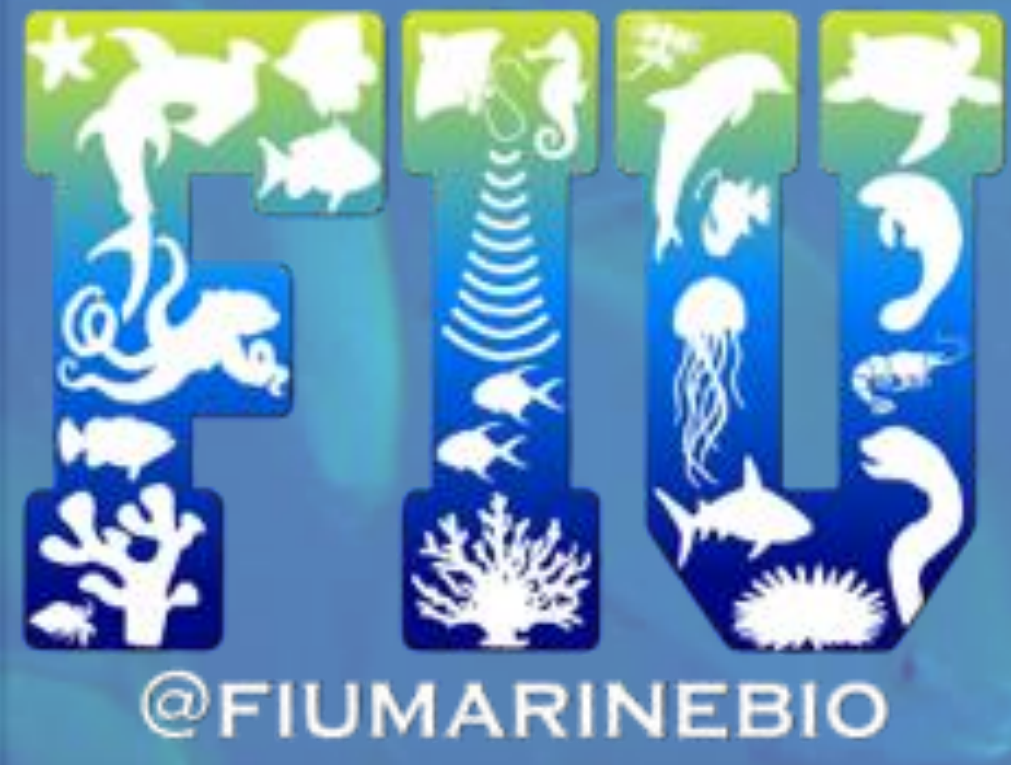


Evening Movement Patterns in Permit (*Trachinotus falcatus*) Pre-Spawning Aggregations as Observed by Active Acoustic Tracking

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Introduction

- Permit (*Trachinotus falcatus*) are a popular sport fish that aggregate seasonally at Western Dry Rocks (WDR)
- Declining permit observations at dusk may indicate that the aggregation dives into deeper waters, off the reef shelf, to potentially spawn
- This study was conducted to investigate the daily movement patterns of permit at WDR and to identify potential spawning sites in deeper waters
- We hypothesize that permit move off the reef shelf after 1600 hours into deeper water as part of potential spawning behavior

Methods

- **119** permit were surgically implanted with V16-4x (Vemco) coded tags over the past three years
- **9** permit were implanted with V16P (Vemco) coded tags with depth
- Detection data was collected using a Vemco VR-100 in conjunction with a directional hydrophone (Vemco VH-110)
- Tracking occurred during the early evening hours (**1400-2200**) from May 13-15 within the WDR closure area.
- A Sontek M9 ADCP and a Kongsberg An ES120-7CD echosounder were pole-mounted alongside the hydrophone

Results

- **17** Individuals accounted for a total of **54** detections
- **14** Detections off the reef shelf
- Depth values ranged from **3.1m – 38.5 m**
- **586** Combined detections and potential pings
- Tracking became increasingly difficult after **1600** hours
- The aggregation was tracked to a depth of approximately **40 m** off the reef shelf

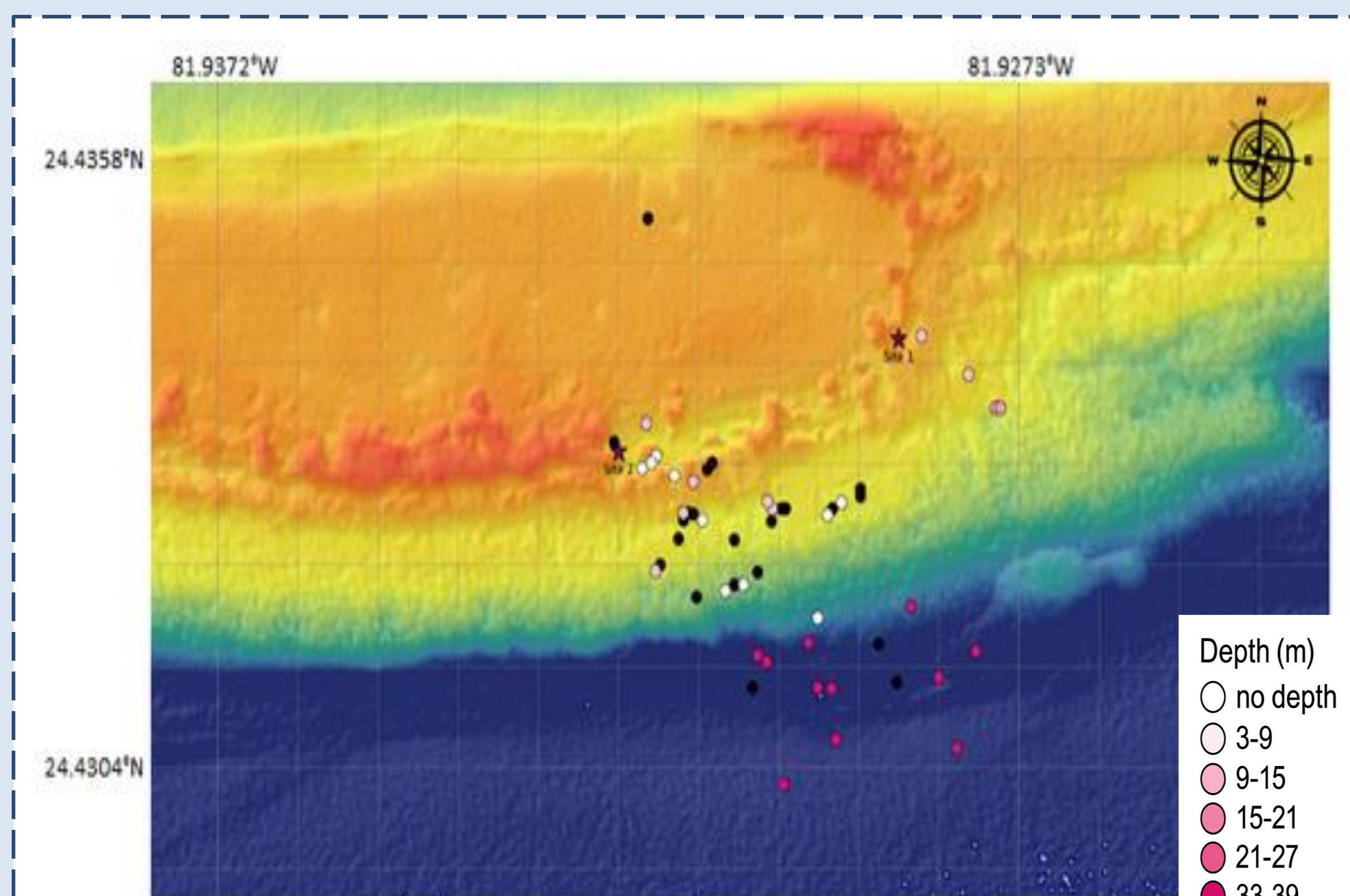


Figure 1 shows the location of all detections throughout the 3 days. Each Detection is marked with depth as transmitted from the V16P. Black Points show no depth due to transmission from V16-4X tags.

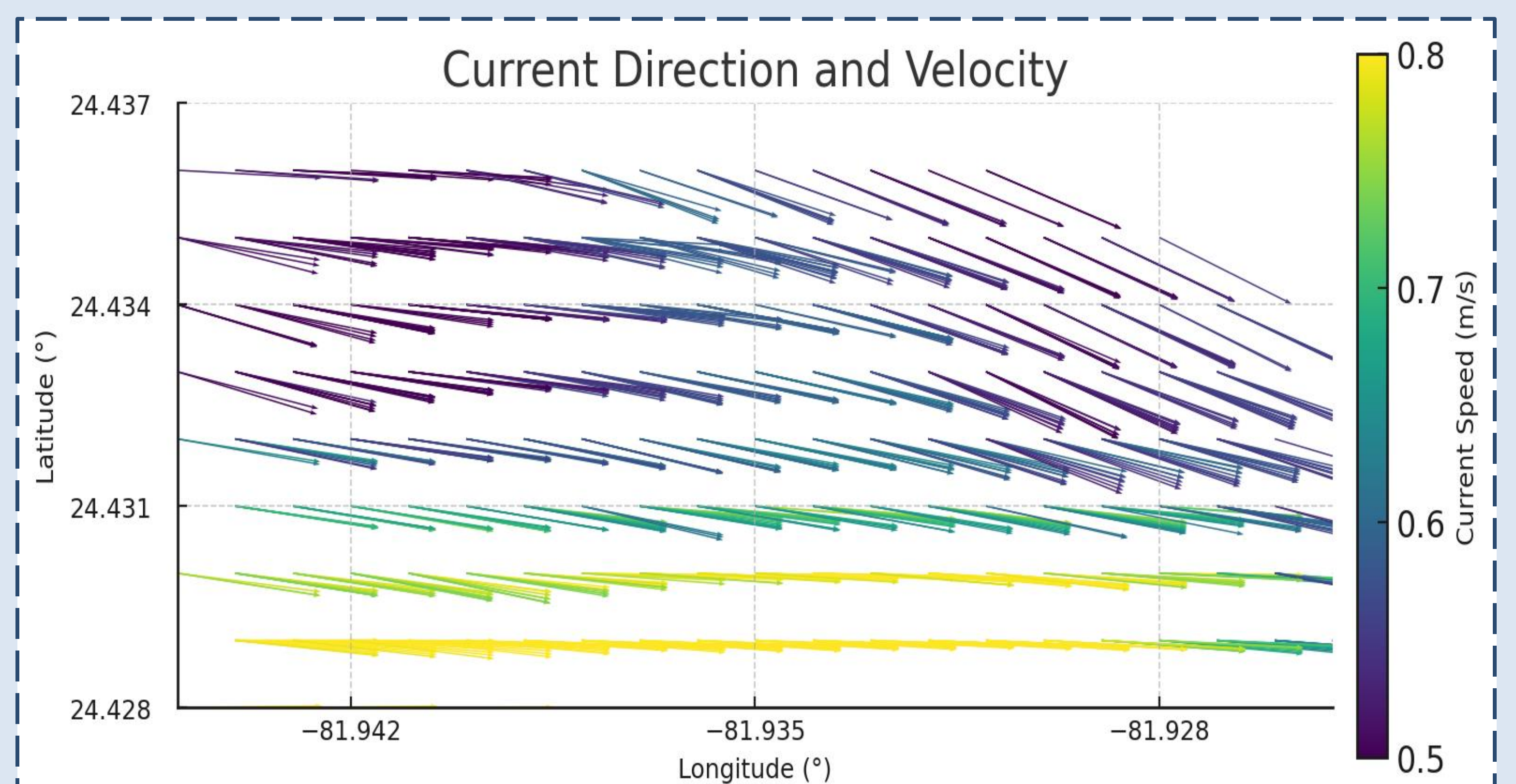


Figure 2 shows interpolated current direction and velocity as recorded by a pole mounted ADCP. Data was collected over the course of the experiment during tracking efforts.

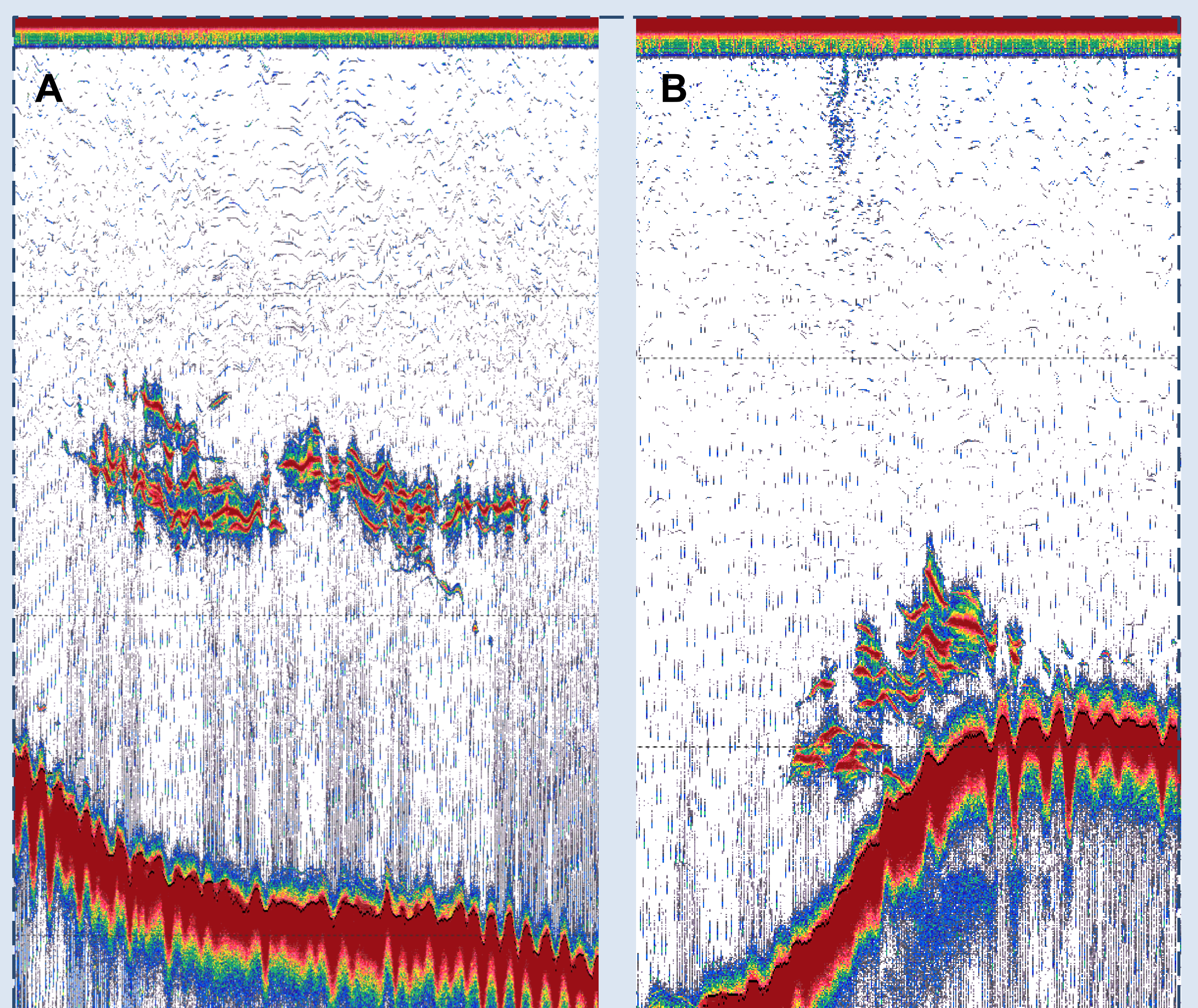


Figure 3 shows an echogram of the permit school in the middle of the water column (~16m) off the reef (A) and near the seafloor (20m) along the slope of the reef (B).

Conclusion

- When tracking near the school, tag detections would often be “interrupted” by overlapping transmissions, resulting in a lack of positive ID outputs and substantially reducing detection counts
- Clustered ping activity generally indicated the presence of the permit school
- Due to the limited amount of data collected and inconsistencies in field efforts, statistical power was low, and conclusions remain non-definitive.
- Future experiments would benefit from the use of continuous, off-frequency pingers, thereby reducing interference and increasing the likelihood of maintaining proximity to the school
- Although not statistically confirmed, observational patterns indicate that permit likely move off the reef shelf into deeper water during evening hours when visual detections cease

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