Monitoring of blue cod in Fiordland with stereo Baited Remote Underwater Video (BRUV)

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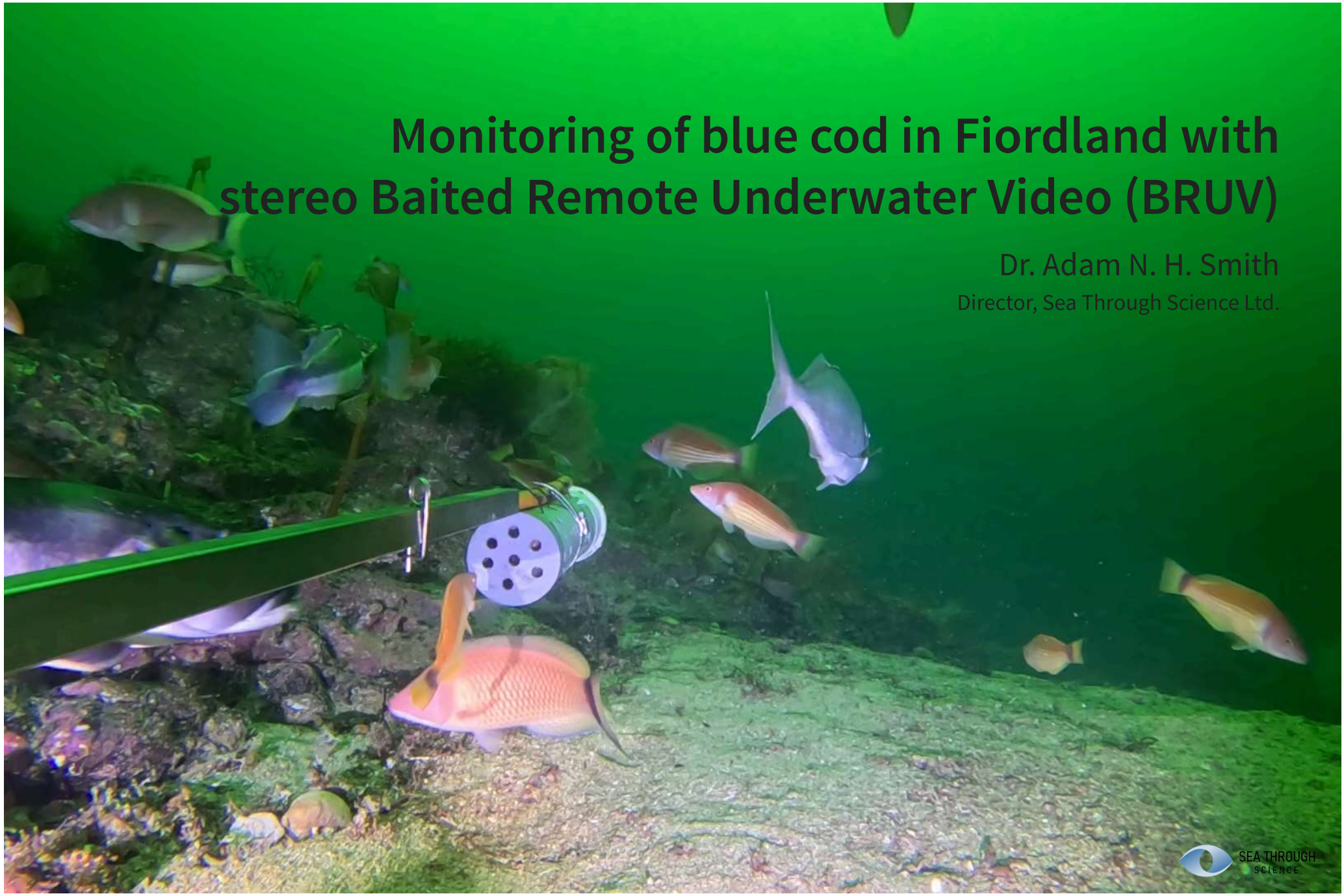

What is a ‘Stereo BRUV’?

- Stereo Baited Remote Underwater Video
- Stainless steel frame with two video cameras pointing at a bait canister, with lights and a depth sensor
- Used around the world as a standard method of monitoring fishes

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What is a ‘Stereo BRUV’?

- After calibration with a specialist cube and software,

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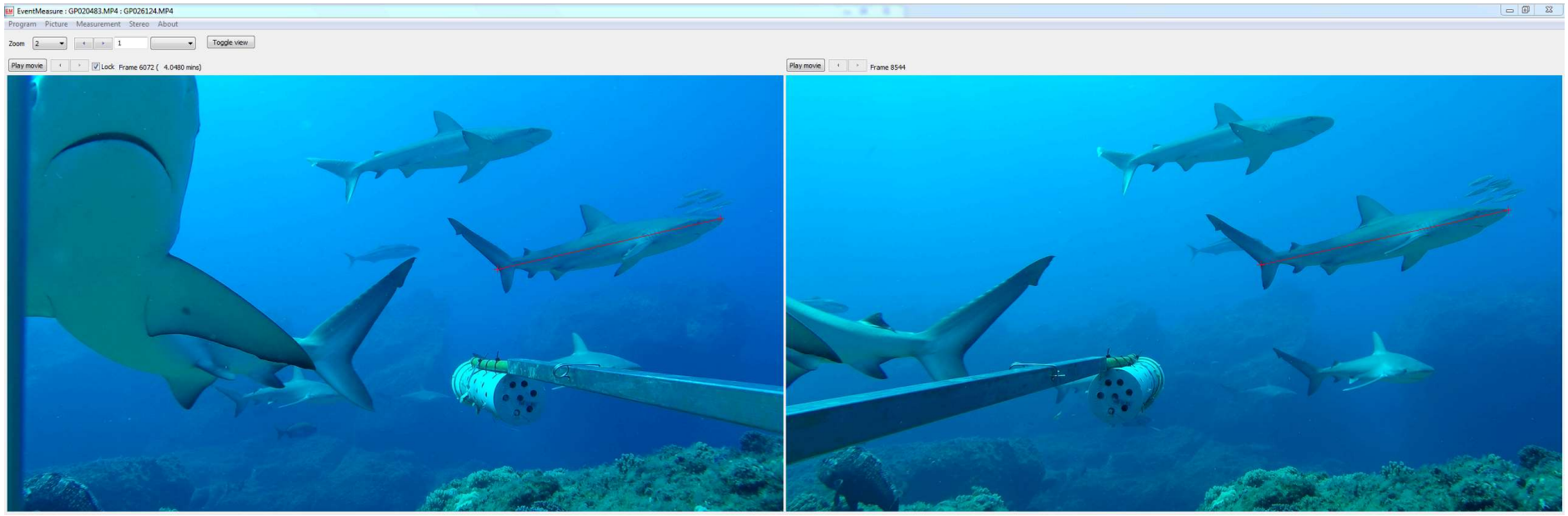

- After calibration with a specialist cube and software,
  a stereo BRUV can accurately measure lengths and distances.

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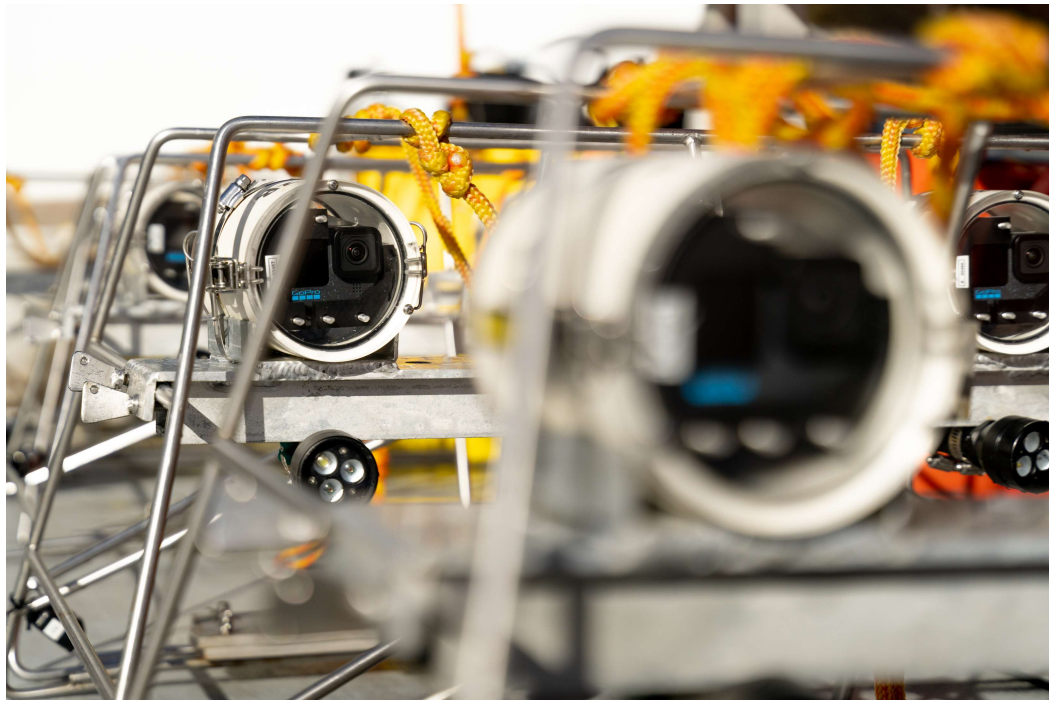
Advantages of BRUVs

- Cost-effective
- Rapid replication
- Non-destructive, non-lethal
- Globally established methodology
- Standardised observation period (60 min)
- Broad depth range
- Captures information on multiple species, size-classes, habitats
- Permanent video archive



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Disadvantages of BRUVs

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- Expensive upfront costs of gear
- Time-consuming annotation of videos (though AI will help!)
- Unknown ‘catchment’ area of bait plume
- Some deployments fail
- Cannot tell the sex of non-sexually dimorphic species (e.g., blue cod)

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Fiordland Marine Area

Unique marine ecosystems surrounded by UNESCO World Heritage site

Important commercial and recreational fisheries include blue cod, rock lobster, and pāua

Oversight by the Fiordland Marine Guardians is mandated under The Fiordland (Te Moana o Atawhenua) Marine Management Act 2005

Data Collection and Monitoring	
Promote use of Mainland Catch to report amateur catch	Mainland Catch is operational. If we can demonstrate uptake, Guardians to advocate for mandatory reporting of all amateur catch in future.
Establish citizen science projects to complement stock assessments	Continue to engage with Fisheries NZ to develop a programme for key species.
Develop non-invasive ways to monitor key stocks	Fisheries NZ are exploring the use of Baited Underwater Video to monitor key stocks in sensitive areas.

Fiordland Marine Guardians (2023) *Proposed further amendments to fishing regulations in the Fiordland Marine Area*

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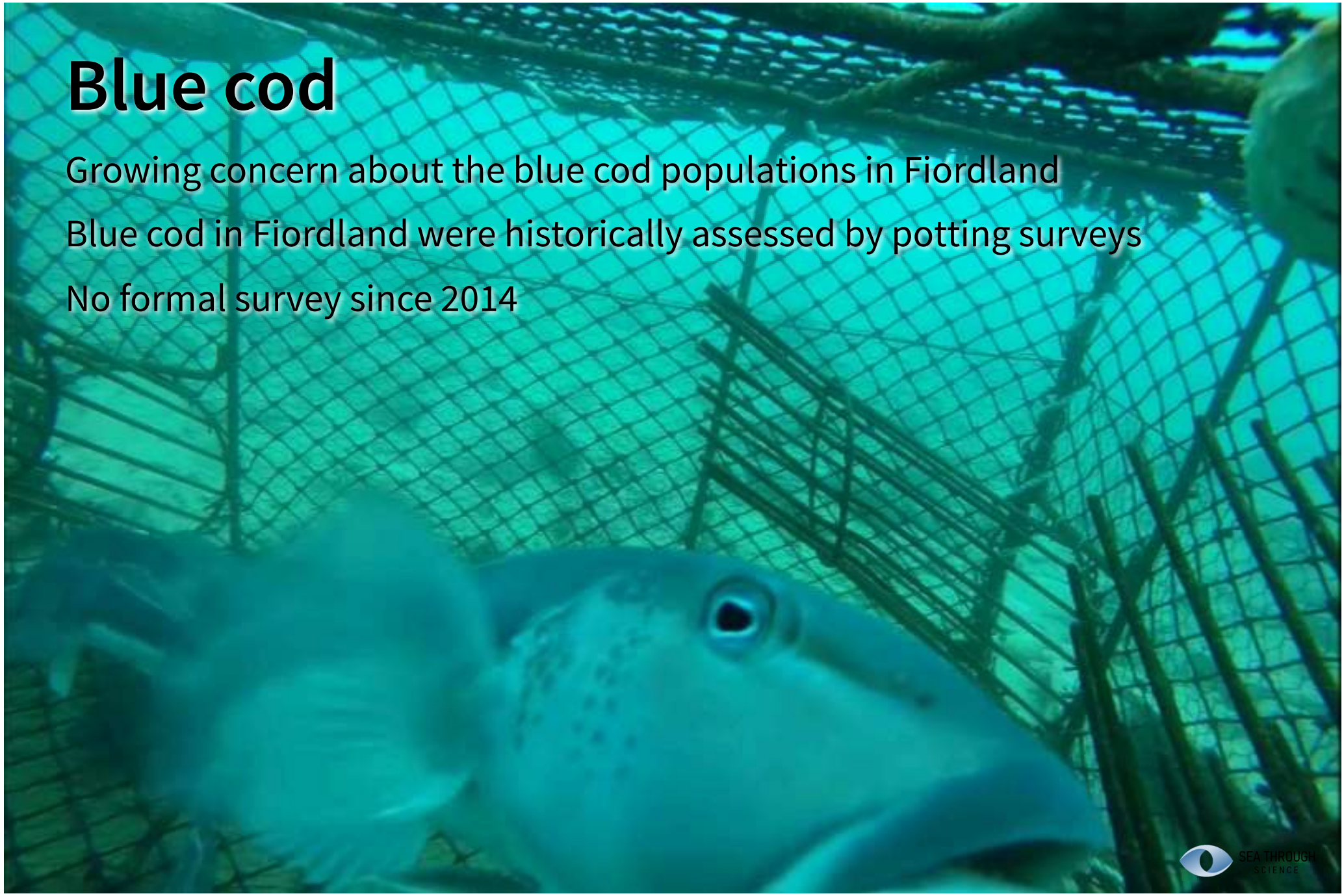
Blue cod

Growing concern about the blue cod populations in Fiordland

Blue cod in Fiordland were historically assessed by potting surveys

No formal survey since 2014



Our work

In 2021 and 2024, the Department of Conservation supported BRUV surveys of Fiordland.

Ministry for Primary Industries has funded the annotation of the videos.

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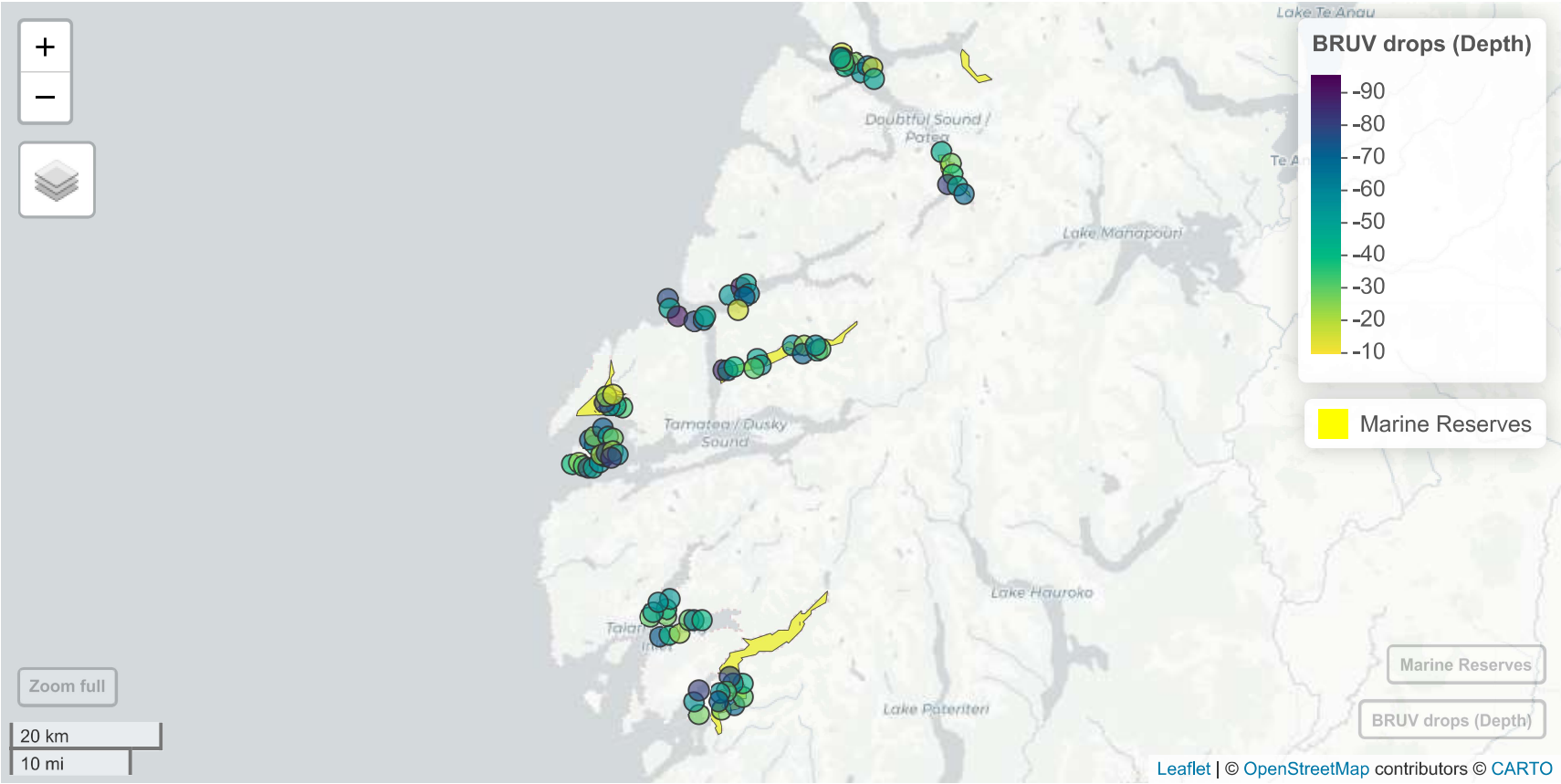
Fiordland 2021



90 deployments at 10-95 m depths.

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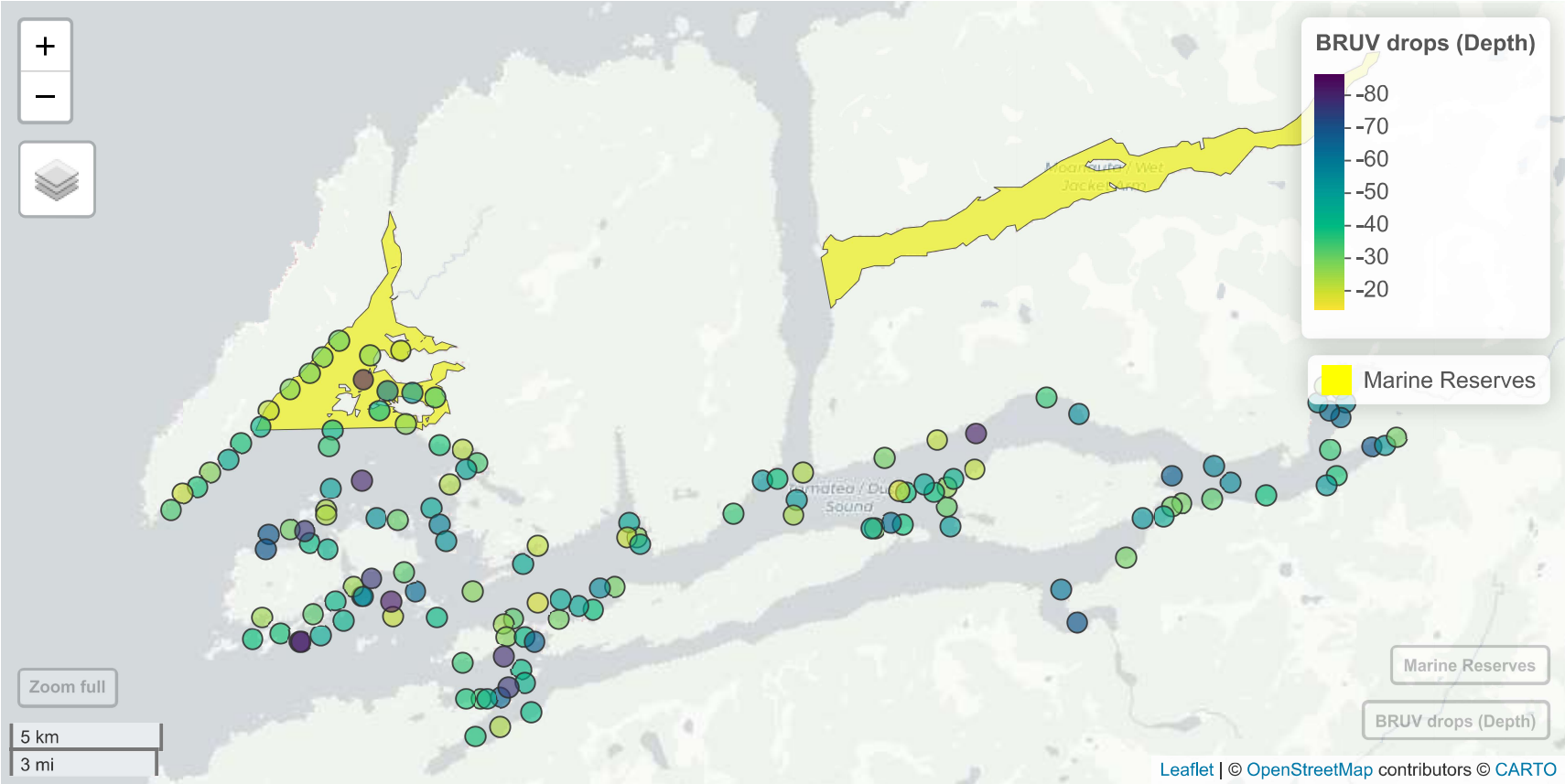
Tamatea/Dusky Sound 2024



139 deployments at 15-86 m depths.

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Current and future work

- Annotation of 2024 Fiordland BRUV videos (ongoing, funded by MPI)
  - Focal species:
    blue cod, tarakihi, hāpuku, school shark
  - Two different indices of abundance:
    “MaxN” and “MeanCount”
  - Length frequencies
    (for both MaxN and MeanCount)
- Ongoing monitoring of Tamatea/Dusky Sound
- Detailed exploration of the potential for BRUVs to provide fishery-relevant information
- Surveying proposed MPAs in the Hauraki Gulf (funded by DOC)

Photo credit: C. Rob Priester

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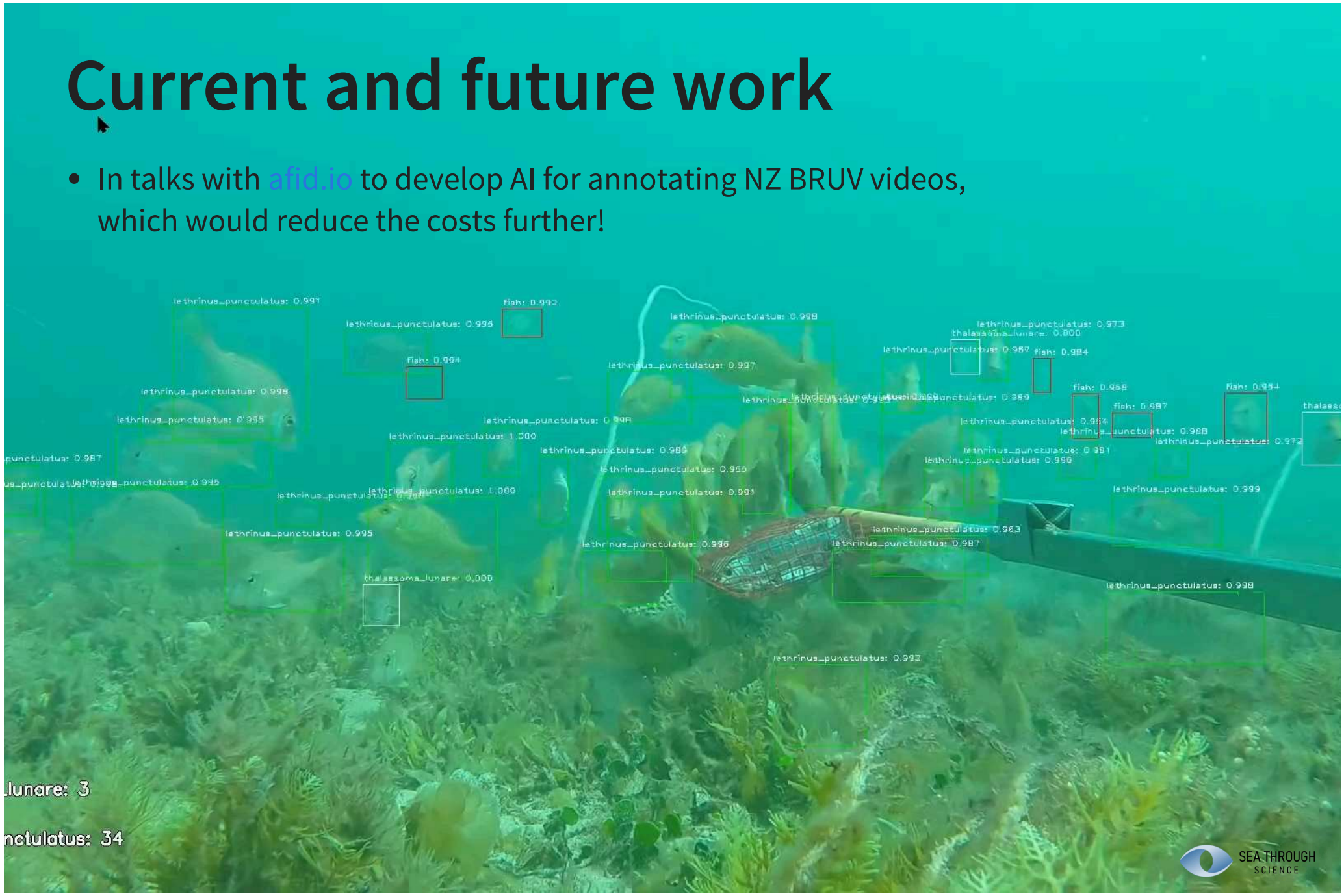
Current and future work

- In talks with afid.io to develop AI for annotating NZ BRUV videos, which would reduce the costs further!



Acknowledgements

- Ministry for Primary Industries
- Richard Kinsey (DOC Te Anau)
- Fiordland Marine Guardians

Rich Kinsey
Photo credit: C. Rob Priester

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- Ministry for Primary Industries
- Richard Kinsey (DOC Te Anau)
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- C. Robert Priester
- Skippers and crew of the Southern Winds

Odette Howarth
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