Deep Storage Reservoir

Purpose and General Description: Above ground deep storage feature that may also be known as an impoundment.

Physical Description: Can be varying water depths. Current analysis evaluated 15-18 foot maximum depths above grade. Embankments are earthen with armor on the interior embankment to prevent erosion. Embankment heights are based on fetch length (length of open water). All features evaluated had a fetch length greater than five (5) miles but less than ten (10) miles; embankment heights are 2.5 times the maximum water depths with three horizontal to one vertical (3H:1V) side slopes. Features include inflow pump stations, gravity outflows, seepage canals, and cutoff walls. Feature may contain internal levees and internal structures.

General Description of Operations: These features are sized such that the inflow pumping capacity and storage capacity is sufficient to capture and hold both normal and peak flows from the local basins and from Lake Okeechobee as appropriate. When there is a requirement downstream, the water is gravity discharged at the desired rate and timing to the downstream flow-ways, shallow storage features or Stormwater Treatment Areas (STAs).

Hydrologic Performance: Deep storage reservoirs are intended to store water at greater depths in order to minimize footprint, reduce evapotranspiration (ET) losses, and increase operational flexibility. Storing water at these depths requires pumped inflows but creates sufficient hydraulic head to allow for gravity outflows. Reservoirs do not mimic natural hydrology within their footprint, but can be utilized to provide deliveries to downstream water bodies that are more consistent with natural hydrology.

Water Quality Performance: High uncertainty in predicting total phosphorus (TP) water quality performance. Limited long-term TP removal performance data exist for large reservoirs, and evidence suggests that under ideal conditions, removal of 15-25% may be achieved. Under less than ideal conditions, TP removal may drop significantly. Discharges from reservoirs must receive further treatment in an STA prior to discharge to the Everglades to achieve the inflow TP concentration requirements. Design and other considerations required to insure discharged water meets all other required water quality standards.

Environmental / Ecological Advantages or Benefits: Deep storage reservoirs are not intended to provide natural habitat within the footprint although they can attract wildlife. The intent is to utilize the reservoir to provide restoration and other benefits to downstream water bodies and habitats.

Environmental / Ecological Impacts or Concerns: Concerns exist with regard to the potential for conditions within these deep storage reservoirs to result in stratification, anoxic conditions, and algal blooms. However, stratification typically occurs in reservoirs with depths of 50 feet or greater. Concerns have also been expressed about the potential for nutrient resuspension/ release due to wind events or dryout. Dryout of the reservoir will have an impact on aquatic habitat and organisms within the reservoir. Design and operational considerations will need to be evaluated to address these concerns.

Economic / Recreational Advantages or Benefits: Deep storage reservoirs require smaller footprints which help to minimize land acquisition needs and potential economic impacts to landowners and local communities. If land availability is a restriction, deep storage features can provide a higher level of performance benefits than shallow storage components. Once the features are operational, limited recreational opportunities will be available.

Economic / Recreational Impacts or Concerns: Limitations to recreational access may occur due to significant water level changes within the reservoir as a result of relatively rapid movement of water in and out of facility. Due to the embankment height requirements and resulting embankment cross-section, deep reservoirs have a higher unit cost per acre foot than shallow storage components.

O&M Considerations (if any): Deep storage reservoirs require large embankments and pump stations that will have to be maintained.

Uncertainty Concerns: High uncertainty related to TP water quality performance.