

FY 2014 NWPG Measure Definitions South Florida

Measure Code: SFL-SP45



Measure Language: Achieve "no net loss" of stony coral cover (mean percent stony coral cover) in the Florida Keys National Marine Sanctuary (FKNMS) and in the coastal waters of Dade, Broward, and Palm Beach Counties, Florida, working with all stakeholders (federal, state, regional, tribal, and local).

Type of Measure: Indicator measure; Cumulatively reported

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Measure Definition

Terms and Phrases: *Stony corals* (scleractinians) make up the largest order of corals and are the group primarily responsible for laying the foundations of, and building up, reef structures.

Methodology for Computation of Results: The Florida Keys Coral Reef Evaluation and Monitoring Project (CREMP) was initiated in 1995 to provide data on status and trends of coral habitat in the FKNMS. The major criteria for monitoring the coral reefs included determining the sanctuary-wide spatial coverage of the coral communities, repeatedly surveying them, and statistically documenting the status and trends of the coral communities.

Percent cover of live coral is determined annually from video transects filmed at each monitoring site. Abutting frames with minimal overlap are extracted from a mosaic and analyzed using a custom software application called Point Count for coral reefs.

FY 2012 results will reflect FY 2011 data.

Units: Percent stony coral cover

Universe: A total of 43 sites are monitored annually to determine percent stony coral cover throughout the FKNMS. The Southeast Coral Reef Evaluation and Monitoring Project was established in 2003 with a total of ten sites to provide data on status and trends of coral habitat in southeast Florida (coastal waters of Dade, Broward, and Palm Beach Counties).

Baseline: 6.8% in FKNMS; 5.9% in SE Florida (FY 2005)

Measure Code: SFL-SP46

Measure Language: Annually, maintain the overall health and functionality of seagrass beds in the Florida Keys National Marine Sanctuary (FKNMS) as measured by the long-term seagrass monitoring project that addresses composition and abundance, productivity, and nutrient availability.

Type of Measure: Indicator measure; Cumulatively reported

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Measure Definition

Terms and Phrases: *Thalassia* is the dominant species of seagrass within the Florida Key National Marine Sanctuary (FKNMS).

Methodology for Computation of Results: The Seagrass Monitoring Project (SMP) for the FKNMS was initiated in 1995 and uses the rapid visual assessment technique known as the Braun-Blanquet method to measure benthic plant community structure. This method is quick, yet robust and highly repeatable, thereby minimizing among-observer differences. A summary metric or species composition indicator (SCI) that assesses the relative importance of slow-growing plants to community composition is computed for the 30 permanent seagrass monitoring sites throughout the FKNMS. The 30 sites are sampled quarterly. The seagrass indicator is based on species composition of seagrass beds. During the first 10 years of monitoring, the SCI had an average of .48. Any decrease in this SCI is interpreted as a decrease in water quality in the FKNMS. The SMP also assesses seagrass nutrient availability using tissue concentration assays. Elemental content (nitrogen/N and phosphorus/P) of seagrass leaves is determined by cleaning the leaves of all epiphytes, drying the leaves at low temperature, and grinding to a fine powder. Elemental content is then measured using established methods. A summary elemental content indicator measure or elemental indicator (EI), which is the mean absolute deviation of N:P ratio of seagrass tissue from 30:1 is computed for the 30 permanent monitoring sites. The long-term average mean absolute difference in the N:P of *Thalassia* leaves at the 30 monitoring sites 8.3. A decrease in EI from the long-term average will indicate a decrease in water quality.

Success for this measure is achieved if both the species composition indicator and elemental indicator are maintained.

FY 2012 results will reflect FY 2011 data.

Units: Both SCI and EI are unit-less measures.

Universe: 30 permanent seagrass monitoring sites throughout the FKNMS.

Baseline: EI = 8.3; SCI=0.48 (FY 2005)

Measure Code: SFL-SP47a

Measure Language: At least seventy five percent of the monitored stations in the near shore and coastal waters of the Florida Keys National Marine Sanctuary will maintain Chlorophyll a(CHLA) levels at less than or equal to 0.35 ug l⁻¹ and light clarity(Kd)) levels at less than or equal to 0.20 m⁻¹.

Type of Measure: Target measure; Annually reported

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Measure Definition

Terms and Phrases:

- *Chlorophyll a* (CHLA) estimates the amount of algae in the water.
- *Light clarity* (Kd) measures the water clarity.

Methodology for Computation of Results: The Water Quality Monitoring Project (WQMP) was initiated in 1995 and samples and data are collected quarterly from 154 stations throughout the FKNMS. The WQMP uses a stratified random design based upon EPA's Environmental Monitoring and Assessment Program (EMAP) and stations are randomly located along near shore to offshore transects. By stratifying the sampling stations according to depth, distance from shore, proximity to tidal passes, and influence of water masses outside the Florida Keys, the project has been able to report on the relative importance of external versus internal factors affecting the ambient water quality within the FKNMS. Numerous (about 18) physical and chemical water quality parameters are tracked by the WQMP. However, for purposes of strategic measures, only four critical water quality metrics are considered. For reef stations, chlorophyll less than or equal to 0.2 micrograms/liter (ug/l) and vertical attenuation coefficient for downward irradiance (Kd, i.e., light attenuation) less than or equal to 0.13 per meter; for all stations in the FKNMS, dissolved inorganic nitrogen less than or equal to 0.75 micromolar and total phosphorus less than or equal to 0.2 micromolar; water quality within these limits is considered essential to promote coral growth and overall health. The "number of samples" exceeding these targets is tracked and reported annually.

FY 2012 results will reflect FY 2011 data.

Units: Monitored stations

Universe: 154 stations throughout the FKNMS.

Baseline: CHL A \leq 0.35 ug/L (75.7%); Kd \leq 0.20m⁻¹ (74.6%) (FY 1995–2005)

Measure Code: SFL-SP47b

Measure Language: At least seventy five percent of the monitored stations in the near shore and coastal waters of the Florida Keys National Marine Sanctuary will maintain dissolved inorganic nitrogen (DIN) levels at less than or equal to 0.75 uM and total phosphorus (TP) levels at less than or equal to .25 uM .

Type of Measure: Target measure; Annually reported

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Measure Definition

Methodology for Computation of Results: The Water Quality Monitoring Project (WQMP) was initiated in 1995 and samples and data are collected quarterly from 154 stations throughout the FKNMS. The WQMP uses a stratified random design based upon EPA's Environmental Monitoring and Assessment Program (EMAP) and stations are randomly located along near shore to offshore transects. By stratifying the sampling stations according to depth, distance from shore, proximity to tidal passes, and influence of water masses outside the Florida Keys, the project has been able to report on the relative importance of external versus internal factors affecting the ambient water quality within the FKNMS. Numerous (about 18) physical and chemical water quality parameters are tracked by the WQMP. However, for purposes of strategic measures, only four critical water quality metrics are considered. For reef stations, chlorophyll less than or equal to 0.2 micrograms/liter (ug/l) and vertical attenuation coefficient for downward irradiance (Kd, i.e., light attenuation) less than or equal to 0.13 per meter; for all stations in the FKNMS, dissolved inorganic nitrogen less than or equal to 0.75 micromolar and total phosphorus less than or equal to 0.2 micromolar; water quality within these limits is considered essential to promote coral growth and overall health. The "number of samples" exceeding these targets is tracked and reported annually.

FY 2012 results will reflect FY 2011 data.

Units: Monitored stations

Universe: 154 stations throughout the FKNMS.

Baseline: DIN \leq 0.75 uM (76.3%); TP \leq 0.25uM (80.9%) (FY 1995–2005)

Measure Code: SFL-SP48

Measure Language: Improve the water quality of the Everglades ecosystem as measured by total phosphorus, including meeting the 10 parts per billion (ppb) total phosphorus criterion throughout the Everglades Protection Area marsh and the effluent limits to be established for discharges from Stormwater Treatment Areas.

Type of Measure: Target measure; Annually reported

Measure Contact: Dan Scheidt; EPA Region 4

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Measure Definition The Everglades has been subjected to phosphorus pollution since the 1960s. Interior Everglades marshes removed from anthropogenic nutrient sources have extremely low total phosphorus (TP) concentrations in surface water, as low as the method detection limit of 2 parts per billion (ppb). Phosphorus loading in stormwater from the Everglades Agricultural Area (EAA) and urban areas has significantly increased phosphorus concentrations in the downstream Everglades (as high as 100 ppb), causing eutrophic impacts to these oligotrophic wetlands. Among the progressive eutrophic impacts are altered periphyton communities, loss of water column dissolved oxygen, increased soil phosphorus content, conversion of the native wet prairie-sawgrass mosaic to dense single-species stands of cattail with no open water, and consequent loss of wading bird foraging habitat. These collective changes impact the structure and function of the aquatic ecosystem. By 1990 over 40,000 acres of the public Everglades were estimated to be impacted.

In 2005, Florida adopted and EPA approved a 10 ppb water quality criterion for TP in the Everglades in order to prevent nutrient-induced imbalances in natural populations of aquatic flora or fauna. The criterion is applied as a long-term average, with achievement of the criterion within the Everglades waterbody determined by data collected monthly at fixed long-term marsh sampling locations.

A phosphorus control program was initiated in the 1990s in order to prevent further loss of Everglades plant communities and wildlife habitat due to phosphorus enrichment. Control is to be achieved by agricultural Best Management Practices along with about 47,000 acres of constructed treatment wetlands within the EAA, referred to as Stormwater Treatment Areas (STAs). This \$1 billion effort to treat large volumes of stormwater down to 10 ppb TP is unprecedented. STAs have permits (NPDES and /or Florida Everglades Forever Act) with TP discharge limits.

Units: Water quality

Universe: See above.

Baseline: Average annual geometric mean phosphorus concentrations were 5 ppb in Everglades National Park, 10 ppb in Water Conservation Area 3A, 13 ppb in Loxahatchee National Wildlife Refuge, and 18 ppb in Water Conservation Area 2A. Annual average flow – weighted total phosphorus discharges from Stormwater Treatment Areas ranges from 13ppb for area ¾ and 98 ppb for area 1W. (2005)

Measure Code: SFL-1

Measure Language: Increase percentage of sewage treatment facilities and onsite sewage treatment and disposal systems receiving advanced wastewater treatment or best available technology as recorded by EDU. in Florida Keys two percent (1500 EDUs) annually.

Type of Measure: Indicator measure; Annually Reported

Measure Contacts: Steven Blackburn, EPA Region 4

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Measure Definition The septic tanks and cesspits traditionally utilized for wastewater disposal in the nutrient sensitive waters of the Florida Keys provide little to no treatment due to the Keys unique environment of poor or little soil, highly porous limestone and elevated groundwater tables. The nutrients from the poorly treated sewage is contributing to water quality and aquatic life degradation and presents a human health risk from bacteria and viruses. Florida enacted legislation in 1999 requiring all sewage treatment facilities and onsite sewage treatment and disposal systems in the Florida Keys achieve advance wastewater treatment standards or best available technology as determined by Florida Department of Environmental Protection.

Terms and Phrases: *EDU* is equivalent to wastewater effluent from one home -- 167 gallons per day per home

Units: EDUs, sewage treatment facilities and onsite treatment and disposal systems.

Universe: 75,000 sewage treatment facilities and onsite treatment and disposal systems.

Baseline: 32,000 sewage treatment facilities and onsite treatment and disposal systems (FY 2009).