An Inter-institutional *E*nvironmental *O*bservation *N*etwork *S*ystem for North Carolina (NC EONS)

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University of North Carolina Research Competitiveness Fund

Amount Funded: $200,000 – starting date January 1, 2008

NC EONS Partners

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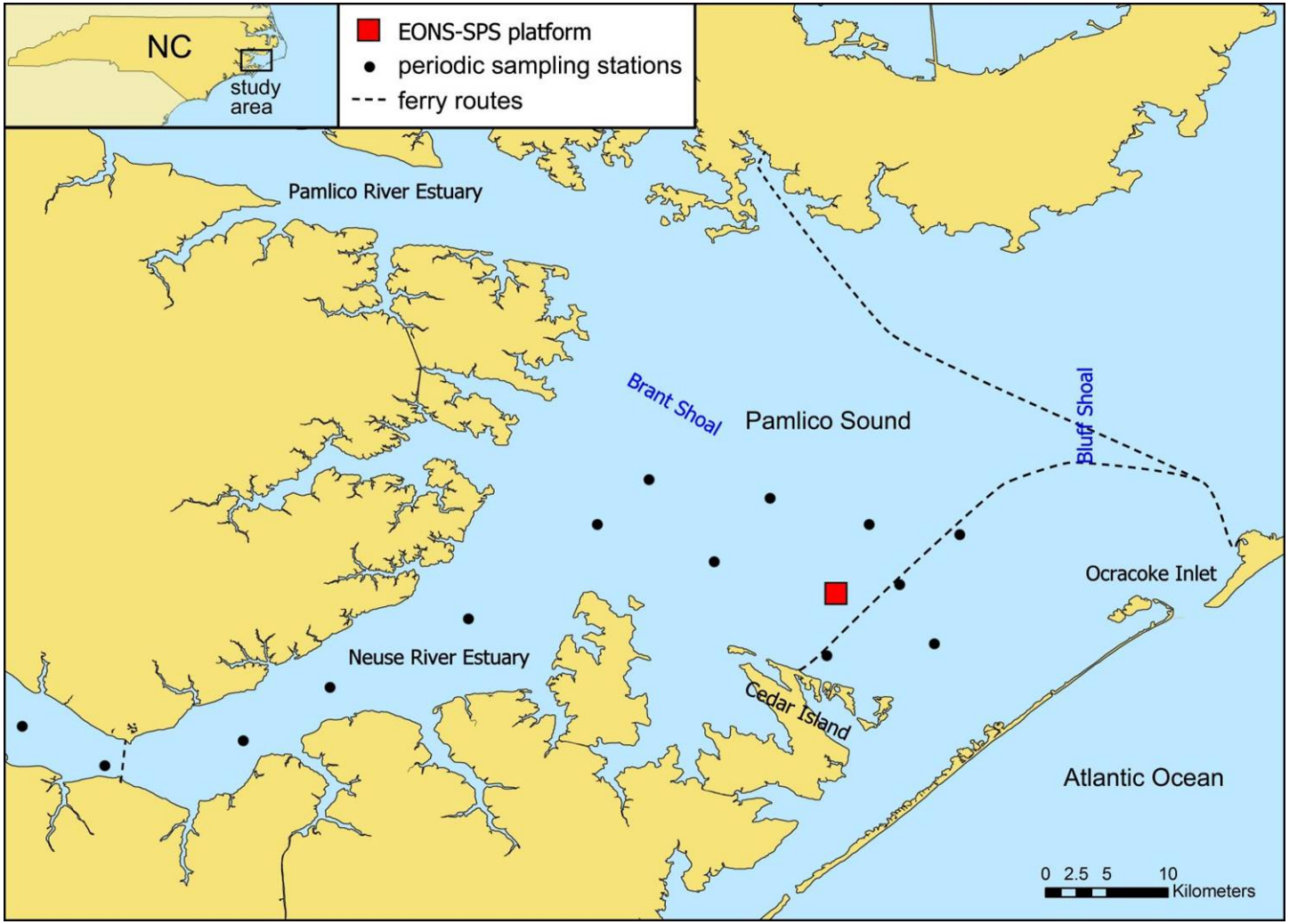
North Carolina Environmental Observation Network System
NC EONS

Organizational meeting at IMS
January 9, 2008

Discussions with NC DOT personnel about communications at Cedar Island

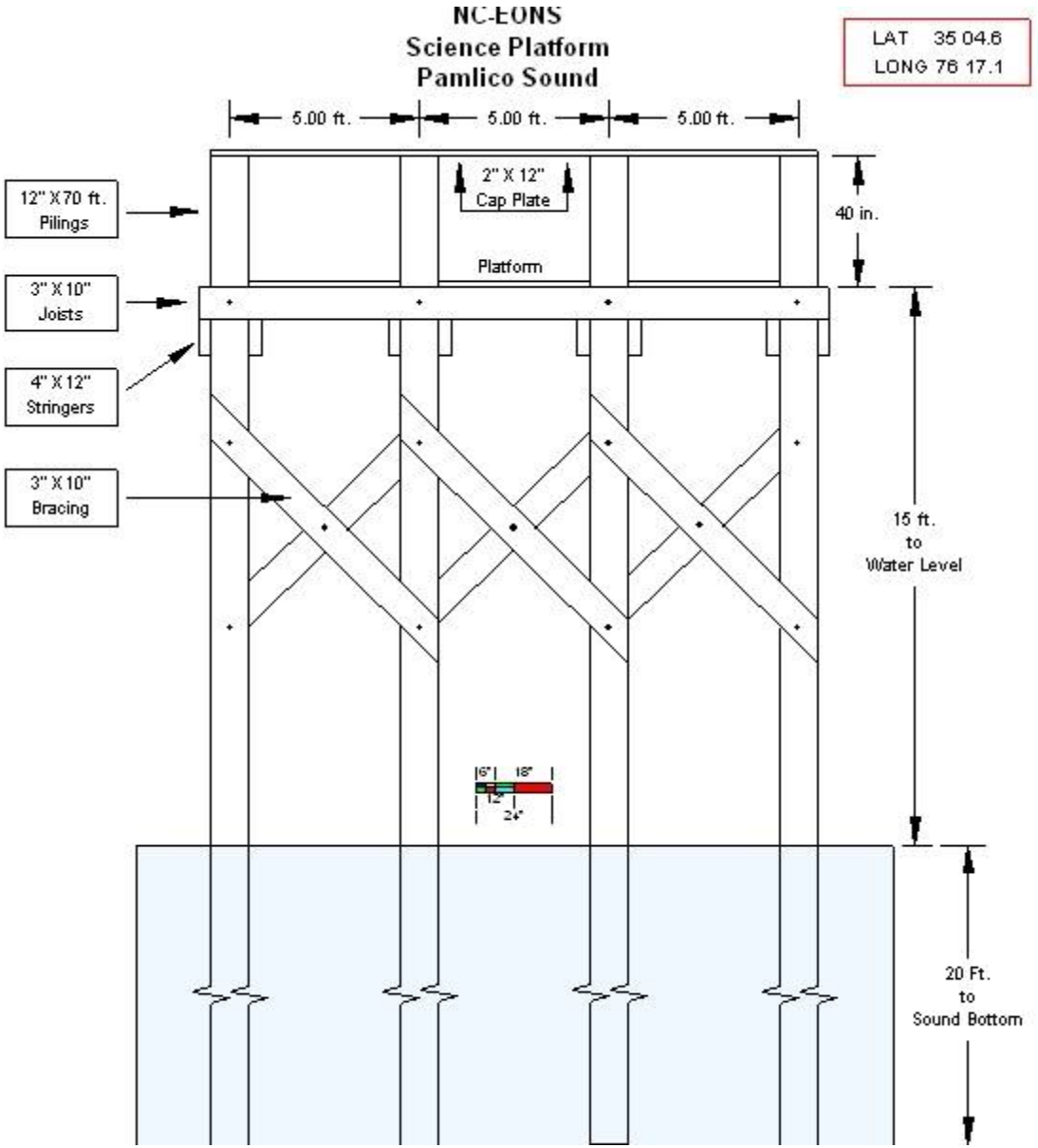
January 9, 2008

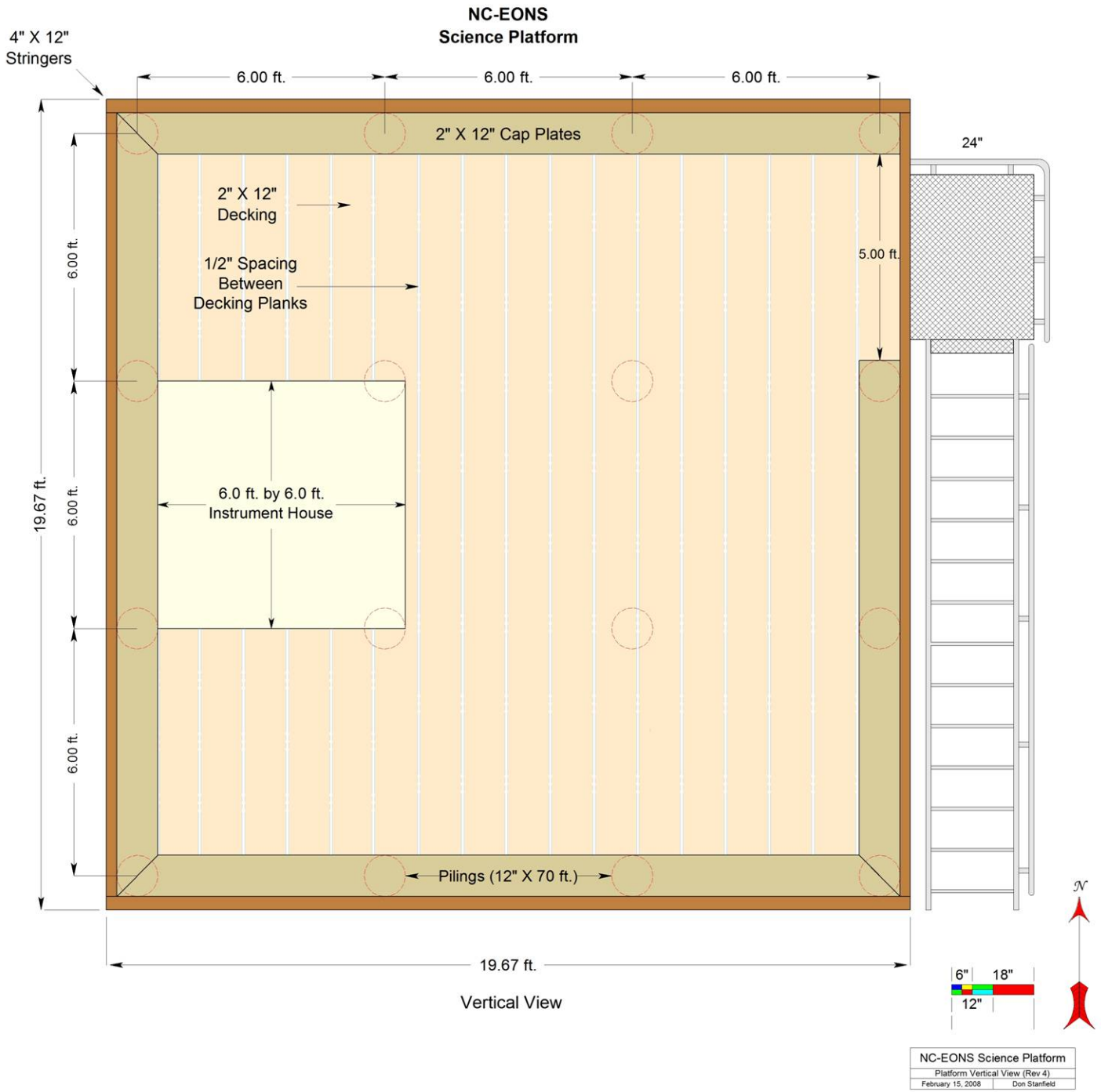
Build a Platform in Southern Pamlico Sound



Platform Specs

- 18 ft x 18 ft, 15 ft above water level
- marine grade pressure treated lumber, weather resistant enclosure to house equipment located on the platform
- expected lifetime of 10 years (including hurricane conditions)
- Design & Permitting – 12/2007 – 3/2008
- Construction started - 4/18/2008
- Installation of 16 pilings completed – 4/25/2008


NC-EONS
Science Platform
Pamlico Sound
LAT 35 04.6
LONG 76 17.1
5.00 ft.
5.00 ft.
5.00 ft.
12" X 70 ft. Pilings
3" X 10" Joists
4" X 12" Stringers
3" X 10" Bracing
2" X 12" Cap Plate
Platform
40 in.
15 ft. to Water Level
20 Ft. to Sound Bottom
6"
18"
12"
24"


NC-EONS
Science Platform
4" X 12"
Stringers
6.00 ft.
6.00 ft.
6.00 ft.
2" X 12" Cap Plates
24"
2" X 12"
Decking
1/2" Spacing
Between
Decking Planks
5.00 ft.
6.00 ft.
19.67 ft.
6.00 ft.
6.0 ft. by 6.0 ft.
Instrument House
6.00 ft.
Pilings (12" X 70 ft.)
N
19.67 ft.
6"
18"
12"
Vertical View
NC-EONS Science Platform
Platform Vertical View (Rev 4)
February 15, 2008
Don Stanfield
North Carolina Environmental
NC EONS
Observation Network System

Power and Communications

- On site solar/wind generation/battery power system ~ 1 Kwh per day power for instrumentation and communications systems
- three communication systems that connect with receivers located at the Cedar Island Ferry Terminal:

  1) a VHF unlicensed 9600 baud packet-switched network using low gain antennas that works well in rain and fog

  2) a 900 Mhz 802.11 system that RENCI is using successfully in their Brunswick County system, and

  3) an experimental 5.8 GHz WiMax system which has very high data throughput.

Instrumentation Systems

(Installation in May/June)

- **Live Video**
  - RENCI will provide 2 - 1080i HDTV webcams
- **Meteorological and Water Level Measurements**
  - ECU & NCSU - Sutron Corp. meteorological package (wind speed and direction, air temperature, humidity, water temperature) integrated with a high accuracy water level measurement system as used by NOAA
  - UNC-W - back-up meteorological package
  - UNC CH - sonic wind profiler
- **Waves, Currents, Hydrography**
  - Bottom mounted ADCP - UNC-W, NCSU
  - Bottom, mid-depth and surface CTDs - UNC-CH, NCSU
  - Small tripod for bottom boundary layer studies - ECU

North Carolina Environmental Observation Network System
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Instrumentation Systems

- **Water Quality and Fisheries**

  – NCSU - profiler to measure water column profiles of water quality parameters such as water temperature, pH, DO, salinity and chlorophyll

  – NCSU - near bottom dissolved oxygen levels

  –UNC-CH - ISCO automated sampler to collect refrigerated water samples for laboratory determination of key nutrients (e.g. N, P, Si, and organic C), chlorophyll-a, and diagnostic pigments

  – NCSU - portable Gas Chromatograph (GC) to measure trace gas emission from estuarine algae

  – NCSU - ISUS submersible chemical analysis system that optically detects nitrate concentrations

  – ECU - long-term acoustic recording system to passively record fish sounds

Data Management and Availability

Data available directly to participating scientists and to public via NC EONS website

- RENCI – Microsoft “Sensor Bus Project” data infrastructure
- UNC W – CORMP data infrastructure
- UNC CH – SEACOOS data infrastructure

Departing the boat ramp at the Cedar Island Ferry Terminal


Dry suit dive in February to check
out bottom for CAMA permit


Barge with pilings and crane departing
Cedar Island Ferry Terminal
P&H

Barge with pilings transit to site

Piling Installation

Piling Installation

Piling Installation


Piling Installation
4 down, 12 to go
P&H
660


www.nceons.org

PARTNERS

- **About NC EONS**
- The North Carolina Environmental Observation Network System (NC EONS) is a collaboration of seven North Carolina universities and additional state and federal agencies to help develop a coordinated environmental observing and modeling system in the North Carolina estuaries and coastal waters. Little is known about the water quality, fisheries and physical behavior of the Albemarle-Pamlico Estuarine System (APES), even though it is the country's second largest estuary and North Carolina's most valuable marine resource. Through NC EONS, scientists, government officials, educators and others will be able to conduct experiments and collect data that are vital to monitoring the health of APES and to understanding it response to climate change.

- **The NC EONS Project**
- Through funding from the North Carolina Research Competitiveness Fund and with support from the National Oceanic and Atmospheric Administration (NOAA) and U.S. Army Corps of Engineers, the NC EONS team is building a 325 square-foot platform 15 feet above the surface of southern Pamlico Sound and about three miles north of the Cedar Island Ferry terminal. The platform will be loaded with sensors and monitoring devices and will be equipped with power and high bandwidth communications that allow researchers in laboratories, students in classrooms and government officials in their offices to access data collected at the site. Data collected at the platform will include live video, meteorological conditions, water level, circulation, temperature, salinity, water quality parameters (e.g., nutrients, dissolved oxygen, chlorophyll), and fisheries information (e.g., acoustic reflection data).
- **Impact and Vision**
- The NC EONS platform will provide an on-water site for novel and important environmental research and will provide information that can be used by educators, researchers, managers and the general public. The data obtain from the platform will help to evaluate the impact of development, coastal storms and climate change on the Pamlico Sound ecosystem and help officials develop policies based on solid scientific data. The vision for NC EONS is to use it as a part of an environmental modeling and monitoring system that covers all the North Carolina estuaries and links with complementary efforts in North Carolina coastal waters and its watersheds. In the longer term, such a coordinated network system could develop the capacity for gathering and disseminating aquatic data that is comparable to what the National Weather Service offers for atmospheric data.
- **News Release**
- New observation site to provide data on marine environments, climate change
- **North Carolina Environmental Observation Network System**