

APPENDIX B – WATER MANAGEMENT

APPENDIX B

This appendix contains additional water management information, including information on historic water levels, stage-duration and exceedance analyses, and lake drawdown and refilling under different conditions.

1. **Historic Water Levels.** Figures 11a through 11n show historic Lake Toho (S-61 headwater) water levels from 1942 to 2001. Figure 12 shows Lake Toho water levels from 1942 to 2001, all on one graph. Figure 13a through 13o show Lake Kissimmee (S-65 headwater) water levels from 1929 to 2001. Figure 14 shows Lake Kissimmee water levels from 1929 to 2001, all on one graph. Data used in preparing the above graphs are provisional and subject to revision. Missing data are denoted by "x"s.

2. **Stage-Duration Curves.** Figure 15 contains stage-duration curves for Lake Toho for the periods January 1942 - December 1962 and January 1963 - December 2000. The period January 1942 - December 1962 was selected to represent the approximate period prior to completion of C&SF Project features in the Lake Toho area. This construction took place generally in the early 1960's and Kissimmee Basin project works were completed in 1970; structure S-61 and canal C-35 were constructed during the years 1962-63. Each curve in Figure 15 shows, for the indicated period of record, the percent of time during which the Lake Toho stage exceeded the values indicated on the vertical axis. Note, in the period January 1963 - December 2000, that the range of water level fluctuation has been reduced due to operation of the C&SF Project. The data used in preparing these curves are provisional and subject to revision.

3. **Exceedance Curves for Daily Stages by Month.** Figure 16 contains exceedance curves for Lake Toho daily stages by month for the period 01 January 1942 - 31 December 2000. It contains plots of the 10, 25, 50, 75, and 90 percent exceedance values through the calendar year for the above period of record. For example, for a given day in the calendar year, the "10% Exceedance" curve shows the stage at which 10 percent of the stage values on that day were greater, for the above period of record. Likewise, for a given day in the calendar year, the "75% Exceedance" curve shows the stage at which 75 percent of the stage values on that day were greater, for the above period of record. Figures 17 and 18 contain similar exceedance curves for the periods 01 January 1942 - 31 December 1962 and 01 January 1963 - 31 December 2000, respectively. These two periods were selected to represent the approximate periods before and after completion of C&SF Project features. The data used in preparing these curves are provisional and subject to revision.

4. Analysis of Proposed Drawdown and Refilling. If single or multi-year drought conditions are experienced while the lake levels are being managed as outlined in Alternatives 1 and 4w, it is likely that the lake level in Lake Toho would probably not return to its normal regulation range until the drought ends and a normal rainy season is experienced. Similarly, lake levels in Lakes Kissimmee, Hatchineha, and Cypress would probably not return to their normal regulation range until the drought ends and a normal rainy season is experienced. Possible scenarios for lake drawdown and refill during "normal year" and "dry year" conditions are shown on Figures 3d and 3e for Alternative 1 and Figures 4e, 4f, and 4g for Alternative 4w.

**APPENDIX C – ALTERNATIVES ELIMINATED FROM FURTHER
ANALYSIS**

APPENDIX C – ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

The following alternatives were eliminated from further analysis as discussed in Section 2.3.

Alternative 2: Lake Toho + 2 lakes pump/weir

Lake Toho drawdown starting on 1 November, ending 15 February, drawdown to 48.5 feet, NGVD. Cypress and Hatchineha drawdown starting on 15 November, ending 15 February drawdown to 48.0 feet, NGVD. Lake Kissimmee drawdown starting on 15 November, ending 1 January, drawdown to 51.0 feet, NGVD. Build weir and install pump between Kissimmee and Hatchineha lakes held at drawdown levels until refill of all lakes begins 1 June.

Lake Toho Zone B1 is a zone of operational flexibility. In this zone, S-61 releases will be made to facilitate the extreme drawdown and habitat enhancement project. This will include lowering Lake Toho to reach 48.5 feet, NGVD on 15 February. After 48.5 feet, NGVD is reached, the lake will be managed to maintain 48.5 feet, NGVD until 1 June. In Zone B1, S-61 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases will be coordinated with FDEP.

Lake Kissimmee, Hatchineha, and Cypress Zone B1 is a zone of operational flexibility. In this zone, S-65 releases will be made to facilitate the extreme drawdown and habitat enhancement project. This will include lowering Lake Kissimmee, Hatchineha, and Cypress to reach 51.0 feet, NGVD on 1 January. After 51.0 feet, NGVD is reached, Lake Kissimmee will be managed to maintain 51.0 feet, NGVD until 1 April. In Zone B1, S-65 releases may be made to maintain minimum flows.

Hatchineha and Cypress Zone B2 is a zone of operational flexibility. Construction of weir and installation of pumps to take place at a location between Lakes Kissimmee and Hatchineha. In this zone, Lakes Hatchineha and Cypress will be lowered to facilitate the extreme drawdown and habitat enhancement project. This will include pumping to reach 48.0 feet, NGVD on 15 February at Lakes Hatchineha and Cypress. After 48.0 feet, NGVD is reached, the Lakes Hatchineha and Cypress will be managed to maintain 48.0 feet, NGVD until 1 June. In Zone B2, S-65 releases may be made to maintain minimum flows.

Alternative 3: Lake Toho Only with Pump

Lake Toho drawdown starting on 1 November, ending 15 February, install pump at S-61 for use when Lake Toho is 53.0 feet, NGVD or within 0.5 foot of the Lake Cypress level, pump from Lake Toho to downstream of S-61, reverse head at S-61 due to Lake Cypress being held above Lake Toho, lakes held at drawdown levels until refill of all lakes begins 1 June.

Lake Toho Zone B1 is a zone of operational flexibility. Pumps are to be installed at S-61. In this zone, S-61 releases and pumping from Lake Toho to C-35 will be done to facilitate the extreme drawdown and habitat enhancement project. This will include making releases and/or pumping to reach 48.5 feet, NGVD on 15 February, and then to maintain 48.5 feet, NGVD until 1 June. Pumping will be needed when S-61 releases are not possible or are limited due to Lake Kissimmee, Hatchineha, and Cypress levels. In Zone B1, S-61 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases will be coordinated with FDEP.

Alternative 4: Alternative 1 w/no release from E. Lake Toho

Alternative 1) plus: from end of April to 1 June when East Lake Toho is below 56.5 feet, NGVD, no releases at East Lake Toho, facilitates work at Lake Toho.

East Lake Toho Zone B1, from late April to 1 June, S-59 releases will be made to maintain 56.5 feet, NGVD. In Zone B1, S-59 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-59 releases will be coordinated with FDEP.

Alternative 4z: Modified Alternative 4 – Gravity Flow with higher lake levels

Lake Toho drawdown starting on 1 November, ending 15 February, drawdown to 49.5 feet, NGVD, Lakes Kissimmee, Hatchineha, and Cypress drawdown starting on 15 November, ending 15 February, drawdown to 49.0 feet, NGVD, lakes held at drawdown levels until refill of all lakes begins 1 June.

To facilitate work at Lake Toho, East Lake Toho from mid-March to 1 June will be managed to follow a more gradual lowering, than shown on the current approved regulation schedule, with a low pool of 56.5 feet, NGVD on 1 June.

Lake Toho Zone B1 is a zone of operational flexibility. In this zone, S-61 releases will be made to facilitate the extreme drawdown and habitat enhancement project. This will include lowering Lake Toho to reach 49.5 feet, NGVD on 15 February. After 49.5 feet, NGVD is reached, the lake will be managed to maintain 49.5 feet, NGVD until 1 June. In Zone B1, S-61 releases may be made to maintain minimum flows. To facilitate FDEP

hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases will be coordinated with FDEP.

Lake Kissimmee, Hatchineha, and Cypress Zone B1 is a zone of operational flexibility. In this zone, S-65 releases will be made to facilitate the extreme drawdown and habitat enhancement project. This will include lowering Lakes Kissimmee, Hatchineha, and Cypress to reach 49.0 feet, NGVD on 15 February. After 49.0 feet, NGVD is reached, the Lakes Kissimmee, Hatchineha, and Cypress will be managed to maintain 49.0 feet, NGVD until 1 June. In Zone B1, S-65 releases may be made to maintain minimum flows.

East Lake Toho Zone B1, from mid-March to 1 June, S-59 releases will be made to obtain 56.5 feet, NGVD on 1 June. In Zone B1, from mid-March to 1 June, S-59 releases may be made to supplement releases, at S-65, to the Kissimmee River. Water stored in East Lake Toho could also benefit refilling of Lake Toho after 1 June. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-59 releases will be coordinated with FDEP.

Alternative 5: Pump alternative w/ no release from East Lake Toho when below 56.5 feet, NGVD (modified Alternative 2)

Alternative 2) plus: from end of April through May when East Lake Toho is below 56.5 feet, NGVD, no releases at East Lake Toho, facilitates work at Lake Toho.

East Lake Toho Zone B1, from late April to 1 June, S-59 releases will be made to maintain 56.5 feet, NGVD. In Zone B1, S-59 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-59 releases will be coordinated with FDEP.

Alternative 6: Alternative 3 w/ no release from East Lake Toho when below 56.5 feet, NGVD

Alternative 3) plus: from end of April through May when East Lake Toho is below 56.5 feet, NGVD, no releases at East Lake Toho, facilitates work at Lake Toho.

East Lake Toho Zone B1, from late April to 1 June, S-59 releases will be made to maintain 56.5 feet, NGVD. In Zone B1, S-59 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-59 releases will be coordinated with FDEP.

Alternative 7: Alternative 4 w/ pump to East Lake Toho

Alternative 4) plus: installation of pump at S-59 to pump into East Lake Toho when East Lake Toho is below 56.5 feet, NGVD.

Lake Toho Zone B1 is a zone of operational flexibility. In this zone, S-61 releases will be made to facilitate the extreme drawdown and habitat enhancement project. This will include lowering Lake Toho to reach 48.5 feet, NGVD on 15 February. After 48.5 feet, NGVD is reached, the lake will be managed to maintain 48.5 feet, NGVD until 1 June. Pumps are to be installed at S-59. When East Lake Toho is below 56.5 feet, NGVD during the period 1 November - 1 June, discharges from Lake Toho may be made by back pumping from C-31/Lake Toho into East Lake Toho. In Zone B1, S-61 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases and S-59 pumping will be coordinated with FDEP.

East Lake Toho Zone B, from late April to 1 June, S-59 releases will be made to maintain 56.5 feet, NGVD. In Zone B, S-59 releases may be made to maintain minimum flows. Pumps are to be installed at S-59. When East Lake Toho is below 56.5 feet, NGVD during the period 1 November - 1 June, discharges from Lake Toho may be made by pumping from C-31/Lake Toho into East Lake Toho to supplement S-61 releases. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases and S-59 pumping will be coordinated with FDEP.

Alternative 8: Alternative 5 w/pump to East Lake Toho

Alternative 5) plus: installation of pump at S-59 to pump into East Lake Toho when East Lake Toho is below 56.5 feet, NGVD, assists drawdown of Lake Toho.

Lake Toho Zone B1 is a zone of operational flexibility. In this zone, S-61 releases will be made to facilitate the extreme drawdown and habitat enhancement project. This will include lowering Lake Toho to reach 48.5 feet, NGVD on 15 February. After 48.5 feet, NGVD is reached, the lake will be managed to maintain 48.5 feet, NGVD until 1 June. Pumps are to be installed at S-59. When East Lake Toho is below 56.5 feet, NGVD during the period 1 November - 1 June, discharges from Lake Toho may be made by back pumping from C-31/Lake Toho into East Lake Toho. In Zone B1, S-61 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases and S-59 pumping will be coordinated with FDEP.

East Lake Toho Zone B, from late April to 1 June, S-59 releases will be made to maintain 56.5 feet, NGVD. In Zone B, S-59 releases may be made to maintain minimum flows. Pumps are to be installed at S-59. When East Lake Toho is below 56.5 feet, NGVD during the period 1 November - 1 June, discharges from Lake Toho may be made by pumping from C-31/Lake Toho into East Lake Toho instead of by S-61 releases, or in addition to S-61 releases. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases and S-59 pumping will be coordinated with FDEP.

Alternative 9: Alternative 6 w/ pump to East Lake Toho

Alternative 6) plus: installation of pump at S-59 to pump into East Lake Toho when East Lake Toho is below 56.5 feet, NGVD, assists drawdown of Lake Toho.

Lake Toho Zone B1 is a zone of operational flexibility. In this zone, S-61 releases and pumping from Lake Toho to C-35 will be done to facilitate the extreme drawdown and habitat enhancement project. This will include making releases and/or pumping to reach 48.5 feet, NGVD on 15 February, and then to maintain 48.5 feet, NGVD until 1 June. Pumps are to be installed at S-59 and at S-61. Pumping at S-61 may be needed when S-61 releases are not possible or are very limited due to Lake Kissimmee, Hatchineha, and Cypress levels. When East Lake Toho is below 56.5 feet, NGVD during the period 1 November - 1 June, discharges from Lake Toho may be made by pumping from C-31/Lake Toho into East Lake Toho instead of by gravity/pumping discharges at S-61, or in addition to gravity/pumping discharges at S-61. In Zone B1, S-61 releases may be made to maintain minimum flows. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases and S-59 pumping will be coordinated with FDEP.

East Lake Toho Zone B, from late April to 1 June, S-59 releases will be made to maintain 56.5 feet, NGVD. In Zone B, S-59 releases may be made to maintain minimum flows. Pumps are to be installed at S-59. When East Lake Toho is below 56.5 feet, NGVD during the period 1 November - 1 June, discharges from Lake Toho may be made by pumping from C-31/Lake Toho into East Lake Toho instead of by S-61 releases, or in addition to S-61 releases. To facilitate FDEP hydrilla treatments in Goblet's Cove/Lake Toho, S-61 releases and S-59 pumping will be coordinated with FDEP.

APPENDIX D – COASTAL ZONE MANAGEMENT CONSISTENCY

**FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES**

**Lake Tohopekaliga Extreme Drawdown and Habitat
Enhancement Project
Osceola, Florida**

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: This chapter doesn't apply to the proposed work.

2. Chapters 163(part II), 186, and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project has been coordinated with various Federal, State and local agencies during the planning process.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: This project does not interfere with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed project has been coordinated with the State during the permit process and will continue to be coordinated with the State during subsequent steps in the permit modification process.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: Since the affected property already is in public ownership, this chapter does not apply.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project area does contain Kissimmee State Park on Lake Kissimmee, and the FWC Three Lakes Wildlife Management Area. The project is consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). We are awaiting a reply.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed project would provide improved recreation within Lake Toho. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed project does not involve work in saltwater or involve saltwater resources. Therefore, this chapter does not apply.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The purpose of this project is to improve fish and wildlife resources under the jurisdiction of this agency, which is also the sponsor of the project.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: The SFWMD is coordinating the use and consumption of State waters, as appropriate.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The future contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed would not have any regional impact on land development in the area. Therefore, the project is consistent with the goals of this chapter.

16. Chapters 381 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project will not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: Draft and Final Environmental Impact Statements addressing project impacts will be prepared and reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed project is not located near or on agricultural lands; therefore, this chapter does not apply.