Appendix 7B-1: Draft CERP Performance Measures

Two kinds of performance measures are being developed for the Comprehensive Everglades Restoration Plan (CERP): (1) evaluation, and (2) assessment. The draft evaluation performance measures are presented in **Table 1**. The draft assessment performance measures are presented in **Table 2**.

Table 1. Draft evaluation performance measures

NUMBER	TITLE	SOURCE	EVALUATION TOOL	TARGET
NE1	St. Lucie Salinity Envelope	St. Lucie Estuary/ Indian River Lagoon CEM Stressor	SFWMM	No more than 10 extreme high flow (>3,000 cfs) events in a 31-year period of record and no more than 18 high flow (2,000- to 3,000 cfs) events in a 31-year period of record.
NE2	Lake Worth Salinity Envelope	C and SF Restudy	SFWMM	Inflow to achieve 23–35 ppt salinity (0–500 cfs).
NE3	Caloosahatchee Estuary Salinity Envelope	Caloosahatchee Estuary CEM Stressor	SFWMM	Freshwater discharges from the C-43 canal at the S-79 structure to be maintained between 300 and 2,800 cfs.
LO1	Lake Okeechobee Extremes in Low Lake Stages	Lake Okeechobee CEM Stressor	SFWMM	No events below 11 ft. No events below 12 ft for >12 months.
LO2	Lake Okeechobee Extremes in High Lake Stages	Lake Okeechobee CEM Stressor	SFWMM	No events above 17 ft. No event above 15 ft >12 months.
LO3	Spring Recession for Lake Okeechobee	Lake Okeechobee CEM Stressor	SFWMM	Yearly stage decline from near 15.5 ft to near 12.5 ft, January to June, with no reversal >0.5 ft/month.
GE1	Number and Duration of Dry Events for Shark River Slough	Everglades Ridge and Slough CEM Stressor	SFWMM	NSM v4.6 prediction for the number of times and mean duration in weeks that water drops below ground for the indicator regions in Shark River Slough.
GE2	Inundation Pattern in the Greater Everglades	Everglades Ridge and Slough CEM Stressor	SFWMM	For each landscape type, NSM v4.6 based target that is range of weeks of inundation and the number of inundation events or an envelope for the duration and number of inundation events

NUMBER	TITLE	SOURCE	EVALUATION TOOL	TARGET
GE3	Extreme High and Low Events in the Greater Everglades	Big Cypress, Marl Prairie, and Everglades Ridge and Slough CEMs Stressor	SFWMM	For each landscape type, NSM v4.6 based target that is a range of the total duration of extreme high and low water events in weeks and the number of extreme high and low water events or an envelope of occurrences that meet the target.
GE4	Seasonal Amplitude and Interannual Variability of Water Levels in the Greater Everglades	Big Cypress, Marl Prairie, and Everglades Ridge and Slough CEMs Stressor	SFWMM	NSM v4.6 targets for multiyear patterns of amplitude and variability
GE5	Seasonal Distribution and Average Annual Flow Volume in the Greater Everglades	Everglades Total System CEM Stressor	SFWMM	NSM v4.6 predictions of regional flow patterns in the remaining greater Everglades
GE6	Species Richness Suitability Index - A Hydrologic Performance Measure for Everglades' Tree Islands	Everglades' Ridge and Slough CEM Stressor	SFWMM	Restoration of historic hydrologic patterns throughout the Everglades' ridge and slough ecosystem such that vegetation communities on intact tree islands are protected and those on degraded islands are restored.
GE7	Total System Phosphorous Levels	Greater Everglades CEM Stressor	ELM	Recover soil and water phosphorus concentrations consistent with predrainage periphyton and vegetation patterns
GE8	Total System Nitrogen Levels	Greater Everglades CEM Stressor	ELM	Recover water nitrogen concentrations consistent with predrainage periphyton and vegetation patterns
SE1	Surface Water Discharges to Biscayne Bay	Biscayne Bay CEM Stressor	SFWMM	Dry/wet season: **Snake Creek** - 93,100/66,5000 acre feet **North Bay** - 41,000/99,000 acre feet **Miami River** - 60,000/132,000 acre feet **Central Bay** - 83,000/161,000 acre feet **South Bay** – 68,000/158,000 acre feet
SE2	Florida Bay - Salinity in Coastal Basins Estimated from Upstream Water Stages	Florida Bay CEM Stressor	SFWMM	Predicted stages at Gage NP67 and Gage P33 that produce lower and upper salinity levels in coastal basins. <u>NP67 lower/upper</u> Joe Bay - 2.63 ft/2.04ft Little Madeira Bay - 2.82 ft/2.02 ft Terrapin Bay - 2.91 ft/1.92 ft Garfield Bight - 2.99 ft/1.97 ft <u>P33 lower/upper</u> North River Mouth - 7.1 ft/6.2 ft
TS1	Continuity - Water Surface Elevations Across Barriers	Total System CEM Stressor	SFWMM	Minimize stage difference across selected barriers

NUMBER	TITLE	SOURCE	EVALUATION TOOL	TARGET
WS1	Lake Okeechobee Service Area - Frequency of Water Restrictions	Florida Statutes 373.0361(2)(a)(1)	SFWMM	Provide at least a 1-in-10 level of service as indicated by simulations by the SFWMM in which three or less water years in the 31-year simulation period have water shortages in which significant supply-side management cutbacks are necessary.
WS2	Frequency of Water Restrictions for the Lower East Coast Service Area	Florida Statutes 373.0361(2)(a)(1)	SFWMM	Provide at least a 1-in-10 level of service as indicated by three or less water years simulated with regionally significant water shortages in the 36-year evaluation period.
WS3	Potential for High Water Levels in the EAA	C and SF Restudy	SFWMM	
WS4	Potential for High Water Levels in South Miami-Dade Agricultural Area	C and SF Restudy	SFWMM	Water levels should lie below target stage duration curves, especially during wet periods (evaluation team made comparison at 10% frequency of stage duration)
WS5	Prevent Saltwater Intrusion of the Biscayne Aquifer - Meet MFL Criteria for Biscayne Aquifer	Florida Statutes 373.044	SFWMM	Canal at Structure: Canal Stages (ft NGVD) C-51 at S-155: 7.80 C-16 at S-4: 7.80 C-15 at S-40: 7.80 Hillsboro Canal at G-56: 6.75 C-14 at S-37B: 6.50 C-13 at S-36: 4.00 North New River at G-54: 3.50 C-9 at S-29: 2.00 C-6 at S-26: 2.50 C-4 at S-25B: 2.50 C-2 at S-22: 2.50
WS6	Prevent Saltwater Intrusion of the Biscayne Aquifer in South Miami-Dade County	C and SF Restudy	SFWMM	Canal at Structure: Canal Stage (ft NGVD) C-100A at S-123: 2.00 C-1 at S-21: 2.00 C-102 at S-21A: 2.00 C-103 at S-20F: 2.00

Table 2. Draft monitoring and assessment performance measures

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
NE1	St. Lucie Estuary Salinity Envelope	St. Lucie Estuary/ Indian River Lagoon CEM Stressor	Northern Estuaries	Reestablish a salinity range most favorable to juvenile marine fish, shellfish, oysters, and submerged aquatic vegetation (SAV). This is estimated at 12 to 20 parts per thousand (ppt) for oysters.
NE2	Lake Worth Lagoon Salinity Envelope	C and SF Restudy and Lake Worth Lagoon CEM Stressor	Northern Estuaries	Inflow to achieve minimum bottom salinity of 23 ppt (500 cubic feet second "cfs") during the wet season at a distance of one-half mile north of the mouth of the C-51 canal. Further refinement of this target will occur upon the SFWMD's completion of the Lake Worth Lagoon Hydrodynamic Salinity Model.
NE3	Caloosahatchee Estuary Salinity Envelope	Caloosahatchee Estuary CEM Stressor	Northern Estuaries	Reestablish a salinity range most favorable to juvenile marine fish, shellfish, oysters, and SAV. This is estimated at 12 to 20 ppt for oysters.
NE4	Loxahatchee River Estuary Salinity Envelope	Loxahatchee MFL documentation, C and SF Restudy, and Loxahatchee River Estuary CEM Stressor	Northern Estuaries	Minimum inflow to achieve a bottom salinity of 2 ppt at the Jonathon Dickinson boat ramp. This target should correspond with another target (X ppt) further downstream in the estuary that is the lowest salinity to support flora and fauna.
NE5	Northern Estuaries Oysters	St. Lucie Estuary/ Indian River Lagoon and Caloosahatchee Estuary CEMs Attribute	Northern Estuaries	Increase the abundance and health of oysters in the St. Lucie and Caloosahatchee Estuaries. Restore oyster beds in suitable habitat and maintain habitat function of oyster beds for fish, crabs, and birds in the Caloosahatchee Estuary.
NE6	St. Lucie Estuary Macroinvertebrates	St. Lucie Estuary/ Indian River Lagoon CEM Attribute	Northern Estuaries	Increase species' richness, abundance, and diversity of benthic species in the St. Lucie Estuary to that typically found in a healthy estuarine community.
NE7	Northern Estuaries Fish Communities	St. Lucie Estuary/ Indian River Lagoon and Caloosahatchee Estuary CEMs Attribute	Northern Estuaries	Restore estuarine fish assemblages with abundance, taxonomic composition, diversity, and representation of life stages characteristic of targeted salinity regimes for each estuary. Decrease fish abnormalities to less than one percent in the St. Lucie Estuary. Maintain or enhance SAV habitat for juvenile fish.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
NE8	Northern Estuaries Submerged Aquatic Vegetation (SAV)	St. Lucie Estuary/ Indian River Lagoon and Caloosahatchee Estuary CEMs Attribute	Northern Estuaries	Increase cover of SAV beds to areas of suitable habitat and maintain flows needed to achieve the proper salinity range for SAV.
NE9	Caloosahatchee Estuary Manatee Population Abundance, Distribution, and Health	Caloosahatchee Estuary CEM Attribute	Northern Estuaries	Maintain and enhance current habitat and foraging areas for manatees in the Caloosahatchee Estuary and in canals to promote species recovery, especially near the Florida Power and Light warm water refugia. Manatee habitat values in canals should be maintained or enhanced, as reflected by continued use of canals by manatees. Decrease manatee deaths in categories "undetermined" and "calves".
NE10	Caloosahatchee Estuary Water Quality	Caloosahatchee Estuary CEM Stressor	Northern Estuaries	
NE11	St. Lucie Estuary Water Quality	St. Lucie Estuary/ Indian River Lagoon CEM	Northern Estuaries	
NE12	Indian River Lagoon Water Quality	St. Lucie Estuary/ Indian River Lagoon CEM	Northern Estuaries	
NE13	Loxahatchee River Estuary Water Quality	Loxahatchee River Estuary/Lake Worth Lagoon CEM	Northern Estuaries	
NE14	Lake Worth Lagoon Water Quality	Loxahatchee River Estuary/Lake Worth Lagoon CEM	Northern Estuaries	
NE15	Northern Estuaries Contaminants (Toxicants and Pathogens)	Caloosahatchee Estuary, St. Lucie Estuary/Indian River Lagoon, and Loxahatchee River Estuary/Lake Worth Lagoon CEMs	Northern Estuaries	Geographic extent and degree of sediment toxicity in northern estuaries should decrease. Concentration of metals and synthetic organic chemicals in canal sediments should not exceed biological effects thresholds established by the State of Florida or by Region IV of the United States Environmental Projection Agency (USEPA).
LO1	Lake Okeechobee Extremes in Low Lake Stages	Lake Okeechobee CEM Stressor	Lake Okeechobee	No events below 11 feet. No events below 12 feet >12 months
LO2	Lake Okeechobee Extremes in High Lake Stages	Lake Okeechobee CEM Stressor	Lake Okeechobee	No events above 17 feet. No event above 15 feet >12 months

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
LO3	Spring Recession for Lake Okeechobee	Lake Okeechobee CEM Stressor	Lake Okeechobee	Yearly stage decline from near 15.5 feet to near 12.5 feet, from January to June, with no reversal >0.5 foot/month.
LO4	Lake Okeechobee Native Vegetation Mosaic - Littoral Plant Communities and Bulrush	Lake Okeechobee CEM Attribute	Lake Okeechobee	**Littoral Plant Communities -** Recolonization of much of their historic coverage areas by spikerush and beakrush. Reduction of torpedograss and cattail. An increase of 500 to 1,000 acres in the distribution of continuous stands of willow and pond apple trees in areas that are surrounded by open water. **Bulrush -** A nearly continuous and thick band of bulrush located along the lakeward edge of the littoral zone from Clewiston north to the area near the mouth of the Kissimmee River (>30 miles), and around Kings Bar and Eagle Bay islands.
LO5	Lake Okeechobee Native Vegetation Mosaic - SAV	Lake Okeechobee CEM Attribute	Lake Okeechobee	Maintain more than 40,000 acres of total SAV in the lake, and more than 20,000 acres of vascular plants (in particular *Vallisneria* and *Potamogeton*) in most years (excluding years of extreme regional drought).
LO6	Lake Okeechobee Fish and Aquatic Fauna (Fish and Invertebrates)	Lake Okeechobee CEM Attribute	Lake Okeechobee	Increased diversity and extent of forage fish and pollutant-sensitive taxa of invertebrates. For macroinvertebrates, the pelagic zone target is to reduce the relative abundance of pollution-tolerant oligochaetes to near 20%.
LO7	Lake Okeechobee Apple Snails and Snail Kite Population and Nesting	Lake Okeechobee CEM Attribute	Lake Okeechobee	**Apple Snails –** Increased average population density of apple snails, and reduced occurrence of years when population is decimated by extreme drought. **Snail Kite -** Increased average number of snail kite nests in littoral zone from the 1998 to 2000 value of 3 to a short-term value of approximately 9 nests/year and a long-term value of over 11 nests/year. Have at least one chick fledge from more than 15% of the nests.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
LO8	Lake Okeechobee Wading Bird Feeding Aggregations and Nesting	Lake Okeechobee CEM Attribute	Lake Okeechobee	Increase the number of large feeding aggregations of wading birds, and in particular, increase the peak number of winter nests to 300 great blue heron, 1,000 great egret, 700 snowy egret, 600 tri-colored heron, 800 little blue heron, and 1,000 white ibis. These numbers correspond to maxima observed during a period of favorable lake stage conditions in the late 1980s.
LO9	Lake Okeechobee Fish Population Density, Age Structure, and Condition	Lake Okeechobee CEM Attribute	Lake Okeechobee	Improved density, age structure, and condition of black crappie, largemouth bass, and brim in the littoral and nearshore regions of the lake. Reduced relative abundance of gizzard shad, threadfin shad, and blue tilapia.
LO10	Lake Okeechobee Alligator Populations and Condition	Lake Okeechobee CEM Attribute	Lake Okeechobee	Maintain present population density and condition of alligators in the lake.
LO11	Lake Okeechobee Shoreline Organic Berm	Lake Okeechobee CEM Attribute	Lake Okeechobee	Reduce the frequency of occurrence and spatial extent of a berm of dead plant material and sediments along the western lakeshore, with no continuous berm > 1 km in length.
LO12	Lake Okeechobee Total Phosphorus Concentration	Lake Okeechobee CEM Stressor	Lake Okeechobee	Pelagic total phosphorus long-term average below 40 ppb.
LO13	Lake Okeechobee Total Nitrogen: Total Phosphorus Ratio	Lake Okeechobee CEM Stressor	Lake Okeechobee	Pelagic total phosphorus long-term average ratio higher than 22:1.
LO14	Lake Okeechobee Diatom: Cyanobacteria Ratio	Lake Okeechobee CEM Attribute	Lake Okeechobee	Pelagic long-term ratio above 1.5:1.
LO15	Lake Okeechobee Algal Bloom Frequency	Lake Okeechobee CEM Attribute	Lake Okeechobee	Less than 5% of pelagic with >40 ppb chlorophyll *a*.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
LO16	Lake Okeechobee Water Clarity	Lake Okeechobee CEM Attribute	Lake Okeechobee	Secchi disk visible on lake bottom in shoreline region from May to September to allow adequate light for submerged plant growth.
LO17	Lake Okeechobee Phosphorus Loads	Lake Okeechobee CEM Stressor	Lake Okeechobee	105 metric tons/year from surface inflows.
LO18	Lake Okeechobee Class I Water Quality Parameters	Lake Okeechobee CEM Stressor	Lake Okeechobee	No increase in exceedances of Class I standards due to cumulative effects of CERP projects.
GE1	Number and Severity of Dry Events for the Greater Everglades	Everglades' Ridge and Slough, Marl Prairie, Mangrove Estuary, and Big Cypress CEM Stressor	Greater Everglades	NSM 4.5 (or later) envelopes throughout the greater Everglades.
GE2	Greater Everglades Hydroperiod	Everglades' Ridge and Slough, Marl Prairie, Mangrove Estuary, and Big Cypress CEM Stressor	Greater Everglades	Restore NSM 4.5 (or later) envelopes throughout the greater Everglades, except in areas where deviations from NSM have been deemed to be environmentally beneficial.
GE3	Greater Everglades Extreme High and Low Events	Everglades' Ridge and Slough, Marl Prairie, Mangrove Estuary, and Big Cypress CEMs Stressor	Greater Everglades	NSM 4.5 (or later) envelopes throughout the Greater Everglades.
GE4	Greater Everglades Seasonal Amplitude and Interannual Variability of Water Levels	Everglades' Ridge and Sough, Marl Prairie, Mangrove Estuary, and Big Cypress CEMs Stressor	Greater Everglades	NSM 4.5 (or later) multiyear patterns of amplitude and variability throughout the greater Everglades.
GE5	Greater Everglades' Overland Flow Volume, Velocity, Timing and Distribution	Everglades' Total System CEM Stressor	Greater Everglades	NSM 4.5 (or later) predictions of regional flow patterns in the remaining greater Everglades.
GE6	Greater Everglades' Soil Nutrient Concentrations	Big Cypress, Ridge and Slough, and Marl Prairie CEMs Stressor	Greater Everglades	Restoration of freshwater flows to the mangrove estuaries in combination with sea level rise is expected to enhance site nutrient status as indicated by increased soil nitrogen and phosphorus concentration. Improved water quality and reduced phosphorus loads in freshwater wetlands are expected to reduce site nutrient status as indicated by decreased soil phosphorus concentration.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
GE7	Wetland Landscape Patterns - Freshwater and Estuarine Vegetation Mosaics	Big Cypress, Ridge and Slough, Marl Prairie, and Mangrove Estuary CEMs Attribute	Greater Everglades	Cease loss of pattern, location, directionality, and spatial extent of the greater Everglades' plant communities.
GE8	Wetland Landscape Patterns - Ridge and Slough Community Sustainability	Ridge and Slough CEM Attribute	Greater Everglades	Maintain or restore processes that sustain coexisting tree islands and sloughs in the current ridge and slough landscape.
GE9	Wetland Landscape Patterns - Tidal Creek Sustainability	Mangrove Estuary CEM Attribute	Greater Everglades	Maintain and restore processes that recover and sustain tidal creeks.
GE10	Wetland Landscape Patterns - Marl Prairie Cape Sable Seaside Sparrow Habitat	Marl Prairie CEM Attribute	Greater Everglades	Maintain or recover tussock-forming plant communities in the areas of the southern marl prairies that support major breeding populations of the Cape Sable seaside sparrow, to the extent possible during the hydrologic restoration of the Southern Everglades.
GE11	Wetland Trophic Relationships - Regional Populations of Fishes, Crayfish, Grass Shrimp, and Aquatic Amphibians	Big Cypress, Ridge and Slough, Marl Prairie, and Mangrove Estuary CEMs Attribute	Greater Everglades	Recover production and size distributions, abundance, and seasonal densities consistent with predrainage hydropatterns and salinities in freshwater and estuarine wetlands.
GE12	Wetland Trophic Relationships - Wading Bird Foraging Patterns in Overdrained Wetlands	Marl Prairie CEM Attribute	Greater Everglades	Increase flock sizes and numbers of birds foraging in overdrained southern marl prairies.
GE13	Wetland Trophic Relationships - Wading Bird Nesting Patterns	Total System CEM Attribute	Greater Everglades and Lake Okeechobee	Recover predrainage patterns of colony locations, timing and abundance, including recovery of estuarine super colonies (locations and frequency).
GE14	Wetland Trophic Relationships - American Alligator Distribution, Size, Nesting, and Condition (Health)	Big Cypress, Ridge and Slough, Marl Prairie, and Mangrove Estuary CEMs Attribute	Greater Everglades	Recover abundance, distribution, and health patterns consistent with predrainage hydrology, including return of predrainage abundance to marl prairies and mangrove estuaries.
GE15	Wetland Trophic Relationships - Periphyton Mat Production and Composition	Ridge and Slough and Marl Prairie CEMs Attribute	Greater Everglades	Increase periphyton mat cover, biovolume, organic content, percent noncalcareous algae and diatom composition.
GE16	Wetland Trophic Relationships - Mangrove Forest Production/Soil Accretion	Mangrove Estuary CEM Attribute	Greater Everglades	Increase the primary productivity and soil accretion of mangrove forests in coastal areas where natural patterns of hydrology and salinity are restored.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
GE17	American Crocodile - Juvenile Growth and Survival	Mangrove Estuary and Florida Bay CEMs Attribute	Greater Everglades and Southern Estuaries	Increase in yearly survival for animals age 0-3 years as compared to baseline values for animals in Florida Bay (current values 1.5%) and an increase in growth rates for animals age 0-3 years from baseline values (0.10 cm/day) to values approaching those observed at north Key Largo and Turkey Point (0.137-0.146 cm/day).
GE18	Total Phosphorus Loads at Inflows to Everglades Protection Area	Big Cypress, Ridge and Slough, and Marl Prairie Stressor	Greater Everglades	Maintain or reduce long-term average TP concentrations to 10 ppb or less in surface water and no increase in TN concentrations from current conditions throughout the greater Everglades.
GE19	Greater Everglades Nutrient (TP and TN) Loads/Flow-Weighted Mean Concentrations	Ridge and Slough and Big Cypress CEMs Stressor	Greater Everglades	Average annual TP loads to greater Everglades varies spatially, but should not exceed 20 (*40-50?*) metric tons/year or a long-term flow-weighted mean concentration of 10 ppb. Average annual TN loads should not increase from current conditions.
GE 20	Greater Everglades Nutrient (TP and TN) Concentrations in Soil	Ridge and Slough and Big Cypress CEMs Stressor	Greater Everglades	Reduce long-term average TP concentrations to 200–400 mg/kg or less in the upper 10 cm of soil and maintain TN concentrations at or below current conditions throughout the Everglades.
GE21	Greater Everglades Sulfate Concentrations in Surface Water	Big Cypress, Ridge and Slough, and Marl Prairie CEMs Stressor South Florida Ecosystem Assessment: Phase I/II - Everglades Stressor Interactions (USEPA, 2001)	Greater Everglades	Maintain or reduce concentrations to 1 ppm or less in surface water throughout the Greater Everglades.
GE22	Greater Everglades Conductivity in Surface Water	Big Cypress, Ridge and Slough, and Marl Prairie CEMs Stressor Source?	Greater Everglades	Maintain or reduce to Florida Class III standard of 1,275 umhos/cm or maintain a less than 20% increase in deseasonalized temperature-corrected conductivity at all stations

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
GE23	Coastal Salinity Gradients	Mangrove Estuary CEM Attribute	Greater Everglades	Push the salinity gradients seaward in the mangrove estuaries due to restoration of predrainage freshwater flow volume, timing, and distribution. Maintain broad coastal gradients of salinity in the Southern Everglades, due to the restoration of predrainage freshwater flow, given predicted rates of sea level rise during the next century.
SE1	Surface Water Discharges to Biscayne Bay	Biscayne Bay CEM Stressor	Southern Estuaries	Increase inflows to southern Biscayne Bay via the tidal creeks and herbaceous marshes of the South Dade Wetlands. Maintain total annual volumes of surface water discharge to Biscayne Bay that equal or exceed those under base conditions.
SE2	Southern Estuaries Salinity Pattern	Florida Bay, Biscayne Bay, and Mangrove Estuary CEMs Stressor	Southern Estuaries	**Florida Bay -** Recover a range of conditions, including less abrupt salinity changes, reduced extremes, reduced hypersaline conditions, lower salinities. **Biscayne Bay –** Recover mesohaline salinity patterns in nearshore waters. **Mangrove Estuary -** Recover oligohaline salinity conditions in coastal lakes and bays.
SE3	Southern Estuaries SAV Distribution, Abundance and Community Structure	Florida Bay, Biscayne Bay and Mangrove Estuary CEMs Attribute	Southern Estuaries	**Florida Bay** - Recover seagrass beds over most of bay bottom, extending west along the Gulf of Mexico coastal shelf to Lostman's River. Replace *Thalassia* monoculture with mixed *Thalassia* and *Halodule*. **Mangrove Estuary** - Increase cover and seasonal duration of *Ruppia*, *Chara*, *Najas* and *Utricularia* in coastal lakes and basins. **Biscayne Bay** - Support seagrass beds, consisting primarily of *Halodule*, in nearshore areas that are presently devoid of seagrasses.
SE4	Juvenile Pink Shrimp and Associated Epifauna	Florida Bay and Biscayne Bay CEMs Attribute	Southern Estuaries	Increase abundance of juvenile shrimp. Increase abundance and diversity of epifaunal fish and macroinvertebrates that are associated with seagrass beds, in Biscayne Bay and Florida Bay and along the Gulf of Mexico coastal shelf westward to Lostman's River.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
SE5	Shoreline Fish Community	Florida Bay and Biscayne Bay CEMs Attribute	Southern Estuaries	Increase diversity and density of fish assemblages along the mainland mangrove shorelines of Florida Bay and Biscayne Bay.
SE6	Juvenile Spotted Seatrout	Florida Bay CEM Attribute	Southern Estuaries	Increase distribution, abundance, growth and survival of juvenile spotted seatrout in north-central and western Florida Bay.
SE7	Roseate Spoonbill Nesting Patterns	Florida Bay and Mangrove Estuary CEMs Attribute	Southern Estuaries	Restore the number of nesting pairs of roseate spoonbills in northeastern Florida Bay.
SE8	Southern Estuaries Nutrient (TP and TN) Concentrations	Florida Bay, Biscayne Bay and Mangrove Estuary CEMs Stressor	Southern Estuaries	**Biscayne Bay** – Maintain or reduce surface water nutrient concentrations so not to exceed historical background, and not exceed a monthly average of 0.005 mg/l TP concentration and 0.80 mg/l TN concentration in open portions of the estuaries. **Florida Bay** – Current nutrient concentrations of surface water inputs from the Everglades and from Florida Keys should not be exceeded so the oligotrophic nature of the bay is maintained.
SE9	Southern Estuaries Nutrient (TP and TN) Loads	Florida Bay, Biscayne Bay, and Mangrove Estuary CEMs Stressor	Southern Estuaries	**Biscayne Bay** – maintain or reduce nutrient loads so not to exceed historical background. Achieve a 47 percent reduction in total nitrogen loading. **Florida Bay** – maintain or reduce current nutrient loads from Everglades inflows and the Keys
SE10	Southern Estuaries Algal Bloom Frequency	Florida Bay and Biscayne Bay CEMs Stressor	Southern Estuaries	Restore conditions in estuaries such that the severity of peak estuarine algal blooms does not exceed 15 ppb chlorophyll at any time.
SE11	Southern Estuaries Water Clarity (PAR)	Florida Bay and Biscayne Bay CEMs Attribute	Southern Estuaries	Improve or cause no further degradation in existing water clarity to promote establishment of seagrasses and other SAV.
SE12	Contaminants (Toxicants and Pathogens) in Biscayne Bay Tributaries and Coastal Sediments	Biscayne Bay CEM Stressor	Southern Estuaries	No increase in geographic extent and degree of sediment toxicity in the bay and coastal wetlands. Concentrations in canal and water column should not exceed established biological effects thresholds.
SE 13	Southern Estuaries Manatee Distribution and Mortality	Biscayne Bay CEM Attribute	Southern Estuaries	Manatee mortality caused by water control structures should be reduced to zero. Manatee habitat values in canals and the bay should be maintained or enhanced, as reflected by continued use of canals and bay areas by manatees.

NUMBER	TITLE	SOURCE	MONITORING MODULE AND SECTION	RESTORATION EXPECTATIONS
TS1	Continuity - Water Surface Elevations Across Barriers	Total System CEM Stressor	Hydrology	Eliminate stage differences across any remaining internal structures.
TS2	Sheetflow - Volume of Water Across Transects in the WCAs and Everglades National Park	Total System CEM Stressor	Hydrology	Restore overland flow to similar volume and timing of flow predicted by NSM 4.5.
TS3	Mercury Bioaccumulation	Total System CEM Stressor	Greater Everglades, Northern Estuaries, Lake Okeechobee, Southern Estuaries	Decrease or cause no net increase in levels of mercury bioaccumulation in tissue of fish and/or fisheating fauna. Levels should not exceed biological effect thresholds established by the USEPA for mercury in wildlife.
WS1	Frequency, Severity and Duration of Water Restrictions for the Lake Okeechobee Service Area	Florida Statute 373.0361(2)(a)(1)	Water Supply and Flood Protection	Decrease seepage losses and harmful releases of excess water for the natural system while providing at least a 1-in-10-year level of service for the Lake Okeechobee and Lower East Coast Service Areas through regional water deliveries and seepage from Lake Okeechobee, the WCAs and Everglades National Park.
WS2	Frequency of Water Restrictions for the Lower East Coast Service Area	Florida Statute 373.0361(2)(a)(1)	Water Supply and Flood Protection	Meet demands on water supply during droughts up to a 1-in-10 year frequency
WS3	Potential for High Water Levels in the South Miami-Dade Agricultural Area	C and SF Restudy	Water Supply and Flood Protection	Maintain existing flood protection in accordance with applicable law
WS4	Prevent Saltwater Intrusion of Biscayne Bay Aquifer and Meet MFL Criteria for the Biscayne Aquifer	Chapter 40E-8, F.S.	Water Supply and Flood Protection	Canal at Structure: Canal Stages (ft NGVD) C-51 at S-155: 7.80 C-16 at S-4: 7.80 C-15 at S-40: 7.80 Hillsboro Canal at G-56: 6.75 C-14 at S-37B: 6.50 C-13 at S-36: 4.00 North New River at G-54: 3.50 C-9 at S-29: 2.00 C-6 at S-26: 2.50 C-4 at S-25B: 2.50 C-2 at S-22: 2.50
WS5	Prevent Saltwater Intrusion of Biscayne Bay Aquifer in South Miami-Dade County	C and SF Restudy	Water Supply and Flood Protection	Canal at Structure: Canal Stage (ft NGVD) C-100A at S-123: 2.00 C-1 at S-21: 2.00 C-102 at S-21A: 2.00 C-103 at S-20F: 2.00