

Management Needs to provide improved management of Florida's coastal and oceans resources.

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Requested submission format:

- 1) **A single sentence summary, stated as a need (for instance “Need the ability to determine the condition of the biological communities in coastal habitats”);**
- 2) An explanation of the need, describing it sufficiently that the reader can clearly understand the nature of the need (for instance “Developing the ability to determine the ‘health’ of the biological communities would allow the agency to identify impacted areas, better determine the causes of those impacts, and develop the means to address the causes”. Please keep this explanation brief (<300 words) but complete;
- 3) Optionally, provide additional background and elaborating information you think is needed for the Oceans Council to fully understand the need. This can be an attachment. Please do not send more than is necessary for understanding (<500 words).
- 4) Was this need submitted to the Council in 2005?
- 5) Is this need:
 - a) statewide.
 - b) not statewide but has statewide transferability.
 - c) local but significant (explain).

- Submitted by state agencies June 2006 -

Florida Department of Environmental Protection

DEP Priority #1

- 1) **Need to develop a sensitive and measurable method (metric) for defining when nutrient loading has caused an imbalance in flora or fauna.**
- 2) DEP is currently conducting a one-year study of nutrients and dissolved oxygen conditions in the Florida's freshwater lakes and streamed. The information will be used, potentially, to revise Florida's designated uses and the existing dissolved oxygen criterion, and provide corroborative information for the development of numeric nutrient criteria. There is a need to address these same issues in Florida's coastal waters. In particular, there is a need to collect data to support the future development of numeric nutrient criteria designed to prevent harmful algal blooms (e.g., Cyanobacteria, dinoflagellates) and protect designated uses and the natural flora and fauna of the state's coastal waters. Recent red-tide and blue-green algae blooms demonstrate the need to better understand nutrient dynamics in Florida's coastal waters.
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #2

- 1) **Need an understanding of the types, structure, functions, and locations of environmental resources (such as habitat regions, salinity and other physico-chemical regimes, substrate and bathymetry) that will result in the ability to discriminate distinct regions of ecological similarity.**
- 2) An ecosystem management perspective requires the use of maps of "ecoregions" in order to set appropriate expectations and therefore environmental management goals. DEP needs to move past a one-size-fits-all approach to coastal management toward one that recognizes critical ecological differences. DEP is in the process of implementing this approach in freshwater systems but lacks the necessary basic information (i.e., map of marine ecoregions) to accomplish this for coastal systems. This need includes mapping offshore submerged state lands, including assessing bottom bathymetry, topography, sediments and rock exposures, sub-bottom stratigraphy, "live rock", and submerged springs.

This information is essential to support decisions concerning the evaluation and management of both natural resources and the environmental impacts on the coastal environment, including assessing geohazards, identifying offshore resources related to pipeline placement, offshore minerals assessment, and "live rock" collection.

- 3) n/a
- 4) yes, it was submitted last year.
- 5) statewide.

DEP Priority #3

- 1) **Need methods to assess the conditions of the biological communities in coastal and ocean waters at bioregion, habitat and species levels that will provide for a timely and appropriate response to environmental concerns and allow informed management and decision making.**
- 2) There exists the need to be able to undertake rapid yet robust assessment on a regular basis of the condition of Florida's coastal and offshore natural resources at bioregion, habitat and species levels. Currently there is limited ability to determine localized conditions of various biological communities (submerged aquatic vegetation, aquatic invertebrates, corals, algae, and fish) in coastal systems but there is no consistent, scientifically defensible approach that would be applicable for a statewide network. Need to be able to compare conditions of communities in different regions in Florida to provide a comprehensive statewide perspective. DEP programs potentially affected include: the Impaired Waters program, water quality standards, Outstanding Florida Waters, Aquatic Preserves and National Estuarine Research Reserves, Southeast Florida Coral Reef Initiative, National Pollution Discharge Elimination System (NPDES), Florida Keys Sanctuary, and the comprehensive coastal water quality monitoring network.
- 3) n/a
- 4) Yes, submitted last year in different form.
- 5) Statewide.

DEP Priority #4

- 1) **Need to assess and characterize the condition of coastal waters and the influence of water quality on the condition of habitat.**
- 2) There is a lack of qualitative and quantitative information concerning the extent, nature and overall condition of southeast Florida's coral reef and hard bottom resources. The factors which influence and control the distribution and health of these resources have not been adequately analyzed.
- 3) n/a
- 4) no, was not submitted last year.
- 5) statewide.

DEP Priority #5

- 1) **Need to determine if it is feasible to reduce the excessively high mercury levels in Gulf of Mexico fish, which are a significant source of mercury exposure for Floridians.**
- 2) The Gulf of Mexico is a very significant fishery, but it is troubling that mercury levels in an extremely high proportion of important commercial and recreational fish that Floridians consume from the Gulf exceed the USEPA mercury standard.

The USEPA Gulf of Mexico Program has concluded that the only chemical that pervasively contaminates Gulf seafood is mercury. Reflecting this, advisories recommending limitation of consumption of fish contaminated with mercury have been issued by the five Gulf States for 100% of the Gulf of Mexico coast.

For Florida, 59 Gulf fish species are under fish consumption advisory. Furthermore, because residents of Florida eat substantially more fish and more Gulf fish than the US national average, our mercury exposure is especially high.

Despite the USEPA, FDA and State-issued fish consumption advisories, nearly 1/6th of American women of childbearing age consume enough high-mercury fish to be diagnosed with blood methylmercury levels above the safe maternal dose, threatening fetal brain and central nervous system development. As well, there is increasing evidence that methylmercury exposure has harmful cardiovascular health consequences (stroke, heart attack) in other adults.

Thus it appears that fish consumption advisories alone are inadequate to protect the population from excessive methylmercury exposure. Other protective measures must be considered, including determining means of reducing mercury levels in the fish we commonly consume.

It may be possible to substantially reduce mercury levels in Gulf of Mexico fish, and reduce our exposure to this toxin from eating fish. This depends on where mercury entering the Gulf is coming from, and where this mercury is methylated by naturally-occurring bacteria in Gulf sediments to methylmercury, the more toxic mercury form which concentrates strongly up the food chain.

- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

DEP Priority #6

Need to understand factors influencing the bloom and proliferation of the Florida red tide organism (*Karenia brevis*) in the Gulf.

- 2) It would seem that anthropogenic nutrient inputs play a role but we are not aware of research being done on this topic, especially the relationship between nearshore nutrient

inputs and offshore blooms. It would also be interesting to see research on the influence of increasing ambient temperatures (due to global warming, normal cycle, etc.).

- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #7

- 1) **Need to quantify nutrient loadings from nearshore and offshore ground water seepage and assess their ecological impacts.**
- 2) Nutrients should be quantified as to species of nutrient rather than total (i.e., specify quantity of ammonia nitrogen (NH₃-N) & nitrate/nitrite nitrogen (NO_x-N) rather than just as total nitrogen (TN).
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #8

- 1) **Need to determine the sources and extent of pollution impacts on marine resources by identifying, quantifying, characterizing and prioritizing the sources of pollution in coastal waters.**
- 2) The completion of these research projects will allow us to develop a mass balance budget to address nutrients, carbon, and other pollutants of concern to the overall health of southeast Florida's coral reefs and associated resources.

It will also allow us to establish linkages between land-based sources of pollution and the degradation of Florida's coral communities.
- 3) n/a
- 4) No, was not submitted last year.
- 5) Statewide.

DEP Priority #9

- 1) **Need to identify and characterize the state's submerged springs in order to better understand the linkage between the upland watersheds and offshore ecosystems in such areas as nutrient loadings and dynamics, hydrogeology, fish populations, pollution, man-made influences and land-use patterns.**
- 2) Knowledge of these springs can identify the linkage between the upland watersheds and offshore ecosystems in such areas as hydrogeology, nutrient dynamics, fish populations, pollution, man-made influences and land usage to support natural resources protection advocated in Florida's Water Quality Assurance Act (Chapter 403).

Additionally, information on offshore springs will contribute to environmental impact models and feasibility assessments of diverting fresh or brackish spring water for use by coastal communities facing severe potable water shortages.

- 3) n/a
- 4) Yes, submitted last year
- 5) Statewide

DEP Priority #10

- 1) **Need to establish a reliable and affordable procedure for differentiating natural and anthropogenic sources of bacteria.**
- 2) self-explanatory
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #11

- 1) **Need more rigorous success criteria and tracking protocols for the restoration of seagrass, coral, and other coastal habitats**
- 2) While there is increasing demand for seagrass restoration projects as mitigation for impacts, the success for seagrass restoration is, at best, mixed. In most cases it is up to the entities that perform the restoration to evaluate its success. As a result, limited use of techniques that have not undergone extensive scientific evaluation is sometimes presented as precedent for expensive and environmentally-risky application of the techniques to more projects. There is need for independent scientific review of seagrass restoration techniques and tracking of their long-term success. Additionally, sound science should be used to evaluate questionable practices like counting the natural expansion of seagrass bed margins as habitat restoration. Similar scientific rigor should also be applied to evaluating the restoration of other coastal habitats. A great deal of money is spent on restoration projects with sparse objective data on success.
- 3) n/a
- 4) Yes, submitted last year.
- 5) Statewide.

DEP Priority #12

- 1) **Need upland and coastal land-use models, including more rigorous modeling of growth in watersheds and related increases in impervious surfaces, loss of habitat, and declines in water quality.**
- 2) Scientifically-derived land use information can empower municipalities, state and federal parks, water management districts, state and federal permitting agencies, land

developers, emergency response teams, roads and highways etc. to make environmentally sound decisions. Commonly-observed oversights include lack of Best Management Practices (BMPs), stream restoration projects next to landfills, clear-cutting, bridge-culvert maintenance and road construction with no turbidity management, and nutrient loading from upland area agricultural sites, sea grass restoration projects in locations with antiquated storm water systems, coastal zone developments with golf courses and subdivisions adjacent to surface waters with inefficient buffers. Hazardous waste spills that are not reported in a timely fashion often are the result of a lack of understanding and/or a lack of appreciation for the relationships between land use and the health of aquatic systems. More rigorous modeling of growth in watersheds and related increases in impervious surfaces, loss of habitat(s) and declines in water quality would yield valuable information for prioritizing anthropogenic components to issues. This information can be especially useful if it is made available in the form of “tools” for decision making to be used by non-scientists.

- 3) n/a
- 4) Yes, submitted last year.
- 5) Statewide.

DEP Priority #13

- 1) **Need to assemble existing monitoring databases from state and federal agencies collecting data along Florida’s coastlines and incorporate into a common database**
- 2) self-explanatory
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #14

- 1) **Need to design and implement routine water quality monitoring networks off major estuaries and coastal areas of Florida, to include nutrient, chlorophyll-a, metered parameters, etc. to allow development of estuarine models.**
- 2) This information, especially as it relates to areas further offshore, is critical in establishing suitable estuarine models with boundary conditions that influence model response. It would be extremely useful for estuarine TMDLs.
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #15

- 1) **Need means to assess, manage, and control the spread and establishment of invasive exotic marine species**
- 2) As an increasing number of exotic species spread through Florida's waters, resource managers must decide whether to commit limited resources in attempts to control their spread. Numerous basic questions arise that are directly related to the impact of exotic species on Florida's native marine resources. For example, as the Asian green mussel is spreading through Florida's coastal waters it colonizes some habitats but not others. Research should focus on the impacts of invasive species on native habitats, and on the feasibility and cost-effectiveness of control measures. Improved networks for tracking the spread of invasives and means of disseminating research results to resource managers are also very important.
- 3) n/a
- 4) Yes, submitted last year.
- 5) Statewide.

DEP Priority #16

- 1) **Need improved understanding of the level of management applied to Oceans and Coastal management generally and determination if it is adequate.**
- 2) self explanatory
- 3) n/a
- 4) No, not submitted last year.
- 5) Statewide.

DEP Priority #17

- 1) **Need to work with NOAA and other agencies to either reinterpret historical SEAWIFF or other satellite or aerial imagery to provide chlorophyll-a estimates along coastal and offshore waters to assist in modeling and evaluation of eutrophication impacts.**
- 2) If re-evaluation of historical information is not possible, new information must be collected. Also relevant to TMDLs in coastal regions.
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #18

- 1) **In addition to improved and expanded chemical and biological monitoring of coastal and offshore waters, need to establish in some areas fixed sites where physical**

measurements (current measurements, wind speed, wind direction, salinity, water temperature DO, etc.) could be recorded and made available for modeling and TMDL use (such as the NOAA buoy sites).

- 2) self-explanatory
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #19

- 1) **Need improved understanding of community expectations of DEP and CAMA in relation to resource management.**
- 2) DEP needs to better understand community expectations and its effectiveness in meeting those expectations to:
 - a) become a better “service provider” to the community by way of better understanding community needs;
 - b) better meet community expectations now and into the future by being able to react in a timely fashion and to plan for the future;
 - c) better design/resource community education programs that sustain and/or improve the understanding in the community of the role of FDEP plays in protecting Florida’s coastal and offshore resources.
- 3) n/a
- 4) No, not submitted last year.
- 5) Statewide.

DEP Priority #20

- 1) **Need cost-benefit analysis relative to development of coastal areas, including evaluation of the impacts of global warming and sea level rise, and the development of options to protect coastal areas.**
- 2) New Orleans and the Netherlands exemplify the impacts of development of coastal areas with and, in some areas, without manmade reinforcements such as dikes, water management systems, etc., versus protection measures (state lands and greenspaces, marine protected areas, protected wetlands, etc.) with no development.
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

DEP Priority #21

- 1). **Need to evaluate the health of Florida’s coastal wetlands and their response to local sea level rise, storm events, and uplands watershed modifications.**
- 2) Florida’s coastal marshes, bays and estuaries play an extremely important role in the environment by contributing to high biological productivity and serving as a buffer against storms, nurseries for fishery species, filters for upland runoff of nutrients and waste.

Increased development associated with Florida’s rapidly growing population threatens the state’s irreplaceable coastal wetlands. Monitoring these marshes provides essential data to local and state officials to identify harmful land uses’ and make informed decisions to mitigate those impacts. This includes conducting elevation change measurements of the marsh surface to enable better prediction of Florida’s wetland systems response to changes that are both natural (sea level change) and human-induced (increasing development in uplands watersheds).

Salt marsh and mangrove forest communities will most certainly be affected by a predicted rise in sea level. Along the low relief topographies of the gulf coastal panhandle and south peninsular Florida areas, these communities may have nowhere to migrate. Near coastal development, with its roads, canals and landscaped lawns, has blocked any "escape" route which would otherwise been afforded a natural migration. Should scientists be preparing for mass relocation efforts to prevent fragmentation or loss of these communities?

- 3) n/a
- 4) Yes
- 5) Statewide

DEP Priority #22

- 1) **Need to develop closer connection between DEP and the HAB Task Force and its recommendations, since it covers blue-green algae, estuarine wildlife impacts, and oceanic red tide.**
- 2) self-explanatory
- 3) n/a
- 4) This was submitted to Council last year
- 5) Statewide significance

Florida Fish and Wildlife Conservation Commission

Note: FWC did not provide a single prioritized list, but established some priorities within several categories.

Fisheries

FWC Priority #1 - Fisheries

- 1) **Reverse the long-term trend in decline of coastal marine and estuarine habitats, which severely limits management ability to sustain or enhance fishery populations.**
- 2) Justification: Fishing regulations in and of themselves cannot effectively ensure sustainable fisheries in the face of continued habitat degradation. Habitat conservation and restoration must occur in conjunction with effective fisheries regulations to ensure healthy ecosystems.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #2 - Fisheries

- 1) **Enhance existing fisheries independent and fisheries dependent sampling programs and integrate these data collection programs with data collected by coastal ocean observing systems to enhance our capacity to correlate fisheries data with environmental data, habitat quality and abundance and physical oceanographic parameters. (Previously submitted)**
- 2) Justification: As fishing pressure increases, regulations on harvest will become more restrictive and the biological information obtained from the fishery will not be sufficient to manage many stocks. Fishery independent data, especially on juveniles, combined with enhanced surveys of recreational and commercial fisheries will provide the most robust data for fisheries management. In addition, linking fishery independent work with coastal ocean observing systems will support modeling efforts to track reproduction and larval dispersal patterns and allow us to identify habitat areas of concern relative to particular stocks.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #3 - Fisheries

- 1) **Develop studies focused on understanding which habitats constitute essential fish habitat, how they are essential, and what will be the likely consequences of habitat change to fisheries species (e.g. dredging in nursery and spawning habitats, shoreline development, seagrass loss, etc.)**

- 2) Justification: Current fisheries stock assessments, upon which nearly all fisheries management is based, do not implicitly include habitat considerations. One of the key first steps to moving toward ecosystem based fisheries management is to understand the connection between habitat and stock dynamics throughout a species life history. Once these relationships are understood and quantified, changes in habitat quantity or quality can be integrated into stock assessments.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #4 - Fisheries

- 1) **Develop studies on species interactions (especially trophic interactions) and utilize fisheries ecosystem models (e.g. ECOPATH) in support of an integrated and adaptive ecosystem-based fisheries management approach.**
- 2) Justification: Another important step in moving toward ecosystem based fisheries management is the quantification of trophic pathways within foodwebs. Multispecies fisheries management will be facilitated by an enhanced understanding of the energetic relationships among trophic levels. This information will ultimately be integrated with habitat and socioeconomic data to form a complete ecosystem based approach.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #5 - Fisheries

- 1) **Evaluate the magnitude and impacts of catch-and-release fishing, and develop practical methods for minimizing catch-and-release mortality.**
- 2) Justification: Recreational fishing pressure will continue to grow in the foreseeable future. As pressure increases, regulations on harvest will become more restrictive resulting in a higher proportion of the catch being released. As a result, the catch and release mortality component of total mortality will become increasingly significant in a stock assessment context and must be estimated accurately and minimized where feasible.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #6 - Fisheries

- 1) **Explore aquaculture's potential for stock replenishment and enhancement.**

- 2) Justification: The potential for aquaculture to restore depleted stocks or augment fisheries under high fishing pressure should be investigated and evaluated as a potential tool for fisheries managers to provide maximum flexibility to meet demand while conserving fish stocks.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #7 - Fisheries

- 1) **Investigate the impacts of fishing gear (entanglement, derelict traps, etc.) on fish and wildlife.**
- 2) Justification: Habitat degradation from derelict or improperly deployed gear is potentially significant in certain areas of Florida. It is important to understand these potential impacts and minimize or eliminate them where feasible.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #8 - Fisheries

- 1) **Investigate the acute and chronic impacts of harmful algal blooms on fisheries populations.**
- 2) Justification: Harmful algal blooms have the potential to alter fish migration patterns, reproductive behavior, reproductive success, and survival. It is important to understand these impacts for stock assessment purposes, and reduce or eliminate HABs which may be linked to anthropogenic nutrient sources.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #9 - Fisheries

- 1) **Understand the effectiveness of Marine Protected Areas including No Take Zones as fishery management tools.**
- 2) Justification: The effectiveness of MPAs as a fisheries management tool likely varies according to the species and habitats involved, as well as fishing pressure within the “spillover” zone. More information is needed on species and habitat specific responses to limiting or prohibiting fishing in a specific geographic area before MPAs can be properly employed in a fisheries management context.
- 3) n/a

- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #10 - Fisheries

- 1) **Investigate the effects of artificial reefs on fish population dynamics.**
- 2) Justification: The deployment of artificial reefs must operate under the principle of “first, do no harm”. Proper siting and construction of artificial reefs has the potential to relieve recreational and fishing pressure from nearby natural habitat thus ensuring the maintenance of key ecosystem services. Understanding the interaction between various types of artificial habitats and adjacent ecosystems is key to proper siting and design of artificial reefs.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

Fish and Wildlife and Their Habitat

FWC Priority #1 - Fish and Wildlife and Their Habitat

- 1) **Identify and establish minimum flows and levels necessary to sustain fisheries and wildlife resources in estuarine systems. Monitor effects of established river and stream minimum flows and levels riverine, estuarine, and marine fish, wetland and estuarine wildlife, wetland plant communities, and riverine and nearshore submerged aquatic vegetation.**
- 2) Justification: Natural freshwater flow regimes are critical for maintaining estuarine ecosystem structure and function. The timing and amount of freshwater entering estuaries must mimic natural cycles as closely as possible to ensure healthy fish and wildlife populations. Monitoring of estuarine ecosystem components’ response to established minimum flows and levels would allow regulators to adjust MFLs adaptively to ensure estuarine ecosystem health.
- 3) n/a
- 4) Yes, part of this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #2 - Fish and Wildlife and Their Habitat

- 1) **Identify the relationship between land-use activities, nutrient loads and coastal harmful algal blooms, such as red tide, as well as estuarine and nearshore seagrass loss.**
- 2) Justification: Coastal HABs can cause fish kills through direct toxicity or anoxia, create public health concerns, limit light availability for seagrasses, and impact local

economies. It is important to understand the link, if any, between human land use, coastal nutrients, and the formation and/or intensification of HABs so appropriate management actions can be taken to ameliorate their effects.

- 3) n/a
- 4) Yes, part of this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #3 - Fish and Wildlife and Their Habitat

- 1) **Develop and implement a statewide seagrass mapping, monitoring, protection, and restoration program with federal, state and local partners to protect vital fisheries habitat.**
- 2) Justification: Healthy seagrass beds are a vital habitat component for the majority of Florida's economically valuable fish and shellfish and are indicative of a healthy coastal ecosystem. Periodic mapping and monitoring of seagrasses and other submerged aquatic vegetation statewide will establish a baseline to track future trends and identify priority areas for habitat restoration.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Develop and implement a coral and hardbottom mapping, monitoring, protection, and restoration program with federal, state and local partners. Improve conditions that enhance the natural ability of corals to survive and recover from stressors in the natural environment and identify areas in which coral communities have been successful in resisting and/or recovering from stress event (e.g., identify causative factors of coral bleaching and define reefs that are resistant to bleaching).**
- 2) Justification: Periodic mapping of benthic habitats will provide an important baseline by which to measure the effectiveness of various management actions and identify key areas for further protection. Understanding the relationship between water quality and other environmental factors and the ability of corals to recover from stressors is critical to protection and restoration efforts.
- 3) n/a
- 4) Yes, part of this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Prevent or minimize the impact of introduced nuisance species, including those found in ballast water, on native fish and wildlife.**

- 2) Justification: Ballast water taken on outside of Florida and subsequently released into our waters may carry invasive exotic species and pathogens which could prove harmful to native ecosystems. The potential threats associated with ballast water introductions should be determined and releases prevented where feasible.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Understand the potential for impacts on fish and wildlife if oil and gas development occurs off Florida.**
- 2) Justification: Current patterns on the West Florida Shelf transport water masses toward the keys and along the east coast. It is important to quantify potential environmental impacts of oil and gas development at both local and regional scales before any siting decisions are made.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Comprehensively assess long term trends in beach loss, and its effect on sea turtle and shorebird population trends and losses of near shore benthic habitats.**
- 2) Justification: Coastal armoring and shoreline hardening destroy turtle and shorebird habitat and/or prevent access to nesting areas. The population implications of this habitat loss must be considered as management decisions regarding beach modification are made.
- 3) n/a
- 4) Yes, part of this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Identify critical nesting and feeding habitats for shorebirds; develop recommendations to reduce impacts to these habitats from recreational and shoreline management activities as well as long-term impacts from climate variability.**
- 2) Justification: Florida beaches are an important stop along the migratory routes of many shorebirds and support diverse local communities as well. The role of our beaches in providing feeding and resting areas for shorebirds must be figured into shoreline management decisions.

- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Establish an economic value for natural coastal and marine habitat associations and associated fishery/wildlife resources. [compared to their “highest and best use” value].**
- 2) Justification: The economic value of healthy coastal ecosystems is likely very large, but unknown. It is important to quantify the economic value of healthy ecosystems for comparison purposes when various management alternatives altering the natural state are being considered.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Enhance estuarine/marine restoration activities where environmental insults have been corrected or abated.**
- 2) Justification: Re-establishing degraded or depleted habitats will jumpstart the restoration of ecosystem structure and function if environmental stressors have been eliminated.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Research to understand the effects of climate variability to fish and wildlife resources.**
- 2) Justification: The long term effects of climate change are largely unknown or unquantified and should be investigated to provide an appropriate context within which future management decisions can be made.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Investigate the impacts of biotoxins on fish and wildlife resources.**

- 2) Justification: Many marine algae and other organisms produce toxins that can result in disease or mortality of marine organisms, and create public health concerns. It is important to quantify and understand these threats in a proactive manner.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #? - Fish and Wildlife and Their Habitat

- 1) **Investigate diseases and pathogens of aquatic organisms and their impacts on fish and wildlife resources.**
- 2) Justification: Increased disease incidence in wild marine organisms is often an indication of impaired ecosystem function. Disease surveillance and subsequent investigation can detect ecosystem dysfunction early.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

Coastal land use, ocean quality, and economic viability

FWC Priority #1 - Coastal land use, ocean quality, and economic viability

- 1) **Assess the social and economic consequences associated with the increasing rates of beach erosion, coastal armoring, beach renourishment and decreasing federal subsidy.**
- 2) Justification: Beaches naturally subside and reestablish themselves over time. There is an economic, environmental and social cost associated with the alteration of this natural pattern and these costs must be placed in appropriate context in management decision making.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #2 - Coastal land use, ocean quality, and economic viability

- 1) **Continue to expand GIS and desktop tools and access to statewide ocean resource data around the themes of fisheries, law enforcement, disaster response, commerce, imperiled species, and resource quality.**
- 2) Justification: Enhanced data sharing and analytical capability will facilitate integrative analyses necessary for wise management in multiple contexts.
- 3) n/a
- 4) Yes, part of this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #3 - Coastal land use, ocean quality, and economic viability

- 1) **Determine water and sediment quality standards for all estuarine and marine environments.**
- 2) Justification: Water and sediment quality standards in coastal systems will provide an objective endpoint to manage activities that may degrade the ecosystem.
- 3) n/a
- 4) No, this need was not submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #4 - Coastal land use, ocean quality, and economic viability

- 1) **Develop strategies and recommendations/guidelines for land-use decisions in light of sea level rise and the predicted decades-long increase in hurricane activity.**
- 2) Justification: Land use decisions must take into account the long term risk associated with storms and sea level rise.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #5 - Coastal land use, ocean quality, and economic viability

- 1) **Continue development and deployment of remote ocean observing and water quality monitoring platforms, including real time monitoring and prediction of red tides.**
- 2) Justification: Coastal ocean observing systems will provide high temporal resolution data on water quality, physical, chemical, and biological parameters necessary for tracking bloom initiation, movement, and dynamics.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

FWC Priority #6 - Coastal land use, ocean quality, and economic viability

- 1) **Reduce shoreline and in-water pollution from marine debris.**
- 2) Justification: Marine debris degrades habitats, creates substantial clean up costs for local communities, and impairs ecosystem services in coastal areas.
- 3) n/a
- 4) Yes, this need was submitted to the Council in 2005
- 5) This need is statewide.

Florida Department of Agriculture and Consumer Services

Note: Each of DACS Management Needs is of equal importance. No priority is assigned.

DACS A

- 1) Need biophysical oceanographic data for Florida estuarine and nearshore waters.
- 2) The department classifies marine waters and acts as leasing agent for the Board of Trustees on aquaculture leases. Having chemical, physical and biological data on Florida's waters would greatly improve the department's ability to manage its responsibilities.
- 3) n/a
- 4) This need was previously submitted.
- 5) Need is statewide. Can fit under mapping, monitoring and data management.

DACS B

- 1) **Need a validated method of bacterial source tracking.**
- 2) The department manages shellfish harvesting based on bacteriological sampling for fecal coliform. Currently management decision making is based upon differentiated coliform cell counts. Developing the ability to distinguish between human and nonhuman sources would greatly improve our ability to eliminate human health risks and increase economic productivity.
- 3) n/a
- 4) This need was previously submitted.
- 5) Need is statewide. Can fit under monitoring, modeling and data management.

DACS C

- 1) **Once B above is achieved, individual watershed maps of the bacterial sources are needed.**
- 2) Mapping bacterial sources would allow the department to evaluate its current water classifications, which are in map form and manage shellfish harvesting areas accordingly. Management could include increasing, decreasing, moving or eliminating areas depending on where the bacterial sources occur.
- 3) n/a
- 4) This need was previously submitted.
- 5) Need is statewide. Can fit under mapping and data management.

DACS D

- 1) **Need the ability to monitor red tide blooms in real-time.**

- 2) Florida has a significant shellfish industry that is unable to move product once red tide is detected at a threshold level. Harvest is not permitted until the accumulation of red tide toxin is below a threshold level within shellfish in that area. This need would allow the department and industry to predict red tide movement, monitor red tide levels in their area and take the appropriated steps to ensure that they have product to sell during the closure. Additionally, it would give the department and industry additional confidence that the red tide does exist or is at a level too high for safe harvest.
- 3) n/a
- 4) This need was previously submitted.
- 5) Need is somewhat statewide. Can fit under monitoring.

DACS E

- 1) **Need validated models that relate upland growth/development to changing water quality parameters.**
- 2) Once items A & B above are accomplished, a model needs to be created and tested to link biophysical data into what is happening on shore and how those activities on shore are impacting water quality parameters. Accomplishing this need would provide such a tool to use to predict how activities on shore will impact water quality. Prediction capabilities allows agencies to better plan for expanding activities.
- 3) n/a
- 4) This need was previously submitted.
- 5) Need is statewide. Can fit under modeling.

DACS F

- 1) **Need analysis of environmental impacts of concentrated aquatic species production.**
- 2) Marine aquaculture in Florida has existed for years. Unlike terrestrial agriculture, work has not been done on the effects of raising large quantities of animals in a limited area on the animals themselves or the surrounding environment. Placement and limitations on quantities could be handled through management and lease conditions if these factors were known.
- 3) n/a
- 4) This need was previously submitted.
- 5) Need is statewide.

DACS G

- 1) **Need evaluation of production systems or techniques.**
- 2) Aquaculture production provides a viable method of producing food for a growing market. Many different production systems are currently being utilized. As marine

aquaculture continues to expand, regulators are in need of verifiable data to direct the formulation of regulations to manage this industry.

- 3) n/a
- 4) This need was previously submitted.
- 5) Need is statewide.

DACS H

- 1) **Need a thorough evaluation of native species for aquaculture production.**
- 2) As the demand for safe and reliable seafood continues to grow, pressure is being placed on aquaculture to provide that seafood. This request would focus effort to investigate Florida's native species to determine which, if any, could be economically and effectively farm-raised.
- 3) n/a
- 4) This request was previously submitted.
- 5) Need is statewide.

Florida Department of Health

DOH Priority #1

- 1) **Need to assess the effect that human waste management, and septic tank use in particular, has on nutrient loading and water quality in near-shore habitats**
- 2) Human wastes are one of the potential sources of nutrients and water quality impairments in nearshore habitats. In order to prioritize upgrades to waste management practices it is necessary to understand the effects of current and upgraded practices. Central sewer and wastewater treatment plants (WWTP) are frequently proposed and installed as a solution to water quality problems that are linked to insufficient onsite treatment and disposal systems in septic tanks. Frequently, existing septic tanks include a substantial number installed before current, more protective, construction standards came into effect. Low water quality is usually well documented before the installation of a WWTP. Fewer studies are available that compare the actual improvement of water quality to the expected one. This is a necessary step to confirm that the original impact assessment was correct. Such a study is needed to help state and local governments evaluate and prioritize wastewater infrastructure upgrade alternatives.
- 3) NA
- 4) Yes, this was submitted last year
- 5) Statewide

DOH Priority #2

1. **Comparison of environmental risk to coastal waters from several wastewater management approaches.**
- 2) Septic tanks and centralized sewage systems describe two end members of wastewater management approaches. While septic tanks are technologically simple and require only limited maintenance and operational oversight, they achieve only limited treatment, which occurs to a large extent in the drainfield. Centralized sewage systems, in order to provide advanced treatment, employ complex processes and process controls that require continuous attention. While one could approximate the environmental risk by the typical effluent concentrations for average loading conditions this likely gives an incomplete picture. One needed perspective might be differences in attenuation before reaching area waters. Another key element is that the risk stemming from catastrophic events is likely to be different. Anecdotal evidence suggests that lift stations and wastewater treatment plants suffer more observable operational problems during hurricanes than septic systems. A formal assessment of environmental risks to typical area waters from different wastewater management approaches will make the trade-offs between level of treatment and risk under various conditions more visible. This, in turn,

will allow state and local decision makers to more fully evaluate wastewater treatment alternatives, and allow tie-in with DEP's total maximum daily load program.

- 3) NA
- 4) Yes
- 5) Statewide

DOH Priority #3

- 1) **Need to develop and implement a consistent public health strategy and improve public notification of harmful algal bloom (HAB) events at county health departments to mitigate and eliminate adverse health outcomes from exposures to HABs.**
- 2) Florida is home to all major toxin-producing marine, estuarine and freshwater microalgae. The subtropical warm climate, 1200 miles of coastline, varied aquatic habitats, and human interaction through seafood consumption and from water activities create an environment where the presence of aquatic toxins can have a significant impact on public health. This project would allow for the development and enhancement of planning and intra-governmental coordination mechanisms to provide meaningful state participation in ocean resource management and decision-making processes; and improvement in public access through the coordinated response plans to protect the public, direct and reestablish safe access to coastal resources. Activities supported by this strategy would promote and assist local county health departments in their development of HAB-specific response plans, including a User's Manual for each county health department that reflects local needs, resources, capabilities and limitations.
- 3) NA
- 4) No.
- 5) Statewide

DOH Priority #4

- 1) **Need to identify sources of pollution and develop new monitoring tools, ultimately making beaches safer**
- 2) Identifying and understanding the sources of pollution along our public bathing places and other recreational waters would allow the agency to better coordinate with the appropriate beach managers and operators the control and management of these sources. Including: 1- the development of a warning system such as a mathematical model for microbial water quality, rather than a system that is based upon "after the fact" analyses. This system can be tied into environmental factors that are known to impact water quality, e.g. rain events, tidal actions, high winds, etc. This level of coordination will be aimed directly to protect public health and to minimize economical impact due to unnecessary beach closures and advisories. Beaches serve an important role in the U.S. economy. 2- Assessing the potential role that beach sand plays in

harboring pathogens and traditional microbial indicators e.g. Total and Fecal Coliforms, E. Coli, and Enterococci. And 3-Evaluating the human health impacts of non-point sources of pollution utilizing epidemiologic study. Coastal recreation is estimated to contribute approximately 85% of all U.S. tourist revenues. However, this revenue depends upon the availability of coastal areas that are safe for recreational purposes.

- 3) According to the latest U.S. Centers for Disease Control (CDC) report October 22, 2004, the largest number of recreational water-associated outbreaks (65 outbreaks causing illness among an estimated 2,536 persons) occurred between 2001 and 2002. The National Resources Defense Council (NRDC) annual report “Testing the Waters 2005” indicates that during 2004, U.S. beaches had 24,853 beaches closing and advisory days, the highest in 15 years since the NRDC started reporting this data, a 9% increase from 2003. In 2004, 85% of the total closings and advisories were issued because water quality exceeded the recommended bacteria indicator standards for which the sources of contamination were not identified. The inability to identify sources, in particular when point sources of pollution are not obvious and/or not present, has made it difficult to remediate and prevent the impacts to beaches.
- 4) No.
- 5) Not statewide but has statewide transferability

Northwest Florida Water Management District

NFWMD was not able to submit Management Needs this year.

St. Johns River Water Management District

SJRWMD Priority #1

- 1) **The need to know what factors control cyanobacterial blooms and toxin production and what are the environmental consequences of cyanobacterial blooms**
- 2) Intensive blooms of cyanobacteria over the past summer extended from Crescent Lake and Lake George to the mouth of the St. Johns River. Associated with these blooms were concentrations of algal toxins (primarily microcystin) that were more than ten times higher than typical guidelines for recreational use. Evidence indicates that prolonged blooms also negatively impact zooplankton with deleterious implications for fisheries and for other biota. The proposed TMDL for much of this area is designed to reduce the frequency of intense, prolonged blooms in order to maintain zooplankton abundance and diversity. Additional research is needed, however, to ensure that bloom frequency and intensity is reduced enough to largely eliminate occurrences of potential harmful concentrations of algal toxins.
- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005.
- 5) This need is regional (Northeast Florida, St. Johns River) and significant. The research would also have statewide transferability; harmful algal blooms are a statewide issue.

SJRWMD Priority #2

- 1) **The need to know and understand the extent and consequences of hydrodynamic, nutrient, and biotic interaction between the nearshore Atlantic and the mouth of the St. Johns River**
- 2) Nutrient TMDL development in the lower reaches of the St. Johns River requires a quantitative understanding of the significance of nearshore phytoplankton production in creation of oxygen deficits in the river and how significant is river nutrient loading to nearshore phytoplankton production. Benthic macroinvertebrate communities indicate periods of hypoxia in the St. Johns River near the mouth. Dissolved oxygen measurements in the lower reaches of the river indicate that State oxygen standards are often not met. Because of the large tidal range in the South Atlantic Bight, there is a strong interaction between the river and the nearshore area that contributes to the oxygen deficits. The proposed TMDL for lower reaches of the river is designed to reduce algal production that contributes to the river's oxygen deficits, but there is evidence that much of the algal organic matter that causes these deficits is produced in the nearshore ocean and then imported to the river via bottom-water tidal intrusion. This nearshore algal production, in turn, is likely supported to a significant extent by nutrients from the St. Johns River. Other sources of nutrients for the nearshore would include longshore currents and upwelling. Our knowledge of the hydrodynamics,

sources of nutrients, and phytoplankton-nutrient interactions of the nearshore are presently insufficient to precisely determine its interactions with the river.

- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005.
- 5) This need is regional (Northeast Florida, St. Johns River) and significant. The research could also have statewide transferability especially where such ocean-estuary interactions are believed to be significant and have a bearing on watershed nutrient management decisions.

SJRWMD Priority #3

1) Need to assess the ecological and human health risks associated with elevated levels of metals and organic contaminants in aquatic sediments

- 2) We need to conduct integrated ecological and human health risk assessment in coastal waters with significantly high levels of trace metal and organic contaminants. Research in the St. Johns River Water Management District has revealed that many aquatic ecosystems have sediments with elevated levels of potentially toxic pollutants. Screening studies suggest that in some areas there is a high probability that sediment pollutants are at levels injurious to benthic organisms. Despite the high levels of sedimentary organic matter at some locations (SOM serves as a retention mechanism), potentially toxic contaminants are present in the tissues of aquatic organisms, in some cases at levels indicative of bioconcentration. Also, there are concerns that high levels in aquatic animals may be helping give rise to certain pathologies, perhaps as a consequence of compromised immunity. Toxic substance surveys could be coordinated with animal pathology investigations (e.g., fibropapilloma in turtles found in the Indian River Lagoon, infectious and neoplastic diseases in bottlenose dolphins and manatees) to determine if there are links. In addition to the conventional set of trace metals and organic contaminants, pharmaceuticals and medical biocidal agents should also be surveyed. Certainly the presence of toxins in tissues of fish, clams, shrimp, and especially marine mammals raises the possibility of human toxicity.
- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005, but modified with the inclusion of pharmaceuticals and medical biocides in the surveys of contaminants, and the inclusion of marine mammals and turtles as subjects of study.
- 5) This need is statewide

SJRWMD Priority #4

- 1) **Need to better understand the implications of the developmental loss and conversion of headwater wetlands draining to tributaries of the St. Johns River estuary.**
- 2) Need to develop a comprehensive set of findings on the types and levels of impacts of headwater wetland losses on estuarine primary and secondary production, as well as on

progress to restore or protect these functions in estuaries. Development has eliminated or impacted a large portion of the wetlands and riparian areas of tributaries to the estuary. Consequently, the character of organic carbon delivery, processing, and export has changed. Many of these tributaries and their associated wetlands are classified as essential fish habitat by the National Marine Fisheries Service. We need a better understanding of the impacts of headwater wetland losses on organic matter production and processing, secondary production, and fish production to guide regulation, management, and restoration of the estuary.

- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005.
- 5) This need is regional and significant, but can have statewide transferability.

SJRWMD Priority #5

- 1) **We need to quantify the degree of recovery of some major wetland functions as impounded wetlands are reconnected to the Indian River Lagoon in order to better account for the presumed benefits of this restoration strategy.**
- 2) A majority of the Indian River Lagoon wetlands, extending along 1/3 of Florida's east coast, was impounded for mosquito control but recently most of those wetlands have been reconnected to the Lagoon's open waters. What is the recovery trajectory in terms of marsh elevation, plant communities, fish populations, and avifaunal usage? The Indian River Lagoon is reputed to be the nation's most biologically diverse estuary. It is also of enormous economic importance. Fish passage through culverts of reconnected wetlands has indicated that they have substantial value for a variety of species, including commercially important species. More extensive sampling of fish usage within reconnected impoundments and other rehabilitated wetlands is needed to assess the degree of recovery and the overall significance for lagoon fisheries. Moreover, we need to assess bird usage and the recovery trajectory of plant communities, elevation, and other ecological parameters.
- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005.
- 5) This need is regional and significant, but can have statewide transferability wherever coastal wetlands have been impounded and a desire for their ecological restoration exists.

SJRWMD Priority #6

- 1) **Need to understand the major factors regulating seagrass distribution in the Mosquito Lagoon.**
- 2) Determining the limiting factors that control seagrass depth distribution in the Mosquito Lagoon is critical to development of watershed targets (e.g., nutrient TMDLs) and strategies. Seagrasses grow to shallower depths in the southern Mosquito lagoon than in

other areas of the east coast lagoon system. Seagrass optical models indicate that the seagrass depth distribution in Mosquito Lagoon should be more expansive in certain years. What other factors besides light are controlling the depth distribution of seagrasses in Mosquito Lagoon (physical disruption by wave action, biological factors?)? Management of the Mosquito Lagoon, including nutrient TMDL development, would benefit from research that elucidates the factors controlling the depth distribution of seagrasses.

- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005.
- 5) This need is regional and significant, but can have statewide transferability. For example, Tampa Bay NEP has recognized that even though light is the primary factor limiting seagrass coverage, there are other factors that need to be addressed if seagrass coverage targets are to be fully achieved. But, what are those factors?

SJRWMD Priority #7

- 1) **Need to develop a coordinated, multi-agency management strategy for oysters, an important ecological and economic resource in Northeast Florida**
- 2) Oysters and oyster reefs are ecologically and economically important in Northeast Florida, but there is very little being done to assess oyster habitat viability and, in general, to protect this resource. What areas of the northeast coast are important for oyster bed maintenance and development, where are we seeing losses or reef degradation, and what are the major sources of contamination of the beds? The distribution of oyster reefs in the Tolomato, Guana, Matanzas and Halifax river estuaries is not well documented, yet this information would greatly aid management and regulatory decisions. Many areas are, or were, commercially important for oyster harvesting. This economic benefit has declined markedly with the bans or restrictions on harvesting due to high coliform levels. Attempts to recover the economic value of these areas depend on accurate maps of the distribution of oyster reefs and the identification of sources of pathogen contamination. State-of-the-art methods could be employed to identify specific sources of the bacterial load that potentially impact important oyster harvesting areas. The overall management goal would be the achievement of fully distributed and sustainable oyster reef communities to serve both ecological and economic purposes. The management objectives served by this work would be oyster reef protection and enhancement, and the reduction of pathogen sources and the reopening of important oyster harvesting areas.
- 3) Additional background information is not provided at this time.
- 4) This need was submitted to the Council in 2005.
- 5) This need is regional and significant, but can have statewide transferability

Suwannee River Water Management District

SRWMD Priority #1

1) Need to identify the relationships between salinity, flow, and habitat in the tidally influenced portions of coastal rivers within SRWMD.

- 2) There is currently limited salinity data for coastal rivers in SRWMD.
- 3) Salinity and flow data are coupled to generate the location of specific isohalines in coastal rivers. Linear interpolation is used to identify location of specific isohalines. Isohaline location is an important identifier of the extent of available habitat respective of salinity regimes. A salinity regime produces and maintains a specific chemical environment as well as habitat for the biota.

From *Salinity-Flow and Habitat Relationships: Establishment of an MFL for the Waccasassa River*. The tidal characteristics of the estuarine portion of the Waccasassa River have been characterized by Stelzenmuller (1965) and by Mote Marine Laboratory (Dixon, 1986). Generally, the estuarine portion of the Waccasassa River was characterized as a well-mixed system, largely influenced by daily tidal cycles with little apparent stratification (i.e. < 5 ppt). Data related to estimating the effects of freshwater inflows on the salinity characteristics of the estuarine portion of the river were limited to two studies: the 1985 study by Mote Marine Laboratory (Dixon, 1986) for SWFWMD and another synoptic salinity survey conducted in late 2004 and 2005 under the direction of the SRWMD (SRWMD/WAR, 2005). In each of these studies monthly sampling was conducted by collecting vertical salinity profiles in one-meter intervals at fixed locations within the Waccasassa River and extending into Waccasassa Bay (Figure 5-1).

- 4) This need was not submitted to the Council in 2005.
- 5) This need is not statewide but has statewide transferability in establishing river flow below which significant harm would occur to a resource of concern through changes to the existing salinity regime.

SRWMD Priority #2

1) Need to develop efficient data management and analytical methods to identify nutrient-loading rates and trends in surface water quality in the Suwannee River Water Management District.

- 2) Analysis of surface water chemistry data is necessary in determining the long-term affects of land-use practices and the effectiveness of land-use management efforts on surface water quality. A comprehensive loading estimate and trends analyses could better identify temporal changes in surfacewater quality of SRWMD rivers. Currently, SRWMD maintains a monitoring network, but methods must be developed in order to more efficiently analyze loading rates and manage water chemistry data.

The network began in 1989 to assess water quality as a priority project of the Surfacewater Improvement and Management (SWIM) Program. The network was

created to determine water quality status of priority waterbodies within the District, and to identify changing conditions in water quality. There are 76 sampling sites. Field parameters collected include total depth, sample depth, water temperature, pH, DO, conductivity, stage, Secchi depth, and salinity. Physical and biological parameters of water samples include color, turbidity, TDS, alkalinity, TOC, DOC, and chlorophyll a. Concentrations of major ions and nutrients include nitrate + nitrite nitrogen, TKN, ammonia nitrogen, total phosphorus, and orthophosphorus. Monthly field and laboratory data are analyzed for quality assurance and reported by the District's field contractor. Advice is provided regarding major anomalies.

- 3) n/a
- 4) This need was not submitted to the Council in 2005.
- 5) This need is not statewide but has statewide transferability.

SRWMD Priority #3

- 1) **Need to identify spatial and temporal trends in algal and benthic macroinvertebrate communities as relates to surface water quality in the Suwannee River Water Management District. Need to establish standard operating procedures for biological sampling in estuarine waters.**
- 2) Algae and benthic macroinvertebrates have been used for years to assess water quality. Each group exhibits characteristic responses to various kinds of pollution stress. An integrated approach to surfacewater and biological monitoring is necessary if water quality is to be assessed upon the basis of biological communities. Algal and macroinvertebrate data has been collected for sixteen years. A detailed trends analysis was performed for the first 14 years of these data (1989-2003). Trends analyses should be conducted regularly and biological datasets should be managed for efficient computation of such trends. Methods must be developed in order to more efficiently analyze these trends and manage biological data. Methods must also be established as standard sampling procedure in estuarine systems.
- 3) The network began in 1989 as a priority project of the Surfacewater Improvement and Management (SWIM) Program upon the premise that an effective surfacewater quality monitoring program should include biological sampling. There are 35 biological sampling sites, corresponding to specific locations where surfacewater is sampled. Although chlorophyll-a is analyzed as a surfacewater quality parameter, suspended algae is enumerated and identified from respective water quality samples. Periphyton is sampled using glass slides. Macroinvertebrate sampling gear includes Hester-Dendy multiplate samplers in larger rivers such as the Suwannee and Santa Fe rivers, and D-frame dipnets in smaller streams that can be waded. Monthly, bi-monthly, and quarterly biological field and laboratory data are analyzed for quality assurance and reported by SRWMD field contractor. Advice is provided regarding major anomalies.
- 4) This need was not submitted to the Council in 2005.

5) This need is not statewide but has statewide transferability.

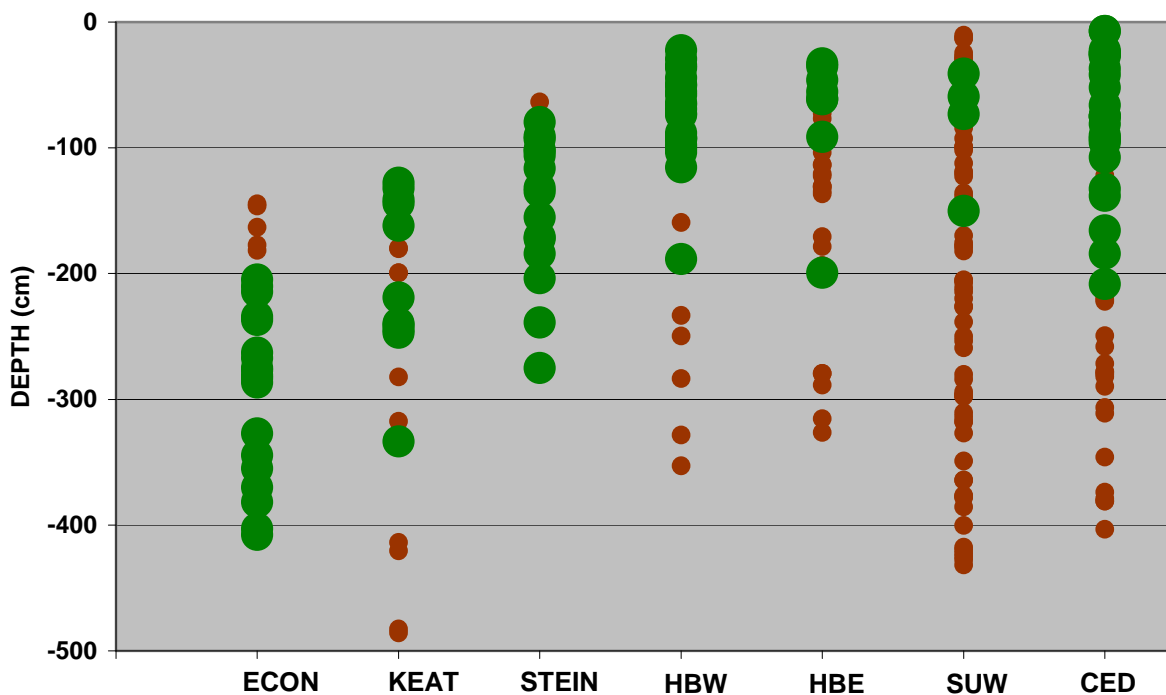
SRWMD Priority #4

- 1) **Need to implement an integrated program of seagrass mapping and biological data analysis in the Big Bend.**
- 2) Seagrass protection is essential to the protection of many economically important fish and shellfish species, and for the maintenance of commercial and sport fisheries in the State of Florida.
- 3) From An Integrated Seagrass Mapping and Monitoring Program for the State of Florida, a draft prepared 12/20/04 by Paul Carlson.

Background- Approximately 914,000 hectares (2,258,000 acres) of seagrass have been mapped within Florida state waters. Inclusion of deepwater seagrass beds in the Big Bend region and the Southwest Florida Shelf raise the total area of seagrass in Florida Gulf Coast estuaries and on the West Florida Shelf to over 3 million hectares (Carlson and Madley, in press).

Unfortunately, seagrasses are vulnerable to many direct and indirect human impacts, especially eutrophication and other processes which reduce water clarity. Duarte (1991) found that water clarity was the primary factor determining depth distribution of seagrasses throughout the world. In Florida waters, water clarity is also the primary determinant of seagrass depth distribution, and eutrophication can affect water clarity over a large area. In the example below, turbidity associated with the Suwannee River affects the depth distribution of turtle grass over a large area extending from the

DEPTH DISTRIBUTION OF THALASSIA



Econfina River to Cedar Keys.

Although concerted efforts to improve water quality have resulted in seagrass increases in some Florida estuaries, seagrass cover in Florida is declining. To protect and manage seagrass resources in Florida, we need to implement an integrated program of seagrass mapping and monitoring. Elements of this program include: 1) mapping of all seagrasses in Florida waters on a 6-year schedule, 2) monitoring seagrasses throughout Florida annually, 3) publication of an annual report documenting seagrass cover and species composition changes at monitoring stations located throughout the state, and 4) publication of a comprehensive report every six years, combining site-intensive monitoring data and trends with statewide seagrass cover estimates and maps showing seagrass gains and losses.

- 4) This need was not submitted to the Council in 2005.
- 5) This need is statewide.

Southwest Florida Water Management District

SWFWMD Priority #1

- 1) **Need method to integrate all coastal data collected into one comprehensive report.**
- 2) Developing an integration method and subsequent analytical report will allow environmental managers to obtain a comprehensive picture of the health of coastal habitats. The ultimate goal is to produce an all-inclusive coastal health report using data collected from all sources, current and historic, including but not limited to federal, state and local agencies, water management districts, and the public.
- 3) N/A
- 4) This need was not submitted to the Council in 2005.
- 5) This need is statewide.

SWFWMD Priority #2

- 1) **Need central data repository for all government and non-governmental coastal ecosystem data being collected.**
- 2) Developing a central, comprehensive database will allow for the identification of data gaps and will provide managers a single location for data gathering. A comprehensive database will afford agencies the ability to custom design research programs without reproducing an existing effort.
- 3) N/A
- 4) This need was not submitted to the Council in 2005.
- 5) This need is statewide.

South Florida Water Management District

SFWMD priority #1

- 1) **Need to identify and quantify factors that cause phytoplankton blooms in coastal ecosystems.**
- 2) It is important for the District to understand the role of freshwater inflow and its interaction with other controlling factors. These include short-term perspective of day-to-day management of inflows to coastal systems and long-term hydrologic changes resulting from CERP.

The frequency and severity of algal blooms seem to have increased in the past several years. This has resulted in reduced light availability for seagrasses and episodes of hypoxia and anoxia.

Freshwater inflows affect ability of phytoplankton to grow. Need to understand the potential source of nutrients, influence of light availability (color, turbidity), and the influence of hydraulic residence time

Management of freshwater inflows needs to consider its influence on algal blooms. Are there temporal patterns of discharge that discourage blooms? Will re-distribution of loads and flows through CERP increase or decrease the frequency and severity of blooms?

- 3) n/a
- 4) Not submitted to Council last year.
- 5) This Management Need is of regional significance, with statewide pertinence.

– Submitted by non-state agencies and public entities
June 2006 –

Caribbean Conservation Corp. and Sea Turtle Survival League

Caribb Conservation Corp/Sea Turtle Survival League Priority #1

- 1) **Develop and establish criteria for assessing structure, health and distribution of nearshore hardbottom (worm rock) reefs and their ecological role in the marine ecosystem.**
- 2) There is a need to determine the value of hard bottom (worm rock) reefs as essential fish habitat and in the life cycle of sea turtles. As the pace of beach renourishment increases the impacts to these near shore reefs are also increasing. Understanding these impacts will aid in the designing of renourishment projects. Understating the role these reefs play in the overall ecosystem will aid in assessing mitigation and restoration when impacts can not be avoided. The reefs serve as nursery and forage areas for hundreds of marine species, they contain unique assemblages of algal communities important as foraging habitat for green sea turtles, and provide refuge for sea turtles and other species. Recent research indicates that some of these near shore reefs located near Atlantic coast inlets contain the most genetically diverse assemblages of juvenile turtles ever recorded in their foraging habitats. These turtles found on Florida's worm rock reefs were born on distant nesting beaches throughout the Caribbean and as far away as the Mediterranean. In addition, capture rates of juvenile turtles on these reefs exceeds the capture rates for this age class for any other habitat studied.
- 2) n/a
- 3) Addressed by the Council in 2005- Partially
- 4) Regional. This need exists wherever these reefs are found. To my knowledge the most extensive area of near-shore hardbottom reefs is along the mid and south Atlantic coast of Florida.

Caribb Conservation Corp/Sea Turtle Survival League Priority #2

- 1) **Develop strategies to protect and restore frontal dunes.**
- 2) Frontal or most seaward dunes provide upland protection from storm surge, may be a substantial source of sand to an eroding beach, provide habitat to listed species, and provide important nesting habitat for marine turtles that nest at the toe of the dune in large numbers. In many areas these dunes have been and are being destroyed or built upon.
- 3) n/a
- 4) Addressed by the Council in 2005? – Not sure.

- 5) Statewide. This need may exist on all of Florida's sandy beaches with existing or historical dunes.

Caribb Conservation Corp/Sea Turtle Survival League Priority #3

- 1) **Research and assess long term strategies that help reduce the development pressures adjacent to or on the frontal dunes of eroding and critically eroding beaches.**
- 2) Even before the 2004 and 2005 hurricane seasons about 38% of Florida's sandy beaches were designated as critically eroding and over half were eroding. At the same time, because there is essentially no coastal building setback, development continues to push seaward to the shore's edge while the beaches erode inland. Because of the need to protect upland structures from coastal erosion, this dynamic increases the need for sea walls and beach nourishment and ultimately destroys the natural beach. Frontal dune development on eroding beaches also ultimately reduces a beaches natural resiliency to recover after storm events. Developing these strategies would enhance protection of the beach/dune system
- 3) n/a
- 4) Addressed by the Council in 2005? – No
- 5) Statewide. This need exists on most of Florida's eroding sandy beaches.

Caribb Conservation Corp/Sea Turtle Survival League Priority #4

- 1) **Conduct an assessment of trends and cumulative impacts of sea wall construction.**
- 2) This need exists because of increasing coastal erosion and storm frequency coupled with increasing sea wall construction. Currently the state does not maintain an active sea wall construction data base. Having a better understanding of these trends and impacts may result in stronger policies discouraging sea walls and may also increase public support for coastal setbacks and other beach management strategies such as renourishment. Sea walls also have significant negative impacts to sea turtle nesting habitat. Understanding sea wall construction trends may provide information on loss of nesting habitat to support the development of a state-wide habitat conservation plan (HCP). An HCP could be designed to mitigate for and minimize the impacts.

Sea walls hold back the upland sand and prevent that sand source from being used on an eroding shore. Understanding these impacts may help predict erosion from storms and other causes.
- 3) n/a
- 4) This need was partially addressed in 2005.
- 5) Statewide. This need exists for most of Florida's eroding sandy beaches.

Caribb Conservation Corp/Sea Turtle Survival League Priority #5

1) **Research and develop new coastal policy strategies that consider predicted increased storm frequency and intensity and predicted sea level rise. This includes developing erosion models that consider these potential stressors.**

2) The establishment of the CCCL and the 30 Year Erosion Line do not take into account these events. Consequently, they may not fully provide the life safety, property, and beach/dune protections as originally intended.

It takes 3-5 years to reestablish the CCCL when its location has been rendered inadequate by coastal erosion and/or dune recession from storm events. New strategies need to be explored to expedite the reestablishment of these lines when necessary.

3) n/a

4) Addressed by the Council in 2005? – Yes

5) Statewide

Charlotte Harbor National Estuary Program

Charlotte Harbor NEP Priority #1

- 1) **Need to identify gaps in flow data based on ecosystem needs and projected needs for water withdrawals due to population growth, development, agriculture, and mining and then implement data collection to address these gaps.**
- 2) To document changes in surface water flows and patterns due to hydrologic alterations, it is important that accurate, long-term data bases be developed for all basins and watersheds. While many areas have extensive historical flow records, other areas lack this historic record. Accurate data will also be needed to assess the effectiveness of the Action Plans. Action will provide accurate, long-term information on amounts and variability of surface water resources and provide a basis for planning. Identifying gaps in flow data will provide a scientific basis for the establishment of minimum flows and levels and assess future changes related to projected development and consumptive uses.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #2

- 1) **Need to identify gaps in water quality data needed to calibrate the appropriate models used to assess impairments, determine Total Maximum Daily Load (TMDL) limits, and develop Basin Management Action Plans (BMAPs).**
- 2) The Florida Department of Environmental Protection assesses impairments, establishes Total Maximum Daily Load (TMDL) for water bodies within the state which have been identified as not meeting current water quality standards, and reviews Basin Management Action Plans developed locally. For many waterbodies, there are inadequate data to determine if a waterbody is impaired. In addition, coordinating existing monitoring programs and implementing programs to fill data gaps for impairment assessments, TMDLs, and BMAPs is important.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #3

- 1) **Need to assess the bacteria, nutrient load, and base flow impacts of septic tank systems, wastewater treatment plants, and reuse water and recommend effective corrective action.**

- 2) There are potential pollutant impacts from high and moderately dense urban areas relying on septic systems to both ground and receiving surface waters.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #4

1) Need to track and present environmental indicators as they relate to targets.

- 2) Subsequent to the 1993 U.S. Government Performance and Results Act (GPRA), government agencies are required to develop performance reports that measure management success using indicators and goals. The U.S. EPA has developed 15 evaluation guidelines for developing environmental indicators that includes, among others, the following:

Relevance to the assessment;

Temporal variability across years;

Discriminatory Ability; and

Linkage to Management Action (U.S. EPA 2000).

Examples of indicators of ecological condition include direct measurements (e.g., total nitrogen concentration), indices (e.g., macroinvertebrate condition index) and multimetrics (e.g., fish assemblage) (U.S. EPA 2000). The Charlotte Harbor NEP developed a series of environmental indicators and targets that was approved by the Management Conference in 2005. Numerous knowledge, monitoring and reporting gaps regarding the approved indicators were identified and will need to be addressed so that the NEP can track environmental changes and success and failures regarding management practices and landuse changes. These indicators and targets will also need refinement as the state of science advances and knowledge gaps are filled. Reference: U.S. Environmental Protection Agency, 2000. Evaluation Guidelines for Ecological Indicators, Edited by Laura E. Jackson, Janis C. Kurtz and William S. Fisher. May 2000, EPA/620/R-99/005, U.S. Environmental Protection Agency, Office of Research and Development, Research Triangle Park, NC 27711

- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #5

1) Need to develop methods to enhance seagrass recovery from prop scarring.

- 2) Seagrasses damaged by scarring are very slow to recover. Research suggests that slow growth is attributable to changes in the sediments where seagrass rhizomes grow.

Methods can be developed that reduce seagrass stresses and promote a rapid recovery of damaged areas.

- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #6

- 1) Need to identify natural, existing and target water budgets for each basin**
- 2) Water flow has been modified by humans since they first came to the region and continues today. Inadvertent ecological degradation resulted from these modifications. To balance the demands of people for drainage, drinking water, navigation, and recreation with preservation of ecological health, one must first understand water flow. Significant benchmarks for studying volume and timing of flow include natural flows from a time before human influence, flow at the present time, and a practical estimate of future water budgets that would more wisely balance conflicting needs.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #7

- 1) Need to conduct a variety of surveys to gauge public awareness and concerns and establish a baseline with care to remove bias to monitor awareness and concerns.**
- 2) Since the first draft of the Comprehensive Conservation and Management Plan (1999), the Program has adopted as a Mission Statement, to educate and to motivate the people in order to understand, to participate in, and to implement the CCMP. The goals of the program have been: to increase public awareness, understanding, and support of the action items in the CCMP. In addition, to develop stewardship and a sense of shared responsibility. It is in the best interest of the Program to conduct a variety of surveys in order to measure the present conditions regarding the level of public awareness, understanding, and attitude of the environmental conditions in the study area.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #8

- 1) Need to identify more accurate nutrient loading rates from various land uses in the Charlotte Harbor Watershed.**
- 2) The amount of pollutants entering waterbodies has important effects on water quality. Thus, it is necessary to understand the relationship between pollutants and land use.

Accurate pollutant loading rates from event mean concentration (EMC) and runoff estimates is useful for National Pollutant Discharge Elimination System (NPDES) permits for municipal (and county) stormwater systems and Basin Management Action Plans (BMAPs). For NPDES permits, Rule 62-624.5 FAC requires an estimate for seasonal pollutant load and the EMC of a representative storm for each major outfall or watershed within the MS4, which are included in an annual report. Parameters for all Florida Phase I permits include: Biochemical Oxygen Demand (BOD5) (mg/L), Total Phosphorus (mg/L), Chemical Oxygen Demand (COD) (mg/L), Dissolved Phosphorus (mg/L), Total Suspended Solids (TSS) (mg/L), Total Recoverable Copper (mg/L), Total Dissolved Solids (TDS) (mg/L), Total Recoverable Lead (mg/L), Total Nitrogen (as N) (mg/L), Total Recoverable Zinc (mg/L), Total Ammonia plus Organic N (as N) (mg/L), and Total Recoverable Cadmium (mg/L).

- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #9

- 1) **Need to develop a historic and current estuarine mixing model, focusing on salinity, indicator species which are sensitive to salinity changes, and ability to evaluate proposed capital and operations projects.**
- 2) Benefits include improvement of previous hydrologic alterations that results from replacement of the causeway and accurate assessment of the potential for new significant unexpected impacts caused by any proposed changes.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #10

- 1) **Need to determine the relationship between macro- and micro-nutrients and phytoplankton/algal blooms.**
- 2) Land development and population rise is often linked to increased nutrient loading and eutrophication of surrounding water bodies. Locally, within the Charlotte Harbor watershed, there has been quick growth and increased development over the past several decades leading to concerns of water quality degradation, including increased occurrence and duration of phytoplankton blooms. Phytoplankton blooms occur when conditions are adequate for rapid growth and cell division. This requires sufficient light for photosynthesis, and sufficient concentrations of macro- and micro-nutrients to fuel carbon fixation during photosynthesis. A suite of macro-nutrients (e.g., NH₄, NO₃, PO₄, SiO₂) and micro-nutrients (e.g., Fe, Cu, Zn, B, Mo, Mn) are used during the photosynthetic process at varying ratios. The general ratios of the nutrient requirements

are known, however specialized phytoplanktonic groups (e.g., nitrogen fixers) will thrive under conditions outside of the defined ratios. Any one of the nutrients can be limiting phytoplankton production at any one time; if the limiting nutrient is supplied phytoplankton will bloom until something becomes limited. In the open ocean micro-nutrients are often the limiting factor, whereas in estuaries macro-nutrients (e.g., nitrogen and phosphorous) are typically limiting. Identifying the limiting nutrient and the source of nutrients within the system allows for better management.

- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #11

- 1) Need to evaluate the Impacts of Man-made Barriers to Historic Flows.**
- 2) Historic flow patterns, including timing and volume, are critical needs for the aquatic life in the ecosystem that has evolved and adapted to natural conditions. Large and small opportunities to restore historic flows are possible if decision makers are provided with comprehensive information about them.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #12

- 1) Need to identify the hydrologic and environmental impacts of reservoirs on estuaries within the watershed (including all types- above and below surface reservoirs for water supply, restoration, or mining).**
- 2) The hydrologic impacts of reservoirs on downstream estuaries will depend on the management priorities established for the reservoirs. If maintaining a certain water level in the reservoir is given a higher priority than maintaining a relatively natural flow to the estuary, then the estuary's water supply will be disrupted. On the other hand, a reservoir can smooth out large flow variations caused by a disturbed upstream water supply, if that smoothing is made a high priority for the reservoir's management. Identifying the impacts would require monitoring water flows and salinity variations within the system. Environmental impacts would include chemical and biological changes to water reaching the estuaries.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #13

- 1) **Identify and showcase accomplishments and excellent examples including research findings, restoration, legislative changes, and outreach successes using a variety of methods.**
- 2) The vision of CCMP is rooted in sound science and measured results. Successful implementation of the CCMP is only successful if results are clearly communicated and put to use by public officials, educators, and private citizens alike. Scientific findings lead to sound decision making in the hands of legislators and other public officials. Sharing effective public outreach methods serves to increase environmental knowledge and awareness exponentially across partner networks. Showcasing CHNEP project results is essential for continued legislative and public support of Charlotte Harbor NEP and highlight excellent examples for partner consideration.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Charlotte Harbor NEP Priority #14

- 1) **Develop site specific criteria for dissolved oxygen, chlorophyll a, turbidity / total suspended solids, salinity, and pesticides as applicable.**
- 2) State water quality rules allow local water quality standards called Site Specific Alternative Criteria (SSAC). SSACs provide meaningful water quality standards where:
 - 1) The natural background conditions of the water body exceeds one or more state water quality standards; or
 - 2) Current state water quality standards are not be sufficiently protective of the resource. SSACs are particularly valuable for parameters that show strong diurnal or spatial variation where a water quality standard must be more complex than a simple numeric target. In the case where the natural background conditions of a water body exceeds state water quality standards, a SSAC developed prior to the verification of a water body impairment may prevent the development of a Total Maximum Daily Load (TMDL). A SSAC may also be an important part of the Basin Management Action Plan which implements a TMDL. In this case, the SSAC is developed to help manage the parameter responsible for the impairment.
- 3) n/a
- 4) Not previously submitted to Council.
- 5) Not statewide but has statewide transferability.

Florida Coastal Ocean Observing System Caucus

FL COOS Caucus Priority #1

- 1) **Need to obtain consistent real-time (and near real-time) interdisciplinary physical, geochemical, and biological observations of the coastal oceans and major estuaries within the State of Florida and outwardly to the U.S. EEZ boundary as a basis for informed decision making regarding the conservation, management, and use of the ocean and coastal resources.**
- 2) No Florida observing system integrates physical, geochemical, and biological observations across the various eco-systems within the State. While Florida's existing observing systems have given scientists and researchers well earned expertise, inconsistent funding commitments have prevented the development of a comprehensive state-wide observations that provide, through an integrated data management system, sufficient information and analysis to conserve and manage Florida's Ocean and Coastal Resources consistent with their highest and best use.

The FOCRC Research Plan (FY 2006-2007) proposed a real-time interdisciplinary observing system best established through eight dispersed pilot prototype observing projects in three coastal regions and five major estuary regions over the next three years. Developing such projects along the northwest Florida coast, the Dry Tortugas, the east Florida coast, and in the Apalachicola / Apalachee Bays estuary region, the Tampa Bay estuary region, the Charlotte Harbor estuary region, the Indian River estuary region, and the St. Johns estuary region represents the best scientific approach for the development of statewide real-time interdisciplinary coastal ocean and estuary research, observing, and prediction system.

Such an initiative would allow Florida to coordinate its existing research programs with the national efforts to develop an Integrated Ocean Observing System (IOOS). Described in the Florida COOS White Paper proposal, these efforts would set the stage for a systems of systems providing the scientific and observational basis for well-documented national objectives: detecting and forecasting oceanic components of climate variability, facilitating safe and efficient marine operations, ensuring national security, managing resources for sustainable use, preserving and restoring healthy marine ecosystems, mitigating natural hazards, and ensuring public health.

By examining our ocean ecosystem as a whole, researchers can better predict and respond to the environmental, geological, and weather impacts on Florida's citizens and visitors and better assess and manage the impact of human activities on our ocean and coastal ecosystems.

- 3) See FL COOS Caucus Brochure (also available at:
http://www.nova.edu/ocean/flcoos/COOS_brochure_web_hires.pdf)
- 4) Yes, this need was submitted to the Council in 2005
- 5) State-wide

Indian River Lagoon National Estuary Program

IRL NEP Priority #1

- 1) **Determine the impacts of on-site sewage disposal systems (OSDS) within the watershed on water quality. Develop and implement strategies to address these impacts.**
- 2) Within the Indian River Lagoon basin, approximately 75% of all OSDS are located on soils poorly suited for their use. Similar situations may be found throughout the state. At present it is unclear what portion of the pollutant loadings to surface waters can be attributed to OSDS. In other areas OSDS have been found to be a significant source of pollutants.
- 3) n/a
- 4) Submitted 2005? No
- 5) Regional with statewide application

IRL NEP Priority #2

- 1) **Coordination of monitoring efforts**
- 2) In most basins there are several entities including federal, state, local/regional governments, academia, private industry and interest groups conducting water quality or resource monitoring. In some basins, water quality and resource monitoring programs are well coordinated with well-defined goals and objectives, consistent sampling methods/protocols and common QA/QC procedures. In other basins, there may be some coordination of portions of the monitoring effort. In still other basins there is little coordination.

Inconsistency in parameters monitored, monitoring methods and QA/QC procedures have resulted in the inability to compare results between or within basins. In an effort to improve the effectiveness and efficiency of monitoring programs a group should be established to coordinate monitoring efforts on both a regional and state-wide basis. One product that could come out of this coordinated effort would be a regular (annual? biennial? other?) Florida Coastal Conditions Report providing coastal residents with an assessment of the condition of the coastal resources throughout the state and in their vicinity.
- 3) n/a
- 4) Submitted 2005? No
- 5) Statewide application

IRL NEP Priority #3

- 1) **Need enhanced (spatial/temporal) algal monitoring**

- 2) In recent years Florida waterbodies have experienced a series of troubling events, ranging from extensive and long-lived red tide blooms on the west coast to blue-green algal blooms in the lower St Johns River and the St Lucie River to toxic puffer fish resulting from a native algae suddenly assuming toxic characteristics in the Indian River Lagoon. In order to better understand and track these events and protection of public health an enhanced algal monitoring program is needed.
- 3) n/a
- 4) Submitted 2005? No
- 5) Regional with statewide application

IRL NEP Priority #4

- 1) **Need rapid response teams for algal blooms.**
- 2) In recent years Florida waterbodies have experienced a series of troubling events, ranging from extensive and long-lived red tide blooms on the west coast to blue-green algal blooms in the lower St Johns River and the St Lucie River to toxic puffer fish resulting from a native algae suddenly assuming toxic characteristics in the Indian River Lagoon. To better understand these and other events the organization of rapid response teams is needed. Similar to oil spill or hazmat response teams, these teams would be multi-discipline, multi-agency capable of assessing a variety of significant ecological or water quality events. These teams may be organized on a regional or state-wide basis.
- 3) n/a
- 4) Submitted 2005? No
- 5) Regional with statewide application

IRL NEP Priority #5

- 1) **Need ecological indicator/index development**
- 2) Need/Background: A suite of ecological indicators or indices of the condition of coastal waters and resources is needed. The condition of these indicators or indices would provide the general public and decision makers with information on the present condition of coastal waters or resources and the ability to compare with previous conditions. These indicators/indices would also serve managers as an indication of the effectiveness of management actions. These indicators/indices may be state -wide or on a regional basis. These indicators/indices would also serve managers as an indication of the effectiveness of management actions. In addition, the indicators/indices should be able to be rapidly applied as well as understandable by the general public.
- 3) n/a
- 4) Submitted 2005? No
- 5) Statewide

IRL NEP Priority #6

- 1) **Need a coordinated public involvement/volunteer program.**
- 2) Given the extent of research and other needs identified by the Florida Oceans and Coastal Resources Council it is unlikely that funding will be available to provide staff to accomplish all these needs in a timely manner. One means of addressing this personnel shortfall may be the use of volunteers. Using volunteers can also increase the commitment to resource stewardship of the general public.

It is suggested that coordinated effort be undertaken to recruit and coordinate volunteers, working with existing NGOs such as Audubon, Sierra and local interest groups.

- 3) n/a
- 4) Submitted 2005? No
- 5) Statewide

Ocean Conservancy

Ocean Conservancy Priority #1

- 1) **Need to ascertain the ecological effects of fishing on marine habitats and communities, especially coral reef communities.**
- 2) The Oceans and Coastal Resources Act specifies the need for Florida’s research management to continue transition to “an ecosystem-based management approach.” As noted in the FOCRC Annual Science Research Plan, “Management of marine resources using zoning is integral to EBM.” (p. 30). The direct and indirect effects of fishing are major disturbances to ocean ecosystems (id., at p. 8), particularly coral reef communities. For example, in it’s National Action Plan to Conserve Coral Reefs, the U.S. Coral Reef Task Force (CRTF) identified two fundamental themes for immediate and sustained national action: 1) understanding coral reef ecosystems and the natural and anthropogenic processes that determine their health and viability, and 2) quickly reduce the adverse impacts of human activities on coral reefs and associated ecosystems, by creating an expanded and strengthened network of Marine Protected Areas. One of the Core Conservation Principles of the CRTF National Action Plan is to “apply marine zoning, including marine protected areas and no-take ecological reserves – in order to protect and replenish coral reef ecosystems by minimizing harmful human impacts and user conflicts in important habitats.” According to the CRTF, “although fishing is considered to be among the most destructive and pervasive threats to coral reefs in the United States and worldwide, relatively few existing MPAs address this activity directly.” Consequently, there exists a great management need in Florida to ascertain the direct and indirect ecological effects of fishing on marine habitats, especially on coral reef ecosystems. In addition to degrading the ecological integrity of coral reef ecosystems, excessive fishing also conflicts with other legitimate non-consumptive use and enjoyment of these public-trust resources, such as the ability of the public to study, enjoy, and experience unexploited marine habitats with a natural abundance and diversity of native marine plants and wildlife.
- 3) Additional background and elaborating information will be provided during the public presentation period.
- 4) Unknown. This is a Council priority from 2005 (Research Component #'s 12, 15, 41, and 46).
- 5) This need is statewide.

Sarasota Bay National Estuary Program

Sarasota Bay NEP Priority #1

- 1) **Linkages between water quality and red tide.**
- 2) Worldwide, the incidence of harmful algal blooms appears to be increasing in both frequency and duration. A number of mechanisms have been proposed, including the increase in nitrogen loading to coastal waters by anthropogenic activities and long term climatic cycles, or the increase in seawater nitrogen content by precursor blooms of nitrogen-fixing phytoplankton, which, may be in turn stimulated by iron deposition associated with Saharan dust. This work proposes to complement recent research on red tides in the Gulf of Mexico, primarily along the Florida coast.
- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Statewide.

Sarasota Bay NEP Priority #2

- 1) **Stormwater run-off reduction assessment**
- 2) Stormwater runoff from urban areas is now estimated to contribute approximately one-third of the nitrogen load to Sarasota Bay. Some information is available from various sources regarding best management practices (BMP's) to reduce stormwater run-off. However, most stormwater BMP's are focused on solids, and little work has been done on improving nitrogen removal efficiencies. If necessary, conduct tests with swales, bio-retention gardens, stormwater ponds and pervious surfaces to determine applicability in different situations.
- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Statewide. Yes.

Sarasota Bay NEP Priority #3

- 1) **Pollutant Loading**
- 2) The existing pollutant loading model for Sarasota Bay and its watershed is based on land use data from 1990. Stormwater pollution loads priority tributaries are based, in part, on land use data that is now more than a decade old. While this past effort predicted pollutant loads expected to occur in future years, recent patterns of population growth might not be quite what was predicted in the existing effort, and sources and quantities of various pollutant might be different than what was expected. In addition, various efforts to reduce point source loads via upgrading wastewater treatment plant operations and increased reuse of wastewater treatment effluent should be examined to determine their actual, rather than expected, nutrient load reduction impact. Finally, the

previous pollutant loading model used wet deposition nitrogen concentration data from Tampa Bay that probably overestimated this loading source, while not including the potentially significant source of "dry deposition" of nitrogen. An updated pollutant loading model would involve the District partnering with the SBEP, as well as various local, state and federal agencies to design a scope of work for this effort that would update and refine the amounts and sources of various pollutant loads to the bay.

- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Regional but has statewide transferability.

Sarasota Bay NEP Priority #4

1) Seagrasses

2) The SWFWMD conducts aerial photography to assess seagrass acreage on a biennial schedule. Over the past several observational cycles, it appears that total coverage increases seen in the mid-1990's may have slowed or stopped. However, changes in percent continuous and patchy appear to be changing. To establish goals for the restoration of seagrasses, proper protocols and better understanding of important seagrass habitat relationships (e.g., seagrass species, and/or density interacting with habitat value as measured by different biotic parameters) should be established using site specific criteria (e.g., water quality requirements and variations in seagrasses by bay segments). Also, the ability to predict changes in seagrass communities (species, density, and acreage) due to variations in water quality and clarity (e.g., light attenuation) should be improved to enhance goal-setting.

- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Regional but has statewide transferability.

Sarasota Bay NEP Priority #5

1) Establishing Habitat Optimization Targets to Achieve Watershed Management Goals

2) A watershed management approach to habitat restoration provides an effective model to integrate and maximize the environmental benefits of separate but cumulative actions to implement land use changes, adjust the timing, duration, and volume of freshwater inputs to bay waters, and achieve targeted effects on estuarine biota (fish, invertebrate, and vegetation) and productivity. Enhancement and restoration strategies or goals may be crafted through an understanding of the full range of form, function, and need within the several, diverse tributaries of an estuarine watershed. Actions that achieve targeted goals may be implemented discretely within specific tributaries while serving an overall cumulative effect in the larger context of an entire estuarine watershed. In simple terms, not every example of habitat restoration need be implemented within every tributary or sub-basin. The challenge lies in determining through a rational process which

restorative actions should be performed where in order to maximize environmental benefits and cost-effectiveness for the estuarine watershed as a whole.

- 3) A habitat optimization analysis project is proposed in order to identify habitat restoration targets on a sub-basin or bay segment basis which can be later integrated with land use and land acquisition strategies to achieve watershed management goals. Tangible results have been achieved in constructing a variety of restored habitats at “sites of opportunity” across the Bay watershed, including artificial reefs and vegetated wetlands. Similarly, habitat assessments have been made of the functional attributes or composition of these natural and restored sites which serve as critical nursery habitat for sustaining recreationally, commercially, and ecologically important fish and shellfish populations across the Bay watershed. However, future priorities for habitat restoration need to be crafted in a watershed management context, that is, a “big picture” approach which identifies synergistic effects that may be achieved through various types of restoration implemented in optimal locations to achieve desired ecological effects. Findings of prior SBNEP habitat restoration planning and habitat assessment technical projects will be integrated to improve restoration goal setting. A spatial (GIS) analysis will be developed to identify needs, opportunities and constraints for vegetated wetlands, artificial reefs, seawall enhancement and oyster bar restoration. The analysis by bay segment will determine priorities for focus on particular or rare habitat types based on critical spawning or nursery habitat value.
- 4) Was this need submitted to the Council in 2005? No.
- 5) Regional but has statewide transferability.

Sarasota Bay NEP Priority #6

- 1) **Mangrove trimming issues**
- 2) It is recognized that the FDEP is stretched very thin with regard to mangrove trimming enforcement throughout the State of Florida. Several local municipalities (including Sarasota County) are considering requesting that DEP rescind to them the responsibility for monitoring of trimming within their sphere of influence. Although mangrove trimming is practiced widely throughout Florida, very little information exists with regard to habitat impacts from trimming mangroves at different levels. Habitat ramifications could include avifauna, benthos, leaf litter export, seed production, runoff and erosion attenuation, economics, hurricane damage, and nutrient translocation. To ensure proper protection of this important resource, effects of current trimming practices need to be examined.
- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Statewide.

Sarasota Bay NEP Priority #7

1) Identification of fecal sources

- 2) The TMDL exercise has identified several areas in Sarasota Bay that may be impaired due to bacterial contamination. However, identification of sources of bacteria is difficult. Several techniques (*e.g.*, fluorescence tests, genetic libraries, optical brighteners, and isotope tests) are now available, and more are coming on-line that aid the identification of fecal sources. This project would investigate the accuracy, precision, and other relevant aspects of these techniques with a focus on impaired waters.
- 4) Was this need submitted to the Council in 2005? No.
- 5) Regional but has statewide transferability.

Sarasota Bay NEP Priority #8

1) Continuing assessment of restoration projects

- 2) Habitat restoration projects have occurred in Sarasota Bay for over 15 years. Areas at several different stages of regeneration are available for study. Examination of intertidal areas of restoration sites created in the Sarasota Bay watershed is important to continue to improve current restoration practices. Other ecological information for mangroves and wetlands in general could also be obtained. This project would compare the biological (*e.g.*, vegetative, fisheries, benthos) characteristics of restoration sites to nearby natural areas.
- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Statewide.

Sarasota Bay NEP Priority #9

1) Determine the degree of nitrogen (N) loading to Sarasota Bay from different components of residential areas

- 2) Recent indications are that a greater amount of nitrogen loading to Sarasota Bay occurs from stormwater runoff from residential areas than previously expected. Unfortunately, no data exists to quantify exactly which components of residential areas are the major contributors of this nitrogen. Current residential N reduction efforts tend to target home landscape fertilization. However, other influences, such as background decomposition of organic matter, cleansing of atmospheric and other N deposition to roadways, and other sources of N need to be identified and quantified in order to appropriately target educational and regulatory programs for maximum N reduction. This would need to be compared to N loading from various types of natural areas.
- 3) n/a
- 4) Was this need submitted to the Council in 2005? No.
- 5) Statewide.

Sarasota Bay NEP Priority #10

1) Integrated Water Resource Evaluation

- 2) Significant changes in freshwater flows to the Sarasota Bay estuary have occurred during the last century. The predominant changes have been the conversion of natural upland and wetland communities to urban land uses including residential and commercial development and agriculture. With these land use changes, alterations in the timing, duration, and volume of freshwater inputs to Sarasota Bay have occurred which may have significant effects on estuarine biota (fish, invertebrate, and vegetation) and productivity.

A number of projects are currently underway or planned including a number of flood storage ponds (detention), stormwater conveyance improvements, Aquifer Storage and Recovery wells, brackish water treatment/disposal, septic tank replacement/wastewater collection system construction, reclaimed water transmission/distribution, and regional distribution of surface water supplies.

Also, pervious surfaces like porous concrete, porous rubber pavement, and various loosely aggregated materials have been developed to allow a certain degree of infiltration, minimizing stormwater runoff. Compacted fill dirt is conceptually known to decrease rainwater infiltration and increase stormwater runoff. However, the impact of these surfaces is limited by lack of data. Investigation of their effects in actual situations could allow decision-making that could minimize total stormwater runoff and decrease the destruction of natural systems during the construction of additional stormwater retention systems.

- 3) This project would: 1) evaluate the combined effects of development, stormwater management, water supply, and wastewater effluent disposal activities on the ecological resources of Sarasota Bay and its tributaries; 2) analyze the major tributaries and freshwater seeps entering Sarasota Bay to estimate the changes in hydrologic characteristics that have occurred during the past several decades; 3) Evaluate current and proposed water resource projects, their relative inputs and withdrawals from various sources, and an analysis of their potential impacts (e.g., salinity changes, effects on oligohaline-dependent vegetation/biota) on the ecological health of the estuary; 4) determine the influence of various pervious and impervious surfaces in urban developments on soil hydrology and stormwater runoff. The results of the analysis would include a series of recommendations for restoring more natural flow patterns or, at a minimum, reduce peak flows and pollutant (e.g., nitrogen) loads in tributaries to Sarasota Bay that have been impacted by development.
- 4) Was this need submitted to the Council in 2005? No.
- 5) Regional but has statewide transferability.

Surfrider Foundation

Surfrider Foundation Priority #1

- 1) **Need to assess Florida’s biological and social cumulative consequences associated with so-called beach “renourishment” and the projects’ adjacent success/failure of mitigation reefs.**
- 2) As the pace of beach “renourishment” increases the total number of impacts to these beach and nearshore environments are also increasing. Florida needs to develop the ability to determine the cumulative impacts on the interconnected biological communities, via competent pre-and postmonitoring, allowing regulatory agencies to identify a regional perspective of impacted resource areas and species, better determine the causes of those impacts (incompatible sand, project design template, time of year, etc), and further develop policy to address the causes.
- 3) Provide additional background. **SEE ATTACHED PAPERS FOR JUSTIFICATION.**
- 4) No, this need not submitted to the Council in 2005.
- 5) Statewide.

Tampa Bay National Estuary Program

TB NEP Priority #1

- 1) **Need to identify and manage sources of elevated mercury concentrations in fish tissue in Florida's coastal and estuarine waters.**
- 2) All coastal waters in the State have consumption advisories (and are listed as impaired) for several species of marine and estuarine fish due to elevated mercury concentrations in edible fish tissue. The identification and relative contributions of sources of mercury (natural vs. anthropogenic; local vs regional, national, global; atmospheric sources vs. land-based, etc) to coastal waters is the critical first step towards developing and supporting state and local management actions, and toward developing TMDL actions to address mercury-impaired coastal systems.
- 3) See work by Tom Atkeson (FDEP Mercury Coordinator)
- 4) Submitted 2005? No
- 5) Statewide

TB NEP Priority #2

- 1) **Need to develop water and sediment quality targets and habitat criteria for the restoration and protection of the biological communities in tidal rivers, streams and tributaries.**
- 2) Tidal tributaries have a major influence on the productivity and diversity of natural resources in many estuarine systems (Holland et al 2004). Based on preliminary work in Tampa Bay and other state waters, tidal tributaries appear to be subject to a range of anthropogenic impacts and are important nursery habitat for many species of fishery value. However, not enough is known of the conditions within tidal tributaries or the faunal communities that utilize these areas to develop an effective management strategy. Management needs to improve protection and management of fish populations in tidally-influenced tributary systems include 1) determining the contribution of tidal tributaries to fish production, 2) determining effects of various habitat parameters (e.g., watershed condition, water quality, structural habitat, etc.) on fish production in tidal tributaries, and 3) developing measurable water and sediment quality and habitat criteria.
- 3) n/a
- 4) Submitted 2005? No
- 5) Statewide

TB NEP Priority #3

- 1) **Need to develop and implement effective monitoring for estuarine and coastal habitat quantity and quality.**

- 2) Although some sections of the Florida coastal areas have ongoing habitat monitoring programs focused on spatial extent, there is a need to develop and implement monitoring programs to track both habitat quantity and quality in coastal marshes and mangrove forests, seagrass meadows, oligohaline habitats and isolated freshwater wetlands, hard bottom and oyster reef communities, and associated uplands, including natural, restored or created habitats. Also, there is a need to implement a mapping program for invasive plants statewide. Understanding and tracking status and trends are critical and necessary steps towards effective management of these habitats and systems.
- 3) n/a
- 4) Submitted 2005? No
- 5) Statewide

TB NEP Priority #4

- 1) **Need to assess the impacts of septic systems to coastal tributaries and estuaries.**
2. Several recent investigations have focused on the impact of nitrogen loadings from septic tanks in estuaries in Indian River Lagoon, Tampa Bay, Sarasota Bay and Charlotte Harbor. Recent studies have also included bacterial pollution from older, malfunctioning septic tanks. Sites in Tampa Bay were surveyed using a variety of traditional and alternative indicators, and included bacterial source tracking, coliphage testing (for the presence of viruses and indication of recent fecal pollution) and direct pathogen monitoring for viruses and parasites (Tampa Bay Healthy Beaches Program and other Healthy Beaches programs statewide). Some source tracking work has been initiated, but management needs concerning the impacts on nutrient loading and bacterial contamination from septic systems remain, including 1) Determining the factors contributing to failure of septic systems; 2) identifying "hot spots" of malfunctioning septic systems, specifically for nutrient or bacterial-impaired coastal waters; 3) improving effectiveness, accuracy and ease of use of bacterial and viral source tracking methods for use in coastal waters; 4) evaluating adequacy of current septage design standards and monitoring; and 5) evaluating septage spreading as a nutrient and public health concern.
- 3) n/a
- 4) Submitted 2005? No
- 5) Statewide