



US Army Corps of Engineers



# Coastal Inlets Research Program Tools for Simulating Aeolian Sediment Transport Near Inlets

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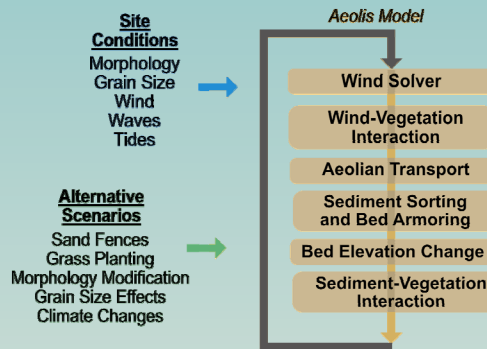
## Problem Statement

- Wind-blown sand can add resilience to coastal systems through dune building
- Aeolian processes can also produce adverse impacts through infrastructural damage and infilling of navigational inlets



## Aeolis Model

- **Aeolis** (Hoonhout and de Vries, 2017) is an open-source multi-fraction aeolian sediment transport model designed for coastal applications
- Model accounts for grain size sorting, shell armoring effects, sediment stirring in the swash zone, and moisture effects

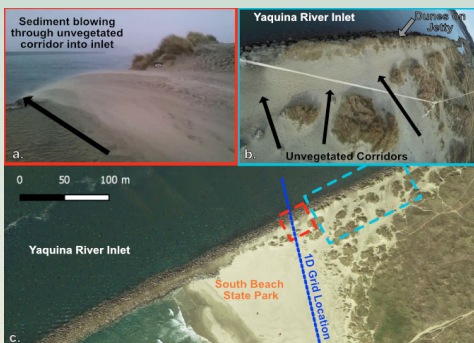


## Model Development

**Aeolis** model development by ERDC and Technical University of Delft collaborators include the implementation of:

- Spatial wind field solvers
- Ecological parameterizations
  - Sand fencing
- Hard (un-erodible) structures
  - Improved swash and groundwater effects

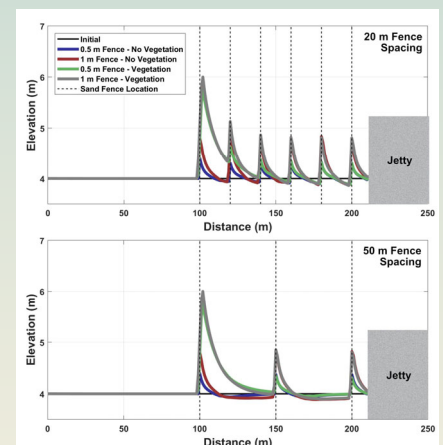
### Yaquina River Field Site



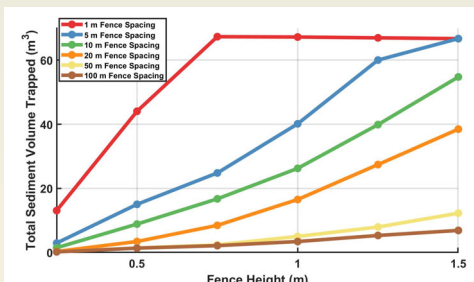
## Yaquina River Inlet (Newport, OR) Case Study

- Recent increases in inlet shoaling rates are hypothesized to be in part from aeolian transport from an adjacent beach
- **Aeolis** is being adapted to hindcast contributions of aeolian sediment transport to inlet infilling
- Sand fencing and grass planting are being incorporated into the model to explore management alternatives for reducing aeolian fluxes to the inlet

### Model Simulated Morphology Change (1 Year)



### Model Simulated Sand Fence Trapping Efficiency



## Availability

- **Aeolis** is available at: <https://github.com/openearth/aeolis-python/>
- Contact the Nick Cohn for updates on model development.



- CIRP website <http://cirp.usace.army.mil/>

