

ICR(22)11



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NEFSC

# ROAM Update

for  
NASCO's  
International Atlantic Salmon Research Board

June 5, 2022

# Acknowledgements

Simon Thorrold  
Camrin Braun

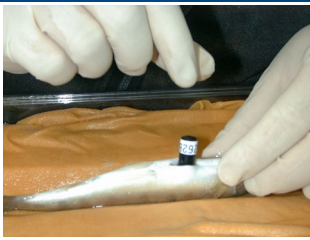


Godi Fischer  
Melissa Omand  
Tom Rossby

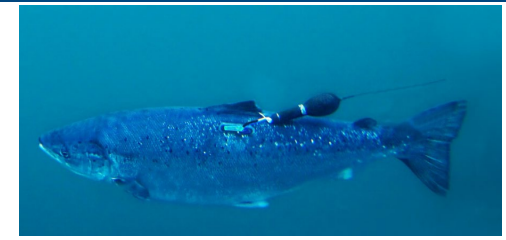


# Electronic tagging technologies

- Have advanced our understanding of the marine ecology for many species
- Two primary tags used for Atlantic salmon:
  - Ultrasonic acoustic tags
    - Since 1994
    - Tag emits a signal that receivers detect and record
  - Pop off Satellite tags (PSAT)
    - Since 2008
    - Geo-positioning from collected data (e.g. temperature, depth, light, magnetic fields)



# Pros and Cons



## Acoustic

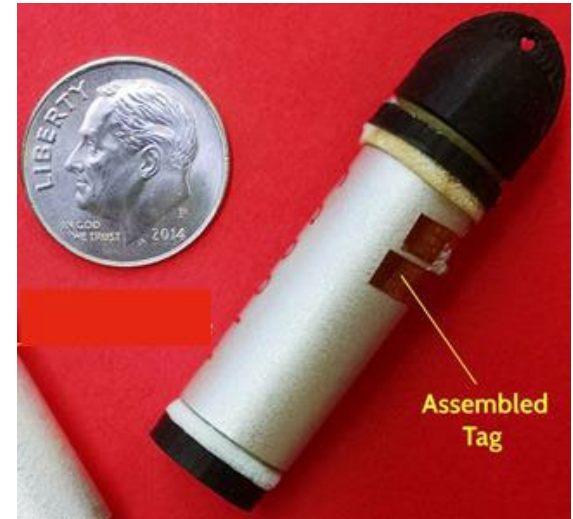
- Small tag size
- Precise locations
- Impacts considered minimal
- Limited tag life
- Small receiver detection radius
- Data from monitored areas
- Monitoring large expansive areas is logistically and economically challenging

## PSAT

- Long-term deployment
- Continuous data collection
- Daily '*precise*' modelled locations
- Large tag size
- Impacts on behaviour
- Behaviour may be incompatible with data requirements
- Sub-set of data informative
- Imprecise location estimates

# ROAM (RAFOS Ocean Acoustic Monitoring) tag

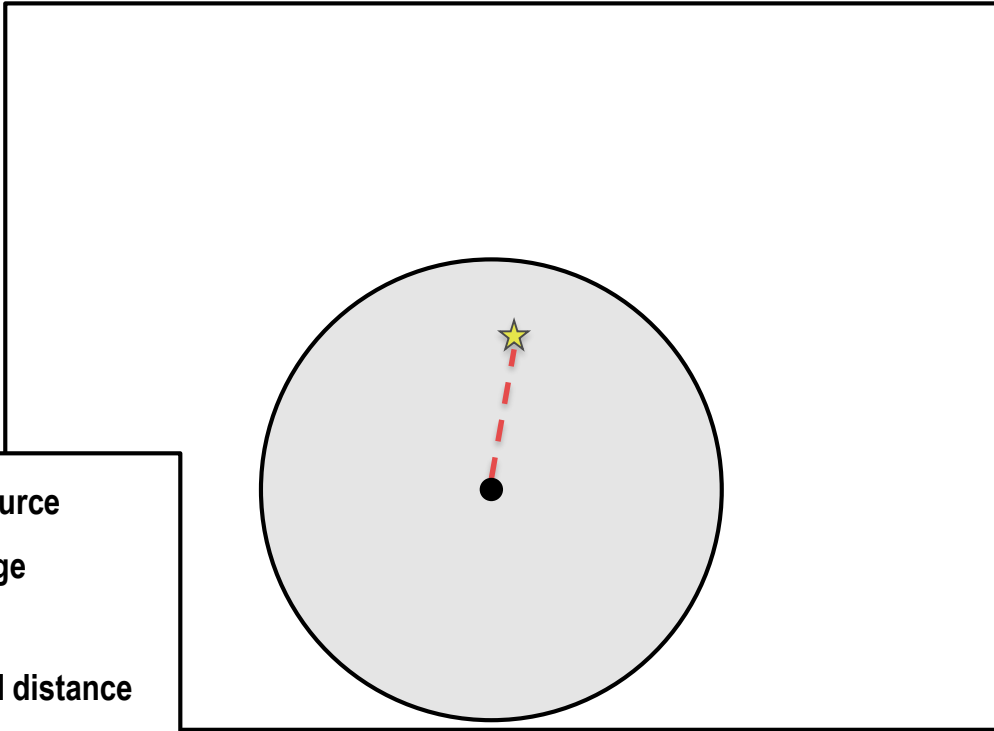
- Evolution of a common oceanographic monitoring tool
  - Modification and miniaturization
- Overview:
  - Moored sound sources
    - 10-year life span
    - Upwards of 1000 km per source
  - Tag is the hydrophone
  - Relatively precise ( $\pm$  few km) geolocation
  - Temperature and depth
  - Archive (*smolt*) and pop-off satellite (*adults and sub-adults*) tags



# Sound Source

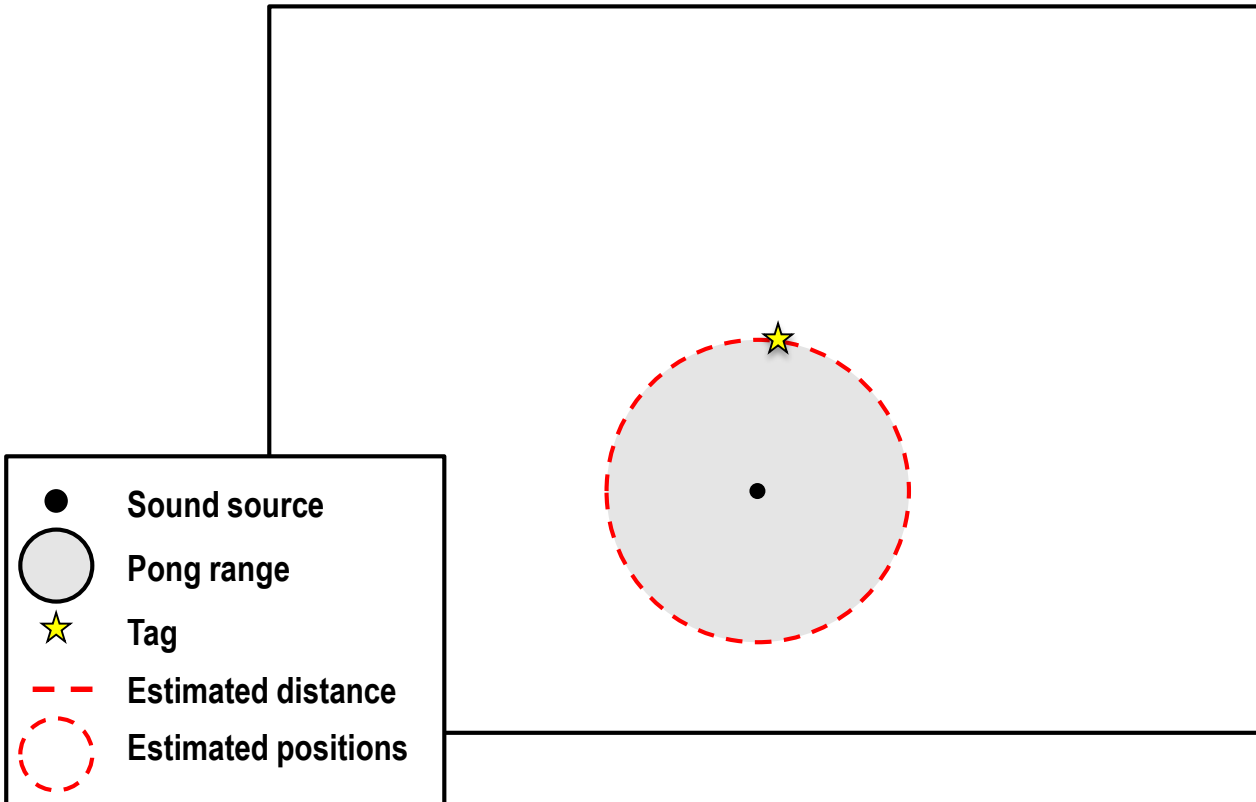


# Single sound source:



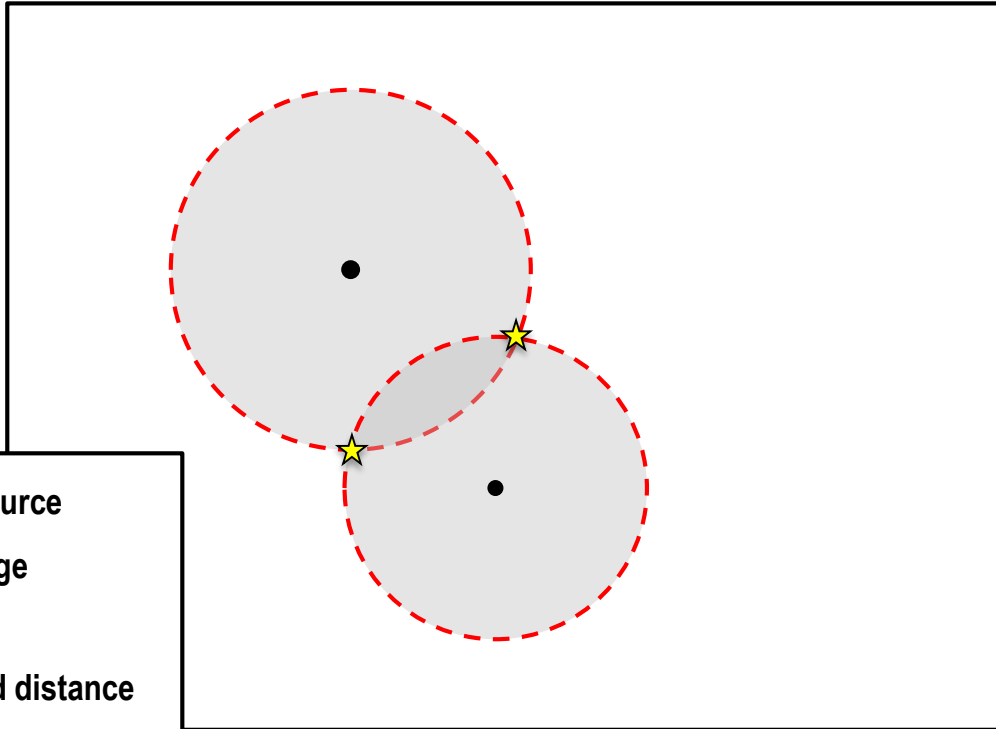
- Sound source
- Pong range
- ★ Tag
- - Estimated distance
- - - Estimated positions

# Single sound source: presence/absence



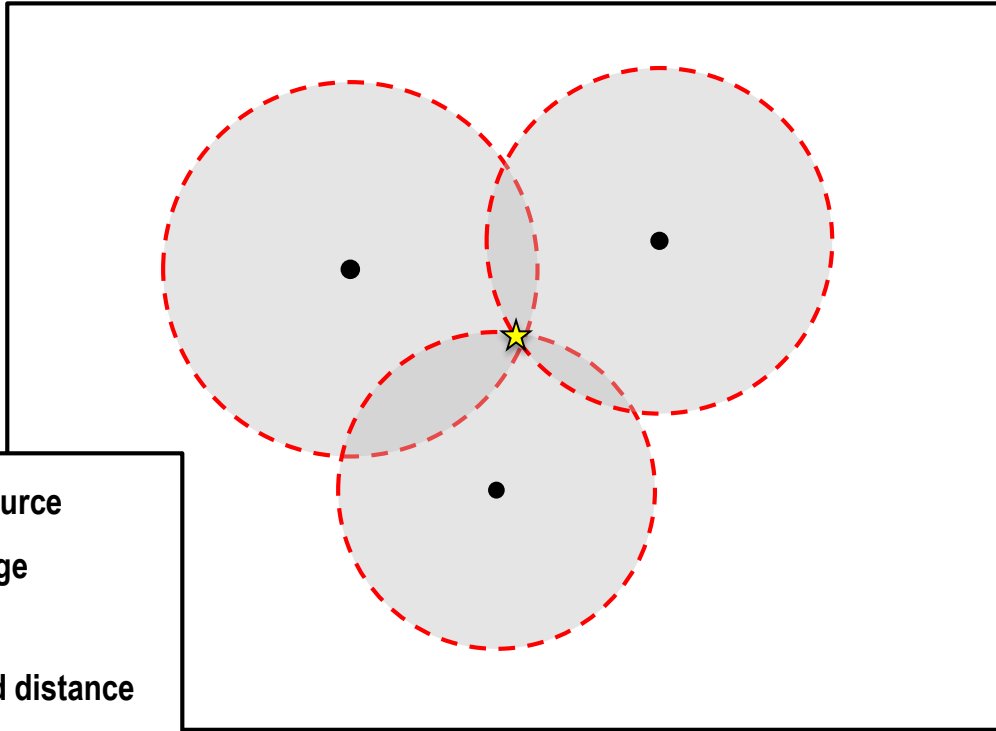


# Two sound sources: two possible locations



- Sound source
- Pong range
- ★ Tag
- - Estimated distance
- Estimated positions

# Three sound sources: one precise location



- Sound source
- Pong range
- ★ Tag
- - - Estimated distance
- Estimated positions

# Timeline

## 2017

- 1<sup>st</sup> presented to IASRB

## 2018

- Bronger and Sheehan (2019)
  - Approach holds promise
  - Challenges/unknowns remain
- Update provided to IASRB
  - Continued support (including £4,000) and interest

## 2019

- 1<sup>st</sup> ROAM 'salmon' sound source
- Field trial cancelled

## 2020

- Field trial scheduled
- Covid

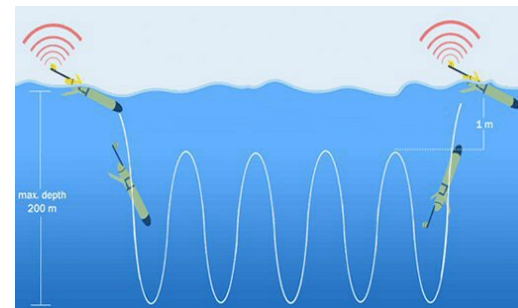
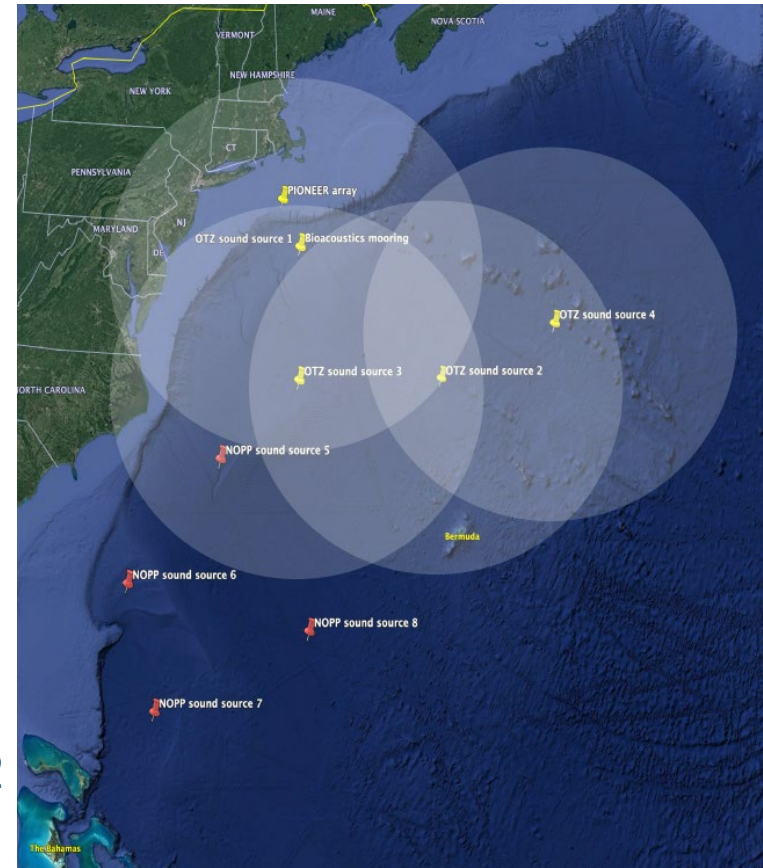
## 2021

- WHOI's Ocean Twilight Zone project
- Tag development progress
- Field trials not possible



# 2022 update

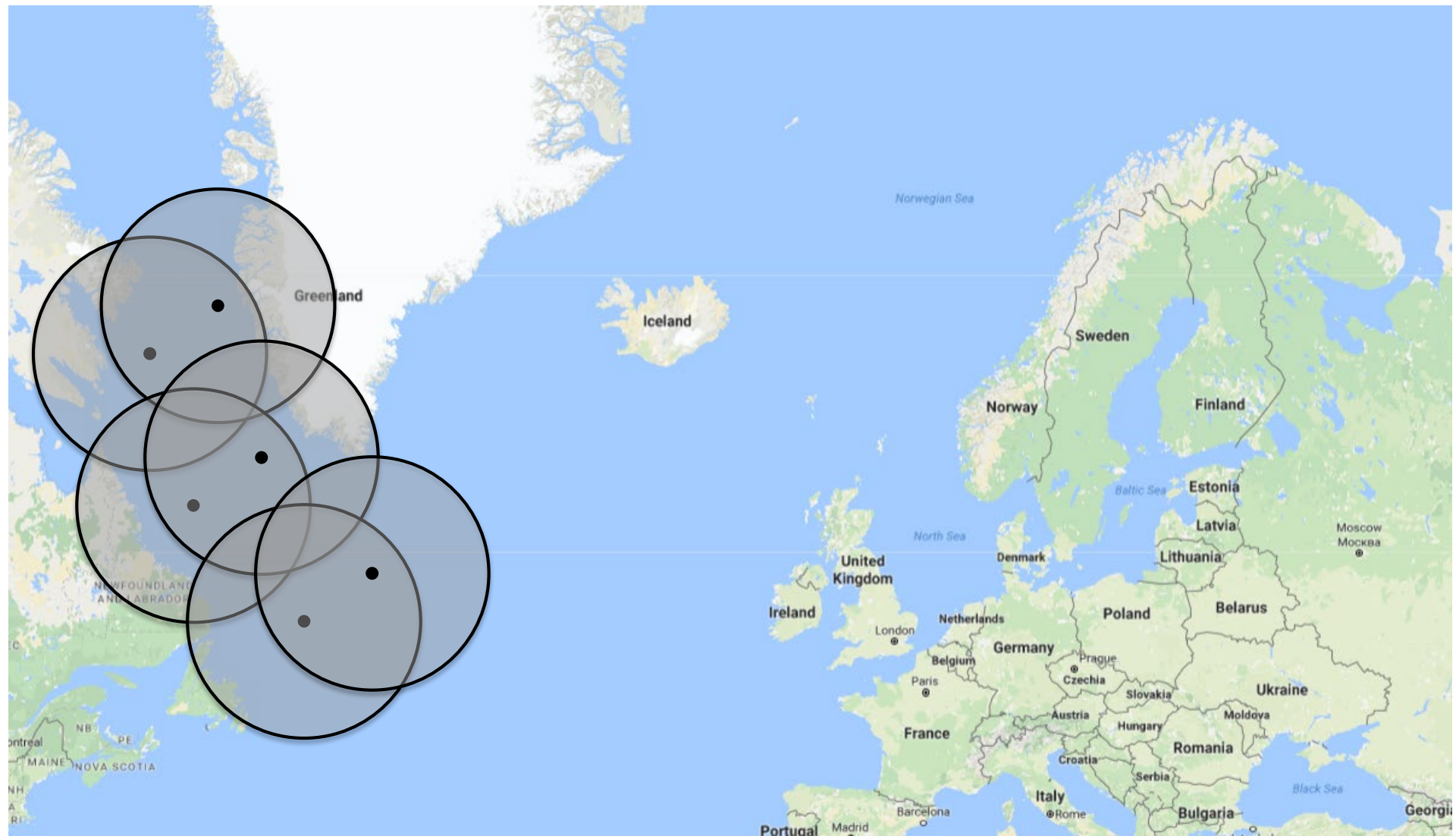
- 2 sound sources deployed
- Multiple *opportunistic* field test during summer 2021
  - Sub-optimal test design
  - Multiple equipment breakdowns
  - 1 semi-successful trial
    - 1<sup>st</sup> open ocean test, 200m depth, 14 of 32 pongs detected at <100 km
    - Geolocation estimates within ~1 km
- Two *dedicated* field trials scheduled for summer 2022
  - Dedicated glider mission (NE US to Bermuda)
  - Large pelagic double tagging
- Multiple funding proposals pursued
  - NW Atlantic and Great Lakes
- Ocean Twilight Zone project
  - ROAM sub-project moving forward



# Summary

- Offers the potential to accurately track further out to sea throughout the marine stage than previously able
  - New use for an old technology
  - Different tag types allow for different research approaches
  - Overall cheaper cost
  - Field testing is needed
- Prime for within and cross-basin multi-species collaborations

# Atlantic Salmon focused study



# Atlantic Salmon focused study

