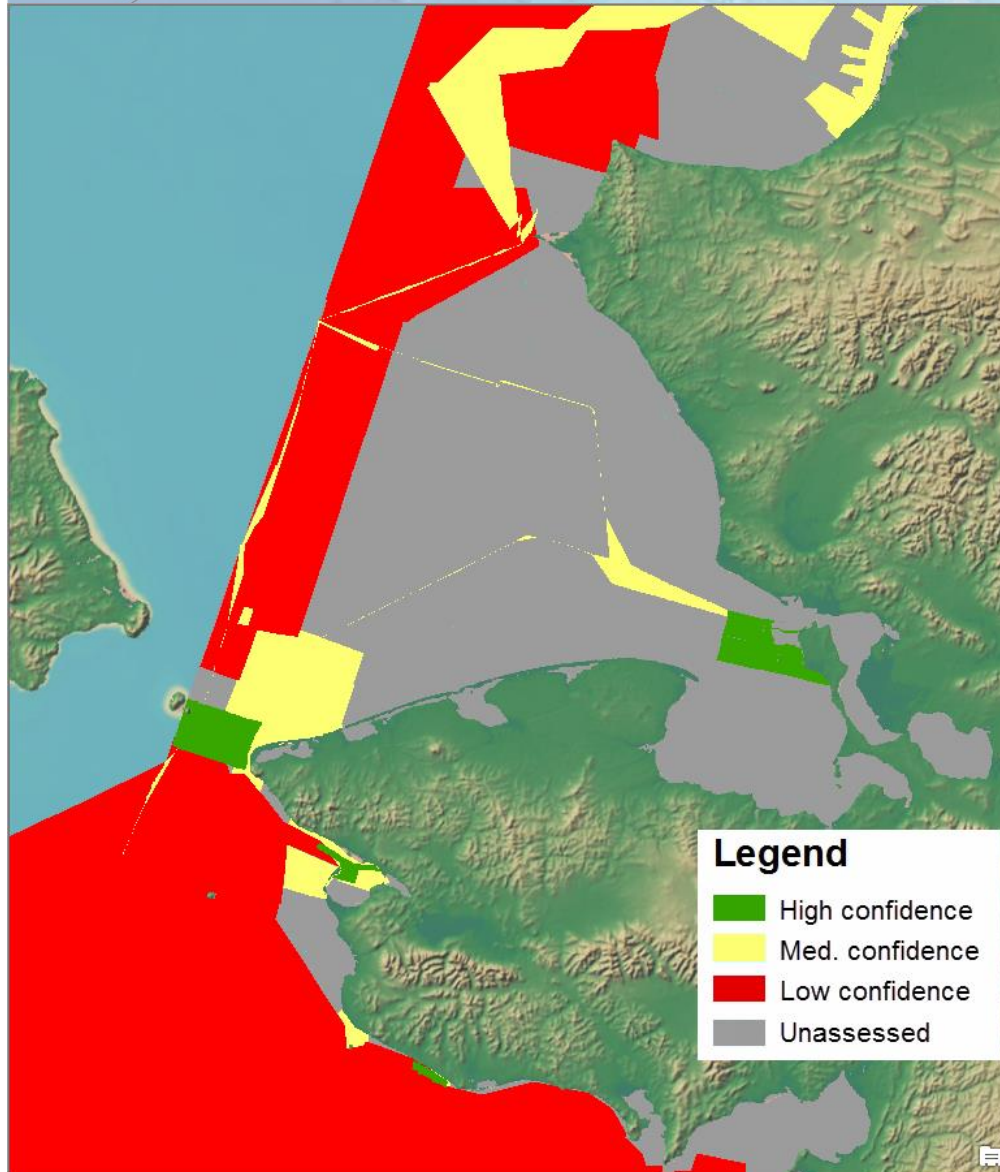
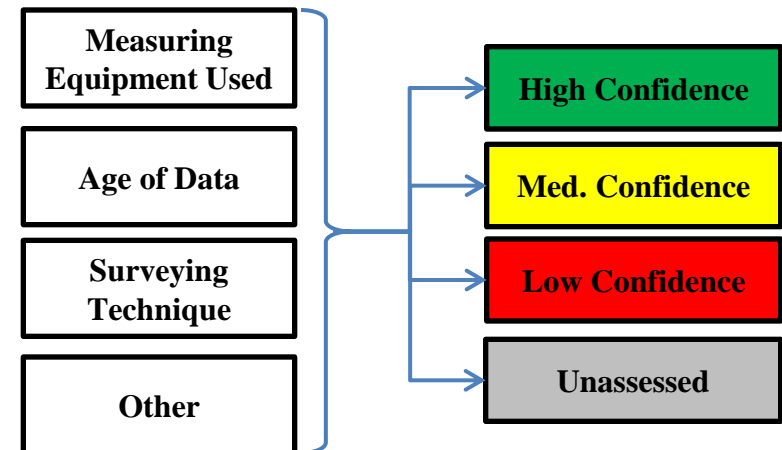


# Demonstration of Methodology

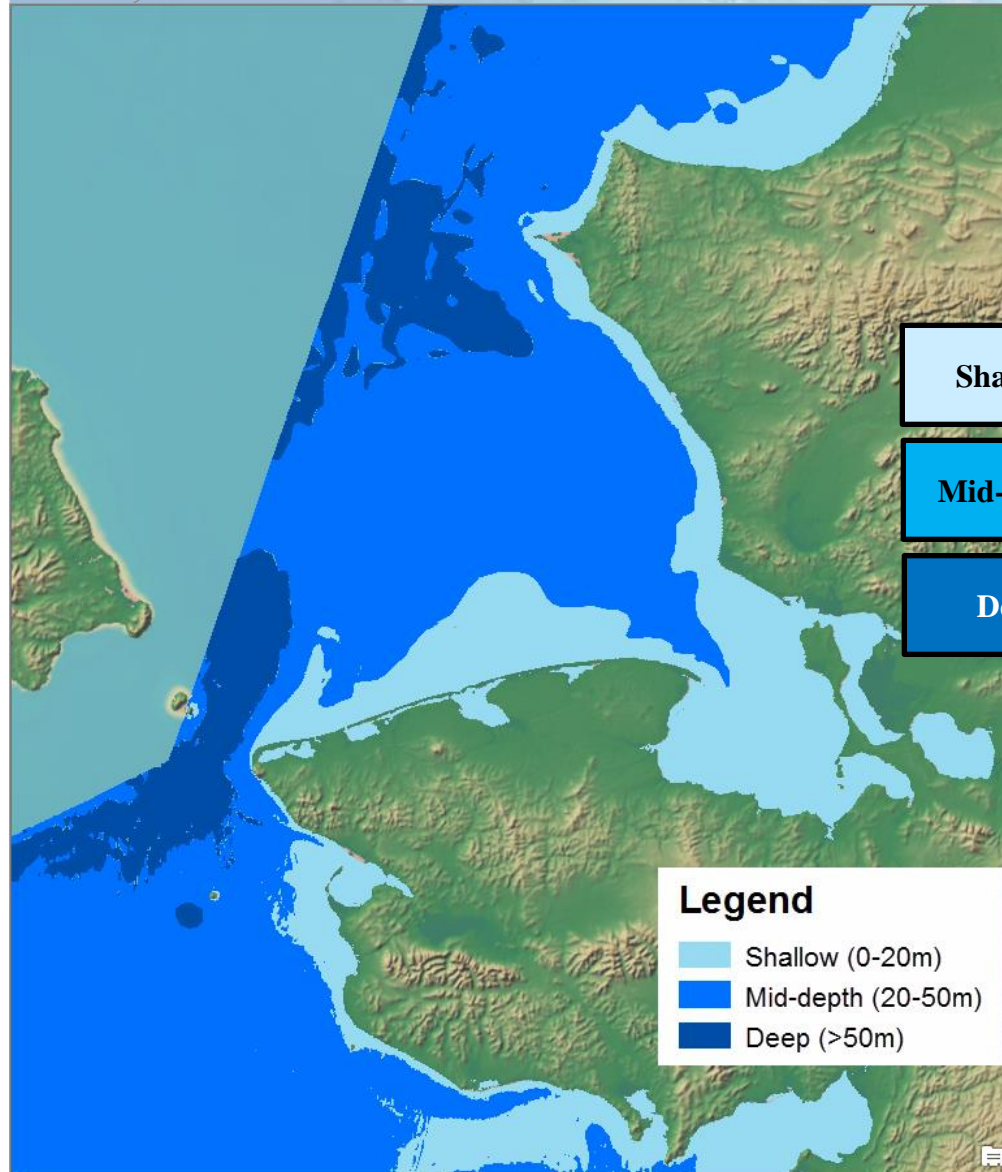


## 1. Determine Confidence of Hydrographic Holdings.

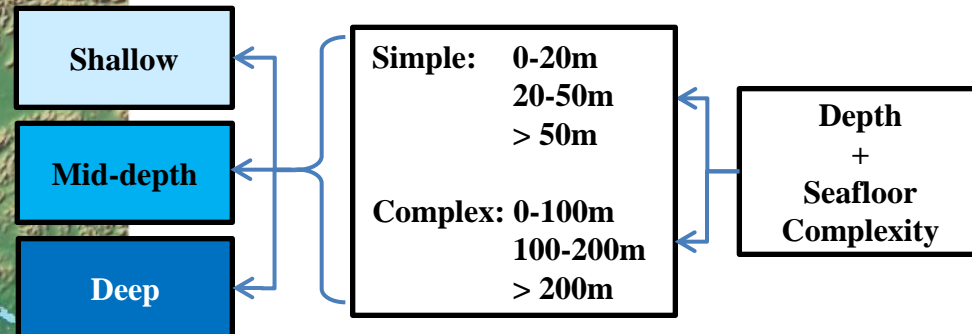


- CAN and USA used Electronic Charts (Zone of Confidence)
- DEN and NOR used type of equipment (multibeam, singlebeam, etc.)

# Demonstration of Methodology



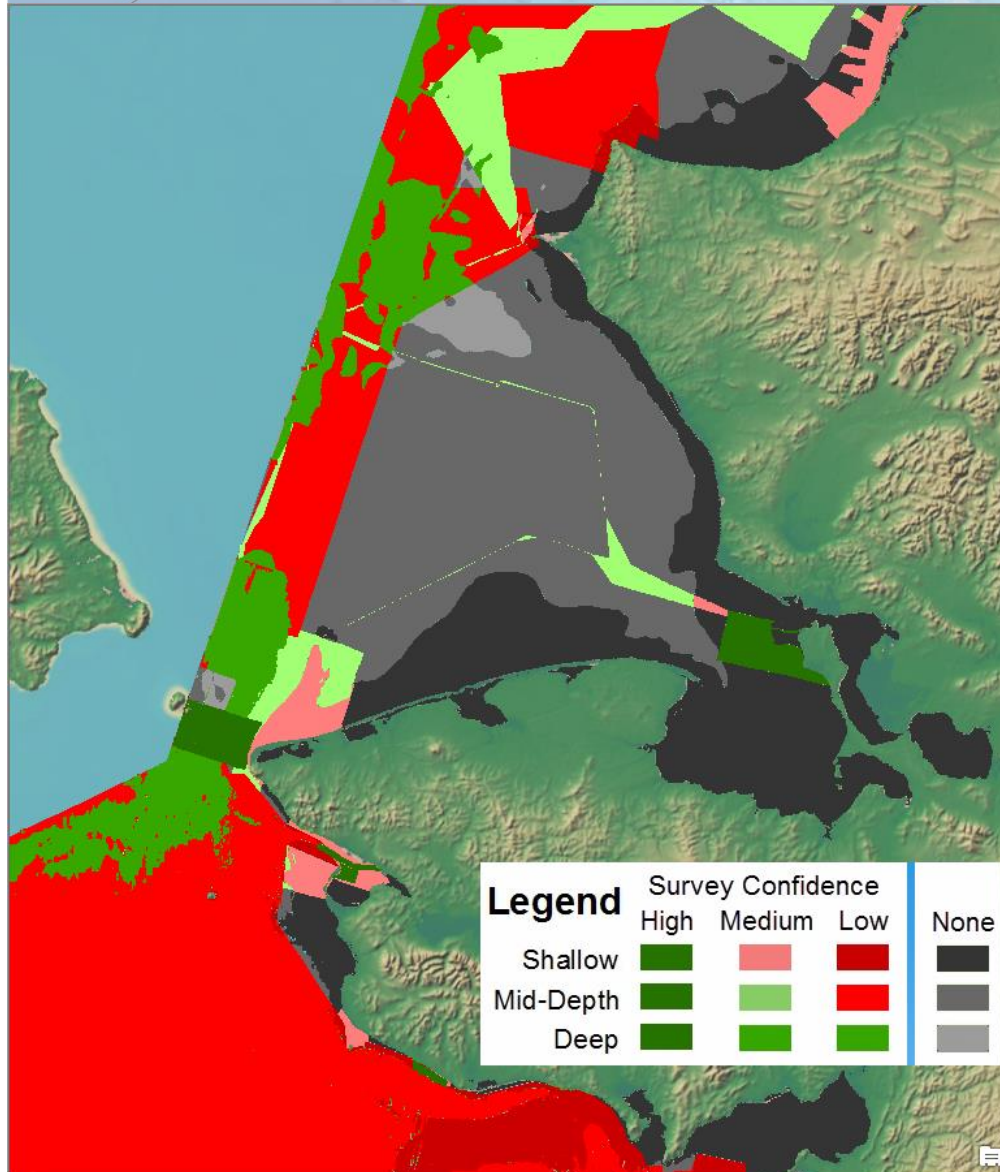
## 2. Define Depth Bands based on Seafloor Complexity.



- The seafloor in this area is considered “simple” (as opposed to the tectonically-active Aleutian chain).
- All depths derived from the International Bathymetric Chart of the Arctic Ocean (IBCAO) dataset.



# Demonstration of Methodology



**3. Intersect Areas of Confidence with Depth Areas to determine Potential Areas of Concern.**

(e.g. Higher Confidence and/or Deeper Depths)



(e.g. Lower Confidence and/or Shallower Depths)

**Lowest Concern**

**Low Concern**

**Med. Concern**

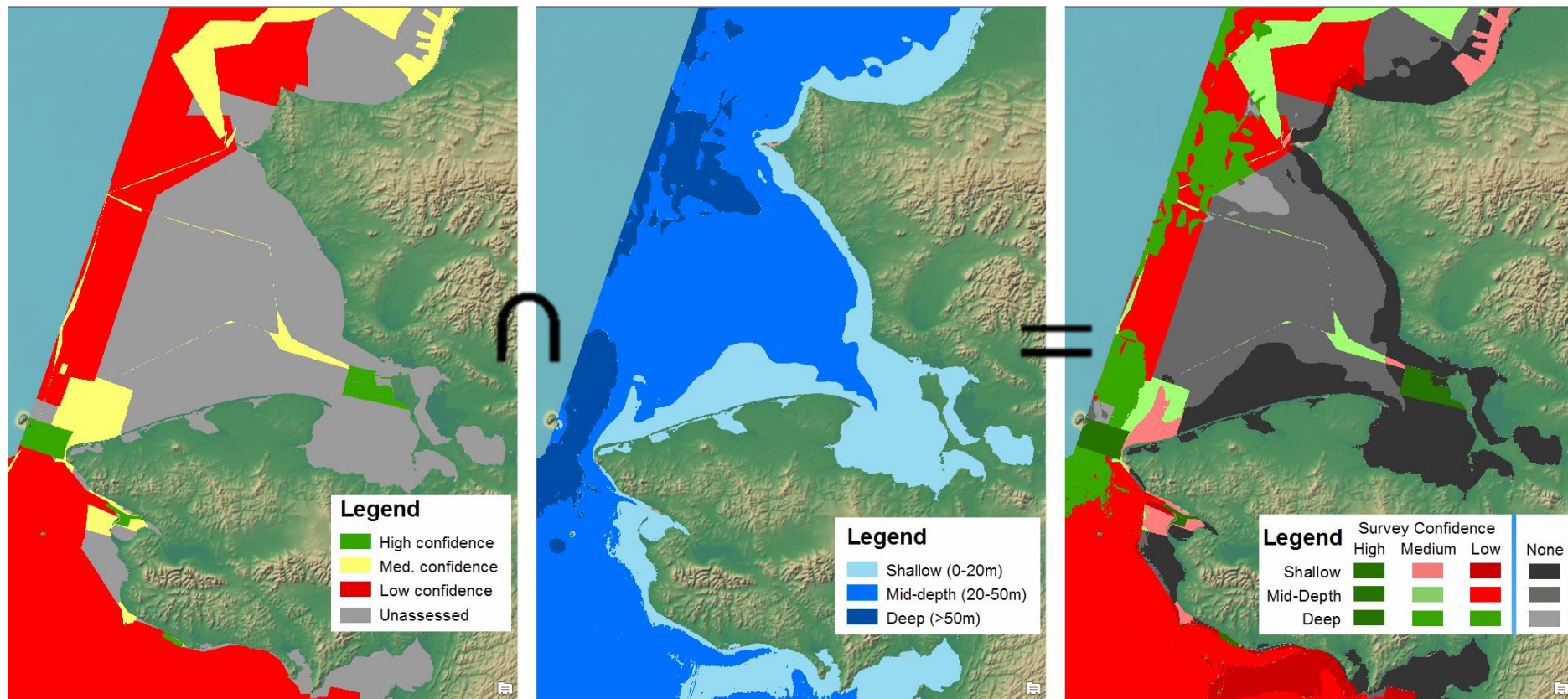
**High Concern**

**Highest Concern**

- The darker the color, the greater the potential for concern...
- However, the areas are only truly concerning if they are being navigated by traffic.

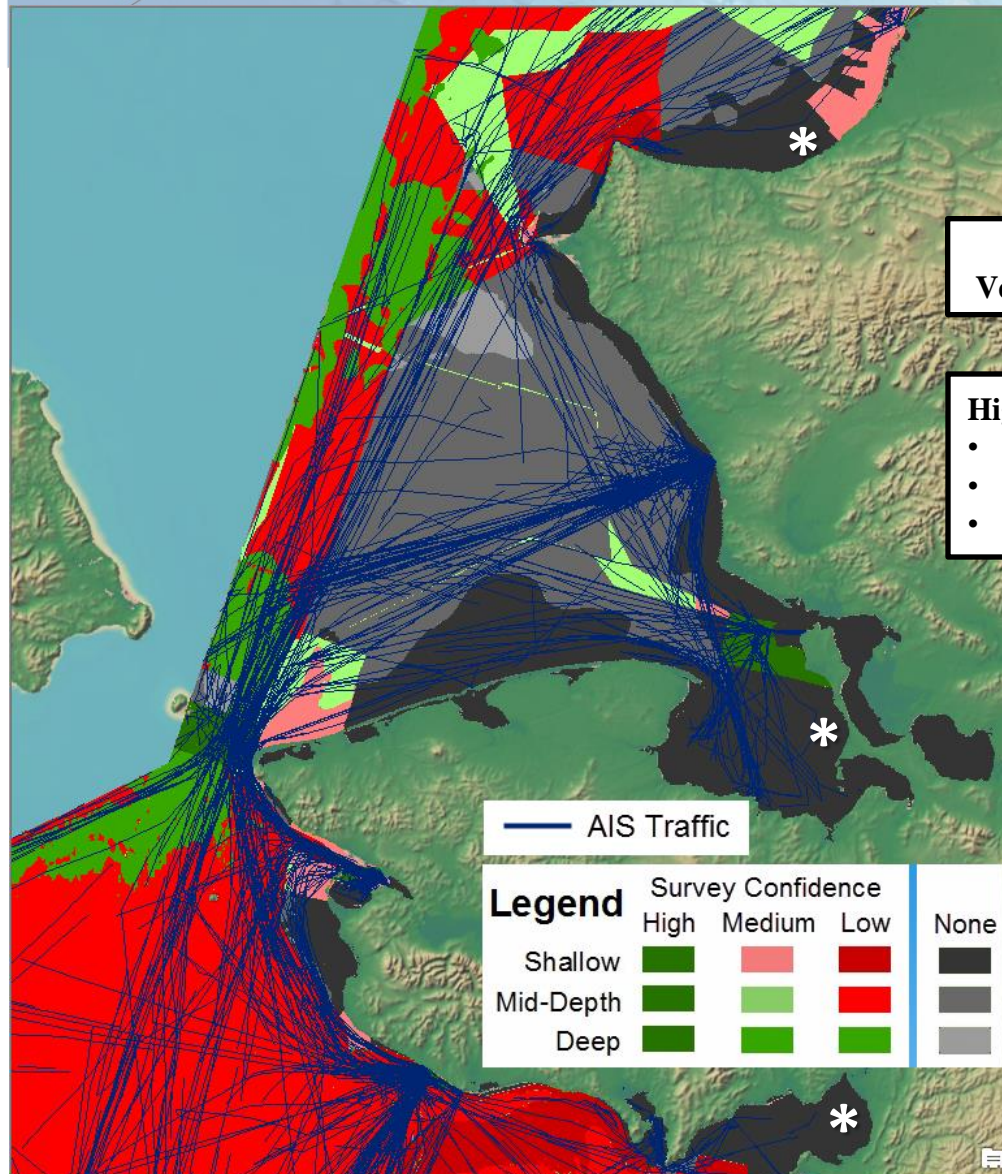
# Demonstration of Methodology

- Side-by-side view showing the intersection between the Areas of Confidence (left) and the Depth Areas (center) to yield the Potential Areas of Concern (right).





# Demonstration of Methodology



4. Extract “High Risk” Vessel Traffic Tracklines and Intersect with Potential Areas of Concern.

Satellite-Observed Vessel Traffic Patterns

Higher Risk Vessels:

- Tankers
- Cargo and Tugs
- Passenger Vessels

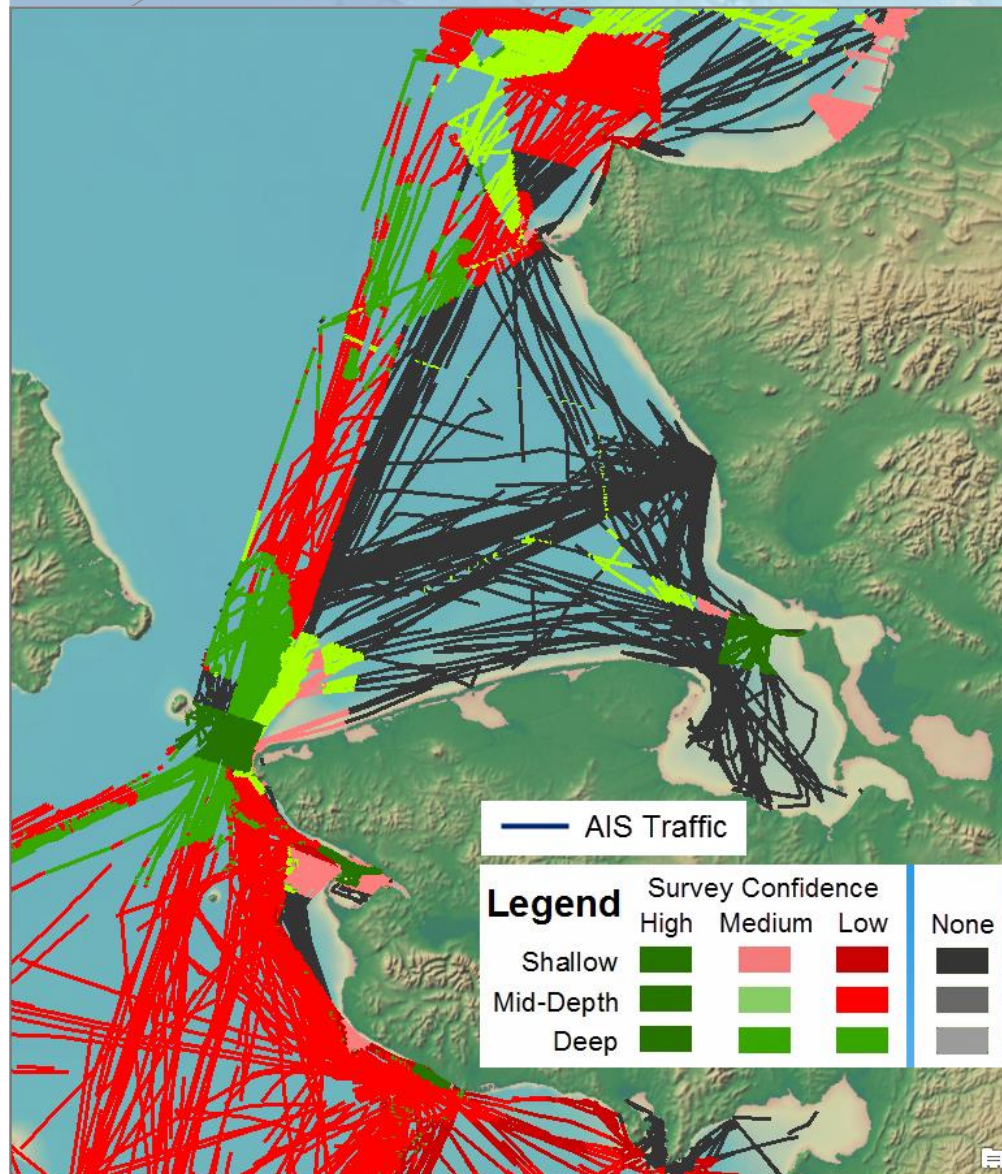
Output:

- Frequency of Vessels transiting within Areas of Higher/Lower Concern...
- ... thus quantifying whether region is adequately charted.

- Notice there are three shallow bays with an Unassessed confidence (marked with an \*)...
- While all three were previously identified as potential areas of concern, only the center one experiences heavy traffic (thus, it could be increased in survey priority over the others).



# Demonstration of Methodology



## 5. Compute Area Geometry of Potential Areas of Concern and Linear Distance Traversed by Vessel Traffic within each Area type.

- Vessel tracks can now be parsed based on how often they transit within any given depth-confidence combination to quantify the problem for any region.
- See next slide for summary tables...