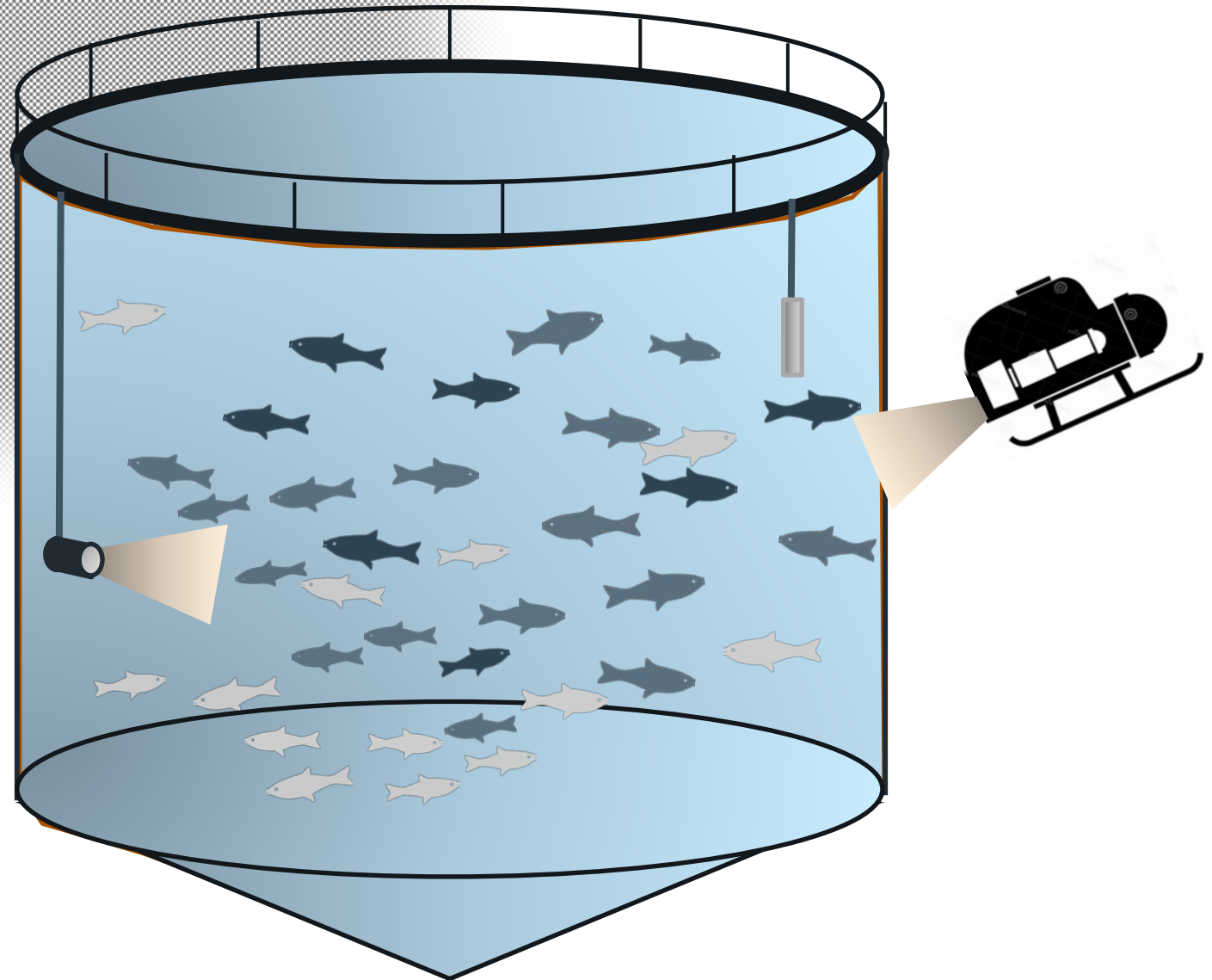
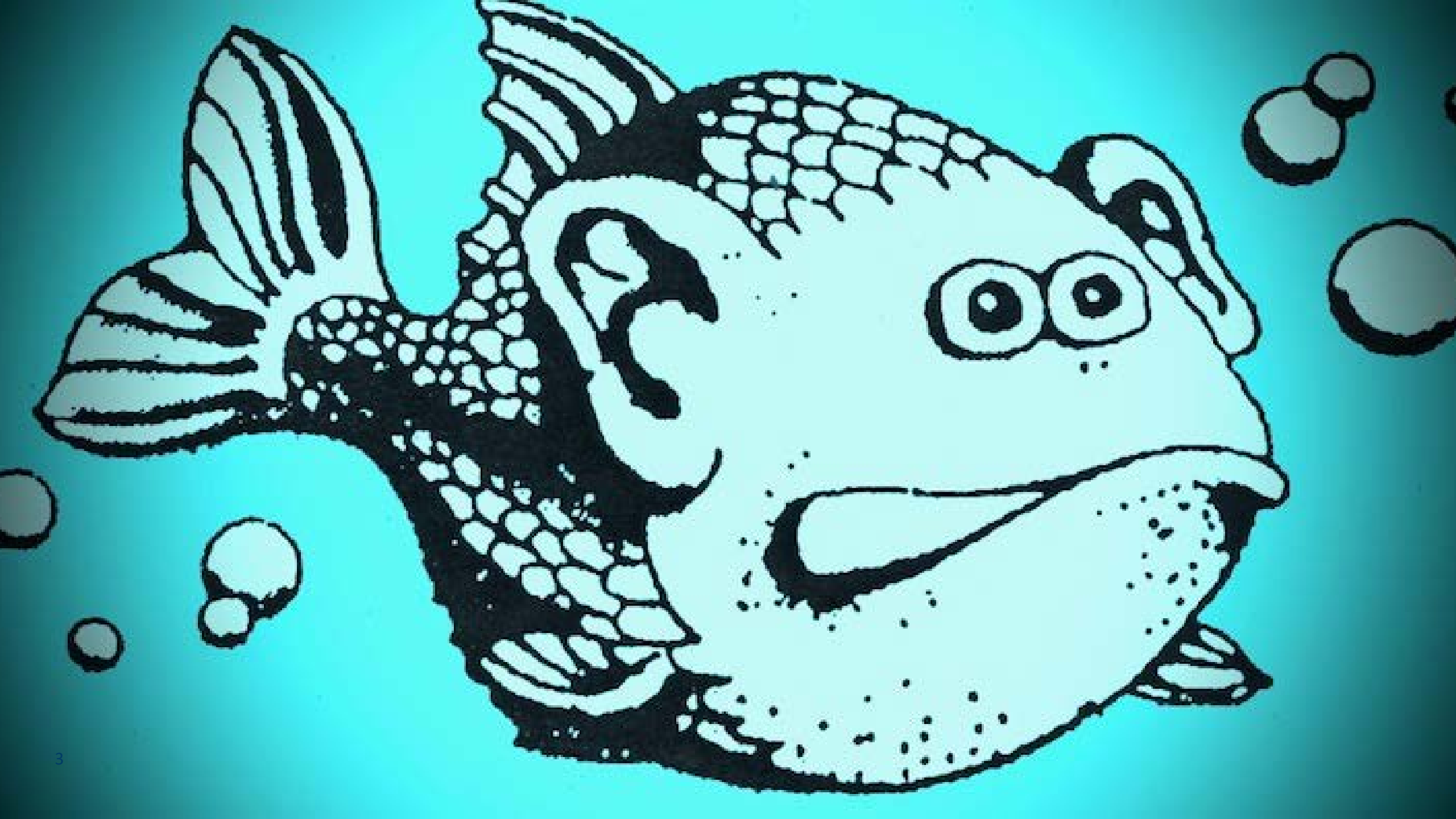


Lyd i merd

Carolyn M. Rosten, John Reidar Mathiassen,
Kristbjörg Edda Jónsdóttir og Zsolt Volent









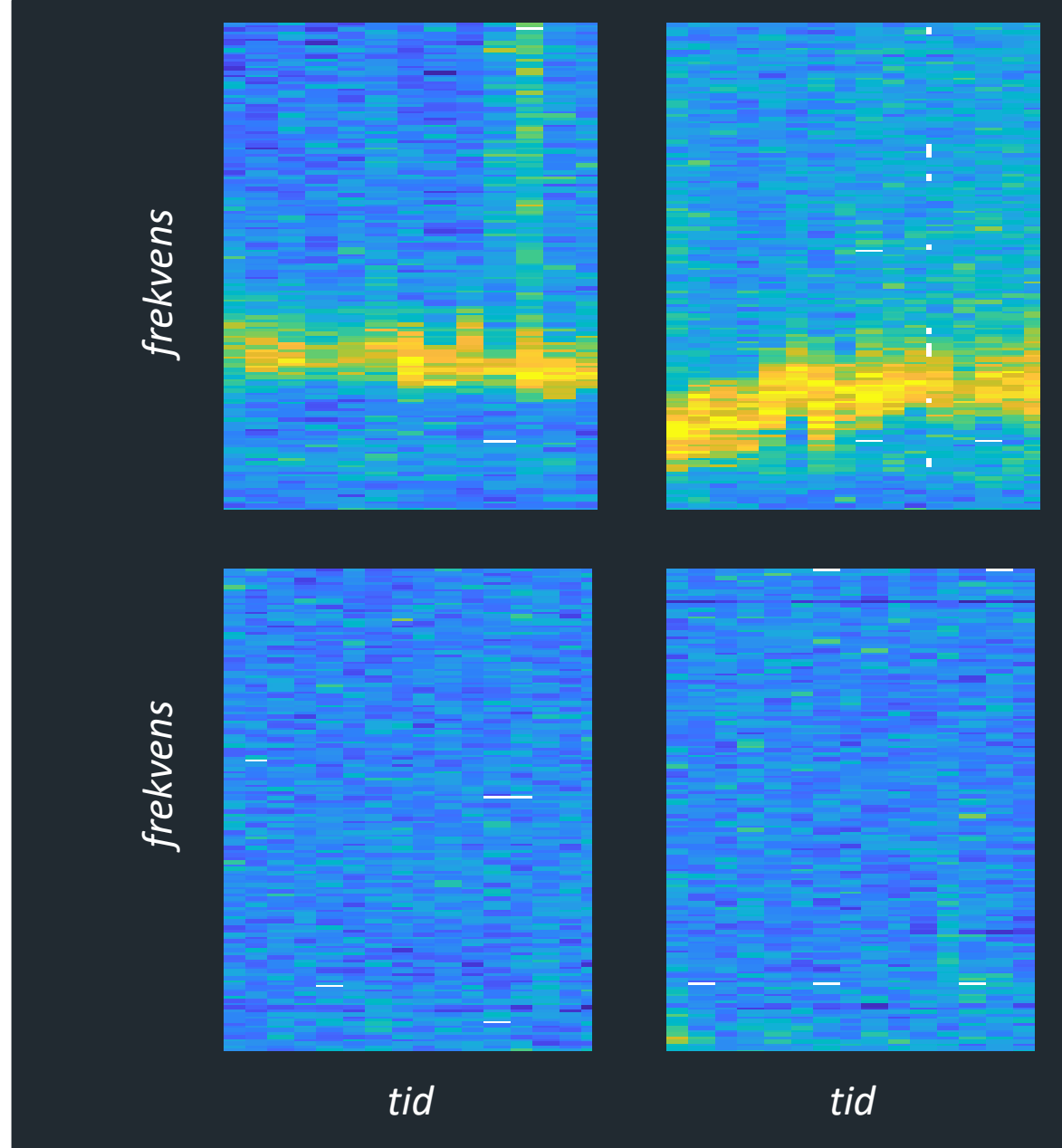


Lydbildet i merd
med/uten fisk

*Kilde: NFR prosjekt SoundWell II /
FHF prosjekt OWITOOLS*

DAG

NATT



I MERD

UTENFOR

MERD

Å utvikle teknologiske verktøy og validere biologisk betydning av tekniske målinger for å sikre objektiv dokumentasjon av **fiskevelferd ved håndteringsoperasjoner** av laksefisk





Labforsøk

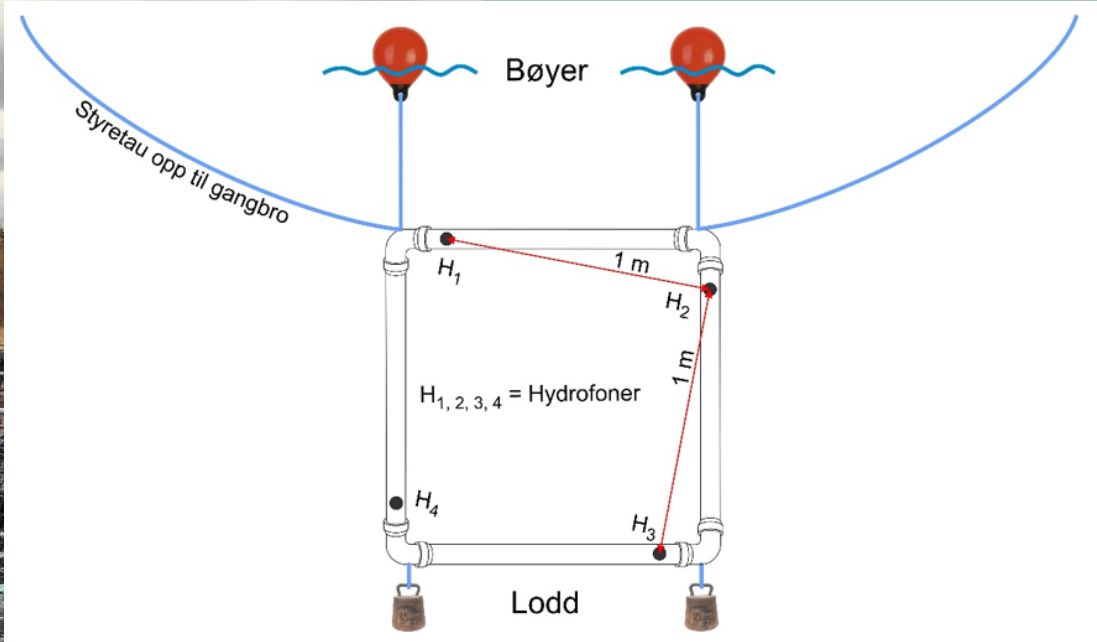
LetSea Forsøk

Dag 15
Trenning

Dag 1
Merking/
flytting

Dag 29
Avslutning





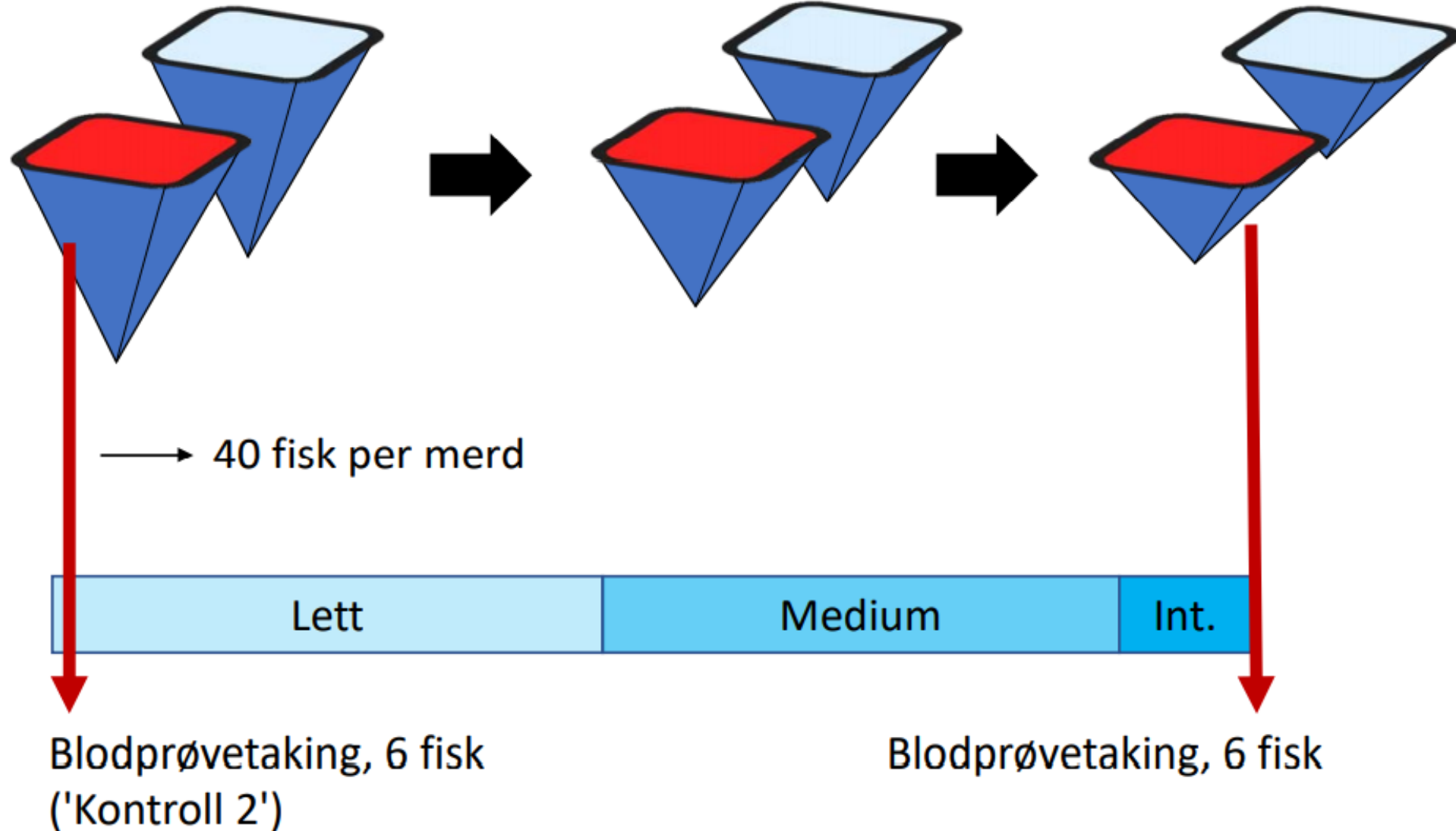
DAG 15



**Lett trening
(50 min)**

**Medium trening,
(50 min)**

**Intens trening,
(10 min)**





Noble et al. 2018 FishWell report:



1. Goal: low stress, no vigorous activity

- ✓ Fish in the sides of the crowd swimming slowly
- ✓ Normal swimming behaviour, but not all in the same direction
- ✓ No dorsal fins on surface
- ✓ No white sides on surface



2. Acceptable: some fins on surface

- ✓ Normal swimming behaviour at suction point, low stress
- ✓ Few dorsal fins on surface
- ✓ No white sides on surface



3. Undesirable:

- Over-excited swimming behaviour (different directions)
- More than 20 dorsal fins on surface
- Some white sides constantly on surface



4. Unacceptable: overcrowding

- Over-excited swimming behaviour (different directions). Some fish decreasing activity
- Pumping rate: Not possible to keep a constant rate
- Many fish stuck up against the crowd net
- Many dorsal fins on surface and numerous white sides on surface
- A few very lethargic fish

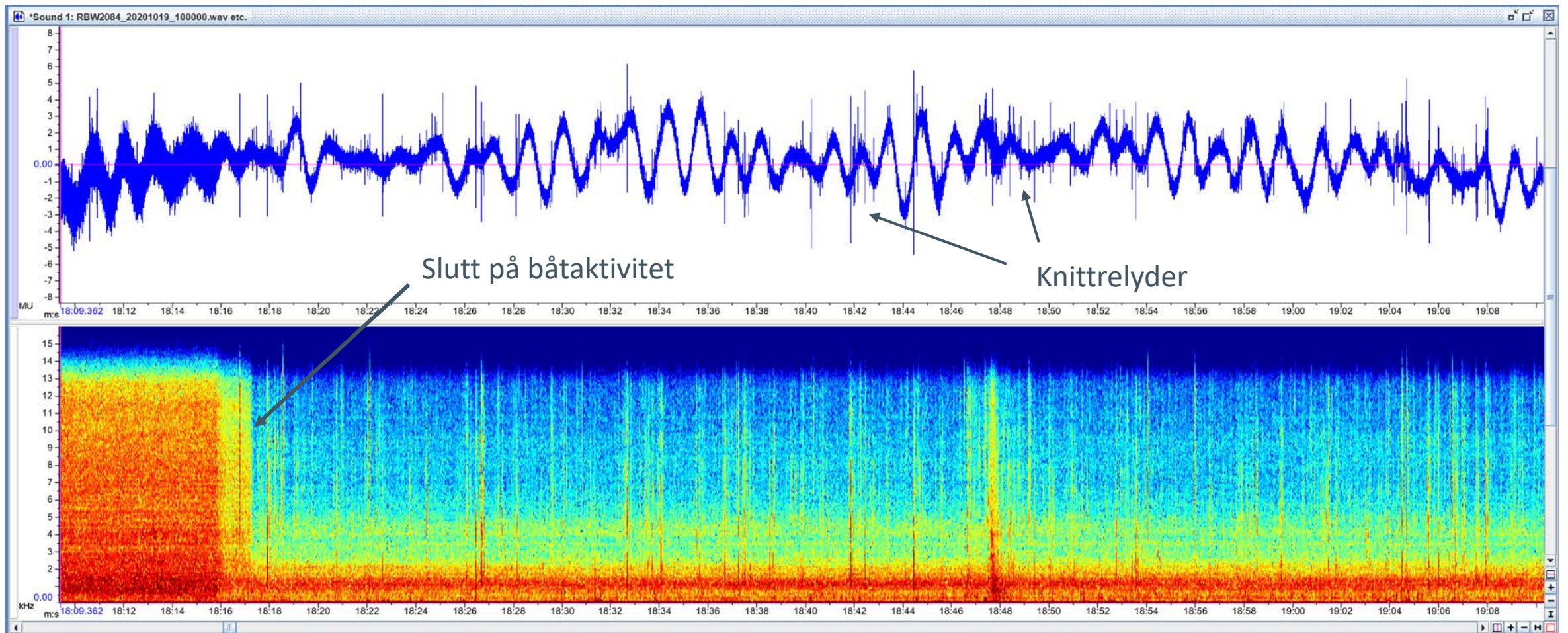


5. Unacceptable: extreme overcrowding

- Whole crowd boiling
- Potential for large fish kill without rapid release
- *Panic in the population, the fish are exhausted*
- *Many fish floating on their side*

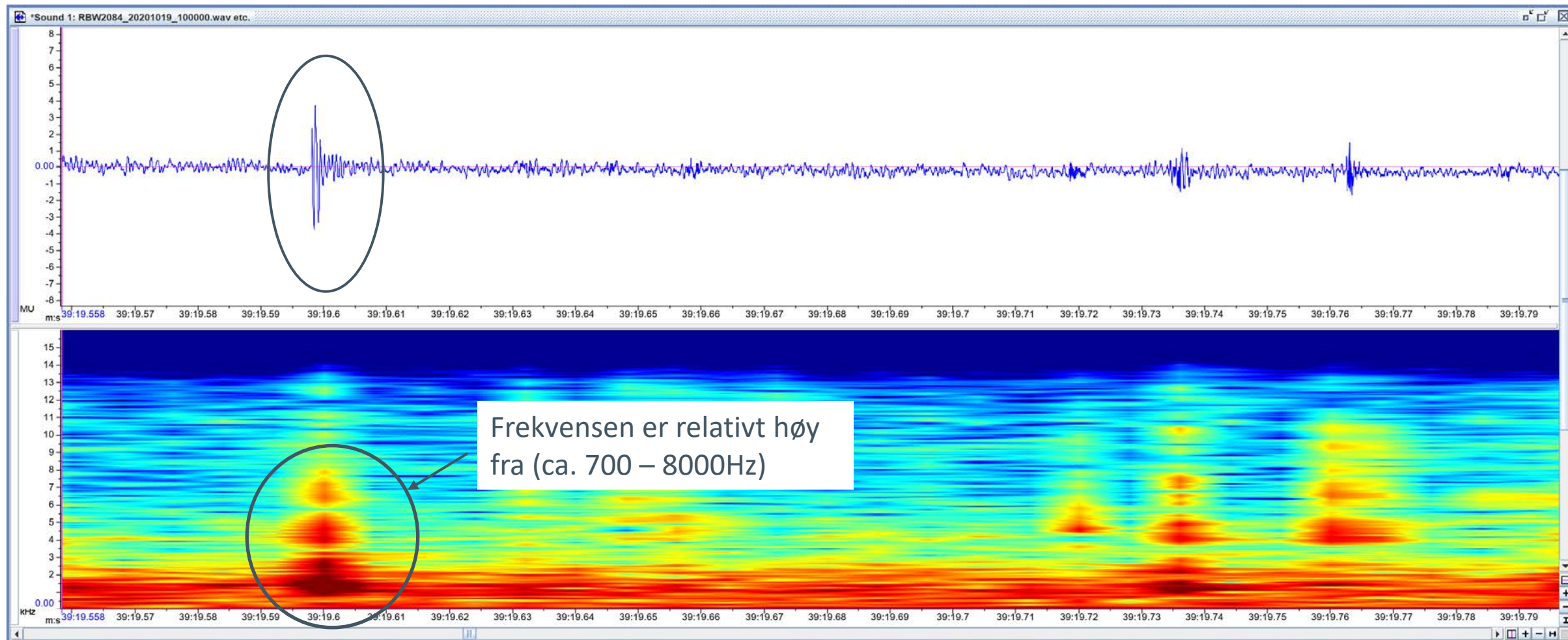
LetSea data fra 19.10.2021 kl. 10:00 – 12:00 UTC, rett etter trengeoperasjon

- Spektrogram med knittrelyd



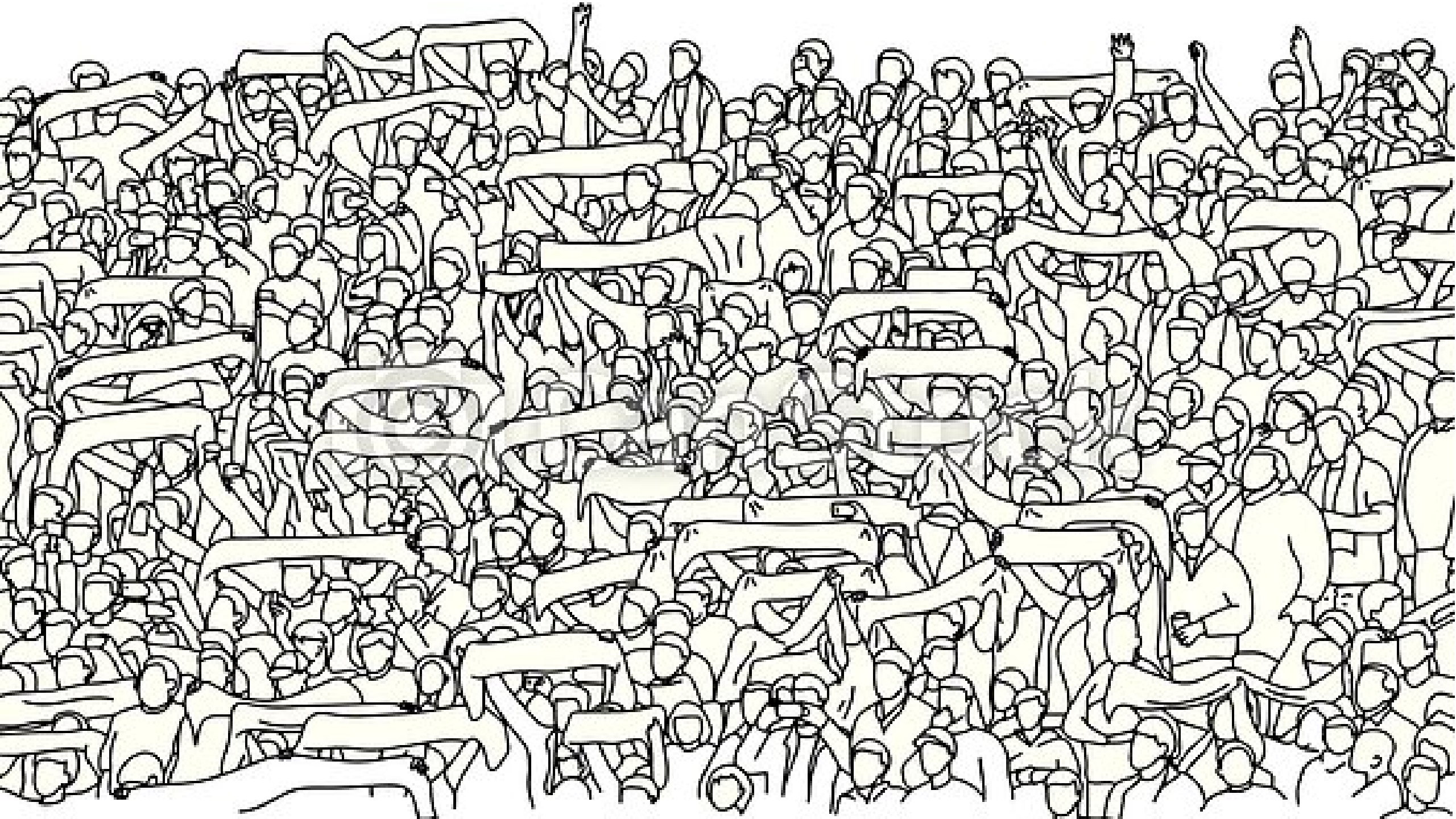
Lakselyd

Karakteristisk signalform på lakselyd



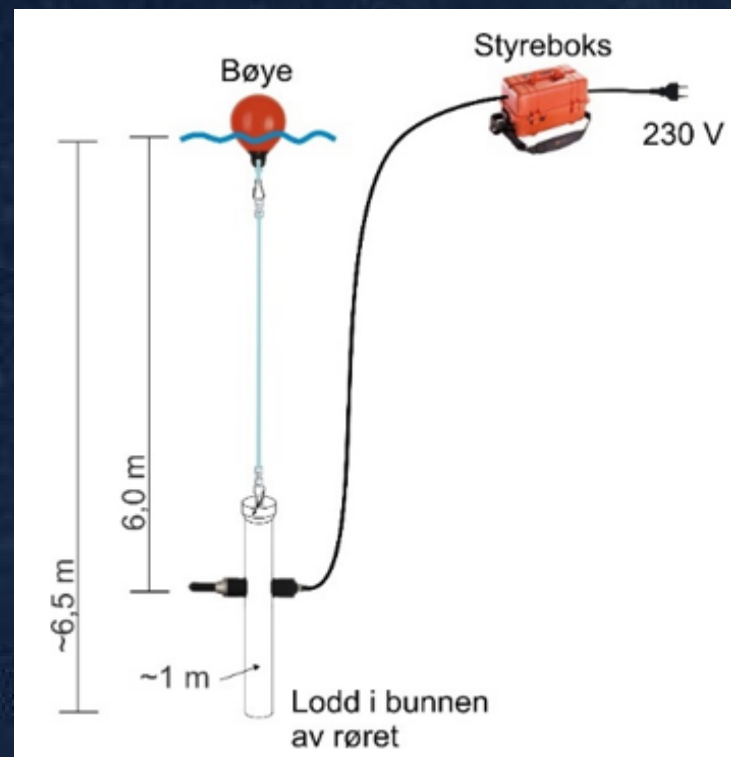


Storskala forsøk



SINTEF ACE Rataren

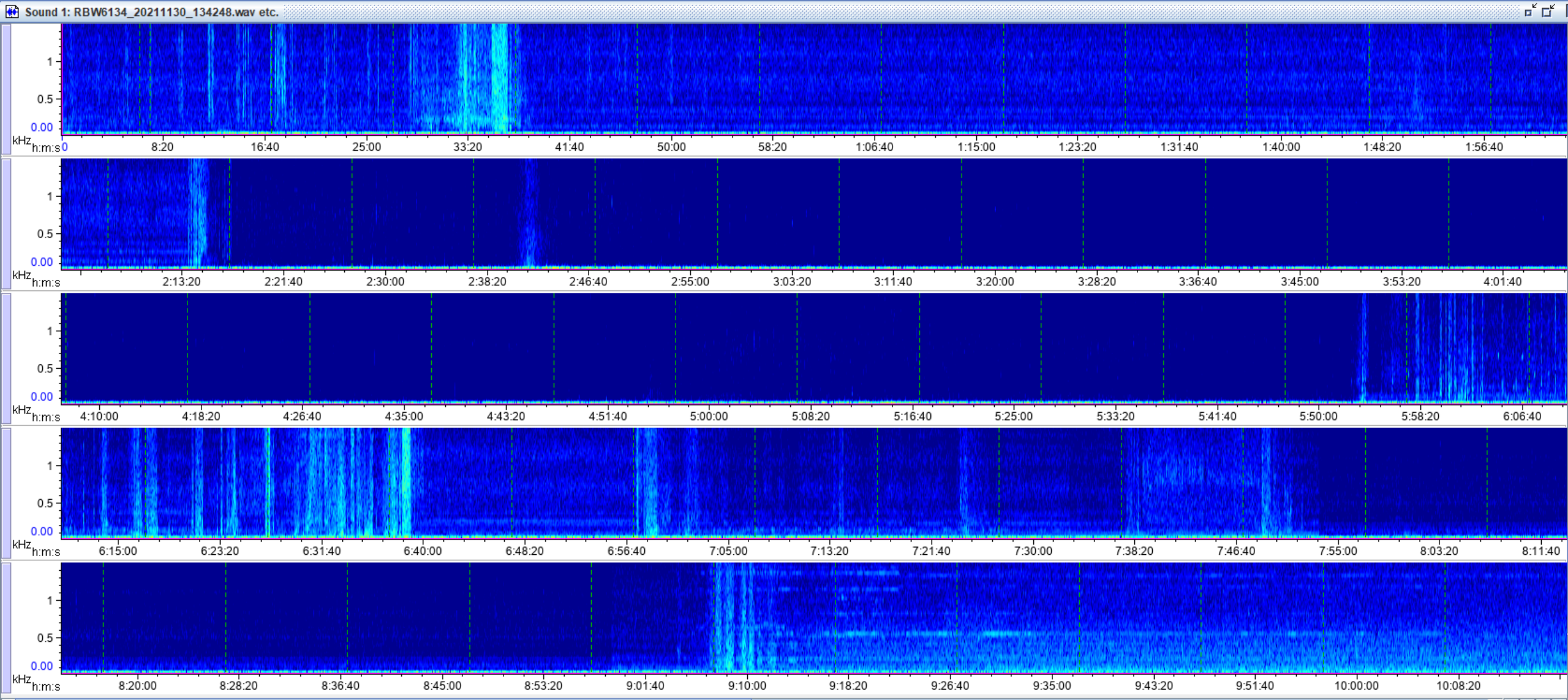




Fullskala trenging

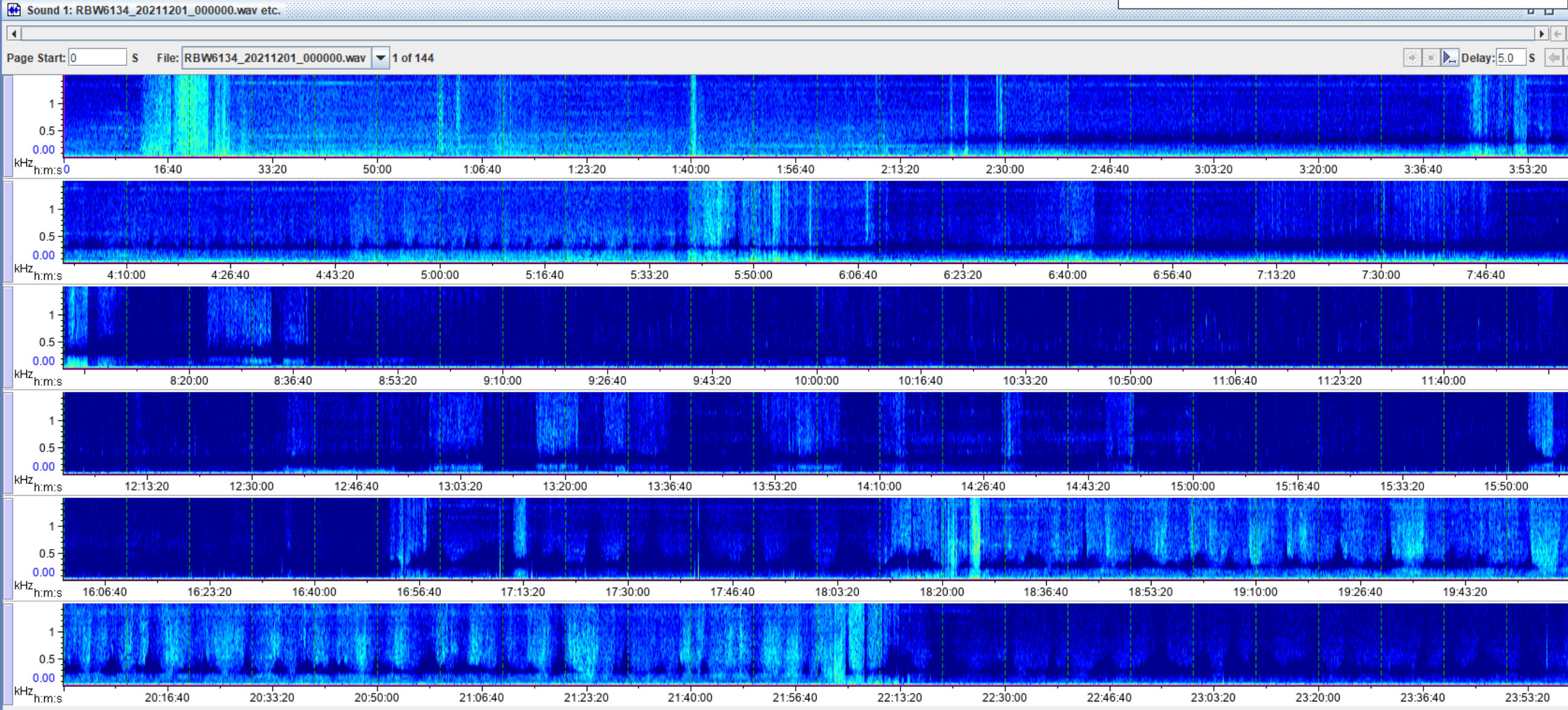
Rataren resultater (merd 3)

Start:30.11.2021 – 13:42:33 UTC

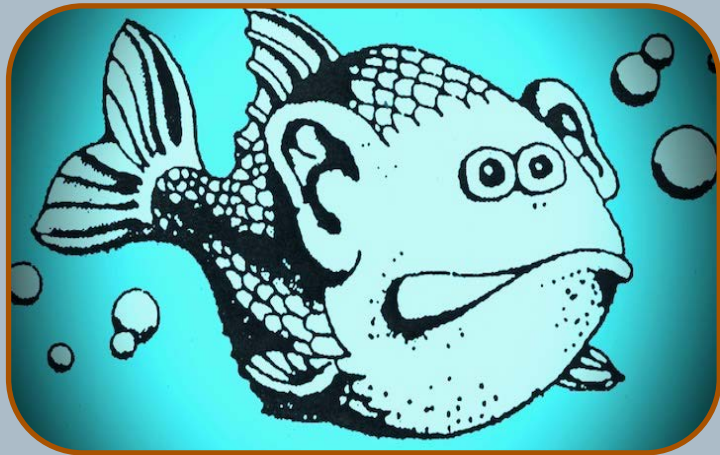


Rataren resultater (merd 3)

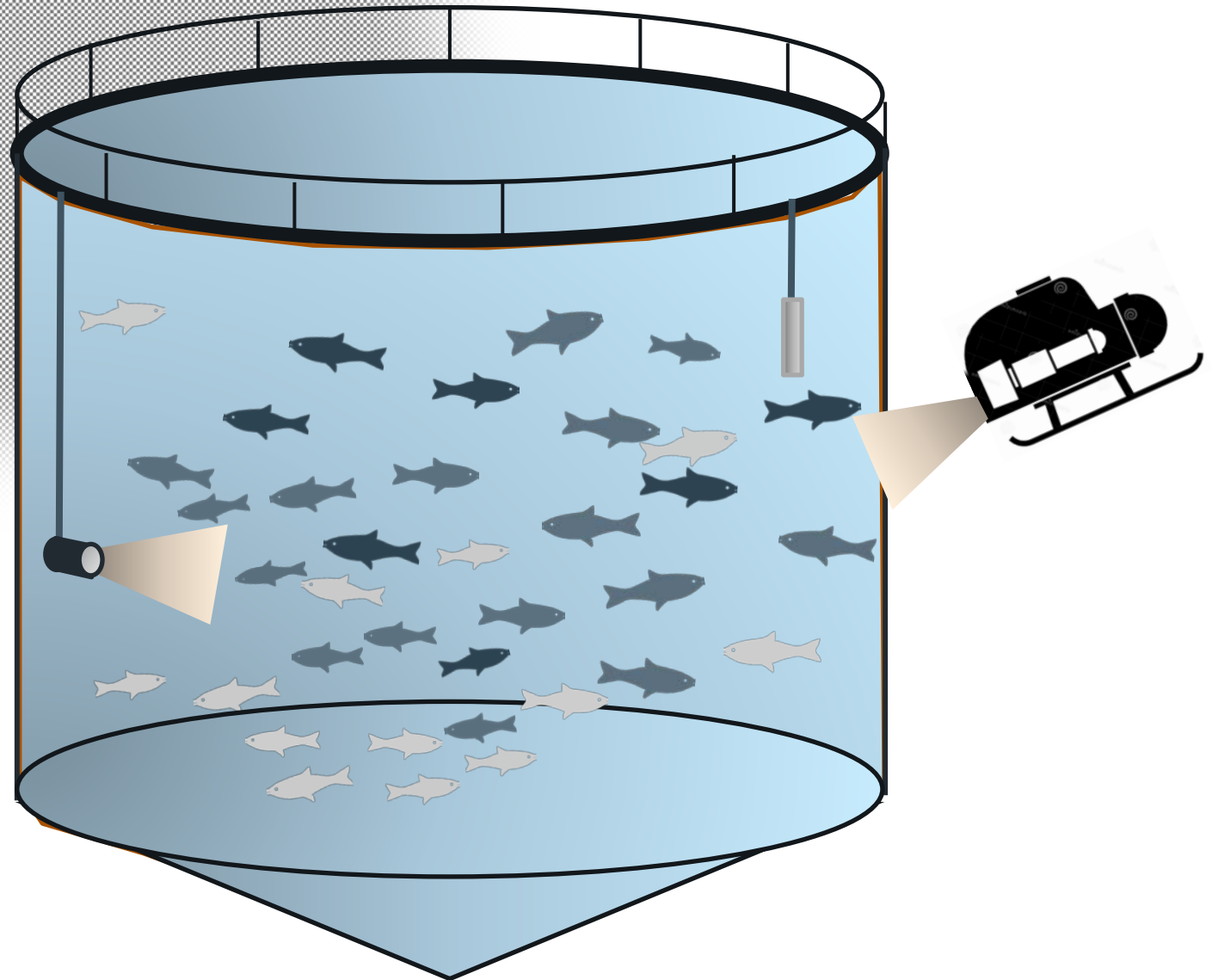
Start:01.12.2021 – 00:00:00 UTC



Å *utvikle teknologiske verktøy* og *validere biologisk betydning* av tekniske målinger for å sikre objektiv dokumentasjon av fiskevelferd ved **håndteringsoperasjoner av laksefisk**



- Detekterer endringer med akustikk
- Endringer reflekterer biologisk respons
 - Generert lyd, reflekterer "stress" ved trenging
 - Dempet lyd, reflekterer tetthet, svømmemønster



An underwater photograph of a river. Numerous salmon are swimming in the water, some near the surface where sunlight rays penetrate, and others closer to the riverbed. The riverbed is covered with dark rocks and vibrant green algae. The overall scene is dynamic and natural.

Samarbeid og kunnskap
for framtidens miljøløsninger

carolyn.rosten@nina.no