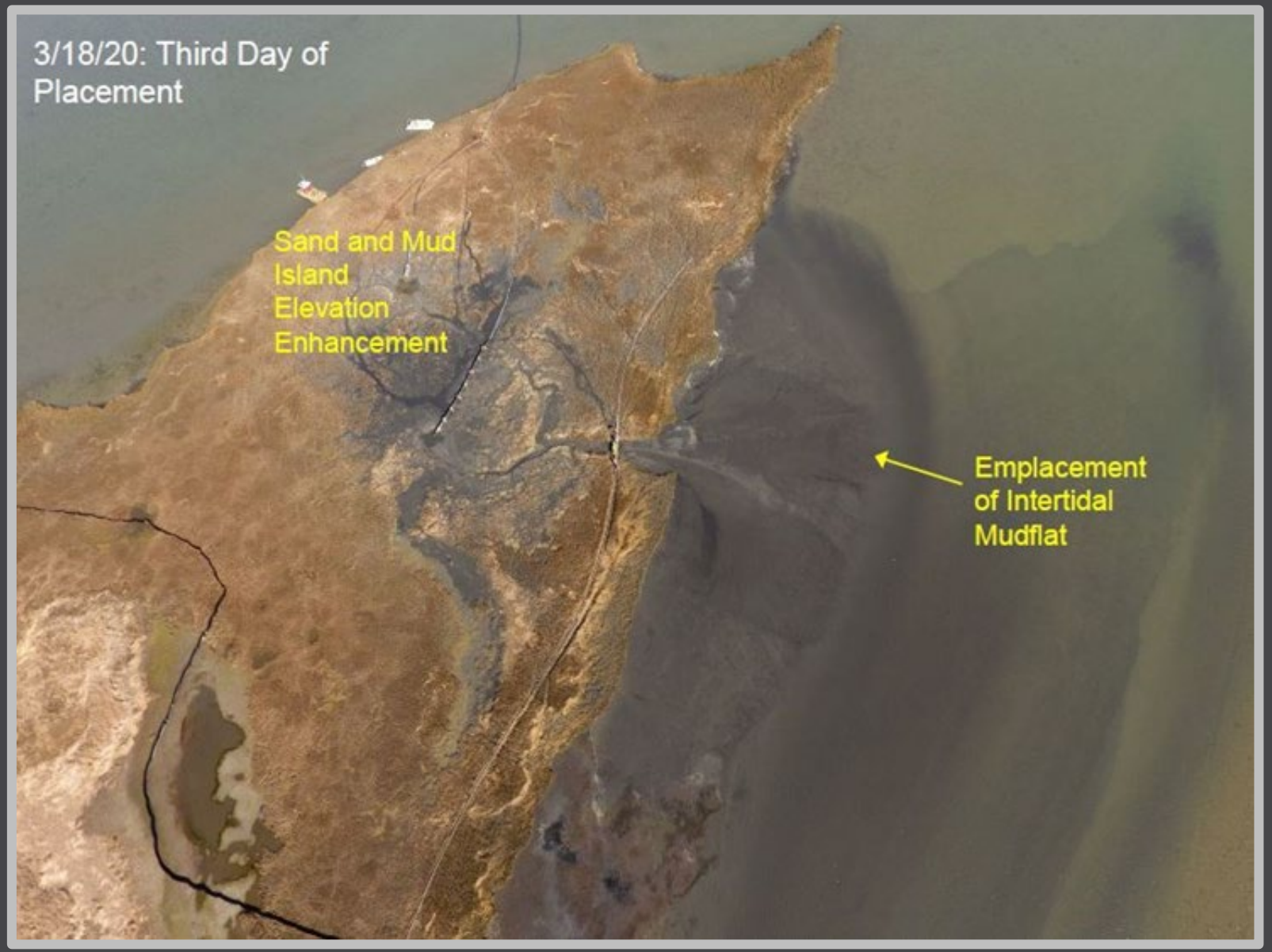
Sturgeon and Gull Island Macroalgae Surveys 2020-2022

Presentation Date : September 07, 2022

Material Placement

- Concern
  - Upland placement reducing macroalgae abundance
  - Sturgeon Island placement March and September 2020
  - Gull Island placement was September and October 2020



Methods - Quadrat

- Quadrat
  - PVC square 0.5m^2
    - 25 10cmX10cm squares
    - Macroalgae with square means cell is covered
    - Example on right has 60% coverage

Methods - Transects

- Transects
  - "Attempted" straight transects perpendicular to shore
  - Quadrat flipped along transect
  - Macroalgae coverage measured every third flip
- Gull Island
  - Eight placement transects
  - Three reference transects
- Sturgeon Island
  - Nine placement transects
  - Three reference transects

Methods

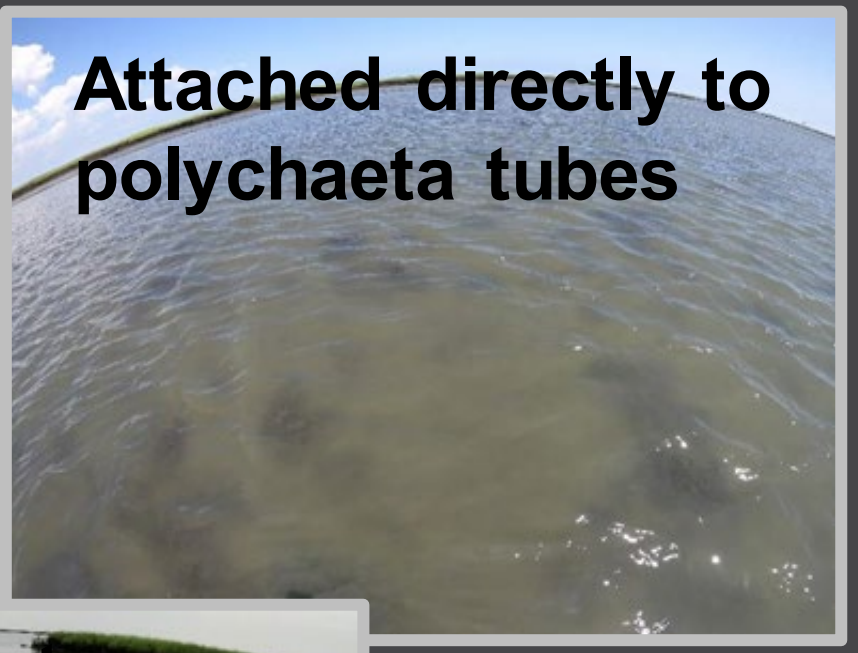
- Sampling dates
  - July 2020
  - July 2021
  - August 2022 (still processing)

Results-Species Encountered

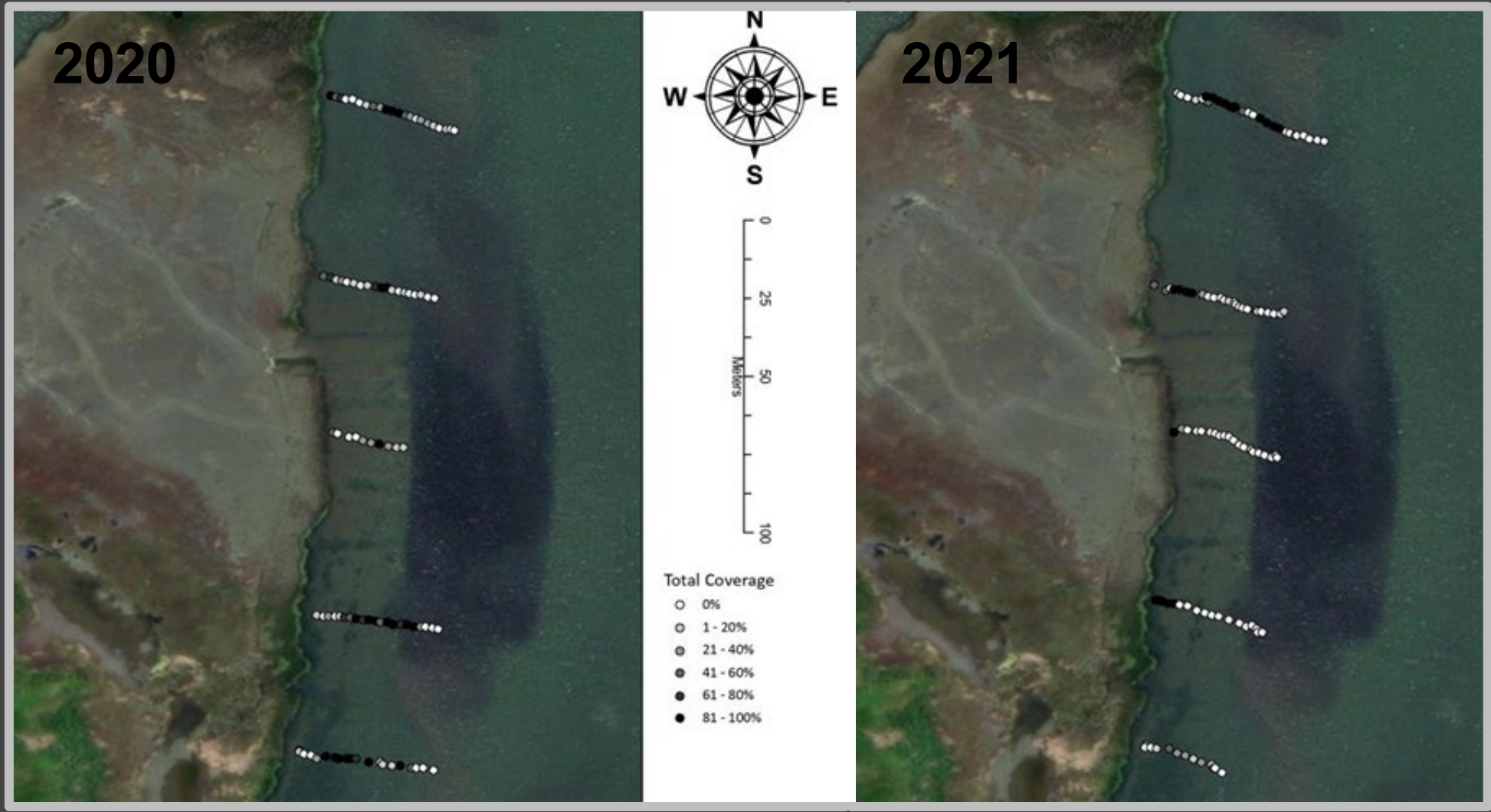
- *Agarophyton vermiculophyllum* (*Ave*)
  - Invasive red algae
- *Gracilaria tikvahiae* (*Gti*)
  - Native red algae
- *Ulva lactuca* (*Ula*)
  - "Sea lettuce"
  - Native green algae
  - Historically (1970s) dominated the area

Results-Coverage Types

- Attached
  - Polychaeta worms bind algae into tube burrow
  - Algae in faster flow almost all bound into tubes
- Transient
  - Large mats
  - Bound to each other
  - Slow flow areas
- Decaying
  - Buried on mudflat

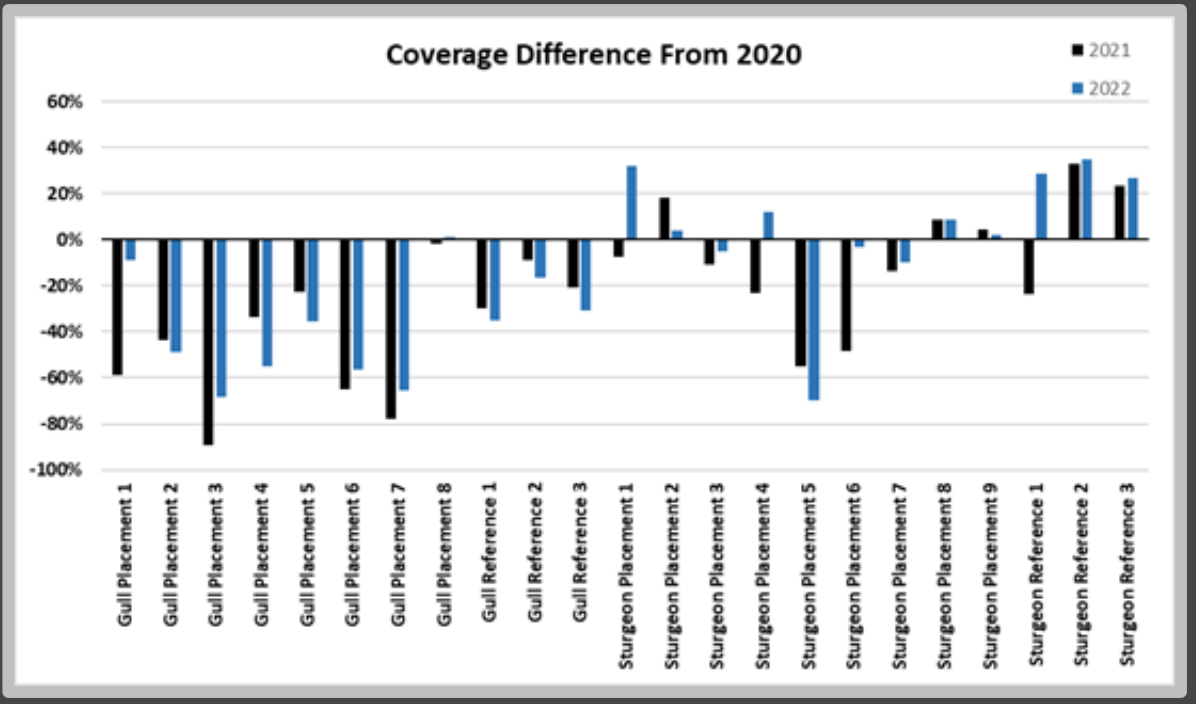


Results – Sturgeon Reference (Example)



Results

- Coverage difference from 2020
  - 85% Coverage now invasive Ave
  - Ave established before placement
  - 2020 year dominated by transient algal mats
  - 2022 year dominated by attached algae



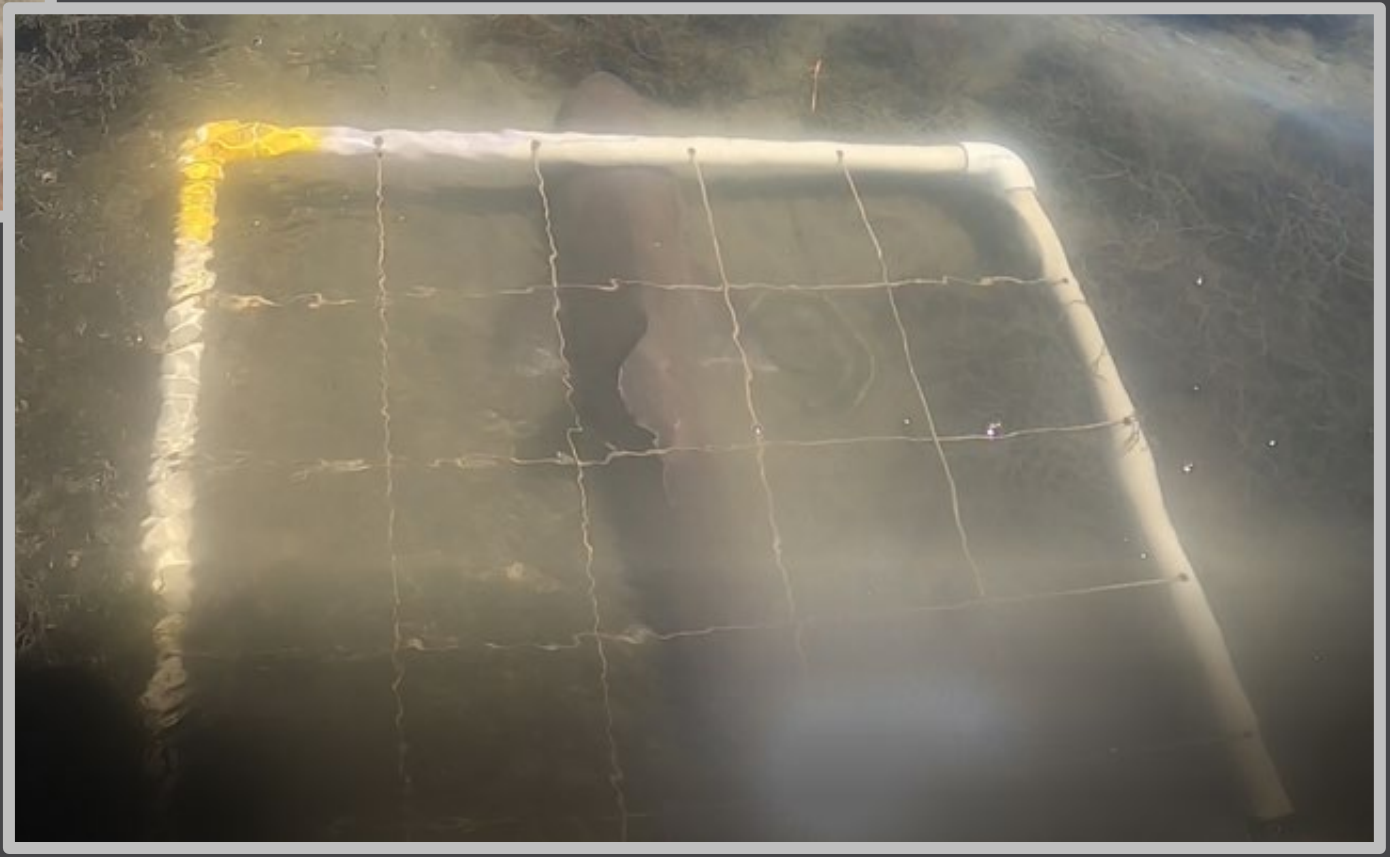
Transect ID	2020 Coverage	2021 Coverage	2022 Coverage
Gull Placement 1	61%	2%	52%
Gull Placement 2	87%	43%	38%
Gull Placement 3	93%	4%	25%
Gull Placement 4	85%	51%	30%
Gull Placement 5	78%	55%	42%
Gull Placement 6	94%	29%	38%
Gull Placement 7	90%	13%	25%
Gull Placement 8	97%	95%	98%
Gull Reference 1	39%	9%	4%
Gull Reference 2	29%	19%	12%
Gull Reference 3	41%	20%	10%
Sturgeon Placement 1	53%	45%	85%
Sturgeon Placement 2	72%	90%	76%
Sturgeon Placement 3	68%	57%	63%
Sturgeon Placement 4	63%	40%	75%
Sturgeon Placement 5	70%	15%	0%
Sturgeon Placement 6	76%	28%	73%
Sturgeon Placement 7	75%	62%	65%
Sturgeon Placement 8	91%	100%	100%
Sturgeon Placement 9	89%	93%	91%
Sturgeon Reference 1	70%	46%	98%
Sturgeon Reference 2	65%	98%	100%
Sturgeon Reference 3	69%	93%	96%

Results

- Transient algal mats are very variable
- Sturgeon Island creek mouth July 19th, 2021
- No coverage here on August 9th, 2022

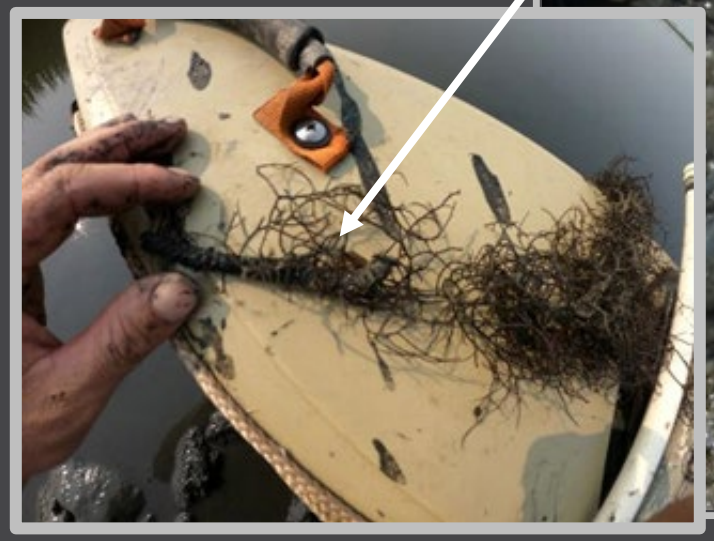
Results

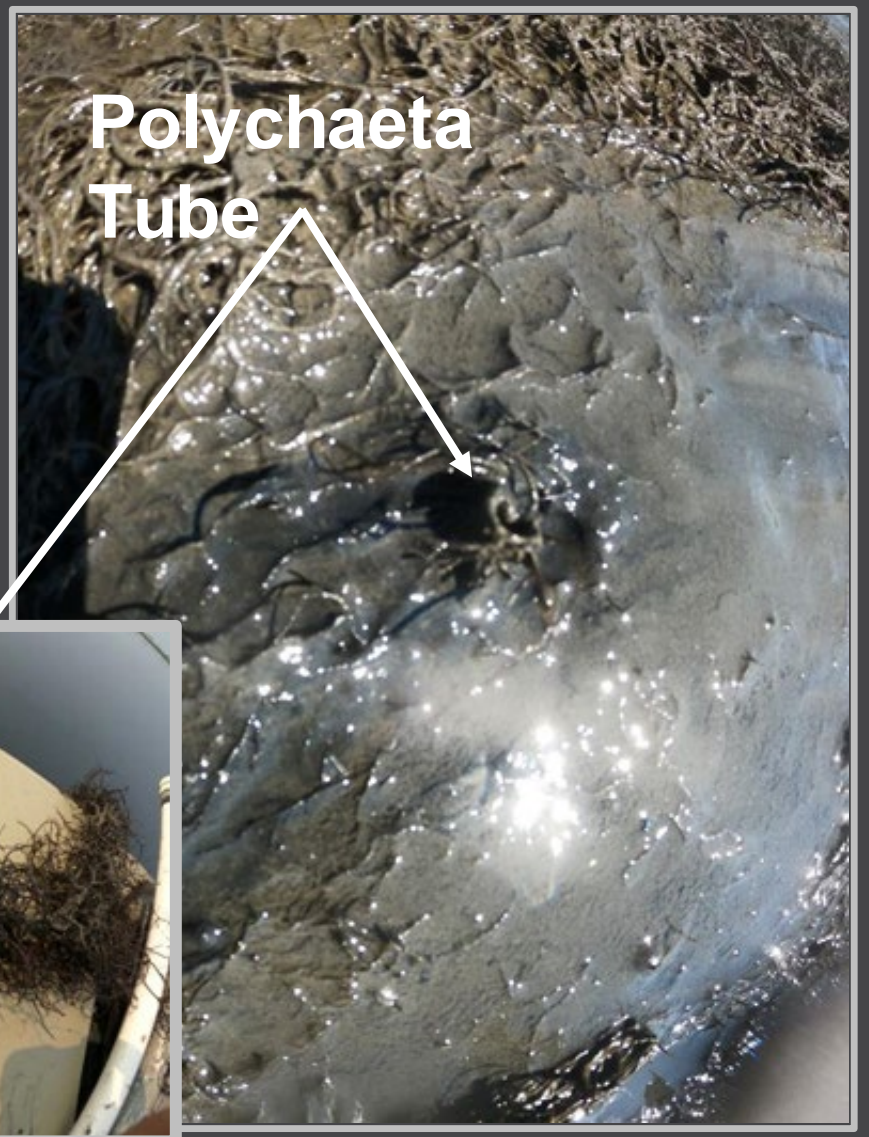
- Nekton
  - Horseshoe crabs
  - Blue crabs
  - Various fish species



Discussion

- Macroalgae in the area seems to be mostly transient
  - Transient macroalgae coverage is volatile and likely driven by tide and currents
- Hard to determine impacts or recovery
  - Current coverage at Gull Placements 2-7 are patches attached to polychaeta tubes
  - 2020 Gull Placement survey was done when transient macroalgae was in the area
  - Similar situation for the three Gull Island Reference transects





Discussion

- Questions

ASSESSING BENTHIC MACROINVERTEBRATES AT STURGEON AND GULL ISLANDS, NEW JERSEY.

US Army Corps of Engineers®

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September 2022

GULL AND STURGEON ISLAND SAMPLING STATIONS

- **Total # Sampling Stations = 46**

- **Data Collection:**
  - **Year 1 (June 2020)**
  - **Year 2 (July 2021)**
  - **Year 3 (August 2022) (*In Prep.*)**

<u>Data Assessment</u>

1. **Benthic Assemblage Composition**
   - **Phylum**
   - **Taxa**
   - **Major Groups**
2. **Abundance**
3. **Water Quality**

SIDECAST PLACEMENT AREA SAMPLING STATIONS

DATA COLLECTION
Year 1 (Baseline) August 2022

TOTAL # OF SAMPLES = 36

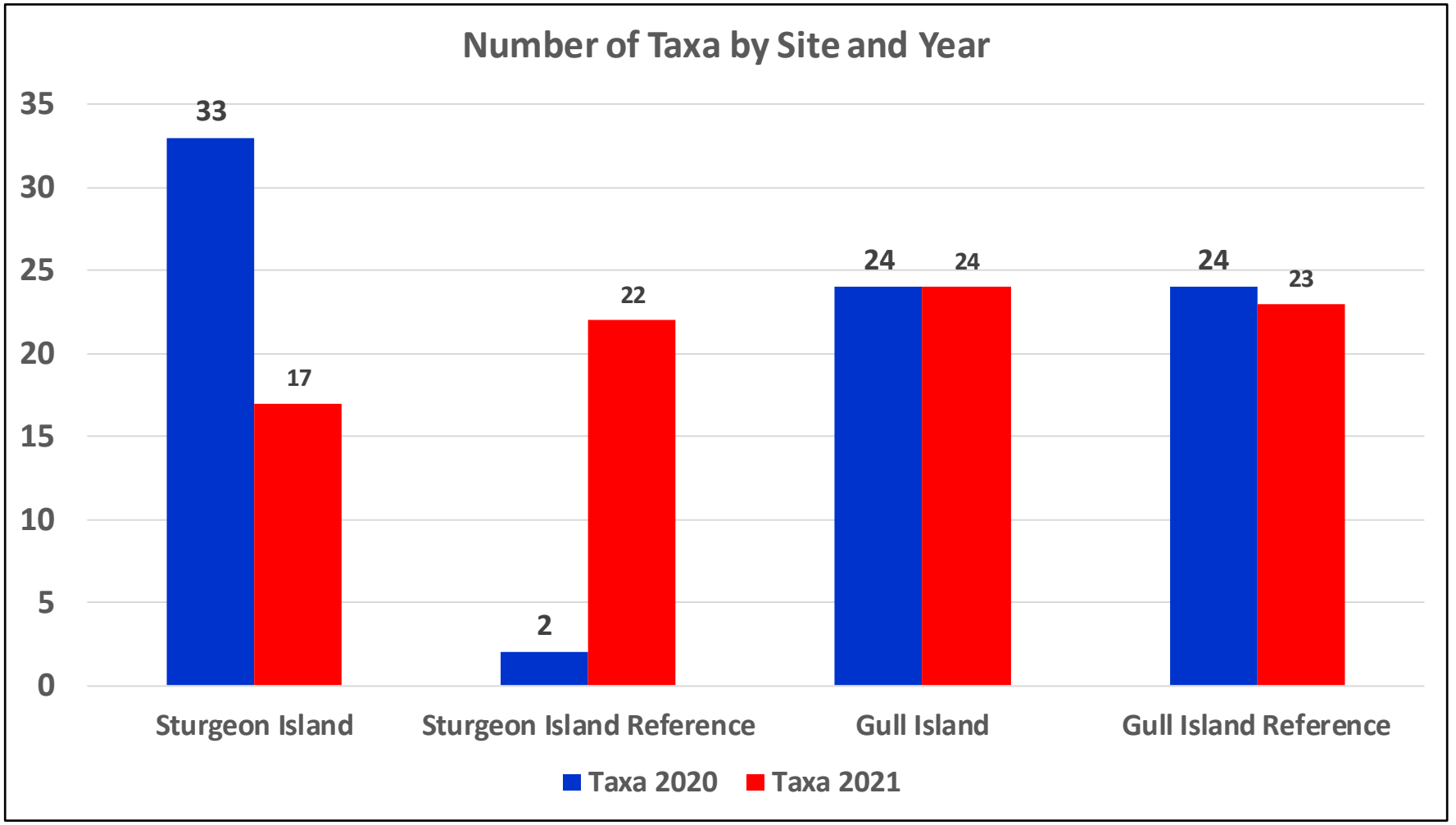
Data Assessment

1. Benthic Assemblage Composition
2. Abundance
3. Sediment Composition
   - Total Organic Content
   - Grain Size Distribution
4. Water Quality

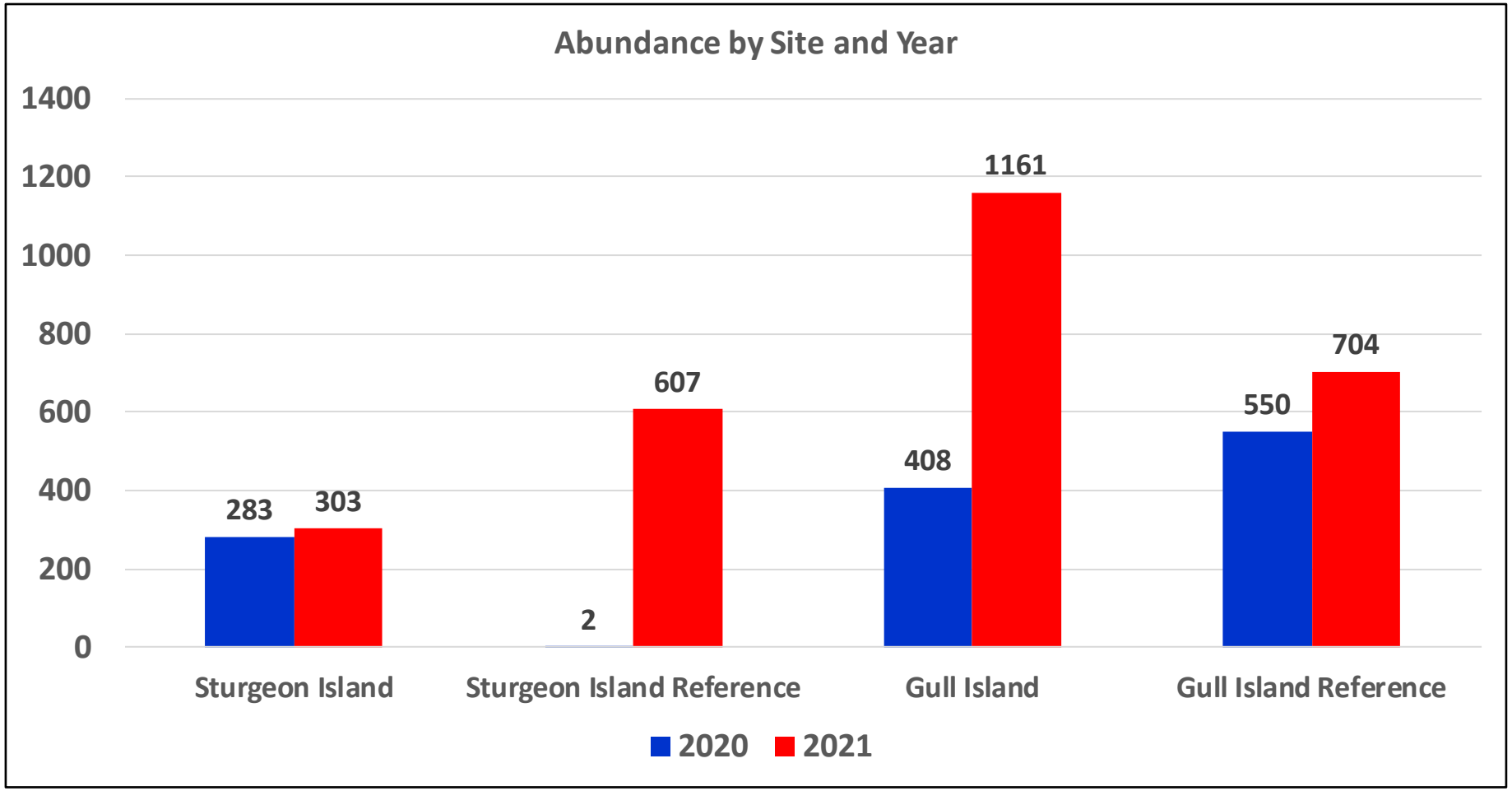
Legend

RNE: Reference North-East **RNW: Reference North-West** **RSE: Reference South-East**
RSW: Reference South-West **RSE: Reference South-East** **PE: Placement East** **PW: Placement West**

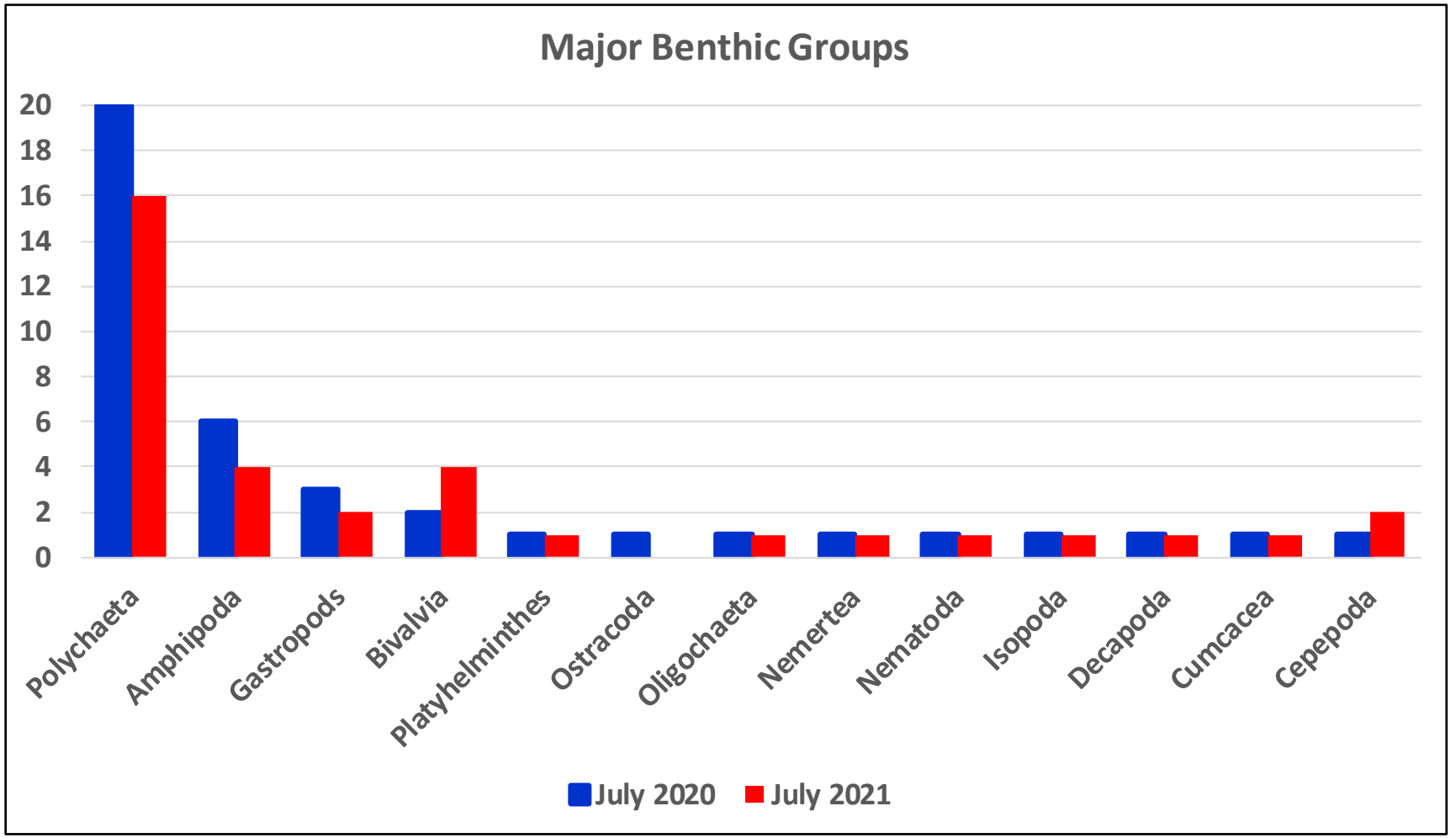
NUMBER OF TAXA BY SITE AND YEAR



ABUNDANCE BY SITE AND YEAR



NUMBER OF TAXA IN MAJOR TAXONOMIC GROUPS



SPECIES WITH THE GREATEST ABUNDANCE BY YEAR

			June 2020		July 2021	
Taxa	**Phylum**	**Group**	**Number**	**% Composition**	**Number**	**% Composition**
Streblospio benedicti	Annelida	Polychaeta	447	35.96	1318	47.43
Nematoda (LPIL)	Nematoda	Nematoda	297	23.89	658	23.68
Tubificidae (LPIL)	Annelida	Oligochaeta	70	5.63	312	11.23
Percent of the Total Abundance				65.5 %		82.34%

13 Species accounted for more than 1.5% but less than 5% of the total species' composition across years. Represent 5 Phyla:

- **Polychaeta**
- **Amphipoda**
- **Ostrocoda**
- **Copepoda**
- **Cumacea**

SUMMARY

Sturgeon

- During both sampling years, the Sturgeon Island Reference Site (SIRS) had the lowest overall abundance; although abundance increased significantly at the SIRS during the 2021 sampling event.
- Sturgeon Island had the most variability in number of taxa (n = 33 in 2020, n=17 in 2021).
- The most significant change in taxa between years occurred at the Sturgeon Island Reference site. Number of taxa increased from 2 in 2020 to 22 in 2021.

Gull

- During both sampling events, Gull Island and the Gull Island Reference Area had a greater abundance when compared to Sturgeon Island or the Sturgeon Island Reference Site.
- There was little variation (~1 taxa) in the number of taxa at either the Gull Island or the Gull Island reference areas between sampling years.

SUMMARY

- During both sampling years, annelids were dominant
  Polychaeta and Oligochaeta accounted for 62.8% (2020) and 70.2% (2021) of benthic inverts
  3 main species: *Streblospio benedicti, Tubificidae and Capitella*

- Nematoda accounted for slightly more than 23% of the total species composition during each sampling event.

- Arthropoda accounted for 11.8% of the total composition. Their numbers decreased in 2021 to only 4.4% of the species composition. Amphipods, Copepods, Decapods and Isopods were most common.

- Mollusc bivalves and gastropods accounted for slightly less than 1% of total composition within each sampling year. The most numerous was the bivalve clam *Gemma gemma*.

- Two samples were collected at the Gull Island Placement Site. Only two taxa were identified in very low numbers, Tubificidae (n = 1) and Nematoda (n =1).

- Water quality parameters: DO ranged from 3 to 8 mg/l (average 5 mg/l); salinity ranged from 32-34.5 ppt; Water temperature ranged from 26.5 to 24.7 C.

Questions/Comments?