

WHITE PAPER

A Florida Coastal Ocean Observing System (Florida COOS)

OBJECTIVE - To provide Florida with an integrated coastal ocean research, observing, and prediction system that will supply the critical physical, chemical, biological, fisheries, and geological information and knowledge needed to support and advance many desired results. These include: expert ecosystem-based resource management; safe, efficient, and productive marine operations and maritime commerce; sustainable and internationally competitive tourism and economic development; reliable beach preservation and public safety; broadly based recreational activities; and, a smooth integration of such efforts within the multi-state regional, national, and international ocean observing initiatives (Florida COOS).

RATIONALE - Florida has one of the longest state coastlines on the North American Continent, one of the fastest growing populations in America, and significant fisheries-related economic interests. The economic, societal, and environmental health of the State of Florida is critically linked to its coastal ocean and maritime industries. Interactions between Florida's watersheds, estuaries, continental shelf, and deep-ocean (from the head of tides to the limit of the Exclusive Economic Zone) determine coastal conditions. All of these interactions impact Florida's maritime commerce, safe and efficient navigation through state and federal coastal waters, the conditions that support public safety and health, the sustainability of natural resources, and the availability of clean and abundant beaches. Because federal waters off Florida's coast adjoin those of other nations, it is essential the Florida COOS also includes international coordination.

While Florida has a robust maritime industry, world-class human resources for scientific research, and a forward-looking government, it also faces serious ocean related environmental and public safety issues. With enhanced ocean and coastal observations and models, data management, information products, and dissemination to users, a seamless integrated system to aid science-based decision making will be provided. Florida's innovative coastal ocean observing system will also enable a more complete understanding of many multidisciplinary, interrelated issues including: ecosystem-based fisheries management, aquaculture, and other non-fisheries living marine resources; Florida red tides and other harmful algal blooms; water quality and fresh water flow requirements; habitat characterization; beaches; coastal hazards; and, the potential effects of climate change on all of these. The existing observing systems, although very limited, have demonstrated substantial improvements in oil spill and other potentially toxic material response and management, search and rescue, public education, storm surge emergency preparedness, efficiency of marine transportation, the understanding of how the coastal ocean circulation leads to the distribution of nutrients and ecosystems organizations, and human health issues.

This document provides a pathway to implement the long-term vision articulated in the [U.S. Commission on Ocean Policy Report](#), the President's [U.S. Ocean Action Plan](#) and Florida's [Oceans and Coastal Resources Act](#). State funding will encourage federal matching funds and put Florida at the forefront of the multi-state regional, national, and international coastal ocean observing systems efforts. Investments made at this time in ocean observing capacity and forecasting capabilities will pay enormous dividends to the residents of the State of Florida for future generations.

A PHASED APPROACH TO UNDERSTAND AND MANAGE FLORIDA'S COASTAL OCEAN: RESEARCH AND MONITORING (OBSERVING, MODELING, AND DATA DISSEMINATION) - A

comprehensive, integrated, and fully operational Coastal Ocean Observing System (COOS) is the desired end goal. Accordingly, this Florida COOS proposal describes a step by step process to plan, develop, and deploy a system for coastal ocean observing for the State of Florida.

Florida COOS will be implemented by a collaborative team comprised of key marine science research, government, private, and stakeholder entities (i.e., public and private academic and research institutions, scientific consulting companies, pilots, port directors, commercial operators, media, emergency managers, Florida State Climatologist, USCG, NOAA, USGS, NPS, USN, USACE, EPA, relevant city, county, state, tribal, and federal agencies, other relevant stakeholders, etc.). The proposed budget includes costs for: 1) instrumenting Florida's coastal ocean and ports and integrating all other observational elements into a state-wide coastal ocean monitoring system; 2) permanent technical and engineering positions that are critical to designing and implementing the system; 3) maintaining and operating the system; and 4) generating and disseminating data products to Florida's user communities.

The Florida COOS proposal involves initial efforts to plan a comprehensive COOS initiative, sustain existing investments, augment COOS elements in data poor sub-regions, and conduct pilot projects (year 1). The subsequent four year effort (years 2 through 5) will focus on developing observing system infrastructure within five Florida sub-regions pivotal to marine commerce, emergency management, ecosystem-based fisheries management, and ocean user communities. The five sub-regions are: Northwest Florida (inclusive of the Pensacola and Panama City ports), West Florida (inclusive of the Tampa Bay and Charlotte Harbor ports), Southeast Florida (inclusive of the Key West, Miami, Ft Lauderdale and Palm Beach ports), East Central Florida (inclusive of the Ft. Pierce and Cape Canaveral ports), and Northeast Florida (inclusive of the Fernandina Beach and Jacksonville ports). Since these sub-regions overlap on the basis of ocean currents and ecology, the sub-regional assets will all be interoperable with each other and with the larger multi-state regional, national, and international ocean observing initiatives. The long-term goal (years 6 through 10) is to fully instrument and model Florida's extensive coastal ocean and provide practical decision-making support tools that will help to sustain the state's growth and prosperity.

To realize the Florida COOS, we propose the following:

1. Initial Research, Planning and COOS Efforts (July 2006 to June 2007) (1 year):

The initial phase of this program requires: an assessment of user needs and existing capabilities; a budget to support research and planning efforts, critical technical personnel to implement the initial projects, a defining path to sustain the state's growth and coastal development; and the development of an administrative plan to manage the program. As such, the following tasks are proposed for year 1 to identify needs and the resources necessary to satisfy those needs:

- Sustain existing observing elements in coordination with the national coastal ocean observing backbone and other ongoing IOOS efforts.
- Identify and analyze: existing observing and prediction systems; useful new technologies, and other requirements and end products, all to serve the user needs in Florida's high priority areas. Implement pilot projects in important data void sub-regions. This includes planning an integrated environmental information system for Florida comprised of state of the art sensors (satellite, in situ, ground based, etc.), computer hardware, software, and networking for modeling, analysis, and dissemination.
- Begin building an interoperable and user-friendly statewide cyberinfrastructure using the latest cyberinfrastructure technology and the Florida Lambda Rail to enable easy and flexible sharing of Florida COOS resources (data, models, computers, and expertise) and easy access by all user groups of useful Florida COOS information, including current conditions, archival data, and model forecasts.

- Begin to develop a Concept of Operations (CONOPS) for the eventual Florida COOS that will coordinate with the IOOS/COOS requirements to ensure the ongoing observing system activities and model product generation and, create an implementation plan for years 2 through 5 of the Florida COOS program that builds upon the first year's efforts
 - Recommend a long-range research agenda for Florida COOS utilizing existing systems, pilot projects, and private sector involvement that will lead to enhancement and improved design.
 - Identify and cultivate significant users and organize user groups: to help direct development of COOS information and knowledge through outreach; to define user, general public, K-12, higher, and graduate educational program needs; and, to determine how to provide for these Florida COOS requirements through research and development, including that of private industry.
 - Begin building infrastructure, including permanent technical personnel, equipment capitalization, new technology developments, and private sector participation and form a user advisory group.
- 2. Sub-Regional Implementation and Continued Planning, Assessment and R&D (July 2007 to June 2011) (4 years)**
- Initiate an observing and prediction demonstration program (with pilot and pre-operational observing elements) within, and interoperable between, the five designated Florida sub-regions, each of which contain important commercial ports.
 - Complete the general CONOPS and design the next generation, comprehensive Florida COOS for implementation in years 6 through 10, including a detailed plan and budget.
 - Develop plan to ensure the transition to fully operational status by year 10, including appropriate private sector involvement; federal, state, local, and tribal government agency participation; multi-state regional, national, and international coordination; and continued academic research and development.
 - Publish annually comprehensive assessments of the Florida coastal ocean condition based on Florida COOS activities.
- 3. Comprehensive Statewide Implementation and Assessments (July 2011 to June 2016) (5 years)**
- Sustain the sub-regional programs (i.e., interoperable pilot, pre-operational COOS elements, etc.) planned and implemented over the five sub-regions, with annual audits, assessments, and modifications appropriate to improve on their responsiveness to user needs. Complete the build-out of a comprehensive Florida COOS as designed during the previous four years, building upon the experiences gained from the sub-regional, multi-state regional, national and international programs.
 - Continuously update the comprehensive assessments of the Florida coastal ocean condition
 - Effect the transition of the Florida COOS to fully operational status by the end of year 10.

BUDGET -

1. Initial Research, Planning and COOS Efforts (July 2006 to June 2007): \$16.2M

- Permanent Florida COOS positions: \$2.0M (18 positions)
- Ship time: \$0.6M (ship operations for existing or pilot projects)
- Equipment: \$2.5M (\$0.5M per sub-region)
- Sustaining existing assets and pilots: \$5.0M (for in water assets or otherwise)
- COOS Research and Planning: \$4.5M (statewide perspective)
- Industry development: \$0.5M (incubator for products/services development)
- Satellite Remote Sensing analysis \$0.3M (capacity needs, reliability, synoptic integration)
- Cyberinfrastructure analysis: \$0.3M (best practices and design requirements)
- COOS Management/coordination \$0.5M (using Florida's science and technology assets)

2. Sub-Regional Implementation and Continued Planning, Assessments, and R&D (July 2007 to June 2011): The costs to be determined during the initial one year term (see 1. above).

3. Comprehensive Statewide Implementation and Assessments (July 2011 to June 2016): The costs to be determined during the previous four year term (see 2. above).

Appendix – Background Information and Florida COOS Caucus

Two multi-state coastal ocean observing regional associations have involved significant Florida attention. The Southeast Coastal Ocean Observing Regional Association ([SECOORA](#)) and Gulf of Mexico Coastal Ocean Observing System Regional Association ([GCOOS](#)) have both involved the efforts and participation of virtually all of the Florida-based oceanographic research and educational institutions. In addition, the Governors of the states adjoining the Gulf of Mexico have, through the Gulf of Mexico Alliance ([GoMA](#)) charter, expressed their interest in jointly reviewing and undertaking coastal ocean observing system developments within the Gulf of Mexico per se that are in the mutual interests of Texas, Louisiana, Mississippi, Alabama, and Florida, and in coordination with their Mexican counterparts.

Further, with the passage of Chapter 2005-166, Laws of Florida ([Oceans and Coastal Resources Act](#)), additional research efforts will be required as the [Florida Oceans and Coastal Resources Council](#) (FOCRC) undertakes efforts: to establish a library to serve as a repository of information for use by those involved in ocean and coastal research; to develop a Florida Oceans and Coastal Scientific Research Plan; and, to prepare a comprehensive oceans and coastal resource assessment to serve as a baseline of information for assisting the development of its research plan.

To pursue Florida interests within the framework of SECOORA, GCOOS, GoMA, FOCRC and related national and international COOS efforts will require an enhance plan to coordinate COOS-related activities throughout Florida. The Florida COOS Caucus ([FL COOS Caucus](#)) meetings were initiated to bring together Florida's oceanographic, coral reef, and ecosystem experts, expected data and resource users, environmental and conservation organizations, governmental regulators and program managers, private and commercial concerns, and other stakeholders who wish to discuss and advocate what is in Florida's best COOS-related interests.

FL COOS Caucus meetings are based upon the efforts of the many participants and organizers. The gatherings are planned with informative guest speakers and comprehensive panel discussions. The FL COOS Caucus website was developed to support these efforts and to help define Florida's immediate and long term COOS interests. In a world of formal meetings by policy decision makers, the FL COOS Caucus offers an opportunity for open debate and public policy development important to our future and the future of the Florida coastal ocean and beyond.

Florida COOS Whitepaper: A draft Florida-based COOS initiative was developed on November 15, 2005 following a recommendation made during the August 2, 2005 FL COOS Caucus² meeting in Orlando, Florida that a proposal be drafted. Referenced as the FL-PCOOS proposal, it was presented to the FOCRC on December 5, 2005. Thereafter, it was reviewed and discussed by the December 6, 2005 FL COOS Caucus⁴ participants in St. Petersburg, Florida to get input and drafting suggestions. The revisions to this draft were further developed into the Florida COOS Whitepaper as presented to Steve Wolfe, Liaison to FOCRC, on January 9, 2005.

This draft Florida COOS Whitepaper represents a collective recommendation of that FL COOS Caucus and describes a method by which the State of Florida will be able to implement a science-based comprehensive and very useful coastal ocean observing and prediction system. It is believed that the Florida COOS proposal, as conceived by the FL COOS Caucus, will be a first-in-place component of [IOOS](#) – the national ocean observing system program being coordinated by [Ocean U.S.](#) as proposed in President Bush's [U.S. Ocean Action Plan](#) and the [U.S. Commission on Ocean Policy Report](#). After decades of successful program and project initiatives (i.e., PORTS, EFSIS, COMPS, IMaRS, SFOMC, etc.), the FL COOS Caucus participants are ready and able to undertake a coordinated and integrated COOS program for Florida, its residents, and visitors that is fully interoperative in good times and bad.

The stage is now set for a coastal ocean observing system that can be undertaken by all of Florida's ocean and related institutions as a common effort. Such a collaborative Florida effort would deliver oceanic and other environmental information to further the operation of Florida's seaports and to help protect and manage Florida's ocean and coastal resources and ecosystems, protect the health of Florida's visitors and citizens, and stimulate a vibrant economy.