STURGEON ISLAND CONCEPTUAL PLACEMENT PLAN

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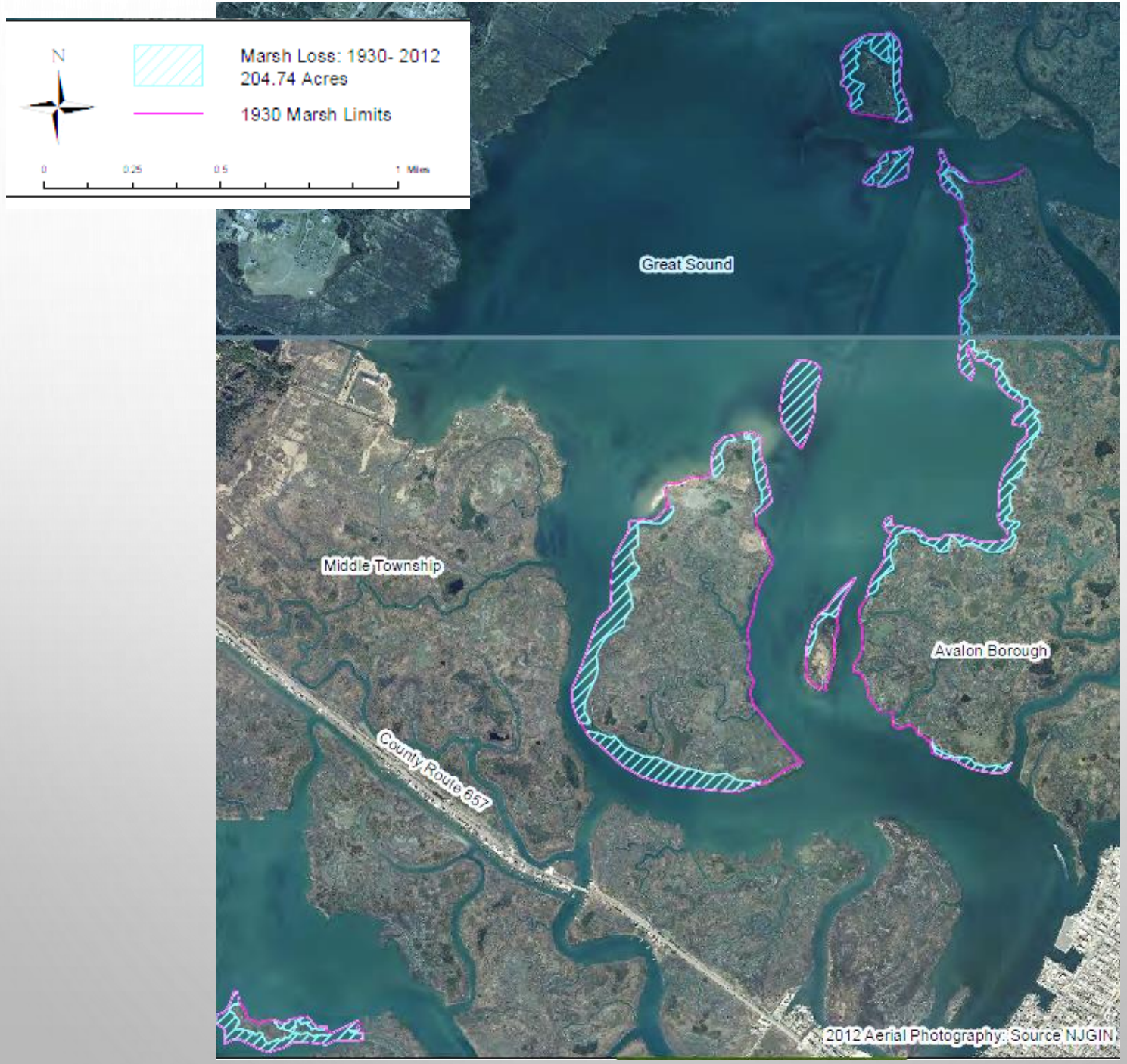
- PRIOR PLACEMENT SITES CREATED IMPORTANT WADING BIRD HABITAT
  - NESTING AREAS ACCOUNT FOR NESTING FOR NEARLY 1/3 OF WADING BIRDS IN STATE OF NJ
- HABITAT DEGRADING WITH ELEVATION LOSS

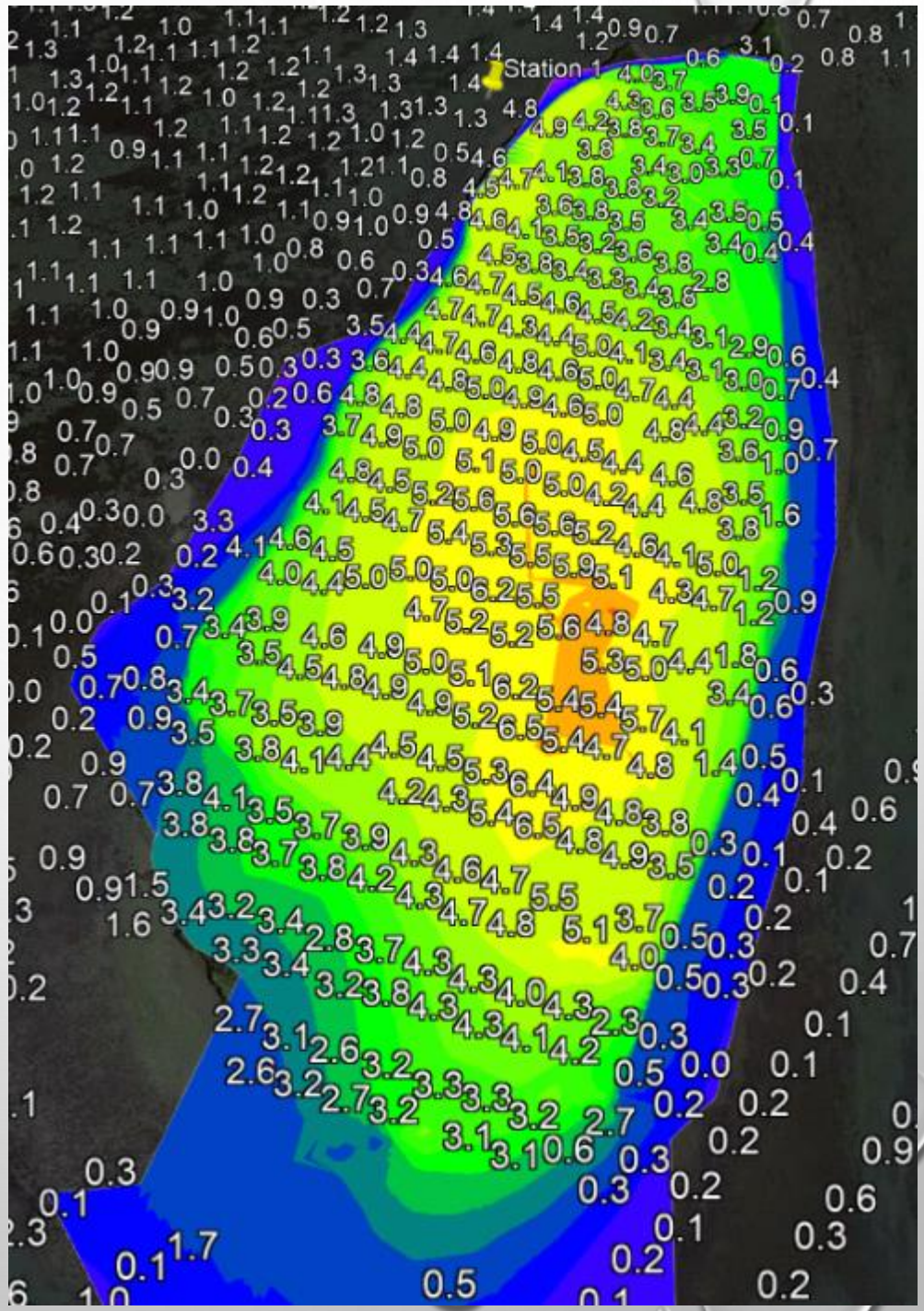
2007 IR Gull/Sturgeon Island Placement Complex


N
Marsh Loss: 1930- 2012
204.74 Acres
1930 Marsh Limits
0
0.25
0.5
1 Miles
Great Sound
Middle Township
Avalon Borough
County Route 657
2012 Aerial Photography: Source NJGIN

GreenVest

STURGEON ISLAND

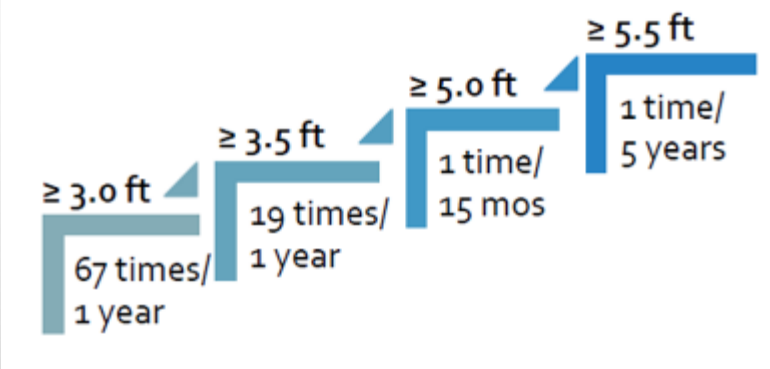
- NAP COLLECTED DETAILED ELEVATION AND BATHYMETRY ON STURGEON
- TWI DOCUMENT NESTING ELEVATIONS AND NEST HEIGHTS
- TWI DOCUMENTED ELEVATION BENCHMARKS ON STURGEON
- NEED ADDITIONAL BIO BENCHMARK DATA



- MLLW Datum
- Subtract 2.41’ to get NAVD88

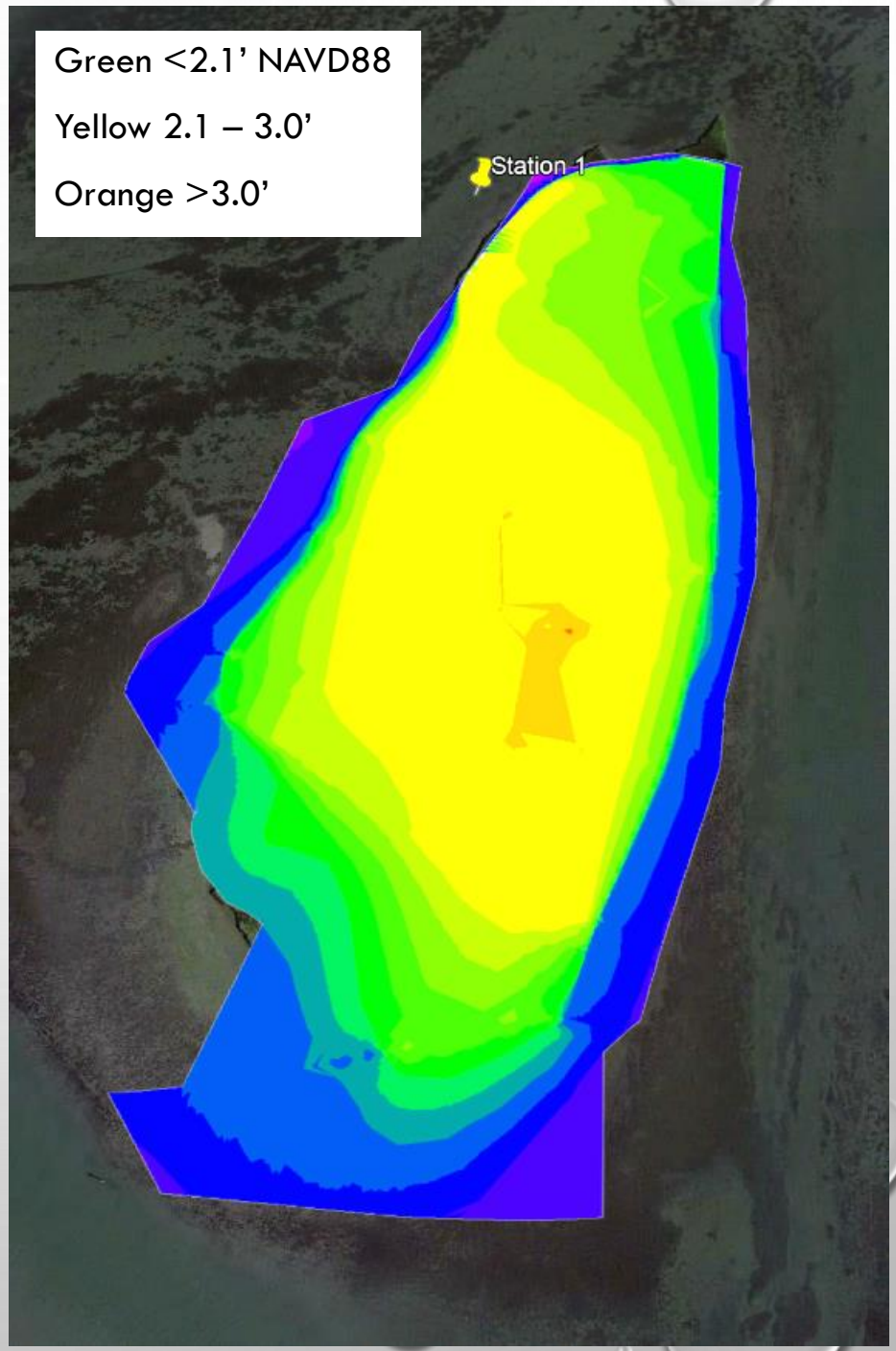
STURGEON ISLAND

Flooding Frequency for Stone Harbor



- GROUND ELEVATION AT NESTING SITES RANGED FROM 2.2'-2.5' NAVD88
- NESTING HEIGHT RANGED FROM 2.7' TO 3.5'
- FAVORED IVA, PHRAG AND MIXED PHRAG AREAS (YELLOW)
  - IVA FRUCTESCENS – 2.18' +/- 0.67
  - MIX – 2.26' +/- 0.61
  - PHRAGMITES – 2.38' +/- 0.57

Flooding frequency for Stone Harbor based on 2003 – 2018. Calculated by Remington & Vernick Engineers.



STURGEON ISLAND CONCEPT: ISLAND ELEVATION ENHANCEMENT AND DYNAMIC BERM CREATION

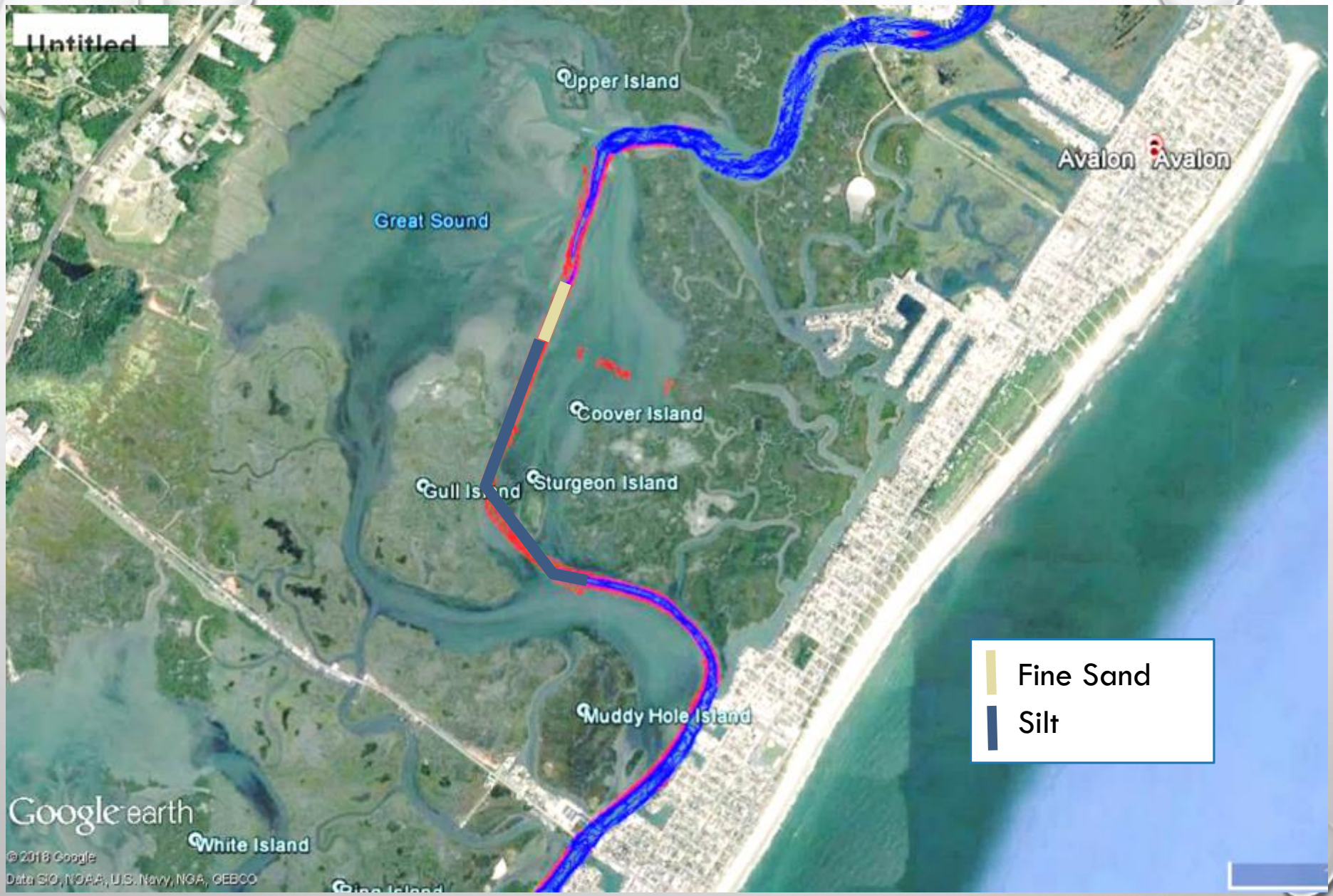
- NAVIGATION GOAL
  - MAINTAIN SAFE NAVIGATION BY CLEARING NJIWW SHOALS BETWEEN MARKERS 386 AND 397
- ECOSYSTEM GOALS
  - ENHANCE HABITAT FOR IMPORTANT WADING BIRD COLONY
    - BUILD NESTING PLATFORM TO CREATE SUITABLE NESTING HABITAT
    - CREATE EROSION BARRIER TO DECREASE WAVE ENERGY AND SUPPLY SEDIMENT TO ISLAND
    - CREATE SANDY TERRAPIN NESTING HABITAT
- PLACEMENT APPROACH GOALS
  - TEST METHODS OF UNCONFINED SEDIMENT PLACEMENT AND MATERIAL TRANSFER
  - DEVELOP TOOLS TO ALLOW SAND AND MUD PLACEMENT DIFFERENTIATION
  - TEST SAND /MUD LAYERING TO MANAGE DIFFERENTIAL COMPACTION

STURGEON ISLAND

- FILL IS VISIBLE IN THE AERIAL AND IN ELEVATION SURVEY
- MAPPED EXTENT WITH PROBE ROD
- FILL AT SURFACE IS VERY FIRM AND SANDY
- FILL TAPERS OFF AT EDGES AND IS BURIED BY MARSH MUD IN A WEDGE THAT THINS TO THE FILL AT THE SURFACE
- DRAINAGE IS TO NORTH ON NORTH SIDE AND EAST ALONG EAST SIDE; SOUTH ALONG SOUTH SIDE – EFFECTIVELY OFF OF THE FILL CORE
- IN MANY PLACES, HIGH VIGOR/LOW VIGOR BOUNDARY FOLLOWS FILL BOUNDARY ESPECIALLY SOUTH EAST SIDE
- EXPECT DIFFERENTIAL COMPACTION IN AREAS WITH AND WITHOUT FILL

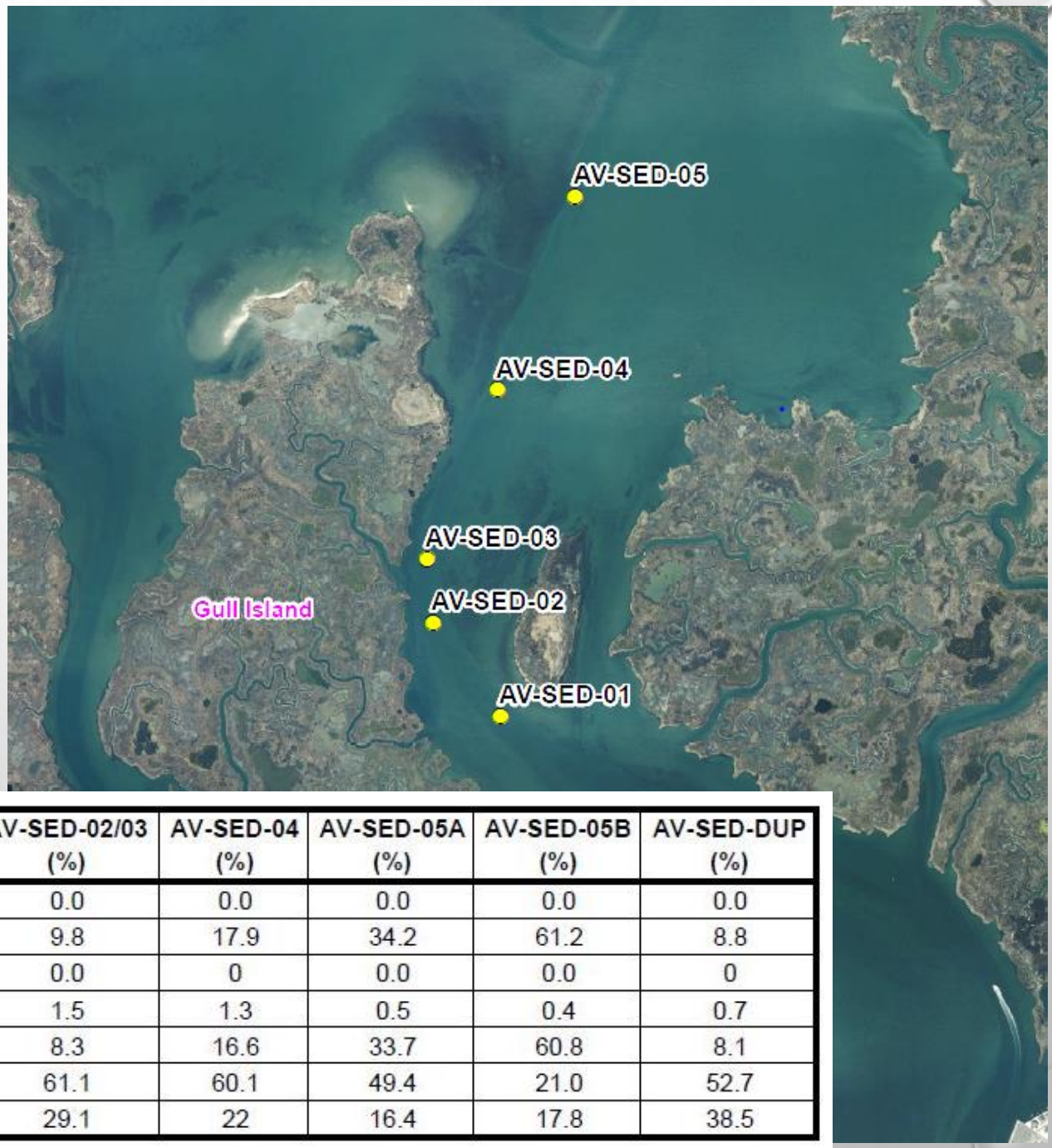
Sturgeon Island

2017 Imagery



GRAIN SIZE OF SEDIMENTS IN NJIWW

- SEDIMENT COMPOSITION PRIOR TO 2014-2015 DREDGING
- NEW CORES IN PROGRESS



Sample ID Analyte	AV-SED-01 (%)	AV-SED-02/03 (%)	AV-SED-04 (%)	AV-SED-05A (%)	AV-SED-05B (%)	AV-SED-DUP (%)
Gravel	0.0	0.0	0.0	0.0	0.0	0.0
Sand	23.1	9.8	17.9	34.2	61.2	8.8
Coarse Sand	0.0	0.0	0	0.0	0.0	0
Medium Sand	1.2	1.5	1.3	0.5	0.4	0.7
Fine Sand	21.9	8.3	16.6	33.7	60.8	8.1
Silt	53.5	61.1	60.1	49.4	21.0	52.7
Clay	23.4	29.1	22	16.4	17.8	38.5

Sturgeon Island

- DYNAMIC BERM CREATION WITH SANDIER SEDIMENTS FOR EDGE EROSION PROTECTION, TERRAPIN NESTING HABITAT, WRACK BARRIER AND ELEVATION MAINTENANCE
- UNCONFINED SEDIMENT PLACEMENT TO ELEVATE MARSH PLATFORM TO HIGH MARSH WITH LOW VIGOR *SPARTINA* APRON
- ELEVATED NESTING HABITAT ENHANCEMENT AND CREATION TO SUPRATIDAL ELEVATIONS SUITABLE FOR IVA

STURGEON ISLAND – ISLAND ENHANCEMENT AND DYNAMIC BERM CREATION

- PROJECT PLANNING AND BASELINE DATA
  - COMPLETE
    - BATHYMETRY AND ELEVATION DATA
    - WAVE AND CURRENT DATA
    - BASELINE TURBIDITY DATA
    - AVIAN SITE USAGE AT STURGEON/GULL NESTING COMPLEX
    - VEGETATION MAPPING AND BENCHMARK ELEVATIONS
  - IN PROGRESS
    - SEDIMENT DATA FROM CHANNEL
    - ADDITIONAL BIO BENCHMARKS
    - FLOODING AND WATER ELEVATION
  - TO BE COMPLETED
    - MODIFIED CONE PENETROMETER FOR SHEAR STRENGTH AT PLACEMENT SITES

STURGEON ISLAND – ISLAND ENHANCEMENT AND DYNAMIC BERM CREATION

- MONITORING PLANNING
  - DURING CONSTRUCTION
    - TURBIDITY
    - SURFACE CURRENT MEASUREMENTS
    - SEDIMENTATION
  - POST CONSTRUCTION MONITORING
    - BATHYMETRY AND ELEVATION (USACE-NAP)
    - WAVES AND CURRENTS/ TURBIDITY (USACE-ERDC)
    - AVIAN USAGE AT GULL/STURGEON COMPLEX (TWI/NJDFW)
    - VEGETATION COMMUNITY RESPONSE (TWI)
    - WATER LEVELS (USACE – NAP/TWI)
    - TERRAPIN SITE USAGE (TWI)

DISCUSSION