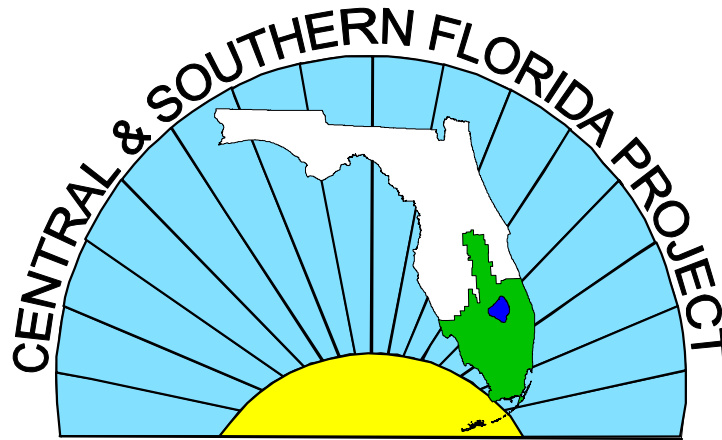


April 2004

CENTRAL AND SOUTHERN FLORIDA PROJECT

COMPREHENSIVE EVERGLADES RESTORATION PLAN



COMPREHENSIVE EVERGLADES RESTORATION PLAN

CONCEPTUAL ALTERNATIVES

Everglades Agricultural Area Storage Reservoirs Phase 1



U.S. Army Corps of Engineers
Jacksonville District



South Florida Water
Management District

Initial Plan Formulation

Initial plan formulation was accomplished with a series of meetings. The first meeting that took place was a sub-group of the United States Army Corps of Engineers (USACE) team for the Everglades Agricultural Area (EAA) Storage Reservoirs Phase 1 in early 2004. This sub-group came up with twelve conceptual alternatives (not including the alternative of no-action). The twelve conceptual alternatives were presented to the full project delivery team (all agencies) and additional ideas for alternatives were discussed and presented at the meeting. All agencies were given the opportunity to turn in conceptual alternatives up to ten days following the meeting. At least two agencies turned in conceptual alternatives and descriptions of those alternatives.

Siting

In most cases, when developing conceptual alternatives, the actual locations of those alternatives are not known or the location of measures may vary from alternative to alternative. For this project, a general area for the components has already been established. This is due to the acquisition of land, which occurred through the Talisman land exchange and the Woerner South property acquisition (1999). The lands were purchased with Department of Interior (DOI) Farm Bill funds, with South Florida Water Management District (SFWMD) funds, and through a series of exchanges for lands being purchased with these funds. Therefore, generally the land already acquired or land near the acquired land was used for the alternatives. The use of this land makes the most sense, even without the knowledge of its acquisition, for its proximity to the major canals, the stormwater treatment areas (STAs), and the agricultural lands. Variation from the use of this land was permitted in the conceptual alternatives and the full use of the lands was not required. One suggestion that was made more than once was to expand Compartment A to include the lands between it and the Miami Canal.

Management Measures

The major management measures suggested for this project were reservoirs and canal improvements. These management measures were suggested because the main objective of the EAA Storage Reservoirs is to store water – from rain events and discharges from Lake Okeechobee. The stated purpose of this feature is to improve timing of environmental deliveries to the Water Conservation Areas (WCAs) including reduce damaging flood releases from the EAA to the WCAs, reduce Lake Okeechobee regulatory releases to estuaries, meet supplemental agricultural irrigation demands, and increase flood protection within the EAA. No treatment of the waters was anticipated – only what is achieved by holding the water. Canal improvements were anticipated to be necessary to reduce flooding during large rain events and have been authorized under separate legislation.

The following management measures/design features associated with reservoirs are suggested:

- Deep water refugia – a place that is kept wet during dry down that mobile organisms could use and that would keep a healthy “stock” population.
- Wetland buffers – areas that would “treat” seepage waters and keep seepage waters from surrounding lands.
- Littoral zones – areas where during high water, vegetation can absorb some of the nutrients.
- Vegetated levees – “over-building” select levees to support native trees, shrubs and herbs in order to create greenways.
- Lined reservoirs – lining the reservoirs in order to reduce seepage.
- Underground storage – using underground storage in order to reduce evaporation. The use of Aquifer Storage and Recovery has been suggested as underground storage for other projects. For this project other underground storage possibilities were discussed, such as the use of grout curtains to contain the water in the porous limestone found just under the land surface. Another option is a combination of in-ground and above-ground reservoirs, which would include an array of 100 foot by 100 foot tanks to a depth of 40 feet. An infiltration gallery would prevent evaporation loss. One tank could contain approximately 1 acre-feet of water.

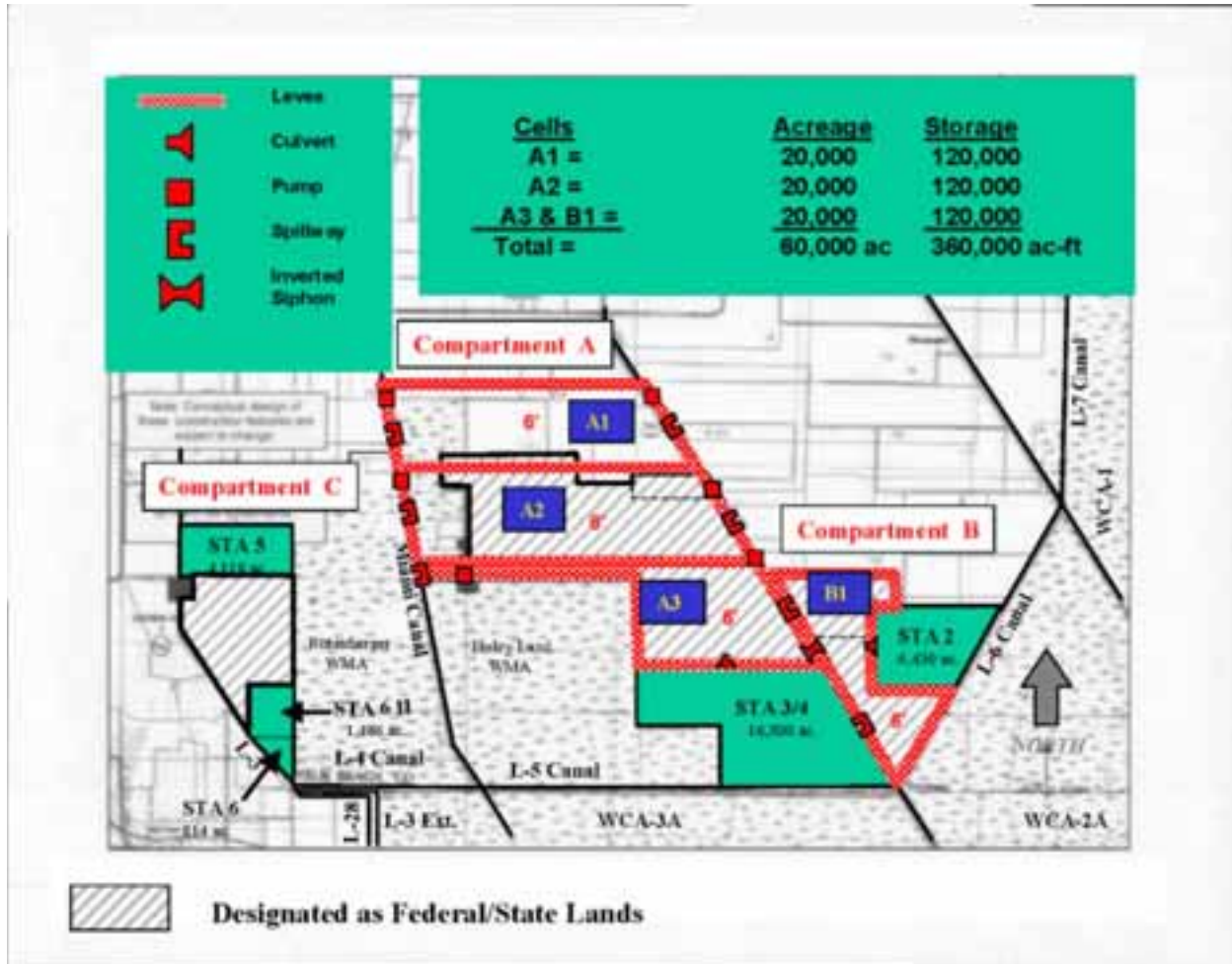
Conceptual Alternatives

The following section describes the conceptual alternatives that were formulated by members of the PDT. The primary component in all of the alternatives is one or more reservoirs. Secondary management measures such as discussed above are noted in the text and in the figures if they were suggested in the alternative. None of the alternatives directly address improvements to the canals. It is anticipated that canal improvement will be dependent upon the size and location of the reservoirs and thus will be addressed once the conceptual plans are screened and those that make it through screening are developed further.

Conceptual Alternative 0

Conceptual Alternative 0 is the Future Without Project condition. This alternative or condition assumes that the other components of the Comprehensive Everglades Restoration Plan (CERP) are in place and that other local and state projects that are proposed are completed. A more thorough description of this alternative will be developed at a later date.

Figure 1



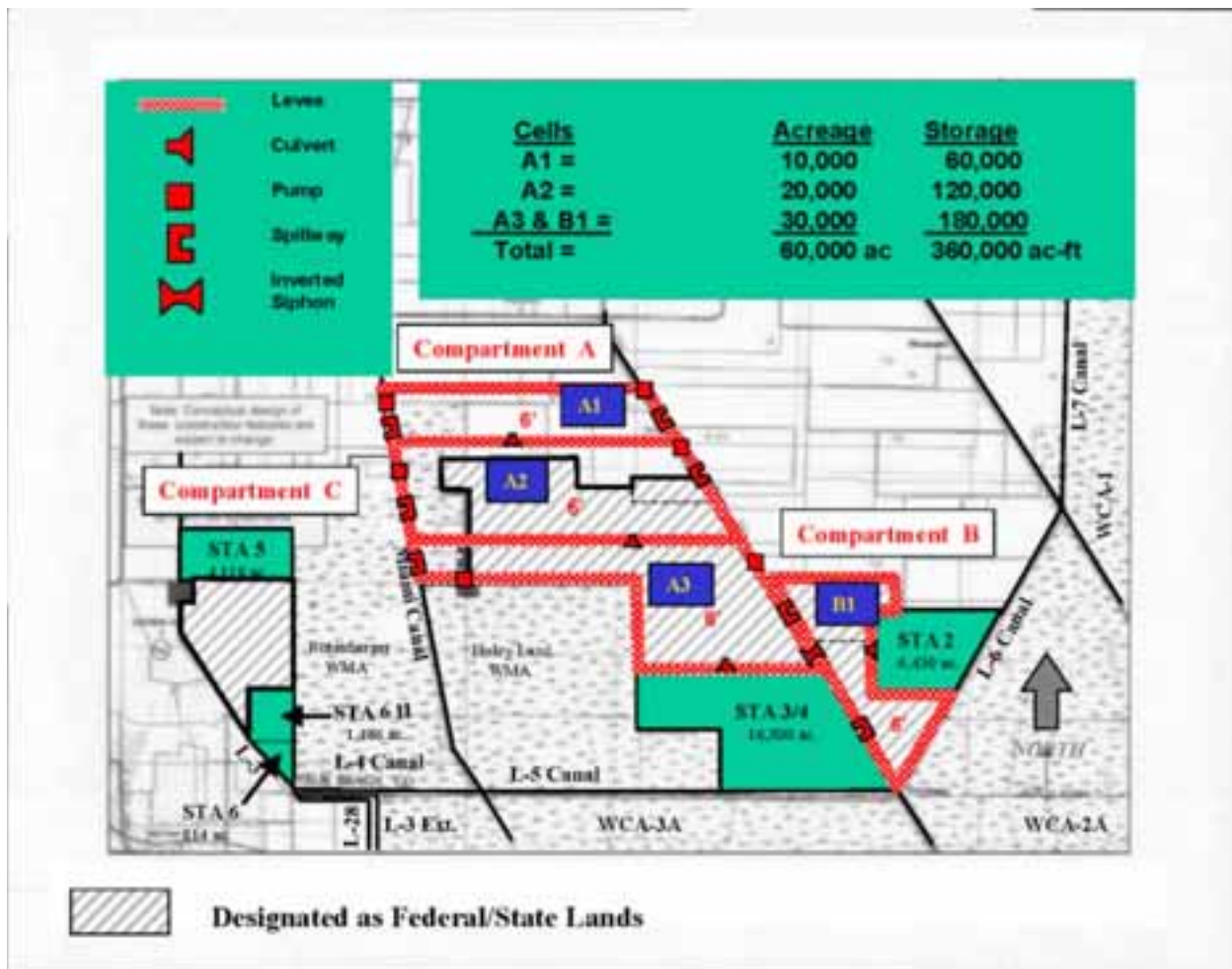
Conceptual Alternative 1

Concept 1 (D13R) has a proposed footprint of 60,000 acres and storage capacity of 360,000 acre-feet (Figure 1). Concept 1 is divided into compartments A1, A2 and A3 & B1 of 20,000 acres each. It is proposed to have four cells. Within Compartments A and B, the proposed cell depths are six feet deep each. There are seven proposed discharges to canals. Four spillways are on the North New River Canal – three for Compartment A and one for Compartment B. Three discharges are on the Miami Canal for Compartment A. There are two proposed discharges to the STAs, one into STA 2 and one into STA 3/4. Pump stations deliver water to the reservoirs from major canals. Three pumps and an inverted siphon are proposed on the North New River Canal and two pumps are proposed on the Miami Canal. This conceptual alternative is based on what was presented in the Central and South Florida Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (April 1999; the Restudy).

The Restudy proposed above-ground reservoir(s) with a total storage capacity of approximately 360,000 acre-feet – 60,000 acres divided into three, equally sized

compartments with the water level fluctuating up to 6 feet above grade in each compartment. The Restudy designated that discharges from the first compartment would be used to meet EAA irrigation demands only. Discharges from the second compartment would be used to meet environmental demands as a priority and irrigation demands secondly. Discharges from the third compartment would be used to meet environmental demands only. The Restudy stated that the storage compartments could be designed to provide a water quality treatment function if needed to ensure water quality protection in the Everglades Protection Area.

Figure 2



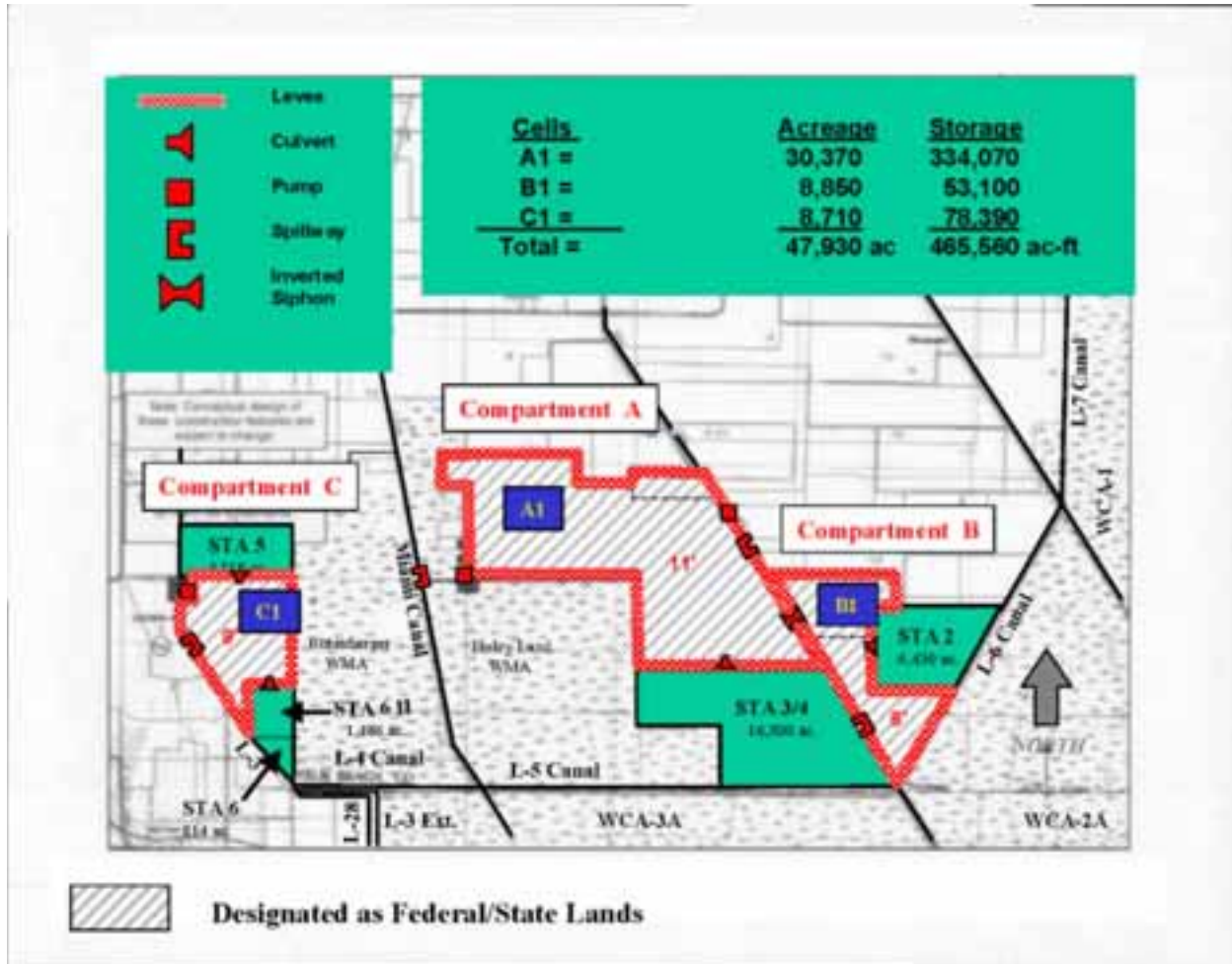
Conceptual Alternative 2

Concept 2 (LEC 2000) has a proposed footprint of 60,000 acres and storage capacity of 360,000 acre-feet (Figure 2). Concept 2 is divided into compartments A1, A2 and A3 & B1 of 10,000 acres, 20,000 acres, and 30,000 acres, respectively. It is proposed to have four cells. Within Compartments A and B, the proposed cell depths are six feet deep each. There are seven proposed discharges to canals. Four spillways are on the North New River Canal – three for Compartment A and one for

Compartment B. Three spillways are on the Miami Canal for Compartment A. There are two proposed discharges to STAs, one into STA 2 and one into STA 3/4. There are two additional discharges proposed between cells. Pump stations deliver water to the reservoirs from major canals. Three pumps and an inverted siphon are proposed on the North New River Canal and two pumps are proposed on the Miami Canal. This conceptual alternative is based on reservoir sizes suggested in the Lower East Coast (LEC) Water Supply Plan (2000).

The LEC Plan recommended four changes to the EAA reservoirs project from what was suggested in the Restudy. The changes were suggested as a means of optimizing EAA water supply without adversely impacting water deliveries to the natural system. First, the LEC Plan suggested the sizes of the reservoirs be modified. This change would enable more water supply demands in the EAA to be met. It was suggested that Compartment 1 be increased to 30,000 acres to meet EAA irrigation demands; Compartment 2A remain the same size (20,000 acres), and Compartment 2B be decreased to 10,000 acres. The second suggestion was that the runoff from the portion of the Hillsboro Canal Basin within the EAA be captured and routed to the enlarged Compartment 1. Thirdly, it was suggested that Compartment 1 be used to meet demands in the West Palm Beach Canal Basin, as well as the other EAA basins. By implementing these changes, a greater percentage of future EAA demands could be met. Lastly, structural and conveyance changes may be necessary to implement these modifications. The models run for the LEC showed that these proposed modifications to the EAA Storage Reservoirs had no effect on performance of the natural system. Performance was the same in both the LEC-1 and LEC-1Revised simulations under average conditions (31-year mean) and drought conditions (five driest years).

Figure 3



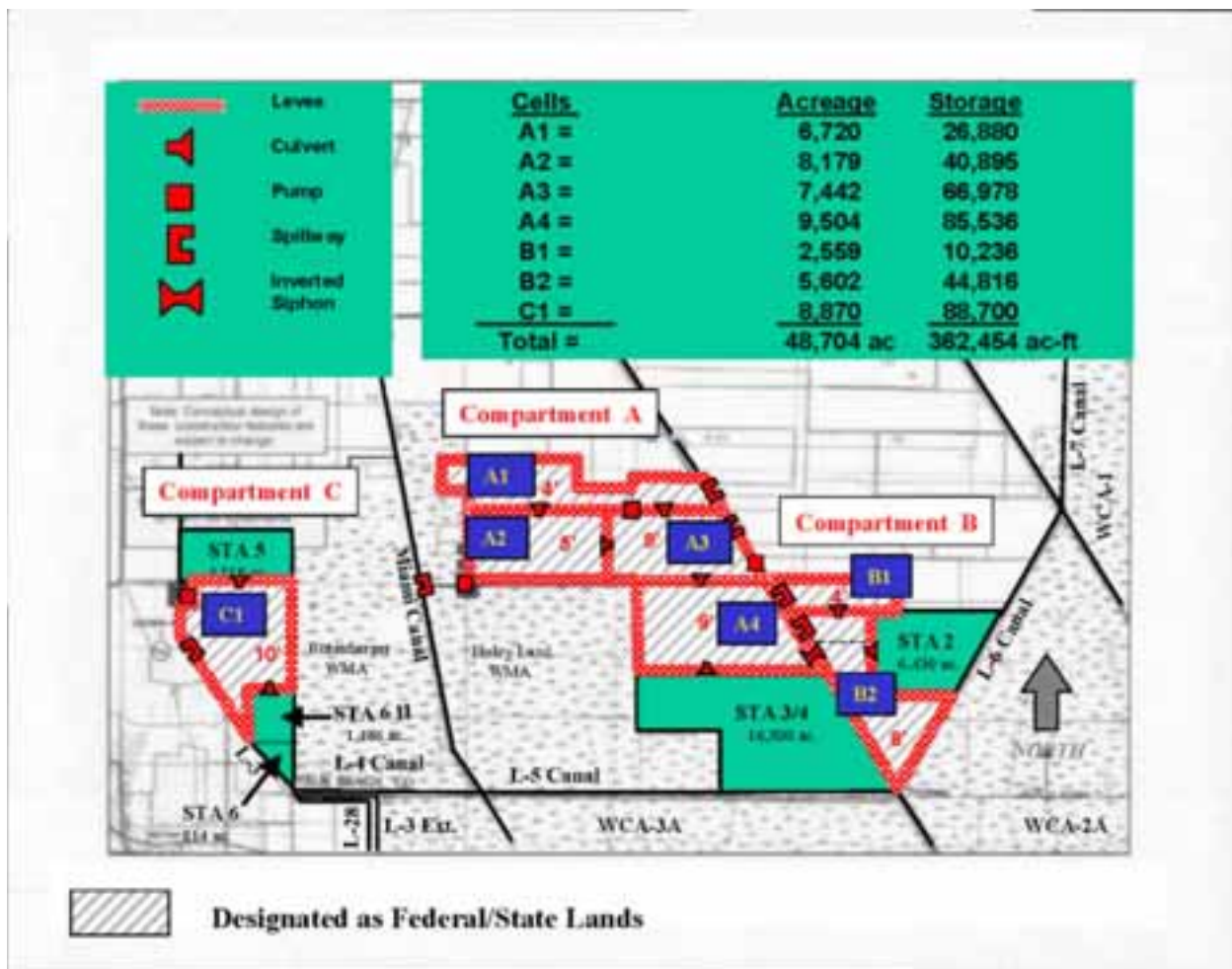
Conceptual Alternative 3

Concept 3 (BSFS) has a proposed footprint of 47,930 acres and storage capacity of 465,560 acre-feet (Figure 3). Concept 3 (BSFS) is divided into compartments A, B and C of 30,370 acres, 8,850 acres, and 8,710 acres respectively. It is proposed to have three cells. Within Compartment A, the proposed cell depth is eleven feet. Within Compartment B, the proposed cell depth is six feet. Within Compartment C, the proposed cell depth is nine feet. There are four proposed discharges to the canals. Two spillways are on the North New River Canal – one for Compartment A and one for Compartment B. One spillway is on the Miami Canal for Compartment A and one spillway is on L-3 for Compartment C. There are four proposed discharges to the STAs, one into each of STAs 2, 3/4, 5, and 6. There is one pump on North New River Canal for Compartment A in addition to one pump east of Miami Canal for Compartment A. There is one pump on L-3 for Compartment C. There is also an inverted siphon on North New River Canal that delivers water between Compartment A and Compartment B. This alternative is

based on the Basin Specific Feasibility Study prepared by Burns & McDonnell for the SFWMD.

The Burns and McDonnell report presented the following recommendations. All runoff from the C-139 Basin and the C-139 Annex are routed to Component C of the EAA Storage Reservoirs project, in addition to the presently simulated inflows (regulatory releases) from Lake Okeechobee. Outflows from the reservoir would then be distributed to STA-5 and STA-6, in proportion to their estimated treatment capacity. All STA-2 inflows are first routed to Component B of the EAA Storage Reservoirs project and there are no other inflows to that reservoir component. Outflows from the reservoir would then be delivered to STA-2. The following inflows would be assigned to Component A: 1) all regulatory releases from Lake Okeechobee other than the 50,033 acre-feet per year average annual volume assigned to Component C; 2) all runoff from the Miami Canal and North New River basins; and 3) all other inflows directed to the Miami and North New River canals.

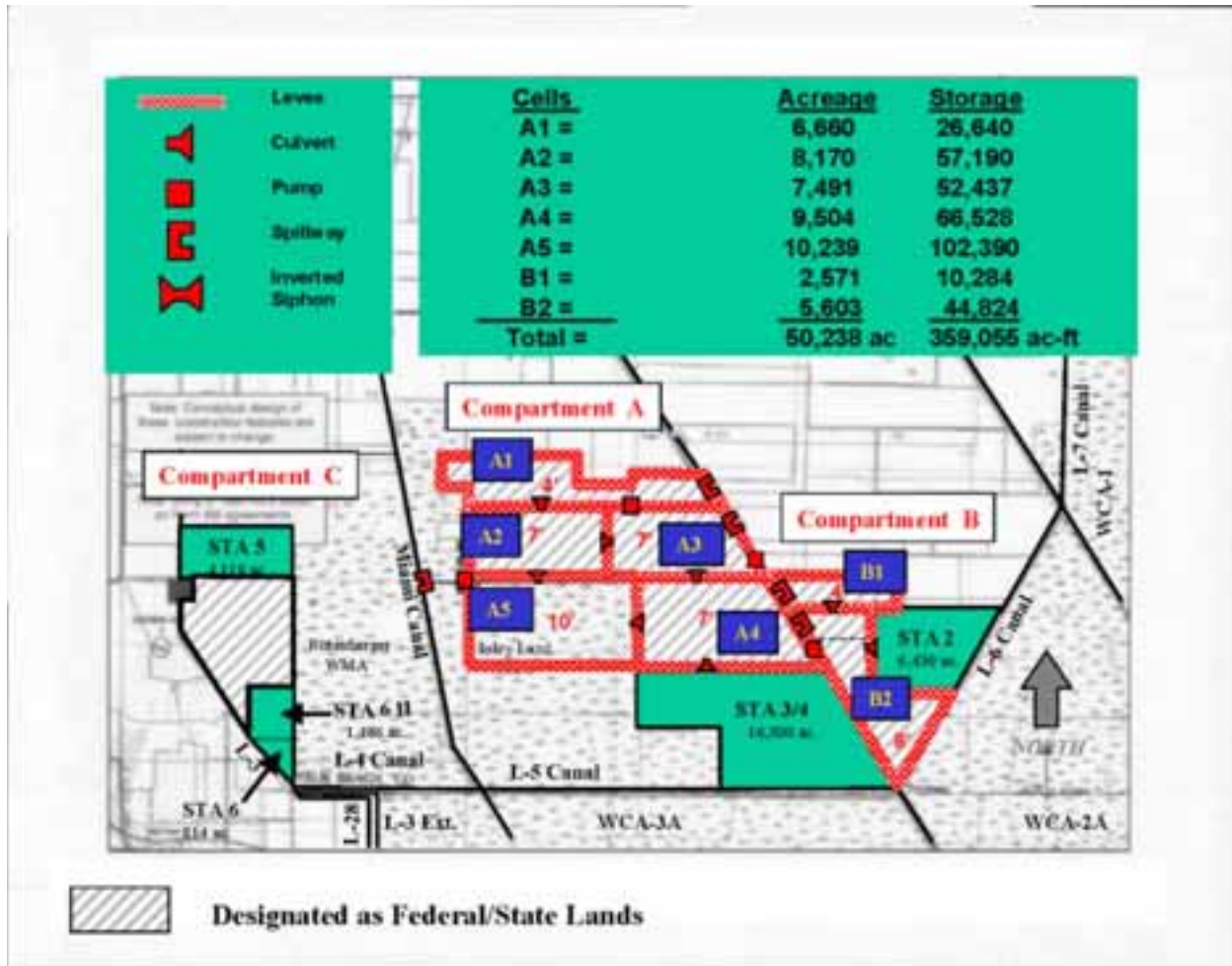
Figure 4



Conceptual Alternative 4

Concept 4 has a proposed footprint of 48,704 acres and storage capacity of 362,454 acre-feet (Figure 4). Concept 4 is divided into compartments A, B and C of 31,845 acres, 8,161 acres, and 8,870 acres respectively. It is proposed to have seven cells. Within Compartment A, the proposed cell depths are one cell at four feet, one cell at five feet, and two cells at nine feet. Within Compartment B, the proposed cell depths are one cell at four feet and one cell at eight feet. Within Compartment C, the proposed cell depth is one cell at ten feet. There are four proposed discharges on North New River Canal; two spillways are for Compartment A and two spillways are for Compartment B. There is also a proposed discharge on the Miami Canal for Compartment A and a proposed discharge on L-3 Canal for Compartment C. There are four proposed discharges into the STAs, one into each of the following STAs: 2, 3/4, 5, and 6. There are five additional proposed discharges between cells. The pump stations deliver water to the reservoirs from major canals and the L-3 Canal. There is one pump on North New River Canal for Compartment A in addition to one pump east of Miami Canal for Compartment A. There is one pump on L-3 for Compartment C. There is also an inverted siphon on North New River Canal that delivers water between Compartment A and Compartment B. There is one pump between the northern nine-foot cell and the four-foot cell. This reservoir layout maximizes storage and minimizes seepage losses. In the areas where seepage is of concern, the area bordering the privately owned lands to the north, four-foot cells are placed to minimize seepage. No additional lands (beyond those already acquired) are required for Concept 4.

Figure 5

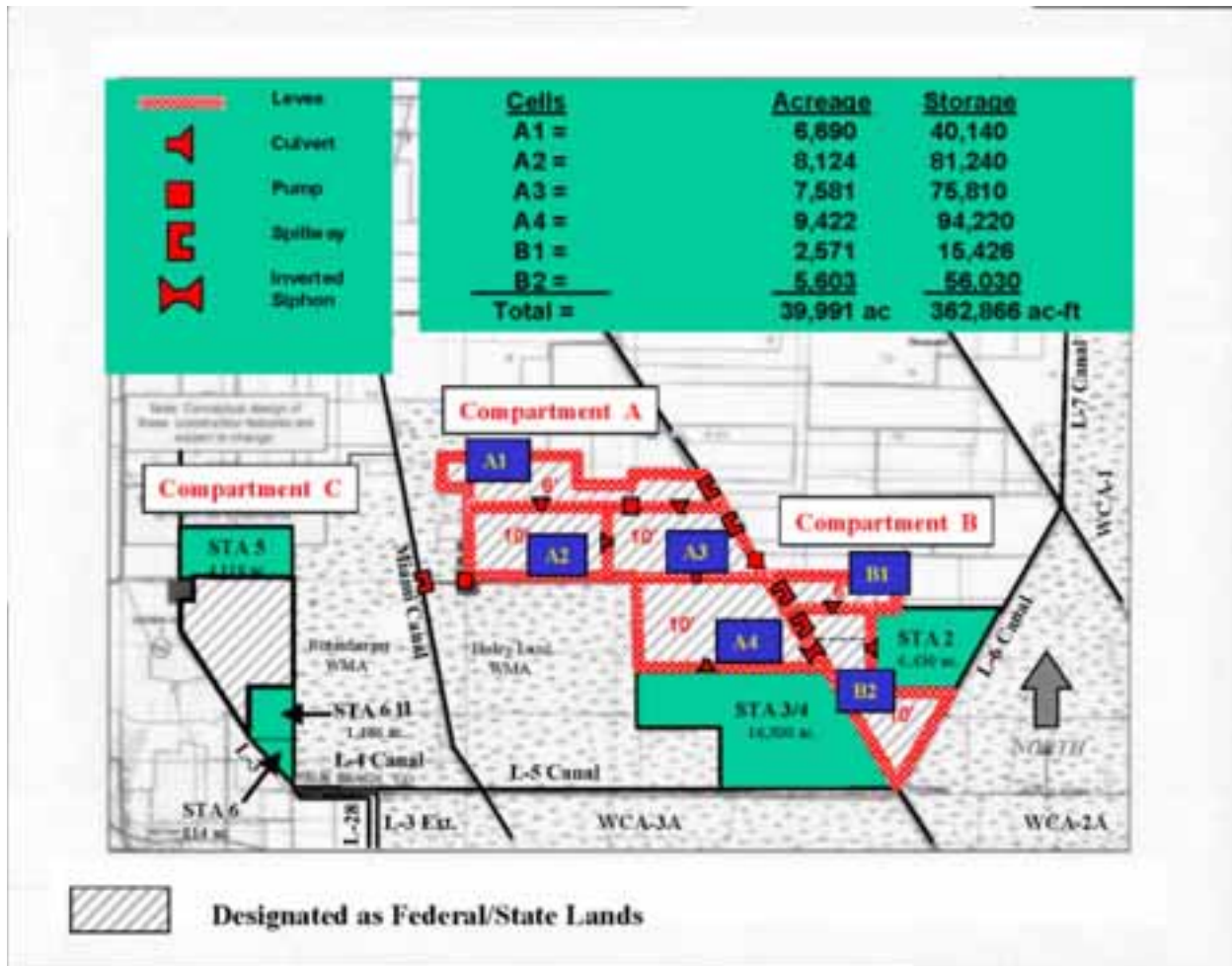


Conceptual Alternative 5

Concept 5 has a proposed footprint of 50,238 acres and storage capacity of 359,055 acre-feet (Figure 5). Concept 5 is divided into compartments A and B of 42,064 acres and 8,178 acres respectively. It is proposed to have seven cells. Within Compartment A, the proposed cell depths are one cell at four feet, three cells at seven feet, and one cell at ten feet. Within Compartment B, the proposed cell depths are one cell at four feet and one cell at eight feet. There are four proposed discharges on North New River Canal; two spillways are for Compartment A and two are for Compartment B. There is also a proposed discharge on the Miami Canal for Compartment A. There are two proposed discharges into the STAs, one into STA 3/4 and one into STA 2. There are six additional proposed discharges between cells. Pump stations deliver water to the reservoirs from Miami and North New River Canals. There are two pump stations proposed on North New River Canal – one for Compartment A and one for Compartment B. There is one pump station proposed on the Miami Canal for Compartment A. This reservoir layout maximizes storage and minimizes seepage losses. In the areas where seepage is of concern, the

area bordering the privately owned lands to the north, four-foot cells have been placed to minimize seepage. Although this layout would require 10,198 acres from the Holy Land Water Management Area (WMA), it is suggested that since Compartment C will not be utilized, this area could be used to expand the preserve area.

Figure 6

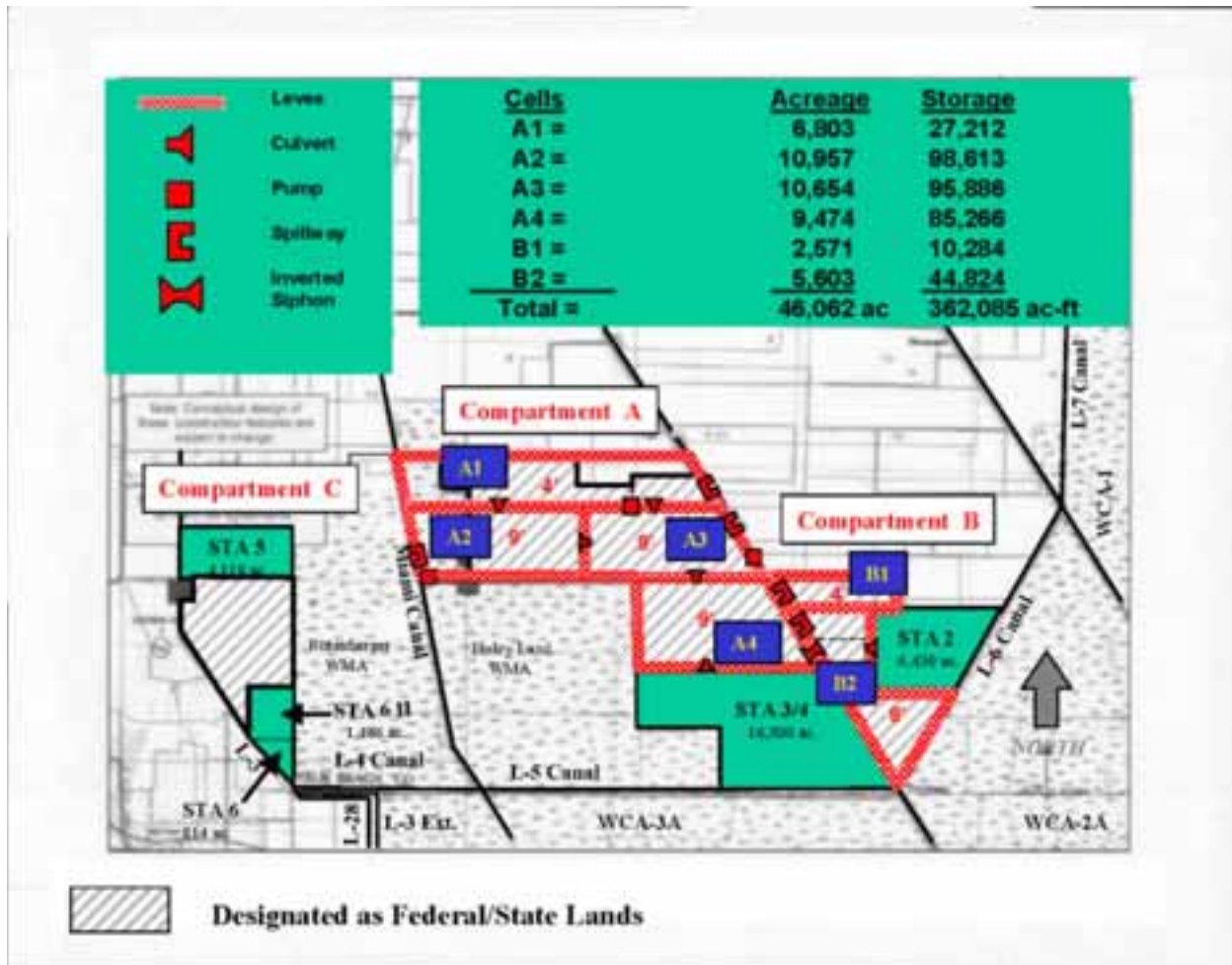


Conceptual Alternative 6

Concept 6 has a proposed footprint of 39,991 acres and storage capacity of 362,866 acre-feet (Figure 6). Concept 6 is divided into compartments A and B of 31,817 acres and 8,174 acres respectively. It is proposed to have six cells. Within Compartment A, the proposed cell depths are one cell at six feet and three cells at ten feet. Within Compartment B, the proposed cell depths are one cell at six feet and one cell at ten feet. There are four proposed discharges on North New River Canal; two spillways are for the reservoirs in Compartment A and two are for the reservoirs in Compartment B. There is also a proposed discharge on the Miami Canal for the reservoirs in Compartment A. There are two proposed discharges to the STAs, one into STA 2 and one into STA 3/4. There are five additional

discharges proposed between cells. An inverted siphon is proposed at the North New River Canal to move water between Compartment A and Compartment B. Pump stations deliver water to the reservoirs from the Miami and North New River Canals. Reservoir layout maximizes storage while trying to minimize seepage losses by placing six-foot cells along the border with the privately owned lands to the north. No additional lands are required for Concept 6.

Figure 7

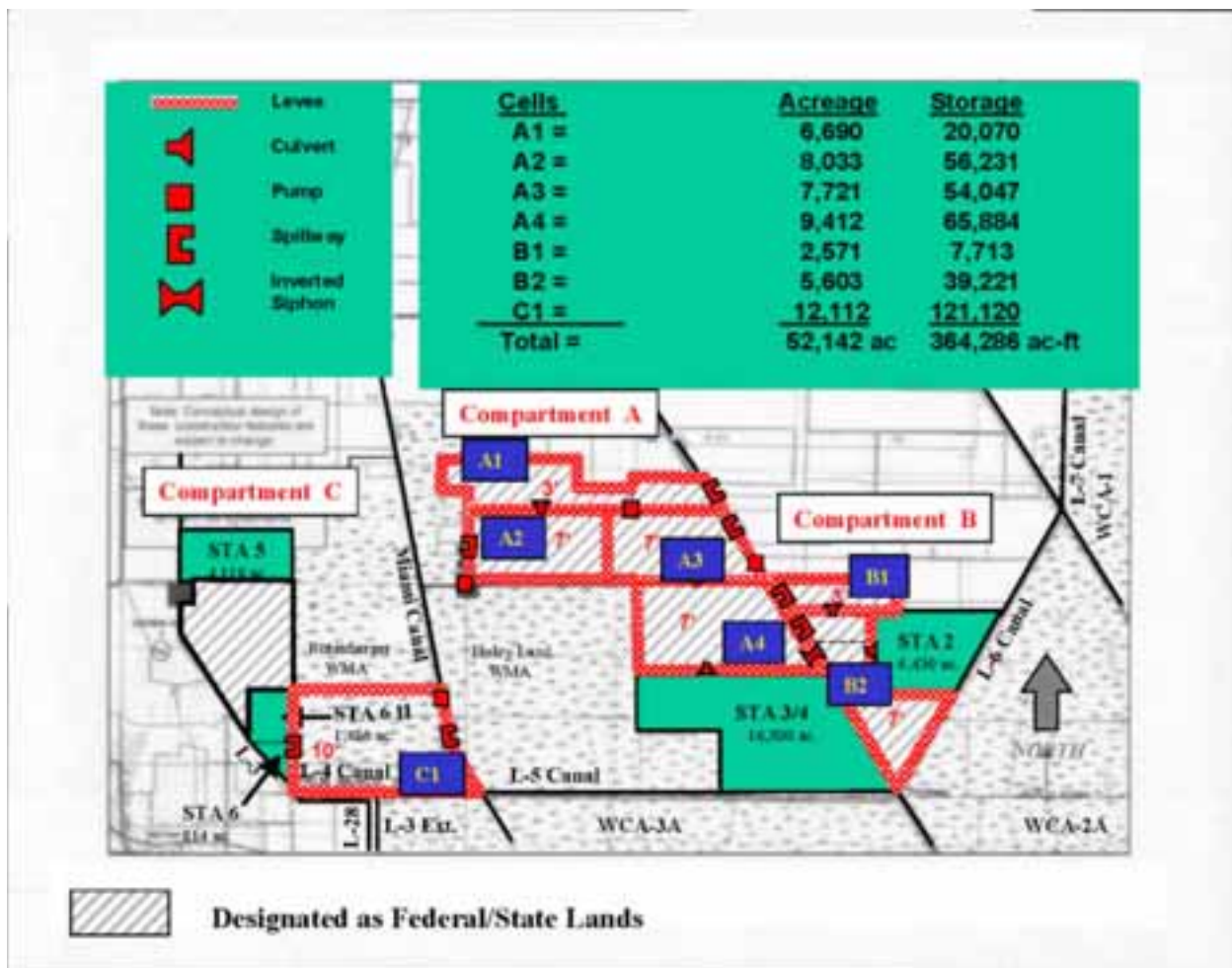


Conceptual Alternative 7

Concept 7 has a proposed footprint of 46,062 acres and storage capacity of 362,085 acre-feet (Figure 7). Concept 7 is divided into Compartments A and B of 37,888 acres and 8,174 acres respectively. It is proposed to have six cells. Within Compartment A, the proposed cell depths are one cell at four feet and three cells at nine feet. Within Compartment B, the proposed cell depths are one cell at four feet and one cell at eight feet. There are four proposed discharges on North New River Canal; two spillways are for Compartment A and two are for Compartment B. There is also a proposed discharge on the Miami Canal for Compartment A. There

are two proposed discharges into STAs; one into STA 2 and one into STA 3/4. There are four additional discharges proposed between cells. An inverted siphon is proposed at the North New River Canal to move water between Compartment A and Compartment B. Pump stations deliver water to the reservoirs from Miami and North New River Canals. Also proposed is a pump station between the four-foot cell and the north eastern nine foot cell. This reservoir layout maximizes storage and minimizes seepage losses. Minimization of seepage is accomplished by putting the four-foot cells along the border between the storage reservoirs and privately owned land to the north. 15,644 acres of additional land is required for Compartment A.

Figure 8

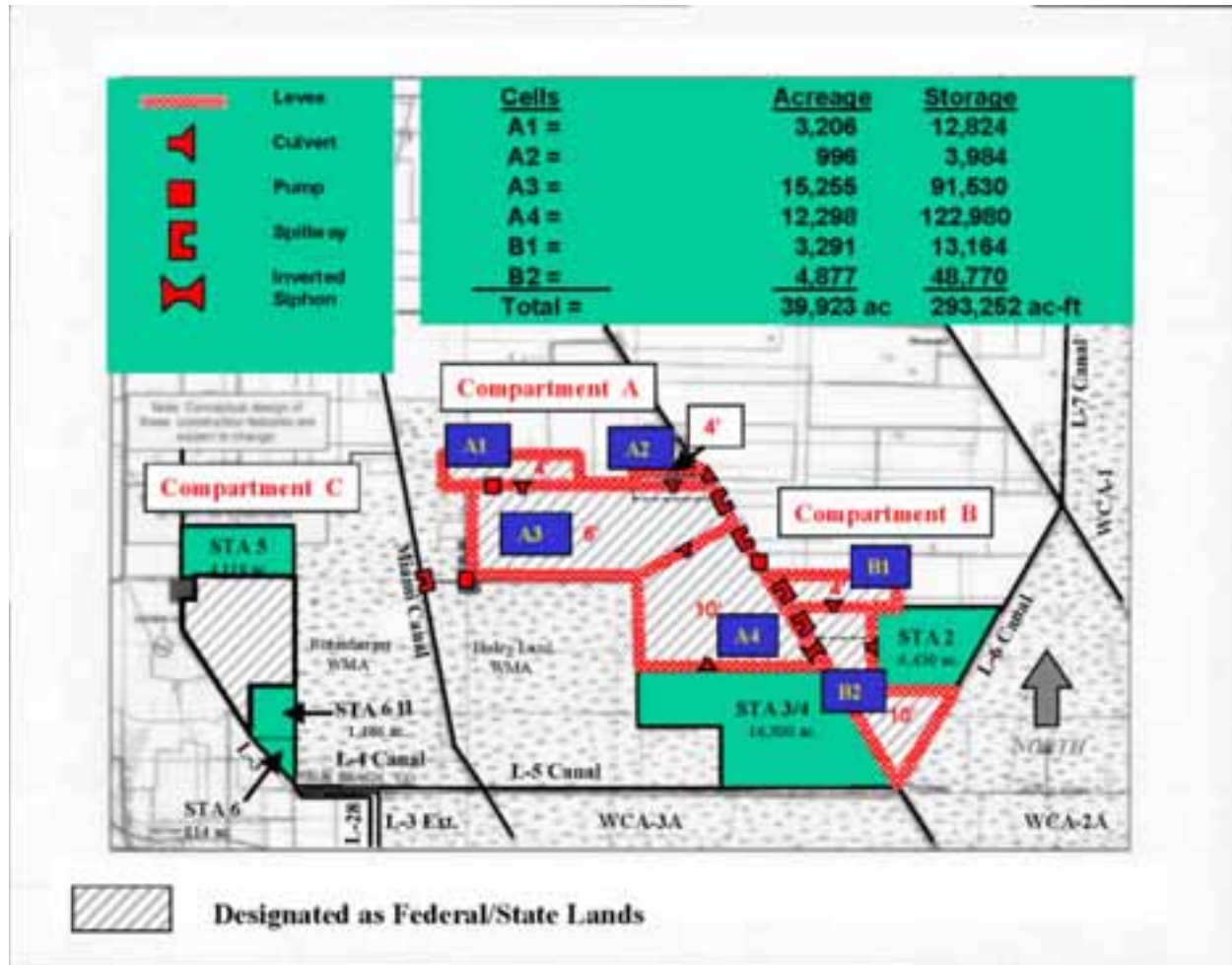


Conceptual Alternative 8

Concept 8 has a proposed footprint of 52,142 acres and storage capacity of 362,286 acre-feet (Figure 8). Concept 8 is divided into compartments A, B and C, of 31,856 acres, 8,174 acres and 12,112 acres, respectively. Note that Compartment C is proposed in the Rotenberger Water Management Area (WMA). It is proposed to

have a total of seven cells. Within Compartment A, the proposed cell depths are one cell at three feet and three cells at seven feet. Within Compartment B, the proposed cell depths are one cell at three feet and one cell at seven feet. Within Compartment C, the proposed cell depth is one cell at ten feet. There are four proposed discharges on North New River Canal; two spillways are for Compartment A and two are for Compartment B. There is also a proposed discharge on the Miami Canal for Rotenberger WMA. There is a sixth discharge to agricultural lands between Miami Canal and Compartment A for Compartment A. There are three proposed discharges into STAs; one into STA 2, one into STA 3/4, and one into STA 6. There are three additional discharges proposed between cells. Pump stations deliver water to the reservoirs from the Miami and North New River Canals. Additionally there is a pump between the three-foot cell and the eastern seven-foot cell in Compartment A. An inverted siphon at North New River Canal delivers water between Compartment A and Compartment B. This reservoir layout maximizes storage and minimizes seepage losses. Minimizing seepage is accomplished by putting three-foot cells along the border with the privately owned lands to the north. 12,112 acres of additional land is required from the Rotenberger property.

Figure 9

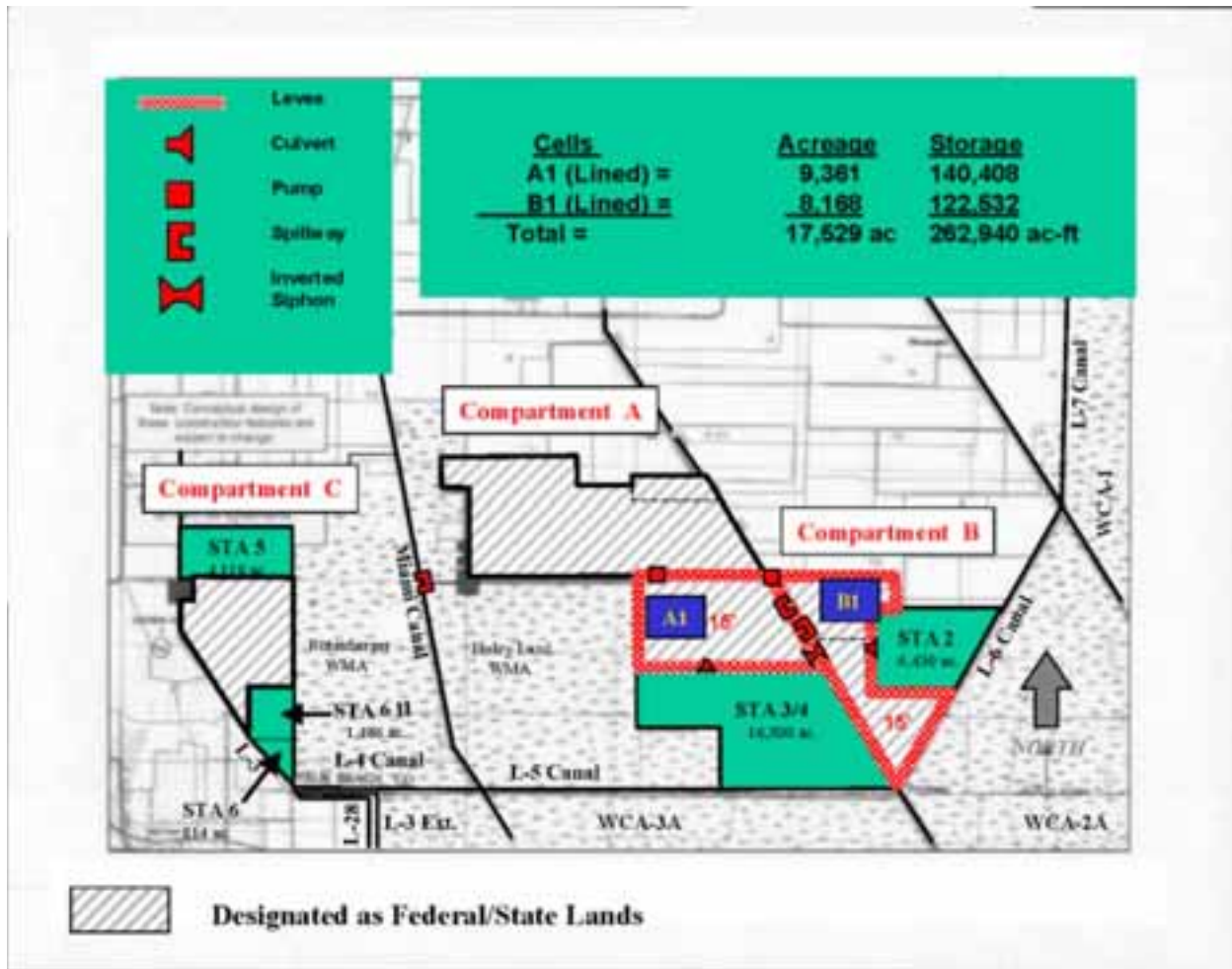


Conceptual Alternative 9

Concept 9 has a proposed footprint of 39,923 acres and storage capacity of 293,252 acre-feet (Figure 9). Concept 9 is divided into compartments A and B of 31,755 acres and 8,168 acres respectively. It is proposed to have six cells. Within Compartment A, the proposed cell depths are two cells at four feet, one cell at six feet, and one cell at ten feet. Within Compartment B, the proposed cell depths are one cell at four feet and one cell at ten feet. There are four proposed discharges on North New River Canal; two discharges are for Compartment A and two discharges are for Compartment B. There is also a proposed discharge on the Miami Canal for Compartment A. There are two proposed discharges into the STAs; one into STA 2 and one into STA 3/4. There are four additional discharges proposed between cells. Pump stations deliver water to the reservoirs from the Miami and North New River Canals. In addition, there is a pump station between the western four-foot cell in Compartment A and the six-foot cell. An inverted siphon delivers water between Compartment A and Compartment B. This reservoir layout maximizes storage and minimizes seepage losses. The minimization of seepage losses is accomplished by

bordering the privately owned lands with the four-foot cells. The levee between the six-foot and ten-foot cells is oriented in a north-east/south-west manner to reduce the length of the levee (thus reducing cost). It is unknown at this time if such an orientation will have any effect on performance. No additional lands are required for Concept 9.

Figure 10

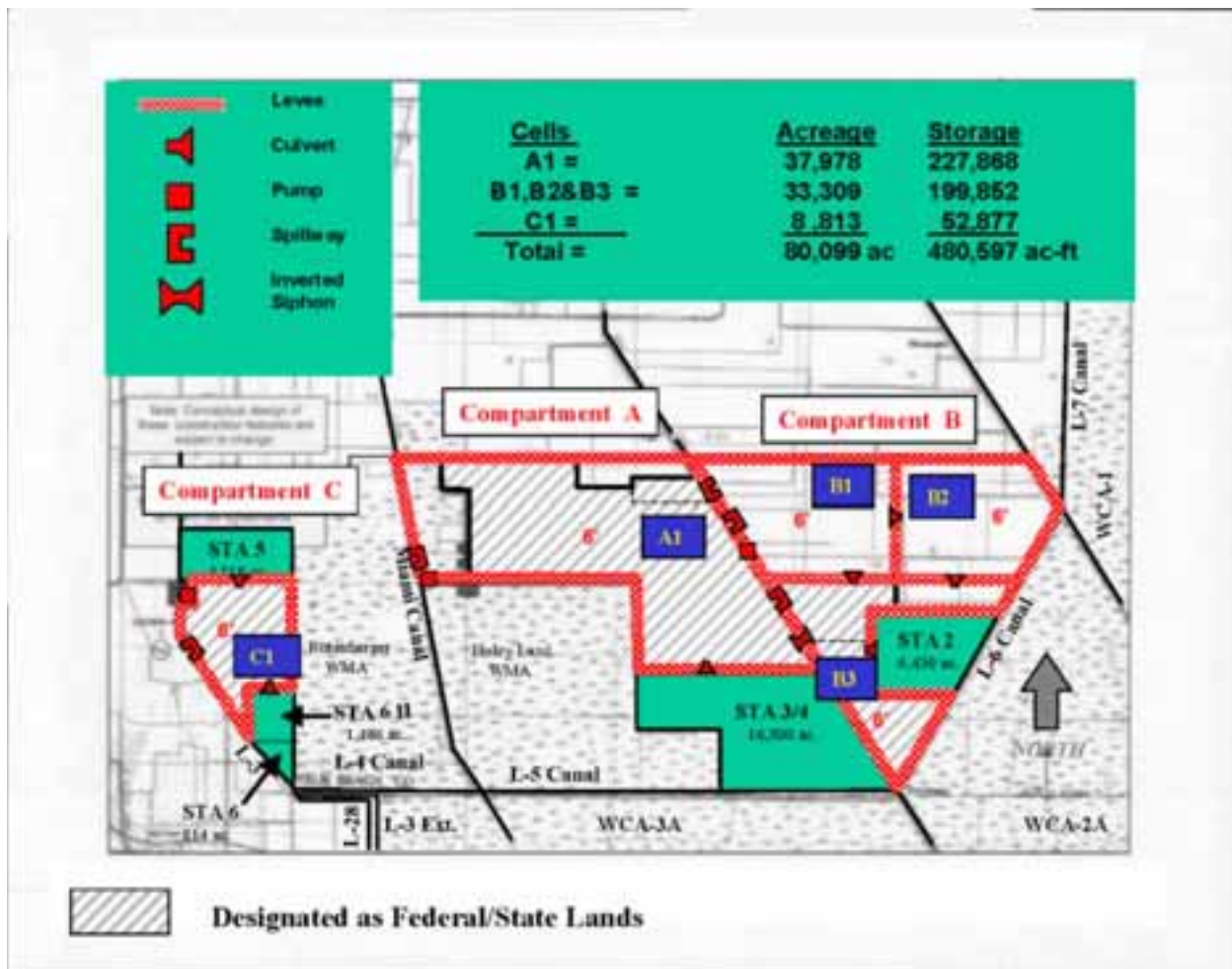


Conceptual Alternative 10

Concept 10 has a proposed footprint of 17,529 acres and storage capacity of 262,940 acre-feet (Figure 10). Concept 10 is divided into Compartments A (Lined) and B (Lined) of 9,361 acres and 8,168 acres respectively. It is proposed to have two cells. Within Compartment A (Lined), the proposed cell depth is fifteen feet. Within Compartment B (Lined), the proposed cell depth is fifteen feet. There are two proposed discharges on North New River Canal; one spillway is for Compartment A and one is for Compartment B. There are two proposed discharges into the STAs; one into STA 2 and one into STA 3/4. A pump station delivers water to the reservoirs from the North New River Canal and an additional pump station is located on the northwest corner of Compartment A. An inverted siphon delivers

water between Compartment A and Compartment B. Compartments A and B are proposed to be lined with high-density polyethylene (HDPE) or clay. This reservoir layout maximizes storage, minimizes seepage losses, and leaves land available for other uses. With less surface area to the reservoirs, there is less evapo-transpiration (ET). Lining the reservoirs eliminates seepage. Although it is more expensive to line a reservoir, the reduction in ET and the practical eliminate of seepage means that the stored water is actually stored and not lost; therefore less land is needed. No additional lands are required for Concept 10.

Figure 11

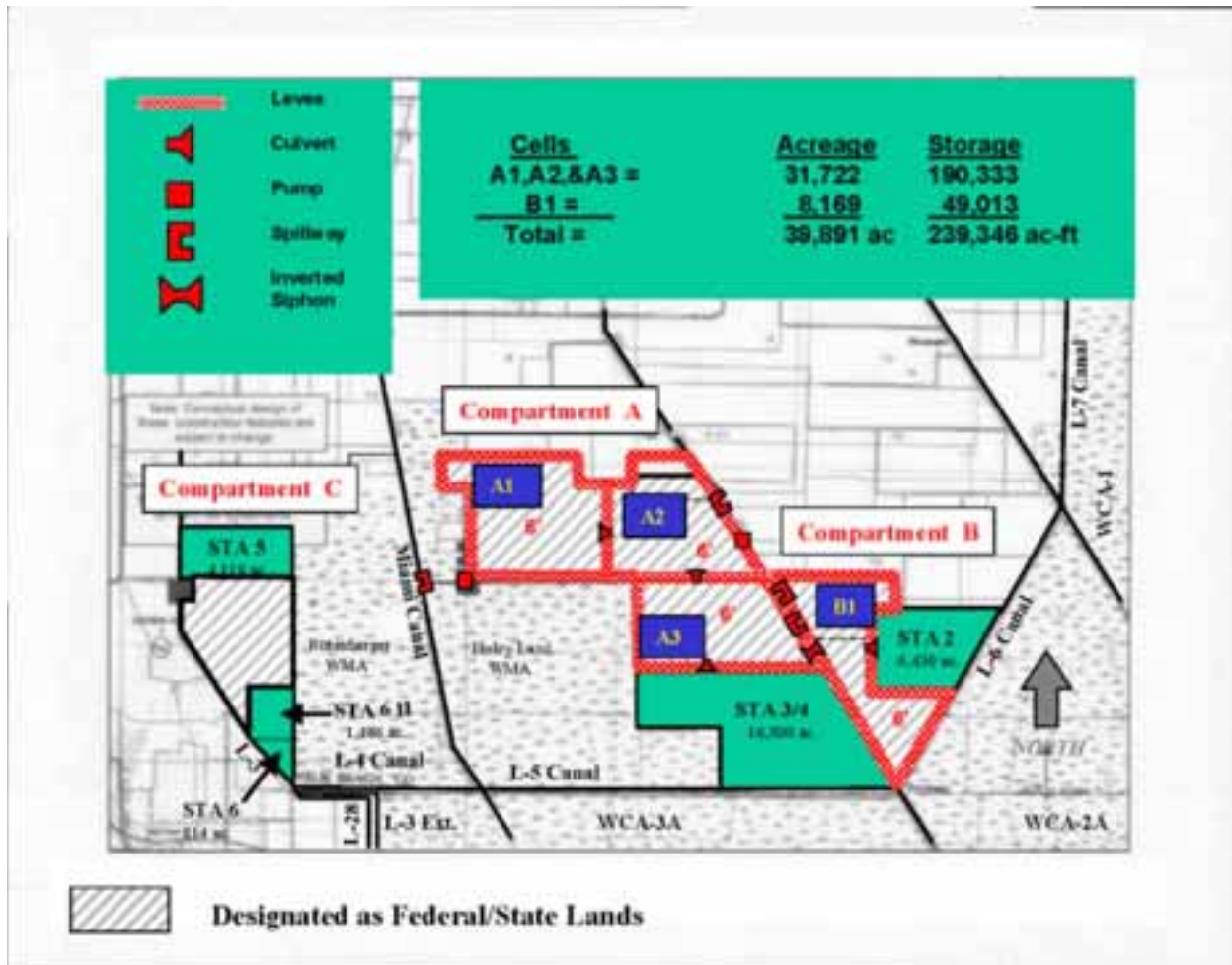


Conceptual Alternative 11

Concept 11 has a proposed footprint of 80,099 acres and storage capacity of 480,597 acre-feet (Figure 11). Concept 11 is divided into compartments A, B and C of 37,978 acres, 33,309 acres, and 8,813 acres respectively. It is proposed to have five cells. All five cells are proposed to be six feet deep. There are three proposed discharges on North New River Canal; one spillway is for Compartment A and two are for Compartment B. There is also a proposed discharge on the Miami Canal for

Compartment A and a proposed discharge on the L-3 Canal for Compartment C. There are four proposed discharges, one into each of STAs 2, 3/4, 5, and 6. There are three additional discharges proposed between cells. Pump stations deliver water to reservoirs from the Miami, North New River, and L-3 canals. This concept will provide additional storage if ASRs are not constructed. This reservoir layout maximizes storage and minimizes seepage losses. 31,396 acres of additional land is required for Concept 11.

Figure 12

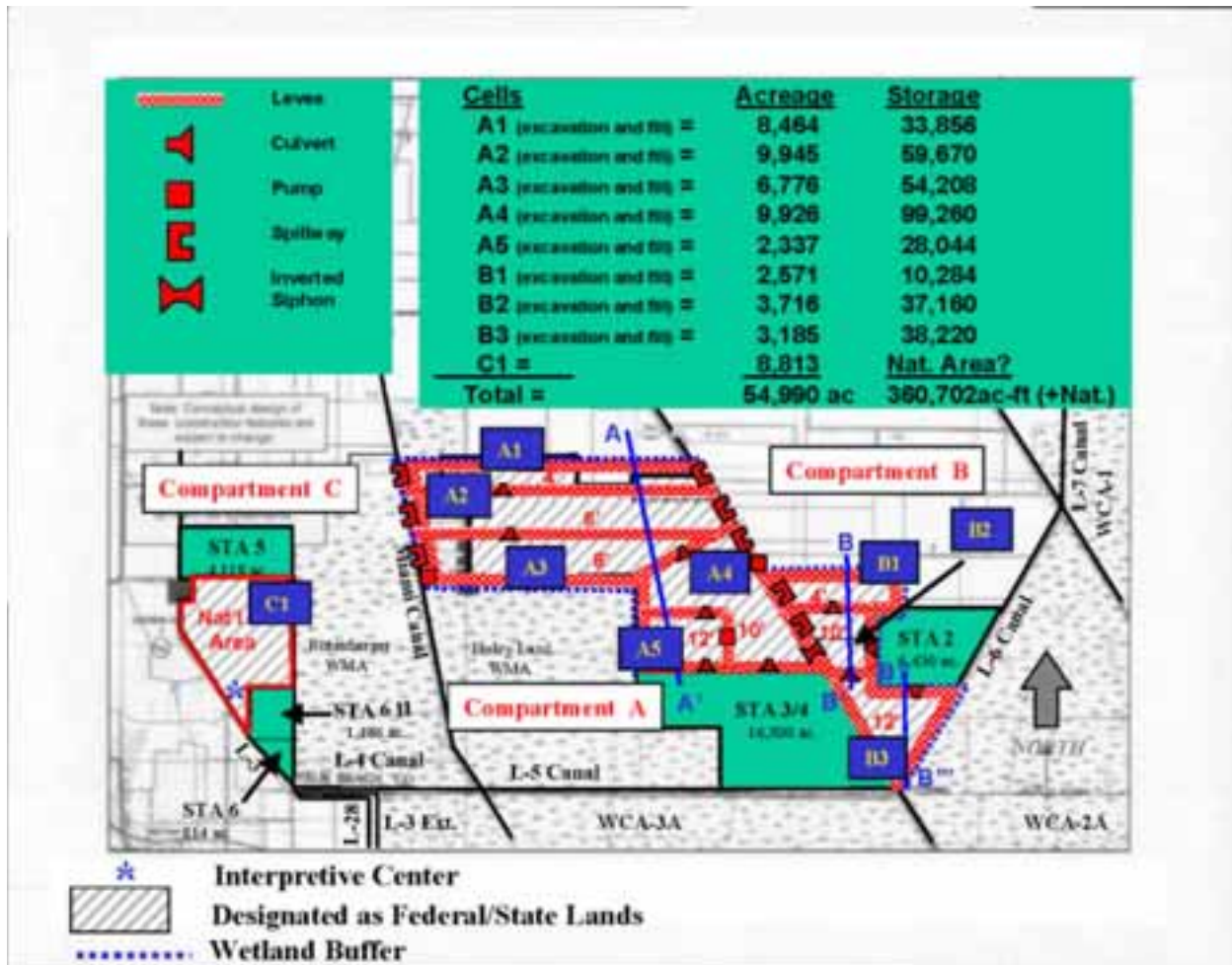


Conceptual Alternative 12

Concept 12 has a proposed footprint of 39,891 acres and storage capacity of 239,346 acre-feet (Figure 12). Concept 12 is divided into compartments A and B of 31,722 acres and 8,169 acres respectively. Within Compartment A, all three cells are proposed to be six feet deep. Within Compartment B, the proposed cell depth is six feet. A pump and an inverted siphon are proposed on the North New River Canal. The pump would deliver water to Compartment A, while the siphon would deliver water between Compartment A and Compartment B. One pump is proposed east of the Miami Canal for Compartment A. There are three proposed discharges

on North New River Canal; two discharges are for Compartment A and one is for Compartment B. There is also a proposed discharge on the Miami Canal for Compartment A. There are two proposed discharges to STAs, one into STA 2 and one into STA 3/4. There are two additional discharges proposed between cells. This reservoir layout maximizes storage using lands currently owned by the local sponsor. This layout achieves the Restudy goal of 240,000 acre-feet of storage for the EAA Storage Reservoirs Phase 1 project.

Figure 13A



Conceptual Alternative 13

Concept 13 (Figure 13A) has a proposed footprint of 55,733 acres and storage capacity of 360,702 acre-feet (plus Natural Area). Concept 13 is divided into Compartments A (excavation and fill), B (excavation and fill), and C of 37,448 acres, 9,472 acres, and 8,813 acres respectively. It is proposed to have eight cells and a natural area. Within Compartment A (excavation and fill), the proposed cell depths are one cell at four feet, one cell at six feet, one cell at eight feet, one cell at ten feet, and one cell at twelve feet. Within Compartment B (excavation and fill), the

proposed cell depths are one cell at four feet, one cell at ten feet, and one cell at twelve feet. Compartment C is proposed to be the natural area. Pump stations deliver water to reservoirs from the Miami and North New River Canals. An inverted siphon is proposed on the North New River Canal to deliver water between Compartment A and Compartment B. All reservoir compartments have outlets to STAs, two each into STA 2 and STA 3/4. All cells have discharges to canals - five discharges on North New River Canal and three discharges on Miami Canal. There are six additional proposed discharges between cells. Lastly, there is a pump proposed north of STA 3/4.

The four-foot cells are five feet above grade (Figures 13B and 13C). The six-foot cell is three feet above grade. The eight-foot cell is two feet above grade. The ten-foot cells are one foot above grade. The twelve-foot cells are three feet below grade. The alternative includes a 370-acre wetland buffer zone (Figure 13D). This wetland buffer would be on the west, north, and south sides of Component A and on the north, east, and south sides of Component B, outside of the levees. The wetland buffer would be approximately 350' in width and planted with native vegetation to reduce erosion and provide wildlife habitat. The wetland buffer would also reduce seepage out of the reservoir and minimize risk of flooding for the agricultural community. A seepage canal is constructed between the wetland buffer and private land. Native trees and shrubs would be planted adjacent to the out-facing part of the levee along the North New River Canal to minimize aesthetic disturbance and create wildlife habitat.

In order to use DOI-purchased lands for Everglades restoration, Compartment C would be a natural area, with restoration of wetlands. The water that would be placed on the site may be similar to the depth of water in the Rotenberger WMA. This may help alleviate possible flooding in the EAA, as well as provide wildlife habitat, and increase the spatial extent of wetlands. The area would be managed to control exotic vegetation. In addition an interpretive center would be built in the southern portion of the component, with information concerning Everglades restoration, history of the EAA (from an agricultural standpoint), Native American history and the cultural resources in the area, and fish and wildlife. Self-guided boardwalks or other walking trails would be built near the center to promote recreational opportunities. This center might be used to help educate local and non-local school groups.

This concept maximizes storage and minimizes seepage losses. Minimization of seepage is accomplished by putting the four-foot cells along the border between the storage reservoirs and the privately owned land to the north and including the wetland buffers. This plan would require 5,650 acres of additional land acquisition.

Figure 13B

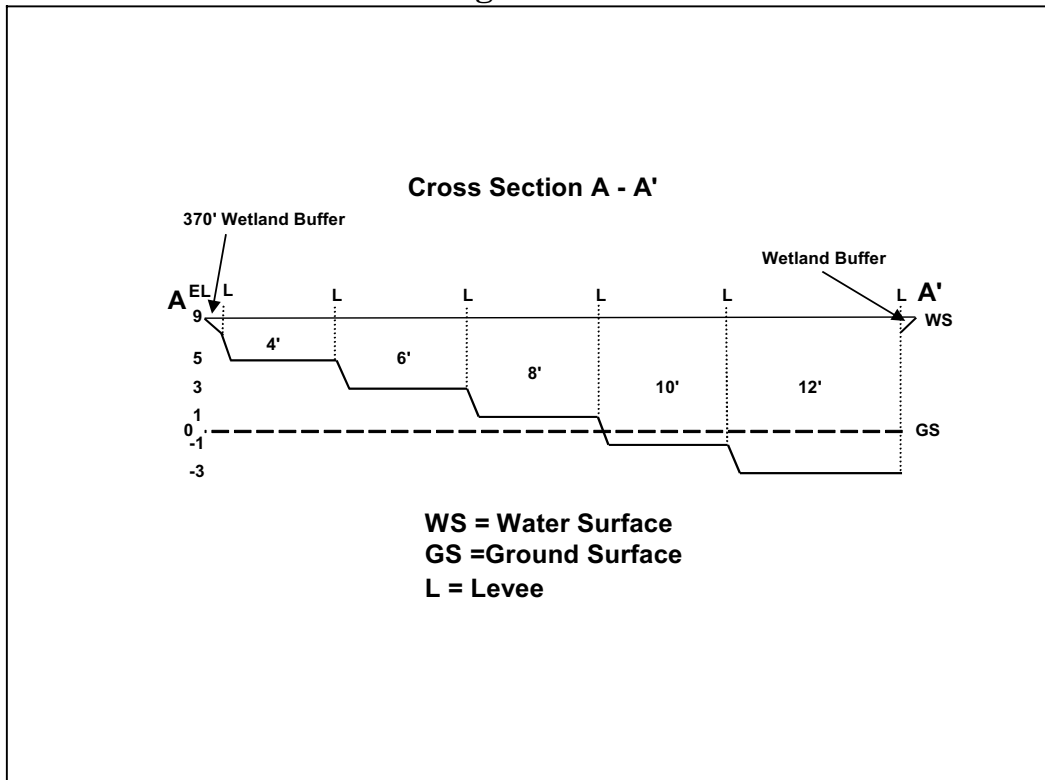


Figure 13C

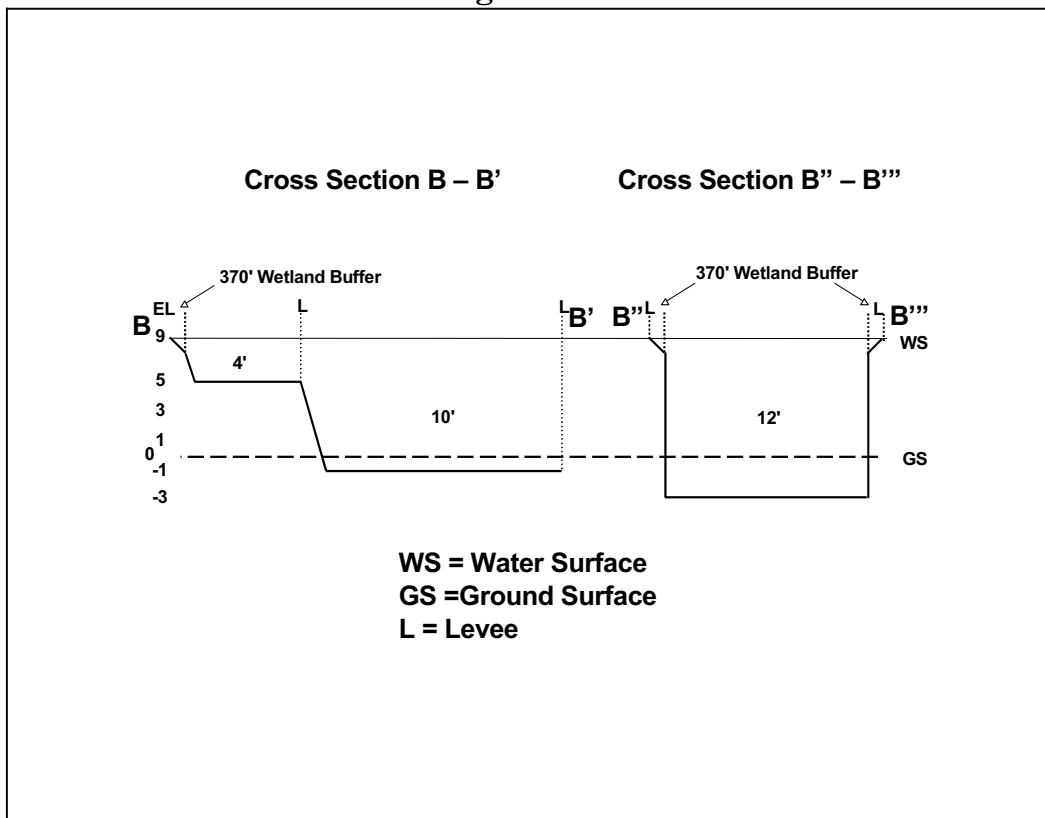


Figure 13D

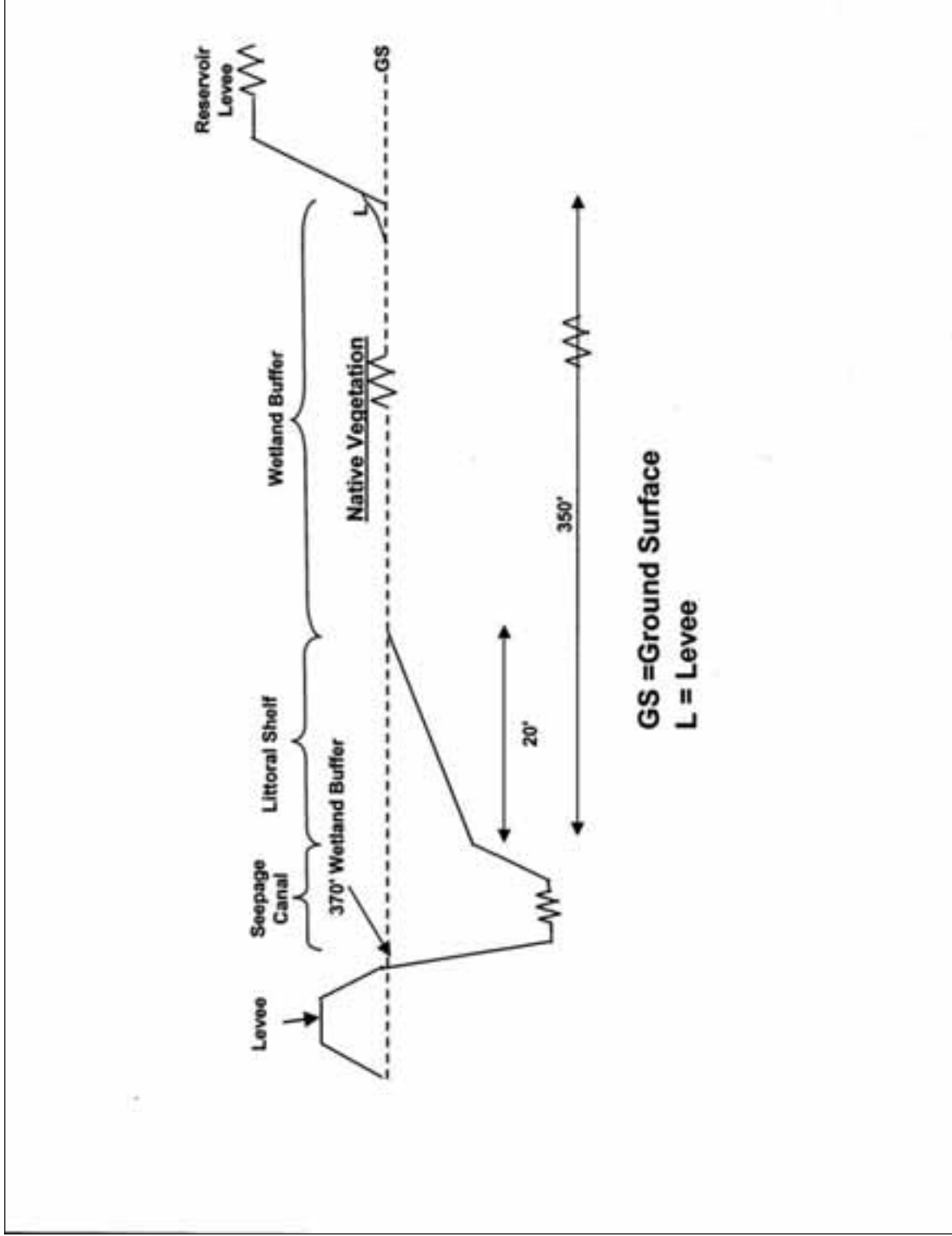
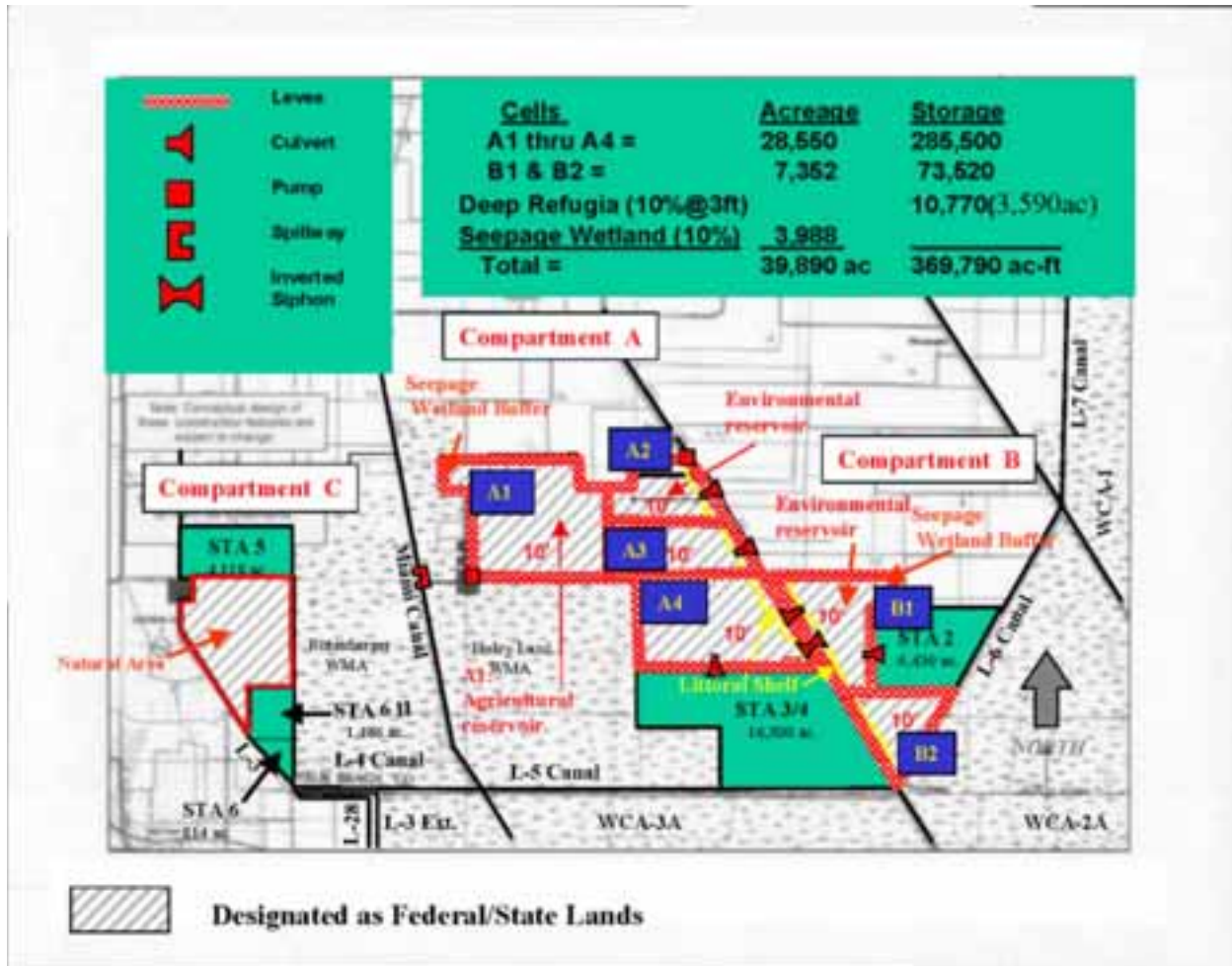


Figure 14A



Concept 14

Concept 14 (FWC1) has a proposed footprint of 39,890 acres and storage capacity of 369,790 acre-feet (Figure 14A). Concept 14 is divided into Compartments A and B of 28,550 acres and 7352 acres, respectively. It is proposed to have six cells. Within Compartments A and B, the proposed cell depths are ten feet deep each, but it is also suggested that the depths be refined with results from the hydrologic modeling showing the most cost-effective depth of the reservoirs. This concept suggests using as many existing structures as possible, but for now the concept shows three spillways are on the North New River Canal; two for Compartment A and one for Compartment B. There is one discharge on the Miami Canal and a pump east of Miami Canal for Compartment A. There are two proposed discharges to the STAs; one into STA 2 and one into STA 3/4. One pump and an inverted siphon are proposed on the North New River Canal. No additional land needs to be purchased for this plan.

The plan follows the Restudy by creating one agricultural reservoir with 120,000 acre-feet of storage and two environmental reservoirs with 240,000 acre-

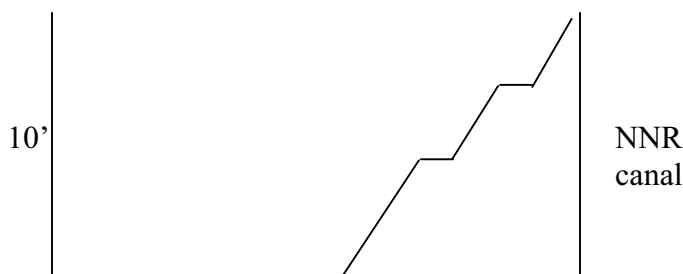
feet of combined storage. The reservoirs will be as deep as is cost-effective to maximize storage, minimize ET, help promote phosphorus reduction, and minimize dry out.

This concept also proposes a management measure to ensure private property is not affected by seepage from the reservoirs. It is proposed that seepage wetland buffers encircle the reservoirs, except where the reservoirs are adjacent to the North New River Canal. The buffers will be outside of the reservoir levee, and a canal will be outside of the buffers for added protection against flooding. The buffers and canals will be within the footprint boundary. The width of these buffers will be of an appropriate area so that they will be able to collect the amount of seepage predicted by modeling. For now, ten percent of the footprint has been set aside for the buffers (3,988 acres), but this can be refined based on modeling predictions.

This concept also proposes deep water refugia (or sumps) on about ten percent of the reservoir area (3,590 acres). Refugia would be approximately three feet deeper than the rest of the reservoir, depending on the depth of the soil layer. These refugia would sequester phosphorus when the reservoirs are reflooded after a dry down and provide refuge to aquatic organisms during dry downs.

Littoral shelves are proposed along the edges of Compartments A and B, where they are adjacent to the North New River Canal. The appropriate heights of littoral shelves can be refined with modeling results showing the stage duration curves for Compartments A and B. A rough sketch of the proposed design is provided in Figure 14B below, and consists of multiple shelves at different depths. Additional benefits of littoral zones may include decreased soil erosion of levees via attenuation of wave energy, water quality improvements due to removal of nutrients by vegetation, and increased recreational opportunities. Littoral shelves may also provide some function by increasing the set-back distance from Highway 27.

Figure 14B



This concept also includes the recommendation of upland functional habitat improvements for a select sub-set of the reservoir levees. The sub-set would be selected to create a “greenway”, thereby maximizing connectivity, wildlife value, and recreational utility. Improvement of terrestrial habitat functional value is

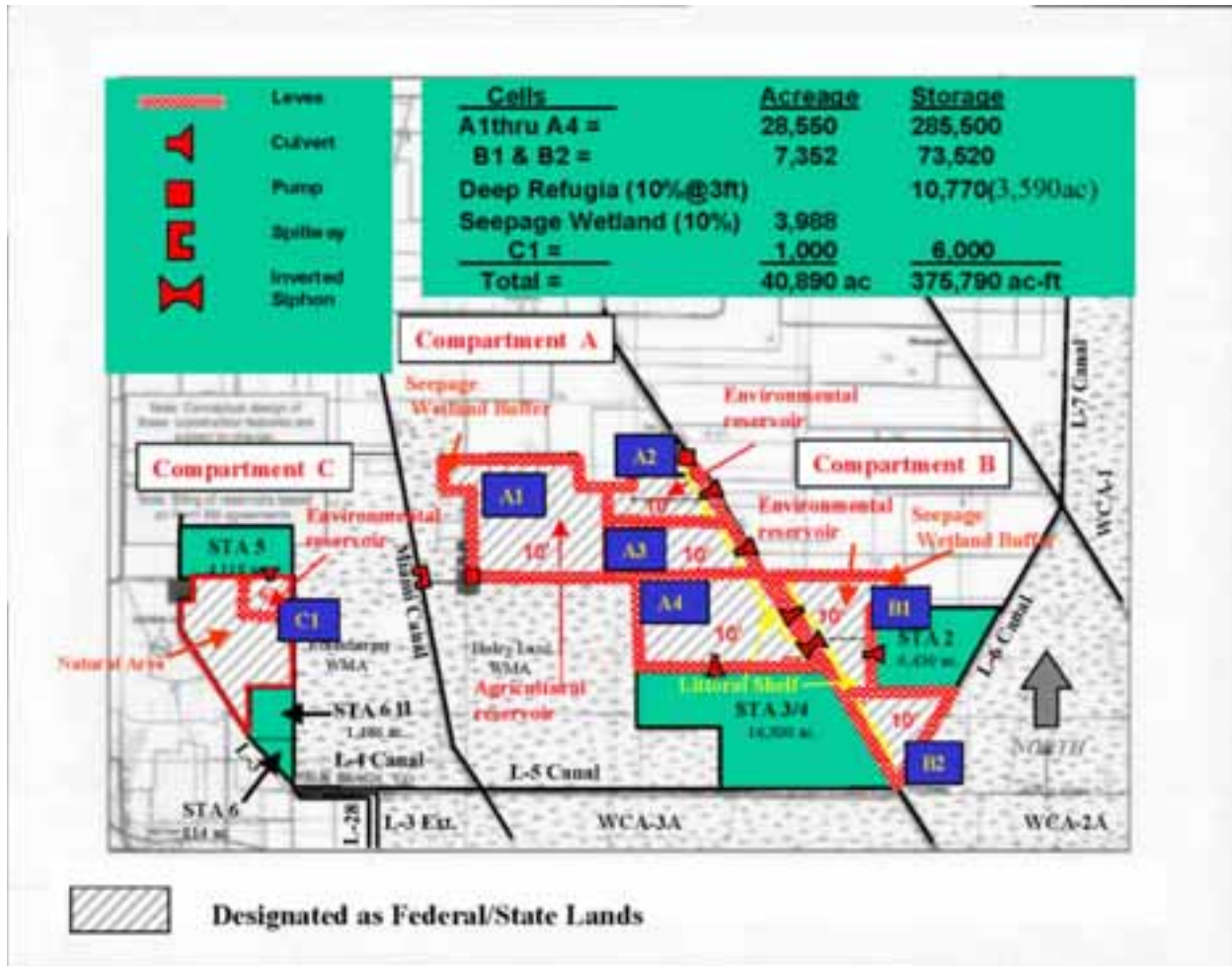
accomplished by “over-building” levees to support native trees, shrubs, and herbs. By coordinating with other state, county, and federal agencies, as well as NGO’s, it may be possible to externally fund some portion of the establishment or maintenance of these greenways.

This concept proposes three choices for Compartment C.

1. Leave Compartment C “as is”, with no improvements, but discontinuing the agricultural activity. This would avoid a Phase 2 cultural resources inventory.
2. Provide minor hydrologic improvements, which would not require Phase 2 cultural resources inventory, to promote restoration of existing isolated wetlands. Examples are: plugging ditches that are draining isolated wetlands and/or removing berms surrounding the wetlands. Placing an education/information center or kiosk at the site and removing exotics are also recommended.
3. Impound Compartment C and create a primarily rainwater-fed wetland, similar to plan for Allapattah Flats. Improvements may include plugging primary ditches that are currently draining the area, removing berms surrounding existing isolated wetlands, and creating a perimeter levee with associated passive outflow structures. For this option, it is likely that a Phase 2 cultural resources inventory may be required. As in option 2, an education/information center and removal of exotics is recommended.

This concept was suggested to maximize habitat evaluation criteria (1.2.1 Terrestrial Habitat, 1.2.2 Aquatic Deep Water Refugia, and 1.2.3 Effects to Wetlands), by creating upland habitat functional value along select levees, aquatic deep-water refugia, littoral shelves, seepage wetlands, and Compartment C wetland preservation/restoration.

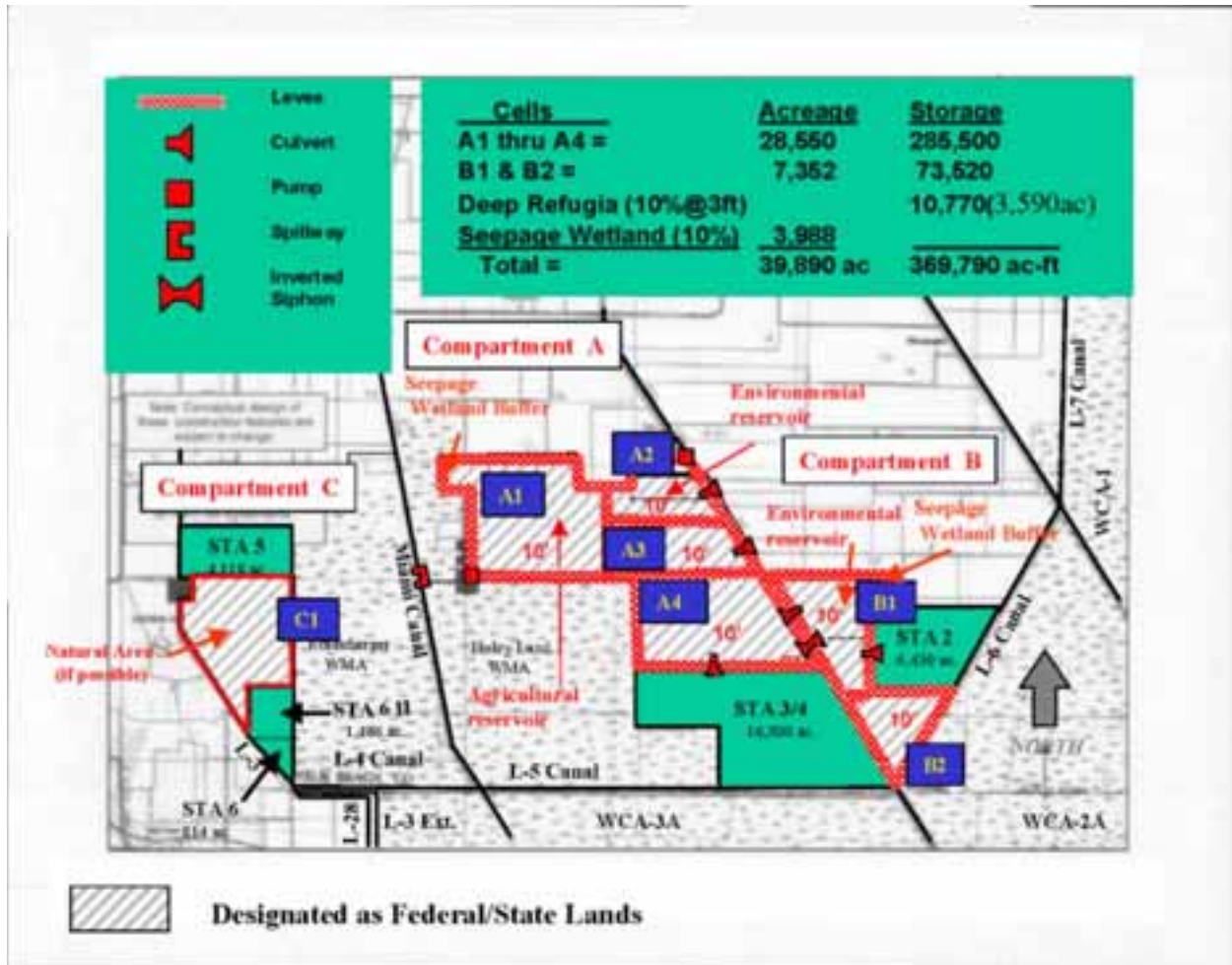
Figure 15



Concept 15

Concept 15 (FWC2) is very similar to concept 14. The major difference is the addition of a 1000-acre storage reservoir, six feet in depth, in Compartment C (Figure 15). Thus, for this concept the footprint is 40,890 acres with a storage capacity of 375,790 acre-feet. In addition, a connection to STA 5 is added for the reservoir in Compartment C. For the rest of the lands in Compartment C, the same choices from concept 14 are suggested. No additional land needs to be purchased for this plan. Optimization of the same evaluation criteria in concept 14 drives this concept as well as a probable slight improvement in the scores of some of the system-wide performance measures from the creation of the 1,000-acre impoundment in Compartment C.

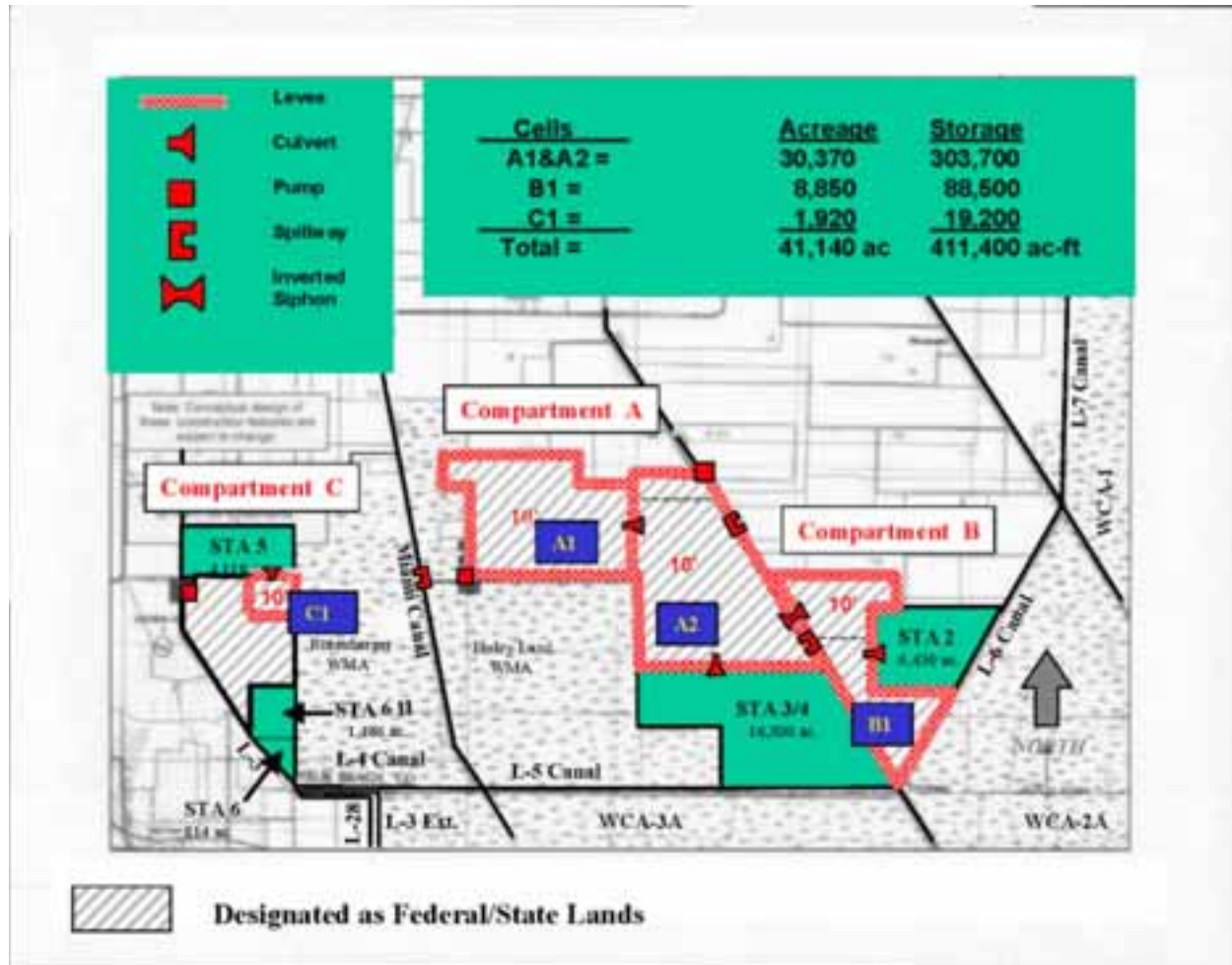
Figure 16



Concept 16

Concept 16 (FWC3) is also very similar to concept 14. The major difference is the use of less management measures. For this alternative, only the seepage buffers and deep water refugia are utilized (Figure 16). All other elements, including the choices for Compartment C, are the same.

Figure 17



Concept 17

Concept 17 (FDEP1) has a proposed footprint of 41,140 acres and storage capacity of 411,400 acre-feet (Figure 17). Concept 17 is divided into Compartments A, B and C of 30,370 acres, 8,850 acres and 1,920 acres, respectively. It is proposed to have four cells, but the compartmentalization of reservoir cells could be adjusted using an optimization model. Within Compartments A, B, and C, the proposed cell depths are ten feet deep each, but it is suggested that the depths be refined with results from the hydrologic model showing the most cost-effective depth of the reservoirs (based on maximizing water storage, minimizing ET, and promoting phosphorus reduction). This concept suggests using as many existing structures as possible, but for now the concept shows two spillways on the North New River Canal – one for Compartment A and one for Compartment B. One spillway is on the Miami Canal for Compartment A. Pump stations deliver water to reservoirs from the Miami, North New River, and L-3 canals. An inverted siphon allows water to go between Compartment A and B. There are three proposed discharges to the

STAs; one into STA 2, one into STA 3/4, and one into STA 5. No additional land needs to be purchased for this plan.

The compartmentalization of reservoir cells, intake locations, pump sizes, EAA canal sizes, and operations should be adjusted using an optimization model. The objective of optimization should be to: 1) eliminate flood control and water supply backpumping to Lake Okeechobee from S-2, S-3 and the 298 Drainage Districts; 2) eliminate the need for any STA bypass; 3) maximize reuse of reservoir water as EAA water supply; 4) maximize benefits to Lake Okeechobee water level control; and 5) duplicate natural system model predictions of monthly flow patterns to the Everglades. Specifically, consideration should be given to the placement of a pump station on the northeastern corner of Compartment A. The location of this pump has the capacity to reduce backpumping on Lake Okeechobee, better control of water levels in the North New River Canal and will minimize impacts to STA 3/4.

A seepage flowway (rather than seepage canal) is proposed adjacent to WMAs and STAs, while a standard seepage canal is proposed adjacent to agricultural lands to maintain flood protection. This flowway should be scraped down to bare limerock to reduce cattail growth and to promote periphyton establishment. This seepage flowway should be shallower and wider than a standard seepage canal and may provide wildlife and water quality benefits to the adjacent natural areas and STAs. The water levels in this seepage flowway should be maintained at a maximum of two feet above the wet season water table. These flowways should not be directly adjacent to the toe of the slope of the levee, as this area needs to be free and clear for inspection of the structural integrity of the levee. The flowway should discharge to the seepage canal and then the seepage canal back to the reservoir.

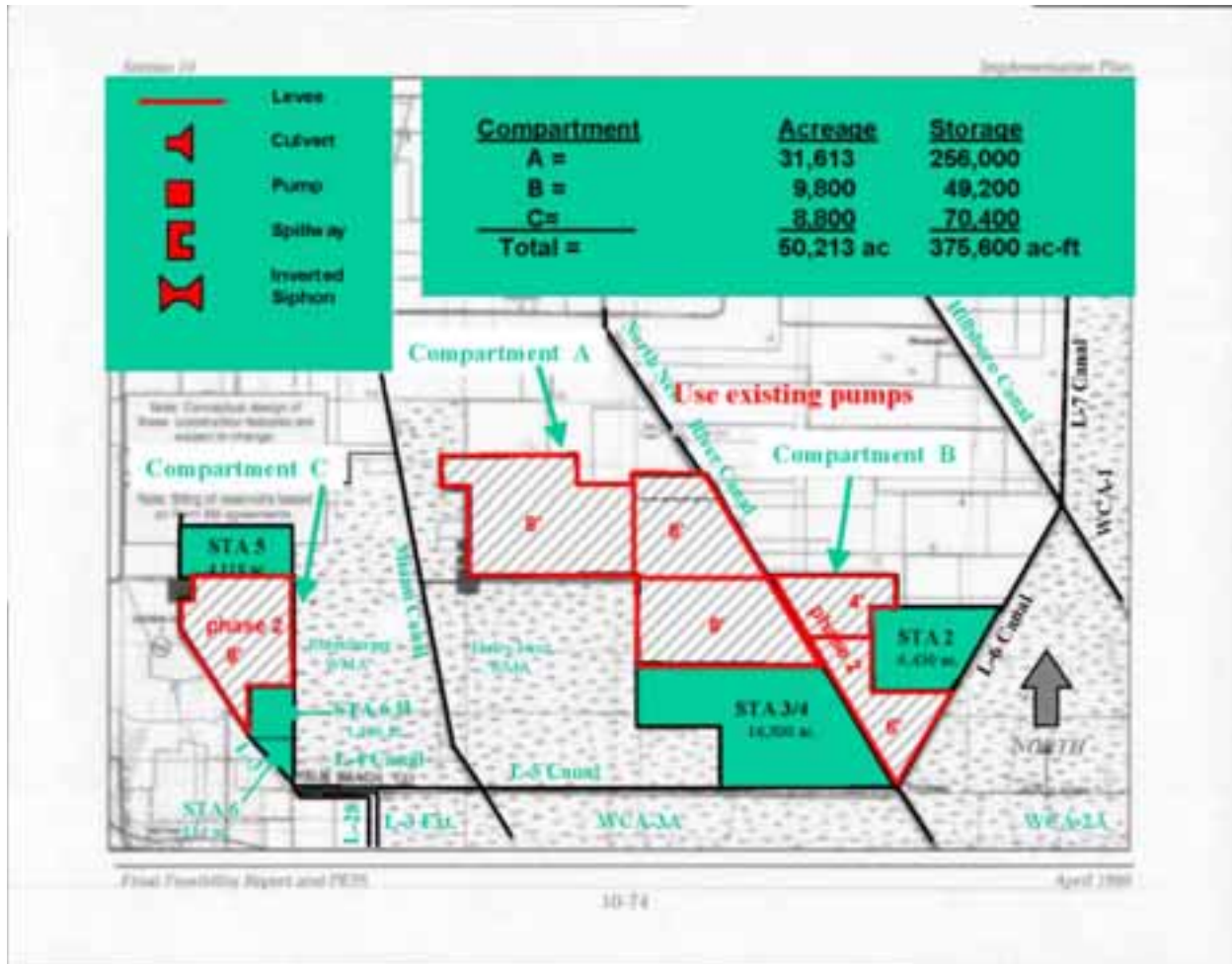
Deep water refugia would be provided by the existing tertiary canal systems within the footprint of the reservoirs themselves as it is not expected that these canals would be filled during construction of the reservoirs. The refugia will sequester phosphorus when the reservoirs are reflooded after a dry down and provide refuge to aquatic organisms during dry downs. In addition, if cells A1 and A2 are built at different times, consideration should be given to the cost effectiveness of installing the overflow structure between them during the first phase of construction. This would prevent shutdown of the first reservoir during construction of the second reservoir.

A reservoir is suggested within Compartment C for flow equalization of STA 5 during wet years and to help attenuate the high phosphorus inflows from the C-139 basin. The reservoir is restricted to Sections 1, 2 and 12, those having the least probability of containing additional cultural resources (as per David Pugh, USACE). A deep sump area at the inflow or in the center could assist in settling out fines and attenuating the expected high phosphorus inflows into this reservoir.

There are several benefits in this concept. This plan maximizes water storage within the footprint of already acquired lands - no additional land purchases are needed. Seepage flowways adjacent to WMA's and STA's provide wildlife and water quality benefits to these areas and will minimize impacts from seepage. Compartment C is utilized based on the need for additional storage, to

reservoirs and reduce seepage impacts to adjacent agricultural lands, as well as natural areas and STAs. The use of this compartment would also allow a pump station to be located on the Hillsboro Canal. This concept is suggested as a way to maximize storage.

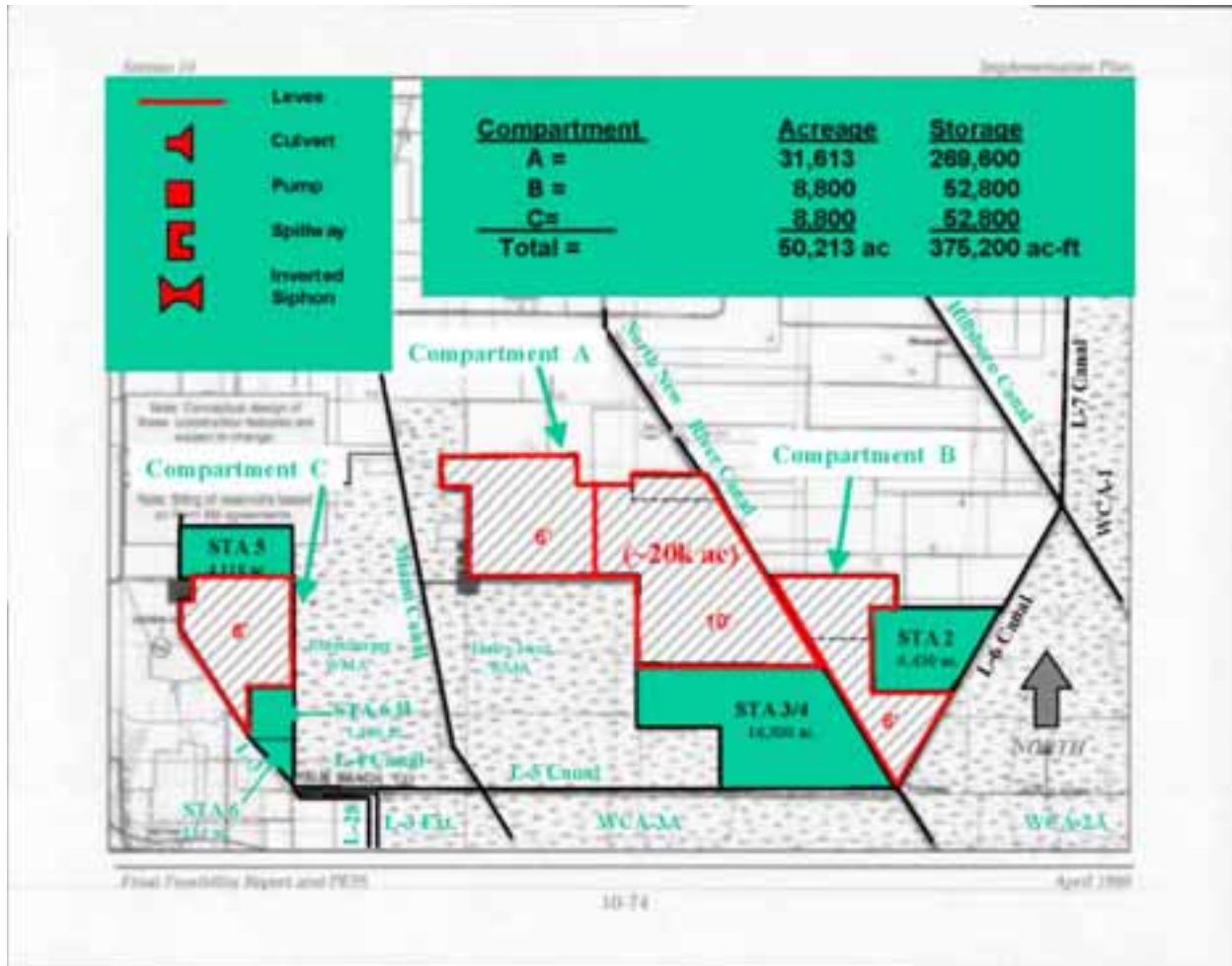
Figure 19



Concept 19

Concept 19, submitted by the local sponsor, has two phases. Phase I has a footprint of 31,613 acres and storage of 256,000 acre-ft (Figure 19). Phase I would consist of three cells in Compartment A – all at eight feet deep. Phase II has a footprint of 18,600 acres and storage of 119,600 acre-ft. Phase II would consist of two cells in Compartment B, one at four feet deep and one at six feet deep, and one cell in Compartment C at 8 feet deep. Both Compartment B and C would have footprints of approximately 8,800 acres. Information on structures and pump stations is not currently available as emphasis is placed on using existing structures as much as possible. Particularly, the possibility of using pump stations G-37 and B-372 should be examined. Compartment B would be managed for water quality by including littoral shelves and different depths.

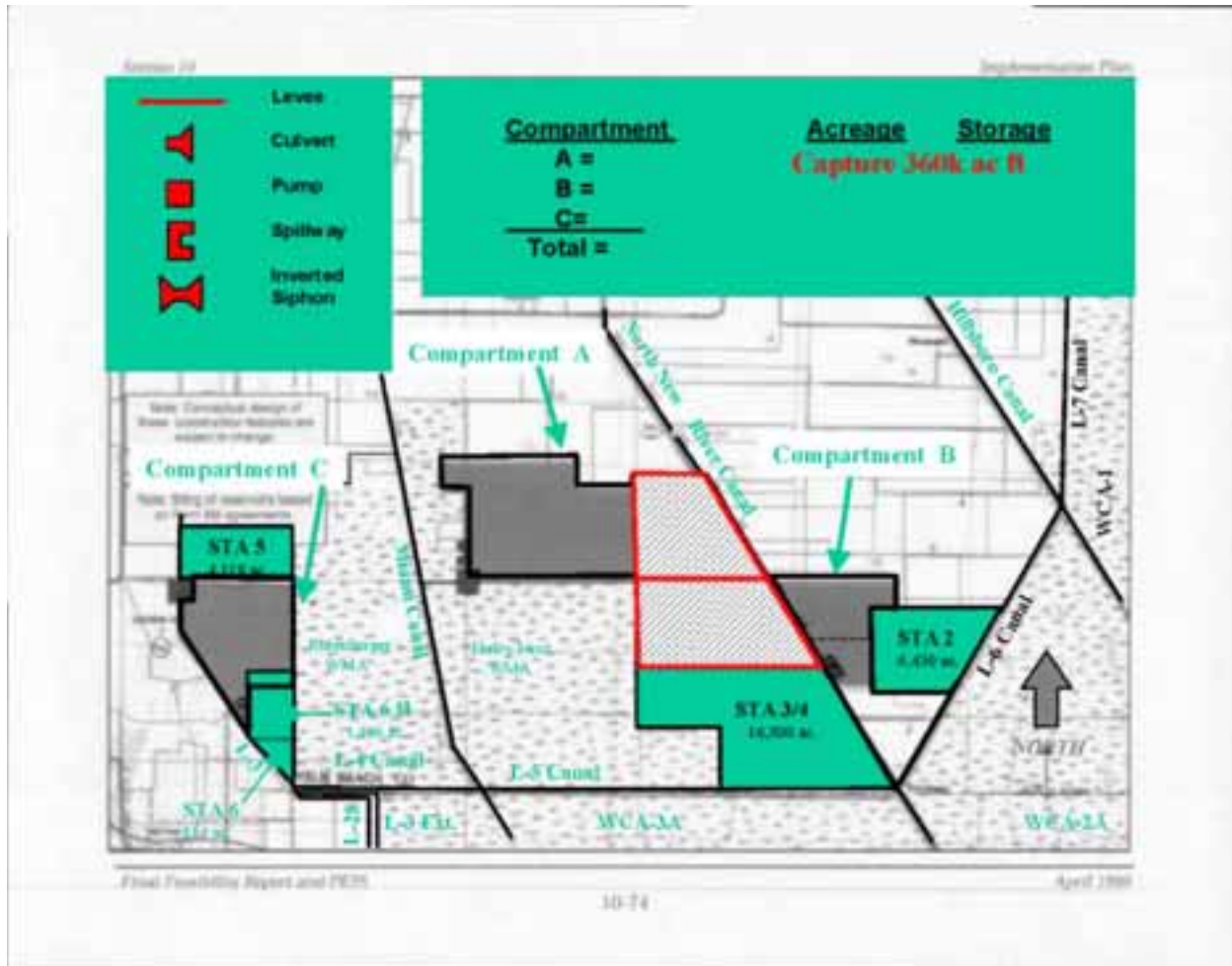
Figure 20



Concept 20

Concept 20 has a proposed footprint of 50,213 acres and storage capacity of 375,200 acre-feet (Figure 20). It is divided into compartments A, B, and C of 31,613 acres, 8,800 acres, and 8,800 acres, respectively. The eastern cells in Compartment A is anticipated to be used as agricultural water supply and thus would be deep (approximately ten feet). The other cells are anticipated to be used as environmental water supply and thus are made shallower (approximately six feet) for pollution sequestration and treatment. These cells would likely have littoral shelves and other features for water quality improvement. One variation on this concept is to manage Compartment C (and possibly B) in a way that helps maximize phosphorus removal in the STAs, especially STA 5. Information on structures and pump stations is not currently available as emphasis is placed on using existing structures as much as possible.

Figure 21



Concept 21

Concept 21 is to build a lined reservoir with sufficient depth and height to provide 360,000 acre-feet of storage or what the hydrologic model shows is needed for agriculture and the environment (Figure 21). The proposed location of the reservoir is in the eastern portion of Compartment A abutted to the North New River Canal. As was discussed earlier, lining a reservoir may be more expensive, but less land is needed, thus fewer miles of levee which results in cost savings. In addition, lining the reservoir would reduce the risk of mercury problems. Information on structures and pump stations is not currently available as emphasis is placed on using existing structures as much as possible. No additional lands would be necessary for this concept. Concept 21 maximizes storage in the minimum amount of space while reducing ET and eliminating seepage concerns.

Concept 22

Concept 22 is proposed to have a footprint that would encompass all of the purchased lands in Compartment A as well as the lands located between the

purchased lands and the Miami Canal – approximately 37,888 acres. For this concept it is proposed that all storage be accomplished in this footprint. To attain storage of 360,000 acre-feet, the cell depth would need to be nine to ten feet. The lands previously purchased in Compartments B and C would not need to be used. That is not to imply that there would or would not be any benefit in letting these lands go fallow.