

## 7.0 RELATIONSHIP OF MODULE ASSESSMENTS TO INTERIM GOALS/INTERIM TARGETS

### 7.1 Southern Estuaries

There is a relatively close relationship between the SAV monitoring (and assessment) and the present IGs for the SE but it is far from perfect. In fact the current MAP work plans will not in themselves be sufficient (unless modified and supplemented) to address some of the refined spatial goals discussed above. Explicit targeted transect sampling will be required and to some degree this has already been initiated outside of the MAP.

The recommended method for predicting Florida Bay SAV for IG purposes is to eventually depend upon statistical and mechanistic seagrass models. Modeling parameters for predicting this indicator include: percent cover and relative abundance of seagrass (*Thalassia*, *Halodule*, and *Ruppia*) and macro algal species; biomass and relative abundance of *Thalassia*, *Halodule*, and *Ruppia*; spatial distribution and extent (coverage) of seagrass community types (based on percent cover and biomass data); and seasonal variation (end of dry and wet seasons) in these measures.

An important and potentially troubling concern may be the need, for modeling purposes, to accurately assess biomass (rather than estimating it indirectly from

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regression relationships based on limited data). Depending upon model sensitivity this might require additional data, effort and expense. Unfortunately given systematic differences in BB estimates it will not be possible at this time to pool FHAP and DERM (and likely NOAA/Beaufort) data to increase the number of observations and perhaps improve regression reliability. In any case such regressions tend to breakdown over the full BB range and are most reliable only at the lower end of the overall range. Since it is probable that the IGs for SAV in Florida Bay will change in its next iteration, and since an update to the MAP is planned for 2007, an opportunity exists to improve the match between the processes of model prediction and assessment as well.

### 7.2 Northern Estuaries

The IGs for oysters were stated simply in terms of acres of suitable habitat under restoration scenarios in the estuaries where full CERP implementation restoration targets exist (all but LWL and in the SE Biscayne Bay).

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A baseline for oysters has been established in all NE except LWL where preliminary mapping exists, but area calculations are not finalized. Mapping consists of distribution of

reefs/beds, size class distribution and percent alive/dead. During CERP implementation new maps need to be created on five-year time intervals to track changes. The current MIS for CERP

was utilized in the model runs to predict the expected progress over time, in five-year increments, toward achieving that target (see the RECOVER recommendations for IGs for details on each of the four NE). A number of watershed hydrology, hydrodynamic salinity and oyster models were employed. The IG for oysters will be assessed using several other parameters as well as acres in order to determine cause and affect relationships of water management changes due to CERP implementation on the health and distribution of the oyster reefs. The monitoring program which is designed to track the predictions made includes measuring spat abundance and distribution, the spatial extent of oyster beds, juvenile growth and survival and oyster health as indicated by condition index and extent of disease. Future refinement of the IG predictions in all estuaries needs to occur. The oyster HSI model is proving to be a useful tool for this purpose. The model needs to be adapted for use on the east coast and the monitoring data currently being collected will improve calibration of the tool. As modeling scenarios for the preferred restoration plan in LWL become final this information will need to be used to develop the five year predictions for that estuary as well. As information is gained in these first few years of monitoring, efforts will be made to make sure that temporal and spatial scales and matrix being predicted and assessed are complementary in all cases.

### 7.3 Greater Everglades

#### Aquatic Fauna Regional Populations in Everglades Wetlands

The desired restoration conditions for aquatic fauna regional populations are to: 1) achieve late wet season population densities, size distributions, and taxonomic compositions of marsh fishes and other selected groups of aquatic fauna consistent with pre-drainage hydrologic and salinity patterns in the Everglades wetlands, 2) shift the distribution of high population densities and larger size classes from artificially impounded areas of the WCAs to persistent pools to be restored in the southern Everglades, and 3) provide high-density patches of prey-availability across the Everglades landscape where wading birds can feed effectively as water levels recede during the dry season. Calculation of the expected benefits of the CERP regarding increased density of marsh fishes and associated aquatic fauna are based on an empirical relationship of fish abundance to hydroperiod (time since the site was last dried out) that has been determined from field studies at long-term sampling sites in the Everglades.

**Given the current approach to aquatic fauna IGs, progress toward achieving the goal during any particular year cannot be assessed from monitoring data. Assessment of progress in achieving aquatic fauna IGs during any given year, based on MAP monitoring data, will require model simulations.**

Present IGs for aquatic fauna are based on average densities for a 31-year POR, given the CERP infrastructure that will be in place for 2010, 2015, etc. For example, the simulated 2010 condition represents the average abundance of fishes produced in all years if the system contained all the projects scheduled for completion by 2010, and it were operated for 31 years given the rainfall patterns observed during the latter half of the twentieth century. Given the current approach to aquatic fauna IGs, progress toward achieving the goal during any particular year cannot be assessed from monitoring data. Assessment of progress in achieving aquatic fauna IGs during any given year, based on MAP monitoring data, will require model simulations.

Such simulations will relate aquatic fauna population characteristics during given sampling years to the hydrologic conditions for the specific years and for appropriate antecedent time periods. Such simulations also will be applied to different geographic locations in the GE wetlands.

#### System-Wide Wading Bird Nesting Patterns

IGs for wading bird population health include system-wide patterns of nesting, and measurement of four variables: numbers of nesting birds, locations of nesting colonies, timing of nesting, and frequency of “supra-normal” colonies. Best professional opinion was used for initial predictions, based on over 50 years of recorded wading bird nesting patterns under previous hydrological conditions.

For the locations of nesting colonies, the desired restoration condition is a substantial increase in nesting by egrets, ibis, and storks in the region of the southern Everglades mainland estuaries.

**The wading bird IGs in their present form are easily assessed at five-year increments from the current monitoring plan.**

An initial desired restoration condition for these species is a return to greater than 50 percent of nesting pairs in the estuarine region compared to less than ten percent under current conditions. For spoonbills, the desired

restoration condition is a realignment of nesting colonies into eastern Florida Bay. The desired restoration condition for timing of nesting applies primarily to the wood stork. Wood storks should initiate nesting no later than January 31 in most years. Wood storks have been initiating nesting as late as February and March in most recent years. For supra-normal breeding events, the desired restoration condition is to recover pre-drainage patterns of “super colony” nesting events. The desired restoration condition has yet to be refined, but in general, it is to have about two supra-normal breeding events during each ten-year time period (less than one event per decade since the 1970s).

The predictions for system-wide wading bird nesting patterns are quantified at five-year intervals. “Total # Pairs” refer to the total number of nesting pairs for the same four species and are based on the mean of three-year running averages. The wading bird IGs in their present form are easily assessed at five-year increments from the current monitoring plan.

## **7.4 Lake Okeechobee**

The current IG/IT for LO are hydrologic based, with the ultimate goal of using operational flexibility to facilitate benefits to the environment without impacting other uses of the lake. Although there are no biologically based IG/IT and this time, the development of goals and targets based on LO’s SAV community would be an important development since the areal extent, density, and species composition of SAV in LO may be the single most important biological indicator of the lake’s overall ecological health. The LO SAV sampling program has indicated that SAV can cover more than 40,000 acres when water levels are favorable (*e.g.*, August 2000, 2002, and 2004), as compared to <5,000 acres during periods of prolonged high water levels (*e.g.*, 1996 to 1999). Therefore, the LOPP restoration target is to sustain at least 40,000 total acres of SAV (vascular and non-vascular) with at least 20,000 acres contributed by vascular plants while the proposed RECOVER PM sets this target at 49,000 acres. Under

existing lake management constraints, this spatial extent is attained in certain years, although in a

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relatively high percentage of years it does not due to sustained high water levels or major physical disturbances (*e.g.*, hurricanes). This leads to the inescapable conclusion that an inter-annual variability factor needs to be included in SAV goals and targets to

capture the ability of CERP related changes to promote the long-term maintenance of quality SAV habitat.