Overview of Work Unit

Inlet Geomorphology

- Work unit focus: Develop tools and databases for operation & management of federal navigation channels and coastal projects considering temporal & spatial scales much greater than dredging cycles, planning timelines, and the dimensions of the navigation channel.

- FY18 Statements of Need addressed:
  - SoN 2016-N-04: Quantifying wave and current driven sediment transport at nearshore dredge disposal sites
  - SoN 2017-N-69: Cross-shore sediment sorting of mixed sediment nearshore placements
  - SoN 2017-N-70: Analysis of shoreline response to nearshore placement geometry
Overview of FY18 Products

- **Technical/Special Reports**

- **Technical Notes**

- **Web Applications**
  - Sediment Mobility Tool Web Application updated with NACCS study results

- **Journal Paper**

- **Presentations**

- **Other**
  - New Smyrna Beach collaborative effort to replace Sand Island
  - ERDC Award for Outstanding Achievement in Tech Transfer (Non-Fed): Sediment Mobility Tool

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Wave Averaging

- **Draft TR**
  - Determine appropriate wave climate predictions to relate to nearshore berm evolution

- **Compiled methods to determine wave metrics**

- **Applied to Fort Myers Beach**
Wave and NB Relationships

- Relate wave metrics to nearshore berm evolution using 2009 Fort Myers Beach data
- Wave data were compared to nearshore berm response to determine possible relationships
- Wave energy flux and Larson and Kraus (1992) relationship seem most influential
- Included in Draft TR

Fort Myers Beach

- Draft TR (FIT)
- Master’s Thesis (S. Ramos)
  - Morphological Feature Analysis
  - Shoreline Trend Analysis
  - Sediment Grain Size Distribution Statistics
  - Sediment Grain Size Changes
  - Longshore Transport Analysis
New Smyrna Beach

- Collaborative effort: SAJ, FRF, RSM proposal for next year
- Test Mini-Argus, shoreline change with nearshore placement
- FRF set up Mini-Argus
- Placement happening soon

Guidance for Numerical Modeling of Navigation Inlet Mining Studies

- Special Report (SR) – Literature Review of Inlet Management Practice (Draft)
- Updated Inlets DB and Webservice [https://arcg.is/nS599]
- Tech-Transfer on the Coastal Modeling System (CMS) and tracer studies at tidal inlets (ASBPA 2018)
- CHETN: U.S. Tidal Inlet Atlas Update
- JP: Morphodynamics of Barrier-Inlet Systems in the Context of Regional Sediment Management in the United States (Draft)
Overview of FY19 R&D and SoNs

- Investigation into Nationwide Sediment Grain Size Information from "Citizen Scientists"
- Nearshore Berm Migration Near a Wetland (RSM, F&C, DOER/EWN?)
- SMT JP
- Testing of C2SHORE for Modeling of Nearshore Berms
- Nearshore Berm Workshop and Working Group
- New Smyrna Beach (continued)
- Nearshore Berm Experiment (FRF or District)
  - SoN 2016-N-04: Quantifying wave and current driven sediment transport at nearshore dredge disposal sites
  - SoN 2017-N-69: Cross-shore sediment sorting of mixed sediment nearshore placements
  - SoN 2017-N-70: Analysis of shoreline response to nearshore placement geometry

Grain Size Data using Citizen Scientists

- Collaboration with JMU to investigate whether it was feasible to use citizen scientists to gather grain size vs. beach slope data
- Update to Wiegel (1964) study to include world wide beaches
- JMU creates and maintains the website
Nearshore Berm Migration Near a Wetland

- Collaboration with CIRP, RSM, F&C, DOER/EWN (?)
- Two phase experiment to fill knowledge gaps on wave energy dissipation and sediment transport in vegetation
  - First Phase: hydrodynamics of waves propagating through submerged vegetation
  - Second Phase: Monitor sediment transport of berm placed near vegetated areas

Testing C2SHORE for Modeling of Nearshore Berms

- Use existing data from Fort Myers Beach (2009 and 2016 berms) to test C2SHORE (now integrated into CMS) as a potential model for nearshore placement of dredged material
- Test capability, not necessarily detailing new information on nearshore placement
- Technical Report summarizing results
Data Collection

- **Nearshore Berm Experiment**
  - Action item from Nearshore Processes Workshop
  - FRF if possible, potential to execute at a district
  - Use FDCAB Mini dredge if at FRF
  - Need to create PDT now
  - Collaboration across several programs at ERDC?

- **Wrap up of New Smyrna Beach Berm with FRF and SAJ**
  - Mini-Argus results and write up

Other

- **Nearshore Berm Workshop and Working Group**
  - Districts want easy-to-use tools for a not so easy answer
  - Discuss State of Science and Future Directions
  - Form Nearshore Berm Working Group

- **JP on SMT**

<table>
<thead>
<tr>
<th>$d_{50}$ (mm)</th>
<th>Frequency of Mobilization</th>
<th>Predicted Sediment Migration</th>
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</thead>
<tbody>
<tr>
<td>0.1</td>
<td>16 – 38%</td>
<td>83% Offshore</td>
</tr>
<tr>
<td>0.2</td>
<td>14 – 30%</td>
<td>60% Onshore</td>
</tr>
<tr>
<td>0.3</td>
<td>12 – 26%</td>
<td>84% Onshore</td>
</tr>
</tbody>
</table>
Reimbursable Studies

- Continued positive feedback from Districts as well as industry on SMT
  - Ease of use
  - Efficiency in determining correct placement depth
  - Communication with stakeholders

Collaborations

- Regional Sediment Management Program
- Dredging Operations and Environmental Research Program
- Mobile District
- Jacksonville District
- CESU with FIT
- Delft (FY19)
- JMU (FY19)
- Flood and Coastal
Conclusion

- **FY18 Major Advances**
  - Wrap up of Fort Myers Beach
  - Relationship between wave metrics and nearshore berm response

- **FY19 Key Products/Advances**
  - Begin nearshore berm near wetlands study
  - Form Nearshore Berm Working Group
  - Test C2SHORE on nearshore berms
  - Nearshore Berm Experiment

- **FY19 Challenges**
  - Nearshore Berm Experiment at FRF may be tough to schedule/execute
  - Potential complications applying C2SHORE coupled with CMS because it hasn’t been tested thoroughly