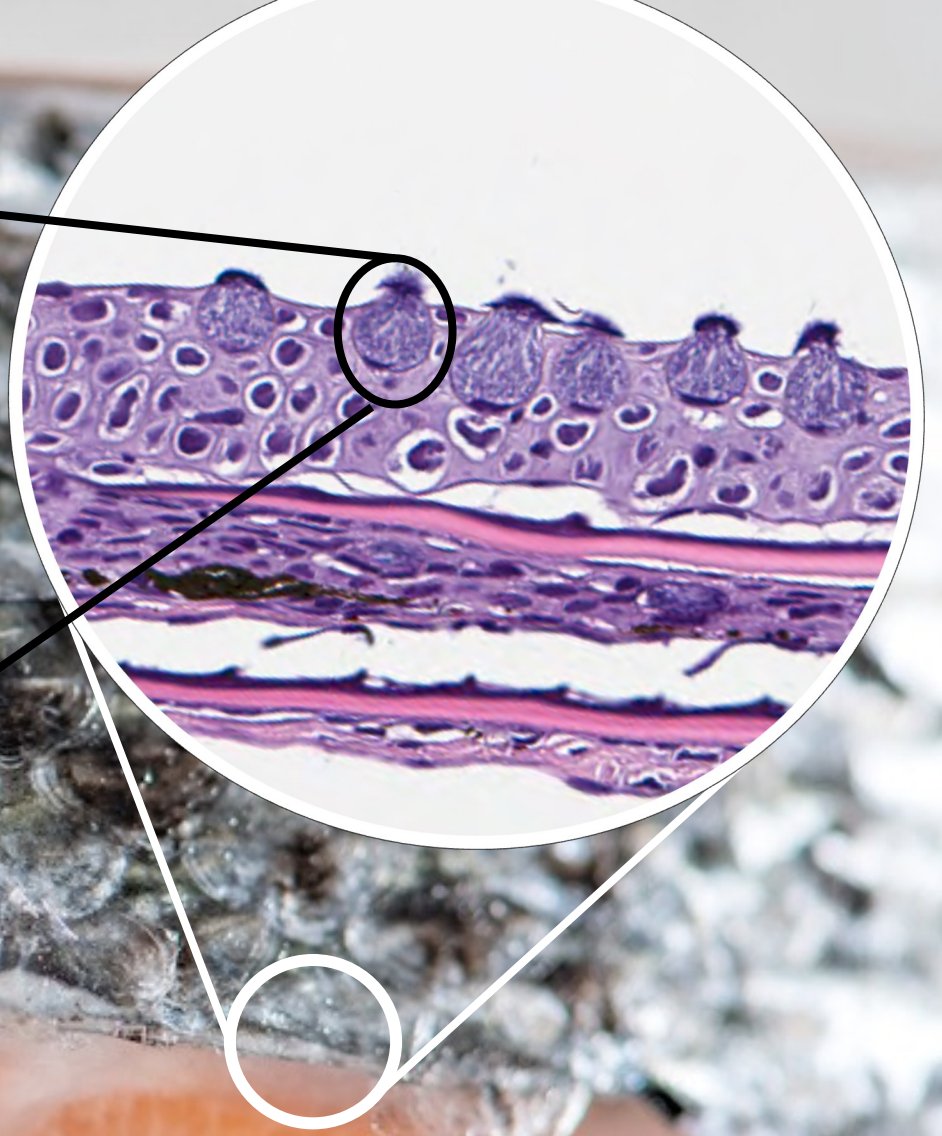

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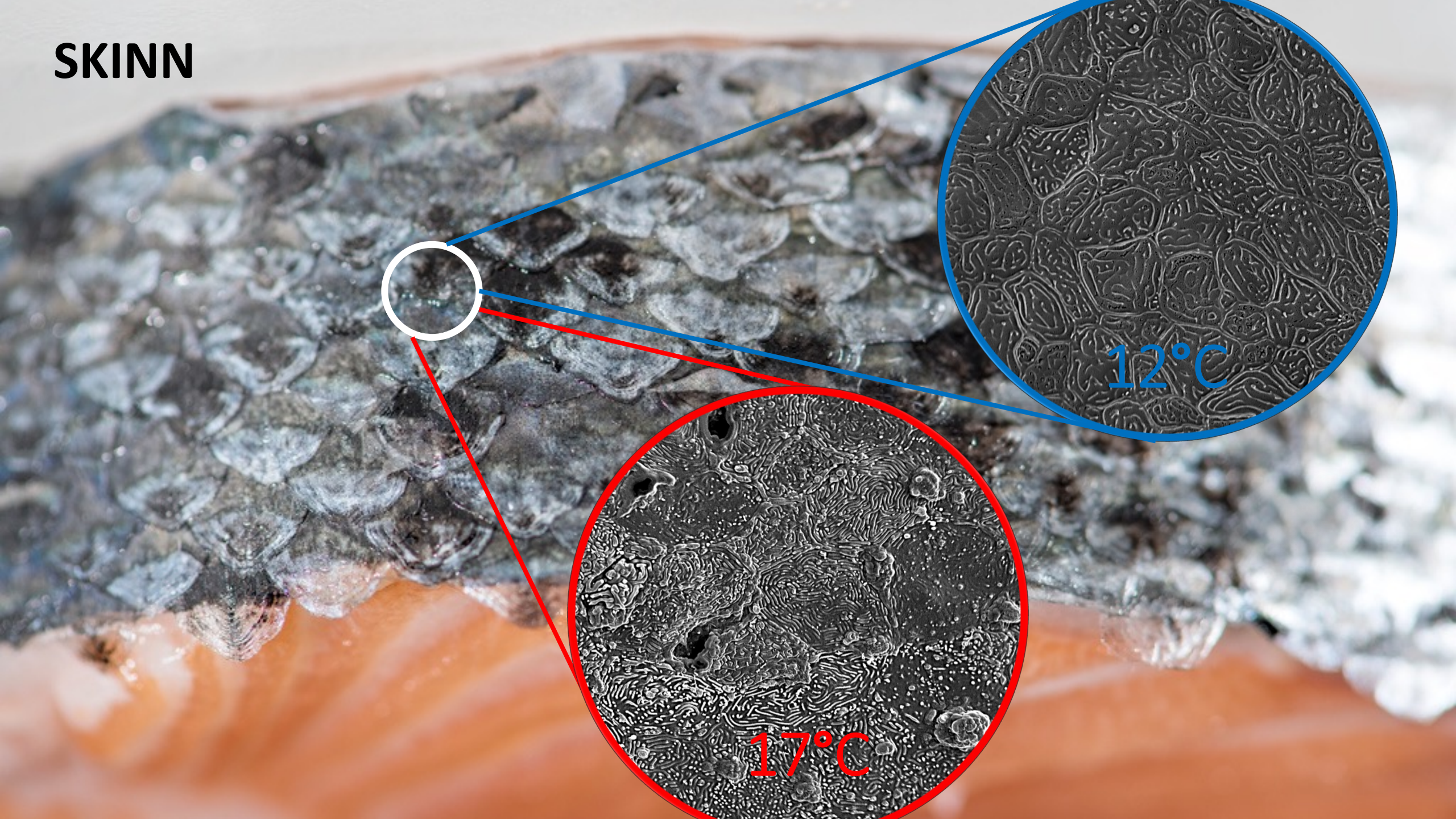
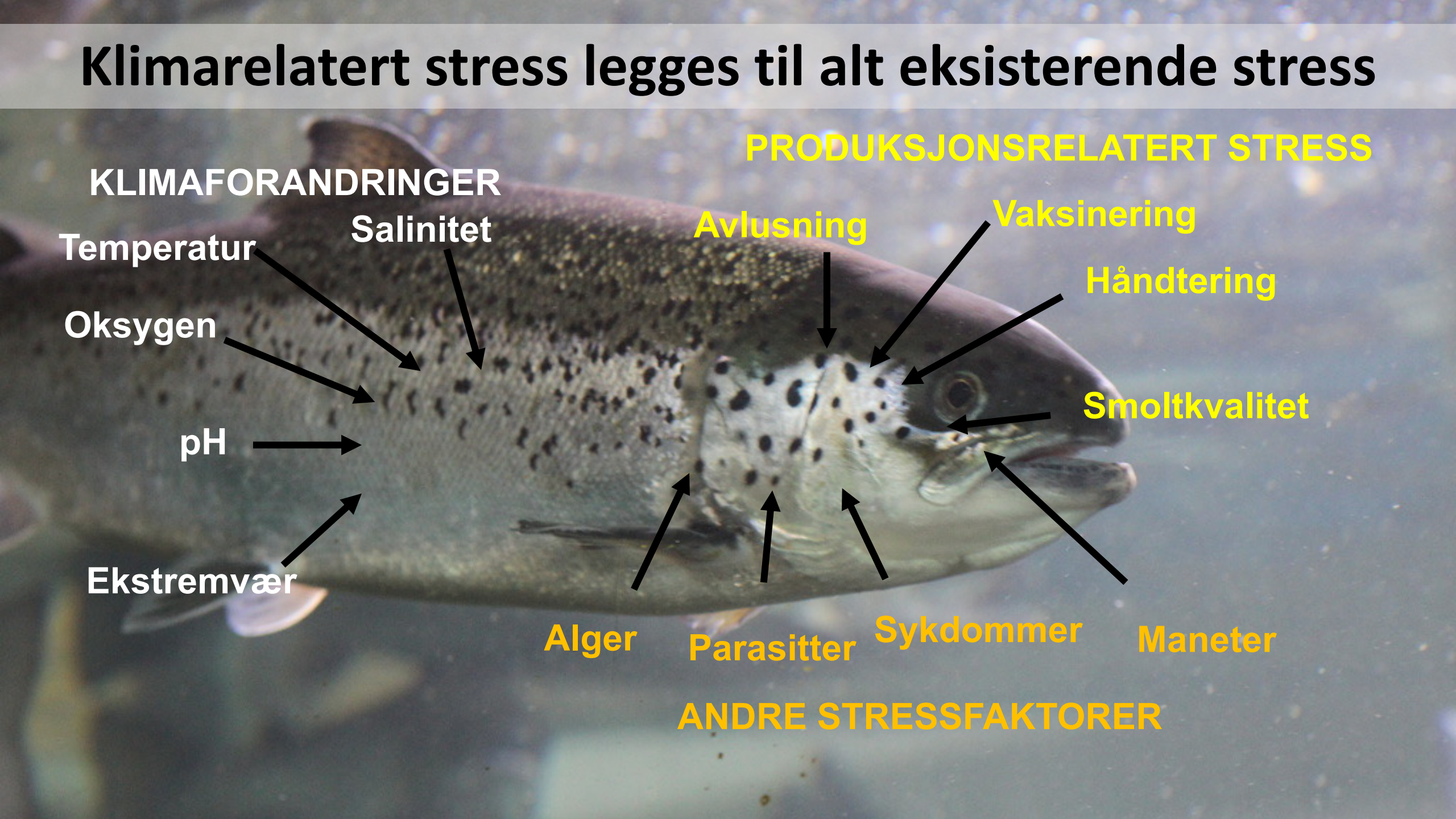



Økte temperaturer
skaper mikroskader
vi ikke kan se


Temperatur

Klimarelatert stress legges til alt eksisterende stress



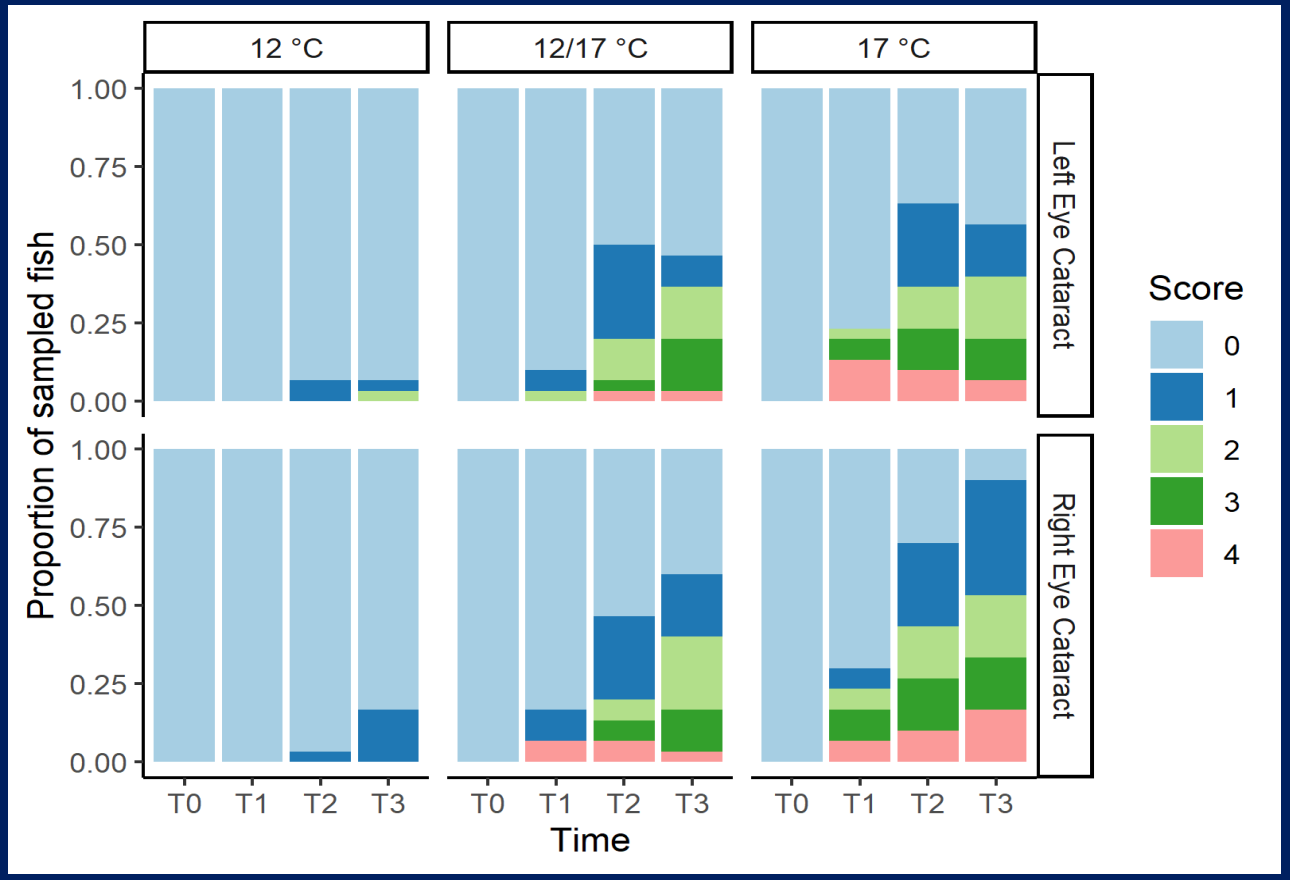
Effekter av behandling blir mer alvorlig på høyere temperaturer

Photo: *Flatsetsund Engineering, I Laks, Fish Pathology*

Effekter av behandling blir mer alvorlig på høyere temperaturer

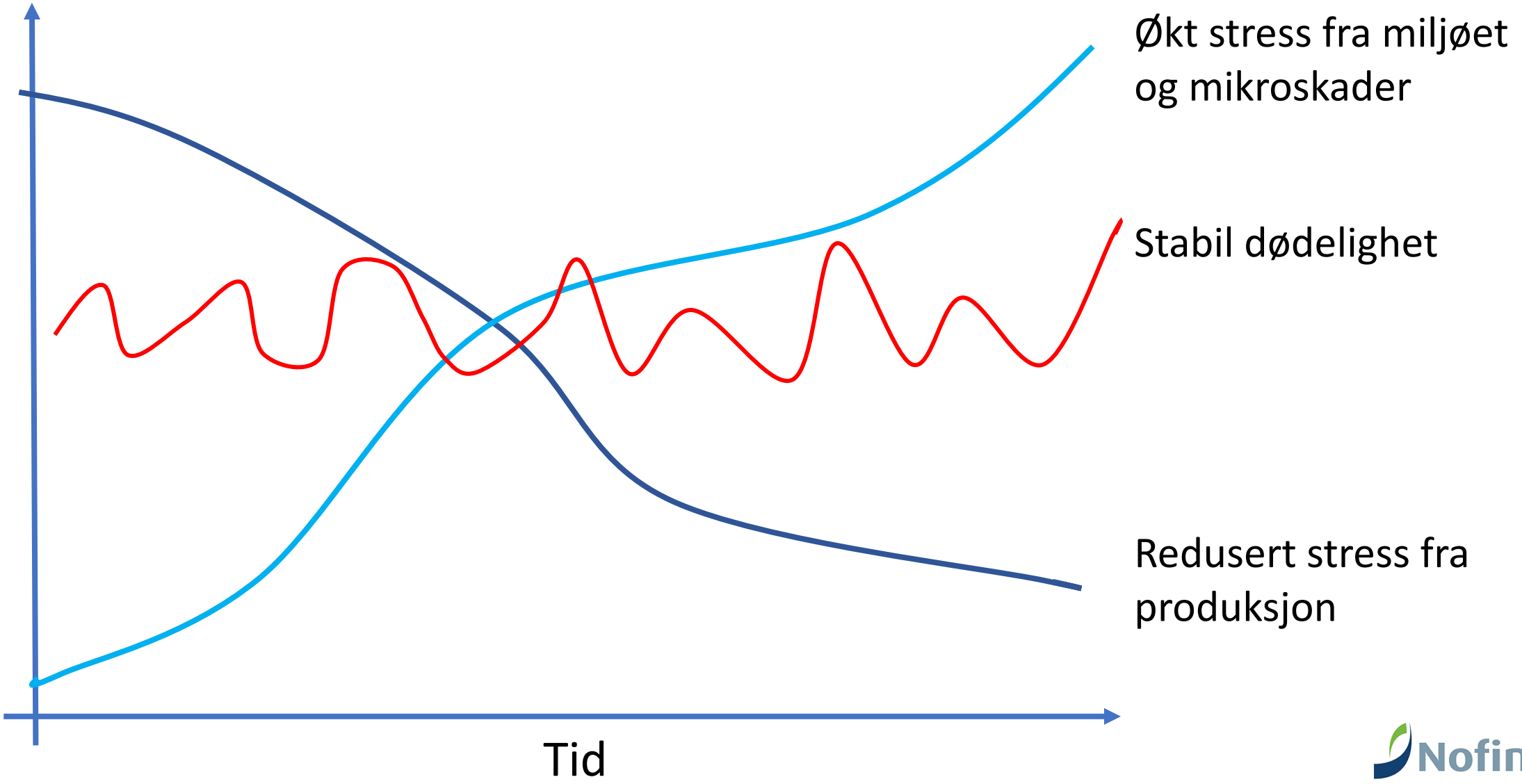
Photo: Nofima & *Flatsetsund Engineering, I Laks, Fish*

Effekter av behandling blir mer alvorlig



Alle artene vi har testet får mikroskader

Kan klimaforandringene maskere effekten av forbedret produksjon?



Rapport 5a | 2026

Veterinærinstituttet

Varmare sjø gir nye helse- og velferdsutfordringar i fiskeoppdrett

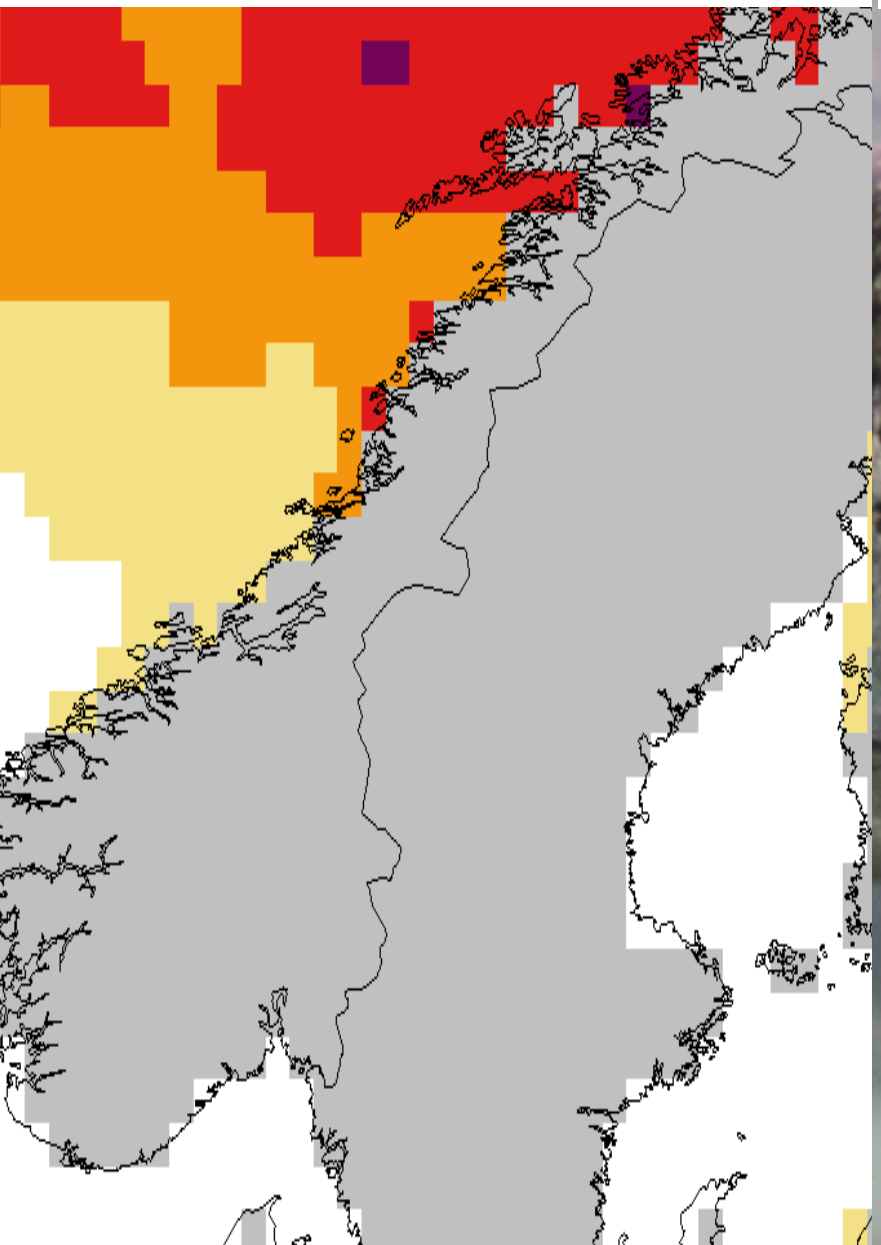
Publisert 11.03.2026

Fiskehelserapporten

2025

Ichthyobodo-parasitter (*Costia*) og blodceller på en laksegjelle (forstørret 12 000 ganger). Bildet er tatt med elektronmikroskop og fargelagt. Foto: Jannicke Wiik-Nielsen, Veterinærinstituttet

Klimapåvirkningene

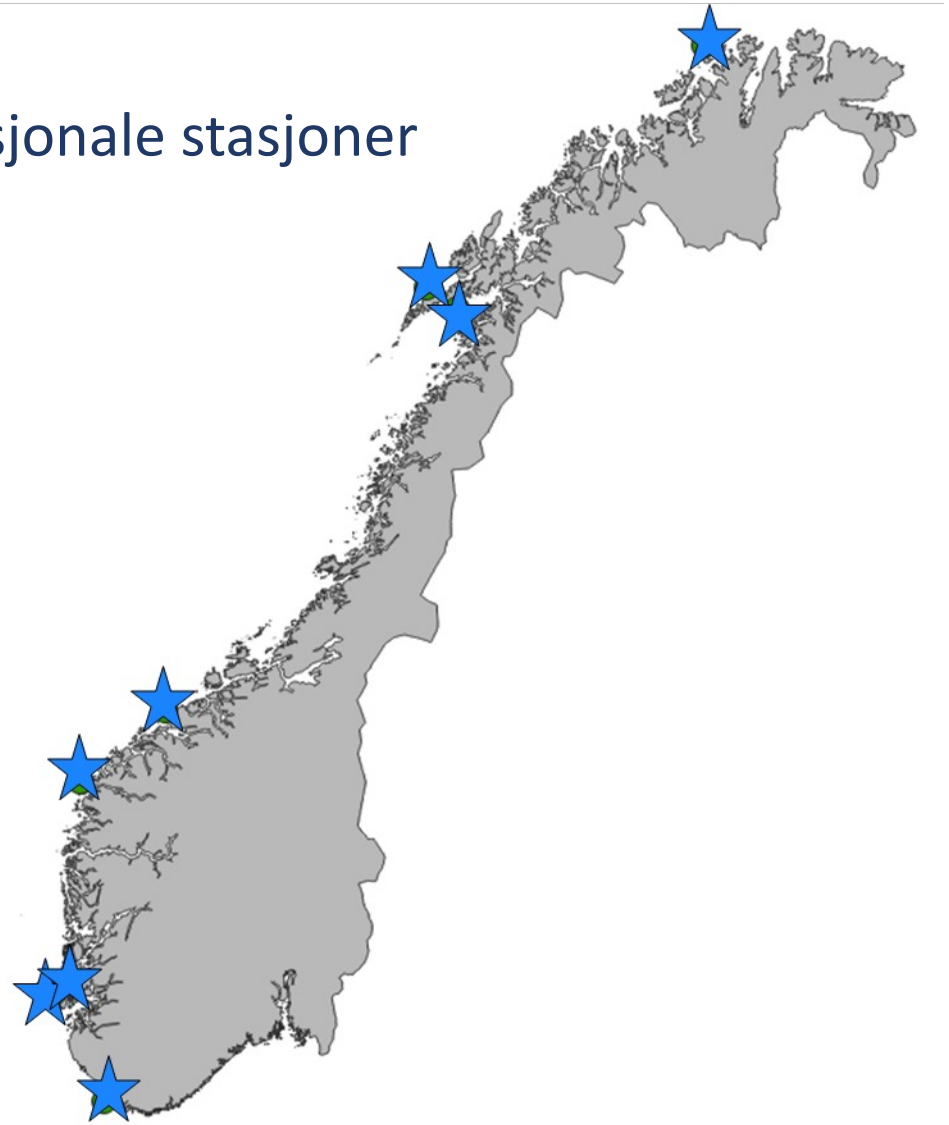


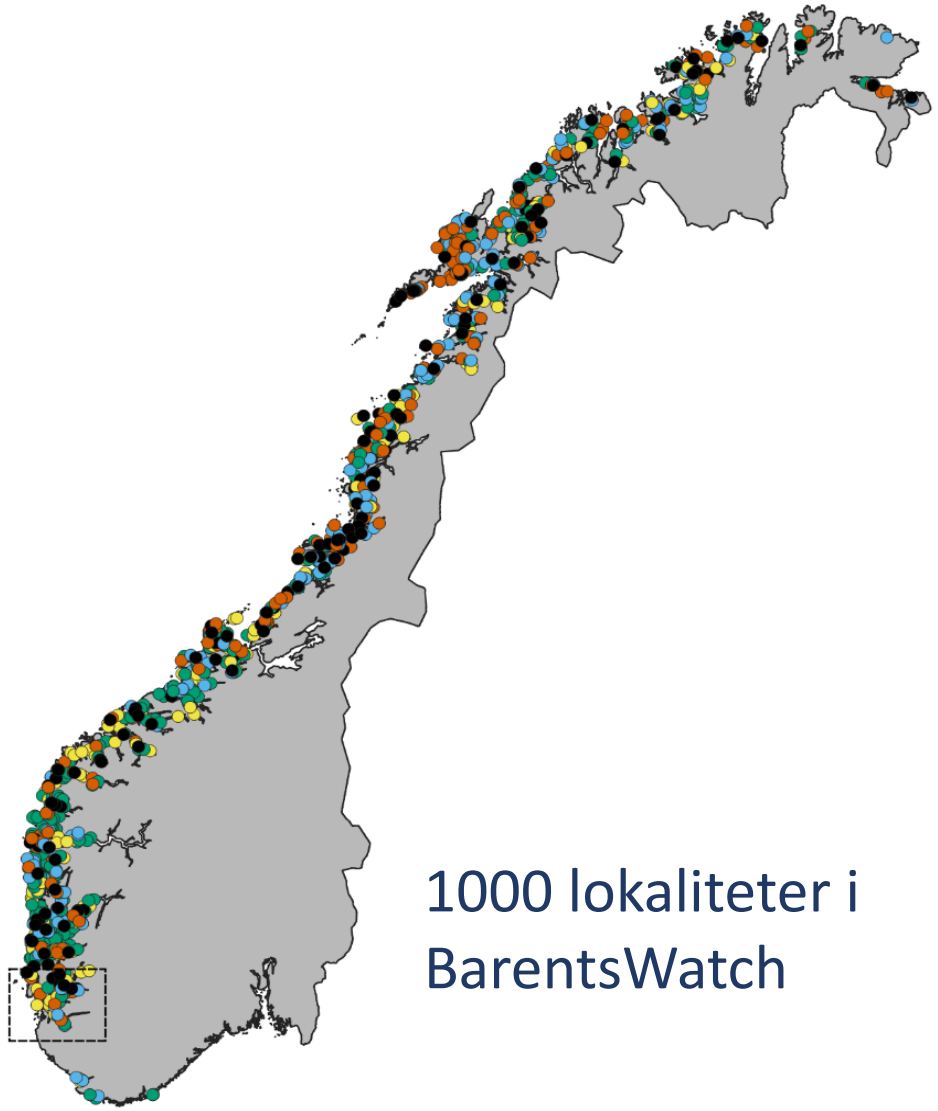
Biologien

X-faktorer

Akvakultur kan bidra til økt klimaforståelse

8 Nasjonale stasjoner

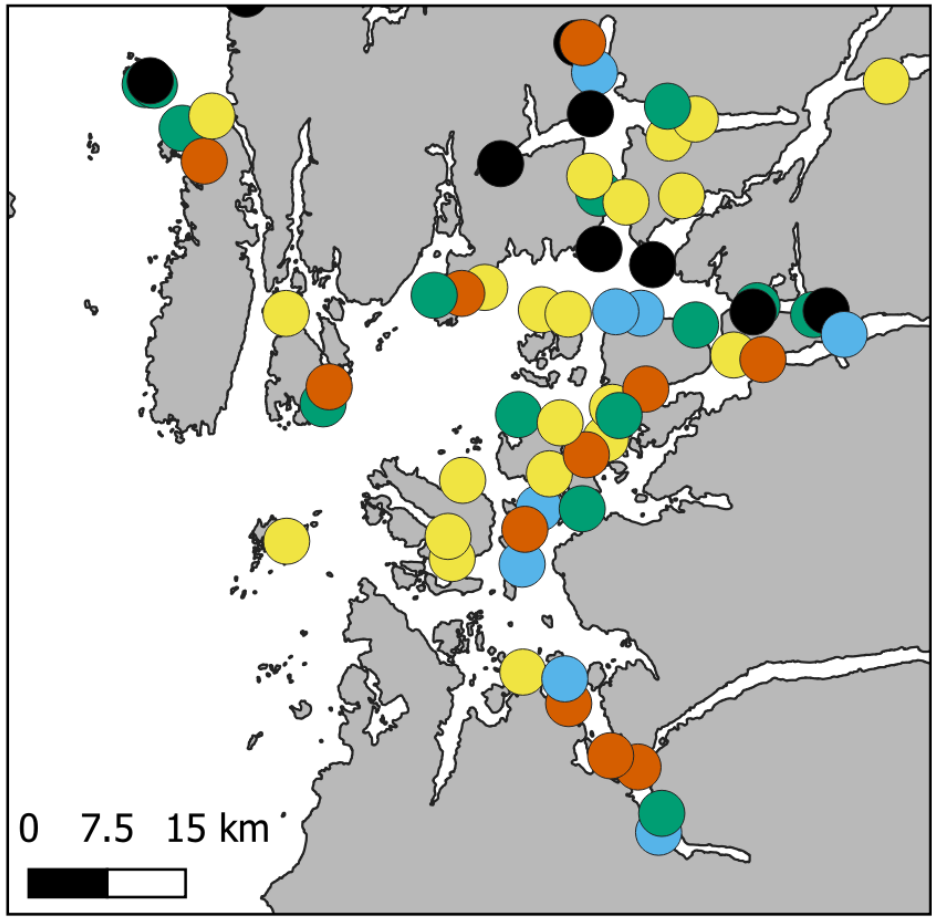




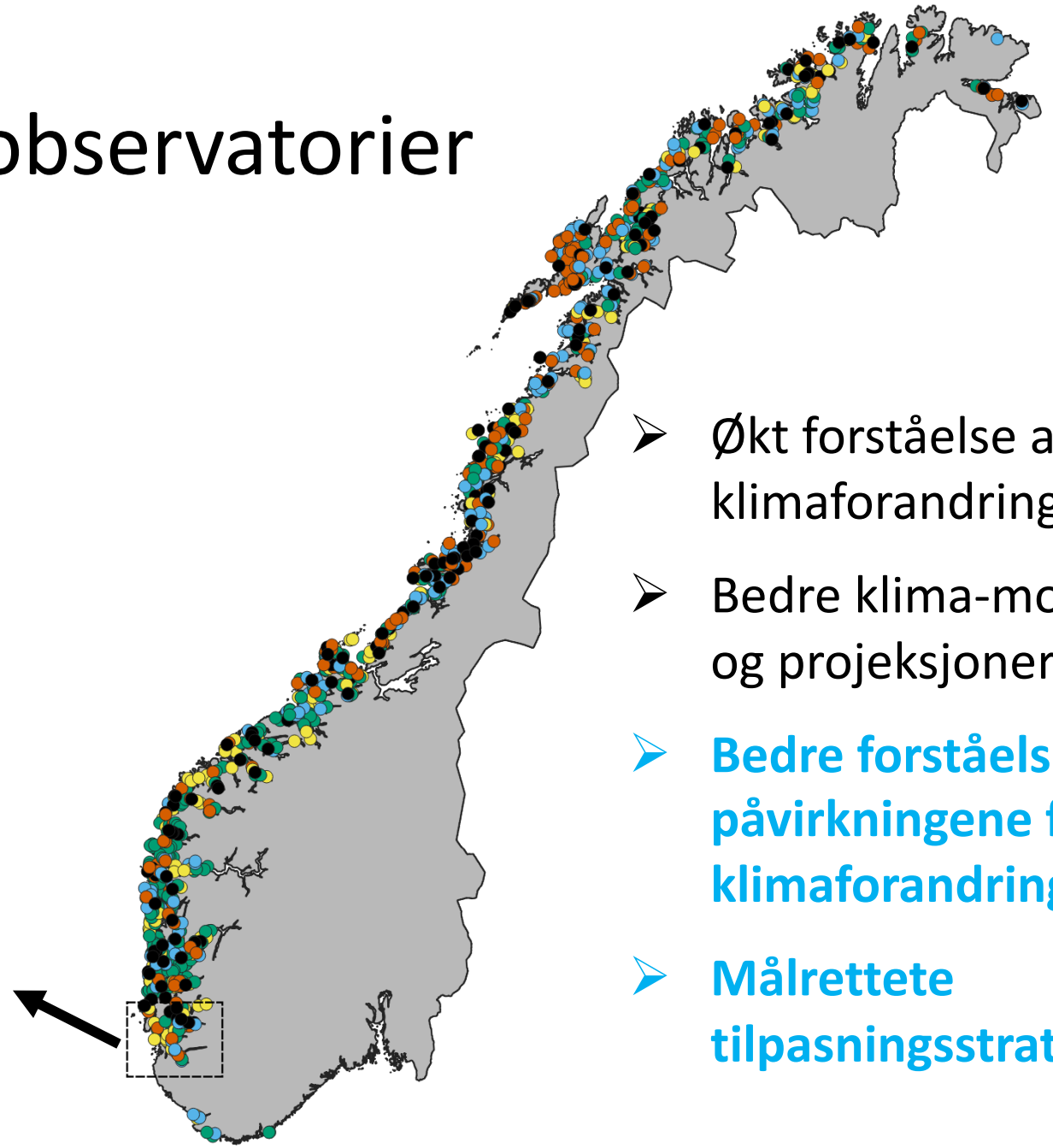
1000 lokaliteter i BarentsWatch

Falconer et al. 2024

Akvakultur som klima-observatorier



Mer enn 60 lokaliteter i dette fjordsystemet

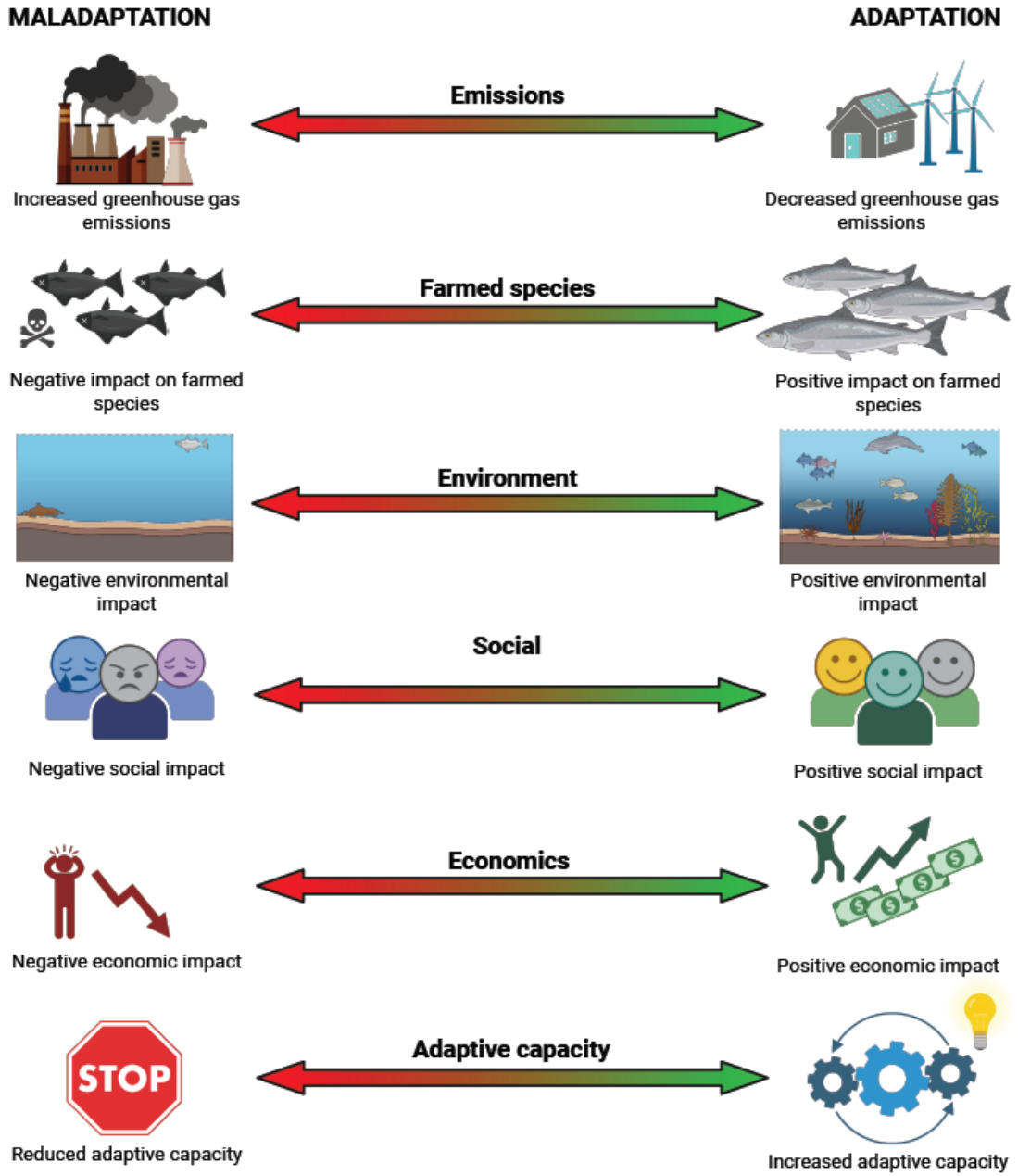


- Økt forståelse av klimaforandringer
- Bedre klima-modeller og projeksjoner
- **Bedre forståelse av påvirkningene fra klimaforandringene**
- **Målrettete tilpasningsstrategier**

Falconer et al. 2024

Feiltilpasning

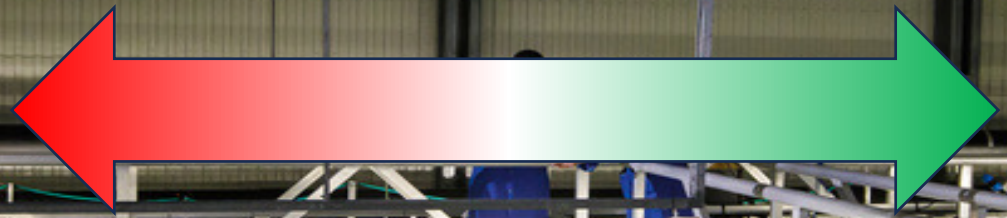
Når effekten av tilpasning fører til noe som er verre/vanskeligere å håndtere enn den opprinnelige utfordringen



Falconer et al., 2025

Landbaserte anlegg

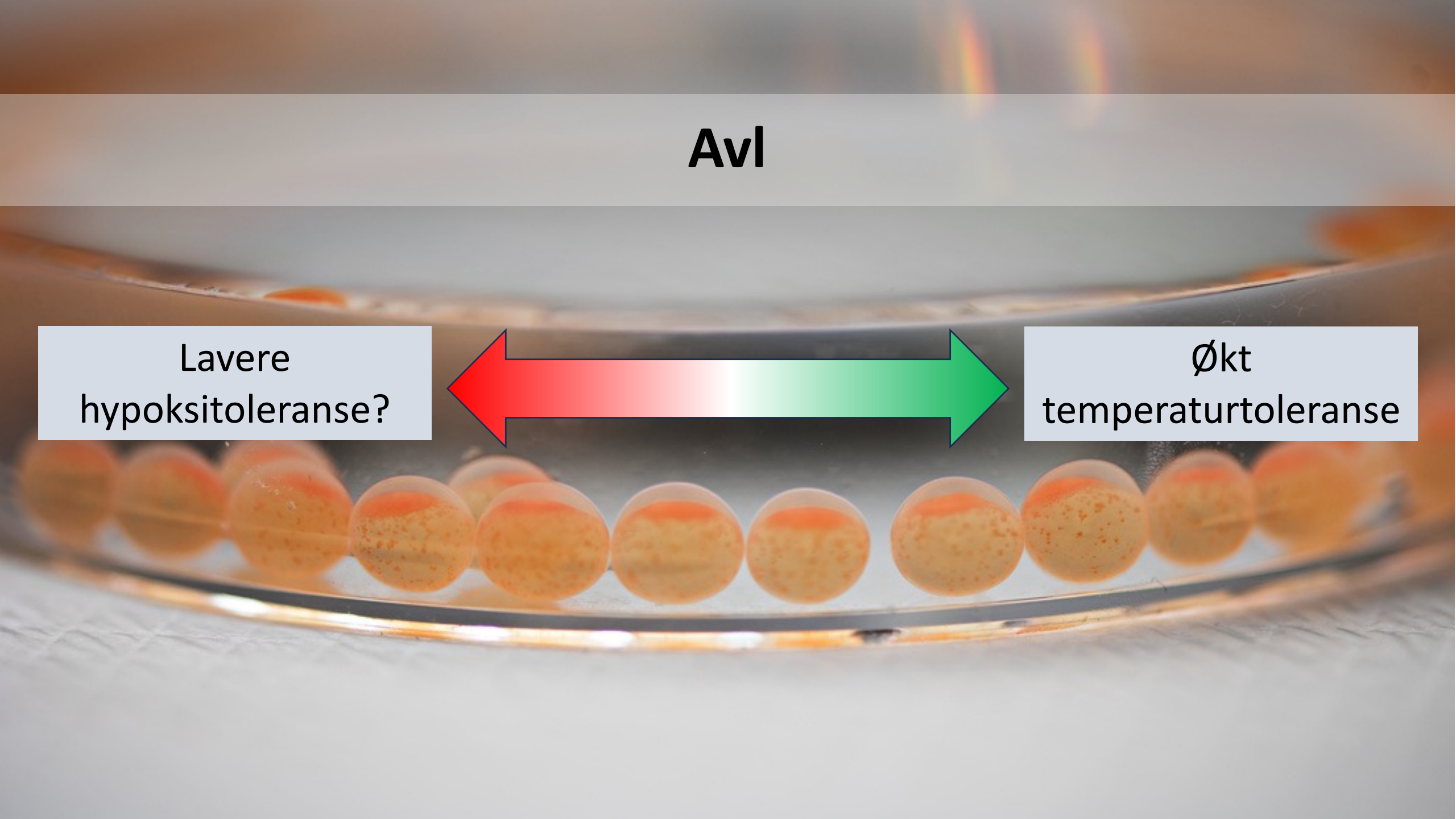
Høyere GHG utslipp



Kontrollerte temperaturer

PwC, 2023

Avl




WE'VE TRIED NOTHING
AND WE'RE ALL OUT OF IDEAS

About Salmon Living Lab

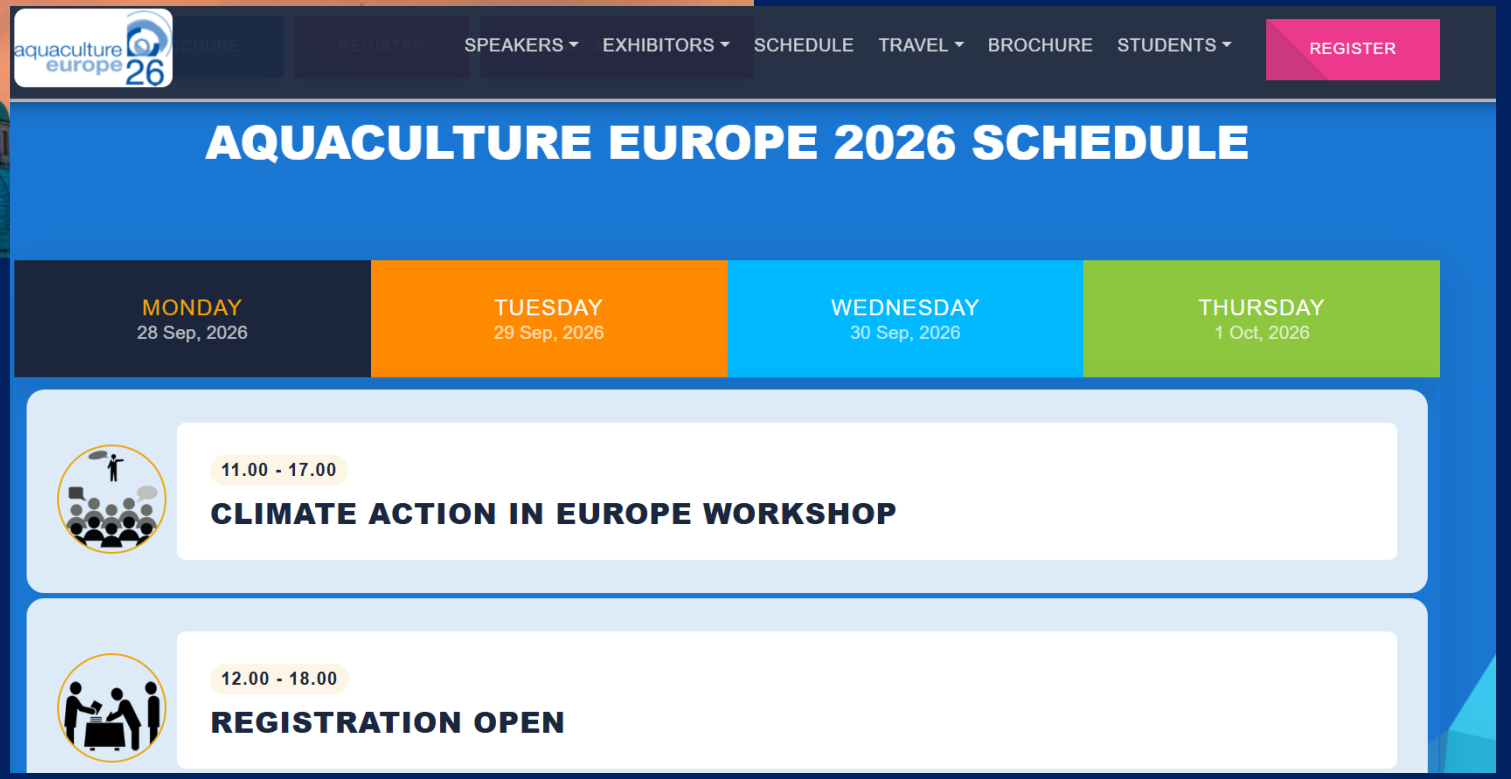
Salmon Living Lab is aglobal research and innovation initiative. Launched by SalMar – one of the world's largest fish farmers, with Cargill, one of the world's largest food manufacturers, as the first partner to join.

We bring together leading expertise from industry, research, academia, NGOs, and authorities to share insights and resources, and to address complex challenges that cannot be solved by individual players alone.

We work across the entire value chain — from egg to fillet, from genetics to consumer. Through collaborative research and development projects, the initiative seeks to close critical knowledge gaps in salmon biology. By strengthening fish health and welfare, we aim to deliver long-term value for the industry and support sustainable food production – on the salmon's terms.

Since launch in March 2024, the partnership has expanded with four additional key partners; the Norwegian University of Life Sciences (NMBU), the research institute NORCE, the


aquaculture europe 26
SPEAKERS
EXHIBITORS
SCHEDULE
PROGRAMME
TRAVEL
BROCHURE
STUDENT
AQUACULTURE EUROPE 2026
September 28 - October 1, 2026
Ljubljana, Slovenia


aquaculture europe 26
SPEAKERS
EXHIBITORS
SCHEDULE
TRAVEL
BROCHURE
STUDENTS
REGISTER
AQUACULTURE EUROPE 2026 SCHEDULE
MONDAY
28 Sep, 2026
TUESDAY
29 Sep, 2026
WEDNESDAY
30 Sep, 2026
THURSDAY
1 Oct, 2026
11.00 - 17.00
CLIMATE ACTION IN EUROPE WORKSHOP
12.00 - 18.00
REGISTRATION OPEN

Takk for oppmerksomheten!

Kontakt: elisabeth.ytteborg@nofima.no

Finansiering:
The Norwegian Research Council (NRC194050, Insight)
The Norwegian Troms and Finnmark County (TFFK2021-179, SecureCod, TFFK2022-241 ArctiCod)
The UK Research and Innovation Future Leaders Fellowship (MR/V021613/1)

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