Assessing passage in a new fish ladder using an ARIS Explorer 3000

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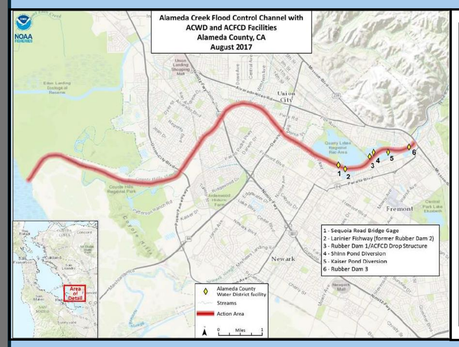
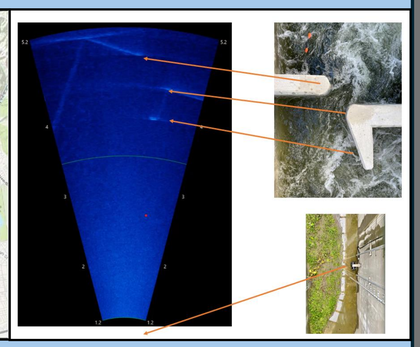
Determining if an Adaptive Resolution Imaging Sonar (ARIS) is capable of monitoring fish passage within a newly constructed fish ladder

Introduction

Background

- A passage facility constructed in 2021 provided anadromous fish access to upper Alameda Creek for the first time in over 50 years.
- An ARIS Explorer 3000 sonar unit was installed to monitor upstream steelhead passage.





ARIS Advantages

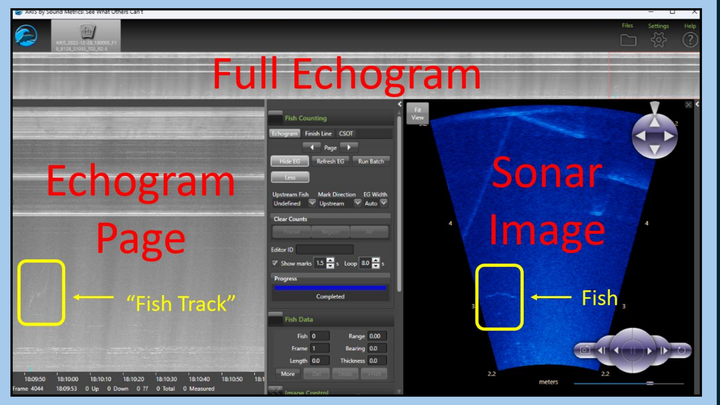
- Able to 'see' further and in a larger variety of conditions compared to traditional video systems.
- Easy to set-up continuous long-term recording schedules.
- Built-in software allows for relatively quick processing of large amounts of data.

Long Term Study Questions

- How many fish pass of different species and when are they migrating?
- What environmental factors affect the timing of these migrations?

Methods

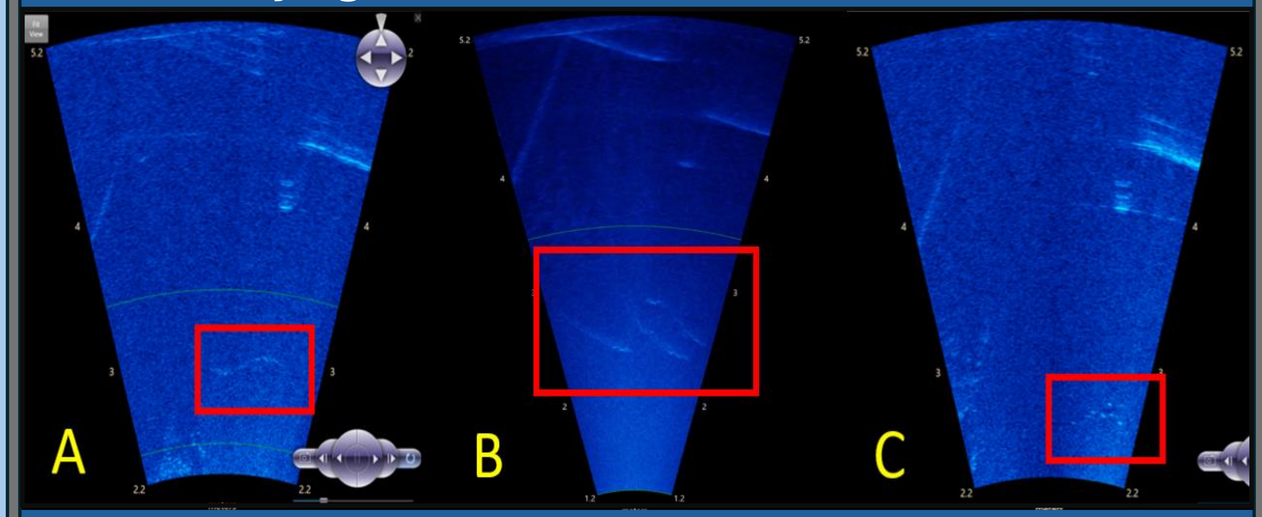
- Manually processed data collected from 1 January to 31 May 2023.
- Used echogram function to mark and measure fish.
- Tracked fish locations to within the field of view to assess detection efficiency.



Results

Observed 8,898 fish images over the monitoring period, including adult Chinook Salmon, adult Pacific Lamprey, and potential adult and smolt-sized steelhead.

ARIS capable of observing fish use within the fishway across varying environmental conditions.



Fish Detected during the 2023 season. (6a.) Pacific Lamprey. (6b) Three Chinook Salmon. (6c.) Group of Small fishes (<10cm).

First Year Takeaways

- True counts difficult to determine due to complex fish behavior.
- Species identification difficult without paired monitoring techniques.
- Regular maintenance is required to maintain quality imagery.

Future Directions

- Added remote viewing capabilities.
- Regularly monitor sonar image quality.
- Improved data collection consistency.
- Reduce manual reading effort with semi-automated processing.

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