

Responses to the Recommendation from the U.S. Fish and Wildlife Service from the Final FWCA Report

A. Threatened and Endangered Species

1. Disturbance to listed species will be minimized or avoided by limiting construction and other disturbances during critical times. Other listed species recommendations will also be incorporated from the *Draft Standard Protection Measures for the Eastern Indigo Snake* (Service 2002), *Habitat Management Guidelines for the Bald Eagle in the Southeast* (Service 1987), and *Habitat Management Guidelines for the Wood Stork in the Southeastern Region* (Ogden 1990).

Response: Habitat management guidelines for the bald eagle and the wood stork are included in the environmental commitments, along with the standard construction precautions and indigo snake.

2. Many of the construction- and operation-related details are not available at this time, but will be forthcoming in the detailed design documentation and operations manual. The Service will make additional recommendations regarding the potential effects of impoundment components on listed species when more detailed design occurs, potentially through the permitting process.

Response: It is typical for detailed designs and operations to be developed in the design phase of CERP project to have some of these details for analysis during the PIR, much earlier than a typical Corps project. Initially, a Draft Operating Manual will be developed during the PIR Phase of the project. During the Detailed Design - Plans and Specs Phase, the Draft Operating Manual may be further developed and modified for use during construction. This Draft will focus on facilitating construction of the project components while maintaining established levels of project purposes, such as water supply, flood protection, and any required delivery of water to the natural system. Following construction, the Draft Operating Manual will be updated, as necessary, and used for operations during the Operational Testing and Monitoring Phase (OTMP), the time period between completion of physical construction and transfer of the project to the non-Federal sponsor for long-term operations and maintenance. Following completion of the OTMP, the completed Operating Manual will consolidate the incremental refinements recommended during the previous phases and will describe operating criteria for use by the non-Federal sponsor for the long-term operation of the project. After the completed Project Operating Manual (POM) is approved and long-term operations are underway, circumstances may arise that will result in modification or update of the POM. This may result from implementation of new CERP or non-CERP project components, changes resulting from recommendations made through the adaptive management and assessment process, or changes made through CERP updates. The Corps and SFWMD will continue to coordinate with the Service through designing and construction, and look to the Service for suggestions of practical species management or design features throughout the process.

3. The construction, operation, and maintenance of the Site 1 Impoundment have the potential to adversely affect the following federally listed species that are under the jurisdiction of the Service: eastern indigo snake, wood stork, and Everglade snail kite. The Service recommends

that standard protection measures, construction precautions, standard local operation procedures, and/or habitat management guidelines be implemented for these species during the construction, operation, and maintenance phases to avoid any adverse effects on such species.

Response: Concur. Management measures and/or standard procedures have been added to the environmental commitments section should alternative B or C be implemented in order to avoid adverse impacts to these species.

4. The potential for the project to provide additional foraging areas for wood storks could be improved through timing operations resulting in draw downs that would concentrate fish in the littoral shelves present in the seepage canal, to coincide with fledging. This type of operational schedule could contribute to increased reproductive success in LNWR.

Response: The seepage canal will reflect in large part pool levels within the reservoir, though fluctuations will be minimal (≈ 0.50 feet most of the time). A combination weir is utilized to minimize stage fluctuations by trickling water out when the stage is low developing more capacity as the stage increases. The reservoir will experience low pool depths during extended dry periods that will be reflected in the seepage canal with minimal stages (lowest possible being water table, approximately another 0.75 feet lower than lower weir crest elevation). This provides a maximum fluctuation of 1.25 feet with littoral shelf having an average depth of 1.50 feet. If lower stages were controlled when reservoir pools were deeper, higher O&M project costs will be occurred for return seepage from not only the reservoir, but from areas outside the project site area as it draws down the surrounding water table as well.

5. In general, the Service has concerns about the potential for the exposure of federally listed species, as well as other fish and wildlife, to contaminants either when former agricultural lands are flooded or as reservoirs are operated and potentially become filled with sediment. If the ecological risks from contaminants to listed species become evident through sampling of groundwater or discharged water, etc., reinitiation of consultation in accordance with section 7 of the ESA may become necessary.

Response: Noted.

6. If new electrical lines will be constructed near open water to service new pumps, the publication *Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996* should be consulted for recommended measures to protect eagles from electrocution.

Response: Concur. The recommendation will be provided to the supplier of electrical power for the project. Normally raptors are not a problem on distribution lines that feed project features such as pump station, spillways, etc. We would require the utility company to relocate in accordance with any permits and/or resource agency guidance. This is also a requirement included in the environmental commitments section of the document. (7.2.17).

7. Eastern indigo snakes may be affected by new access roads constructed for operations and maintenance as well as recreational access. To minimize the potential for road mortalities,

additional educational materials above and beyond those required during construction should be developed and coordinated with the Service and FWC to allow the project to proceed without risk to this species.

Response: Do not concur. Standard protection measures regarding the Eastern Indigo snake shall be included in the environmental protection plan of the plans and specifications and includes education of construction personnel of the potential presence of the snake and it's protected status.

8. Additional federally listed and candidate species are potentially present in the project area. There are two fish species which may occur in downstream reaches for which the NOAA Fisheries has consultation responsibility. These include the endangered smalltooth sawfish and candidate opossum pipefish. The Corps will need to consult with the NOAA Fisheries on these species and any other marine resources under NOAA Fisheries jurisdiction.

Response: The Corps has consulted with NOAA Fisheries for species under NOAA jurisdiction. NOAA/NMFS concurs with the PIR/EA assessment.

9. The Corps should consult with the FWC regarding habitat needs and additional conservation recommendations for species listed as threatened, endangered, or of special concern by the State of Florida.

Response: Concur.

10. Wildlife-protective water quality criteria, including water temperature, should be employed for discharged water to minimize potential direct and downstream effects from poor water quality on the manatee and other aquatic resources. The Corps indicated in their response to the draft FWCA report (enclosed) that the impoundment will be “adaptively managed to avoid negative effects with regards to State water quality criteria as well as site-specific Everglades Forever Act limits...” The Service sees this as a commitment to ensure the Site 1 Impoundment discharges meet water quality standards before entering the Hillsboro Canal and AIW.

Response: The Corps intends to design and operate project features so as to achieve State water quality criteria. While control and reduction of constituents of concern (within the water column) are the primary focus, wildlife protective WQ criteria shall be adhered to whenever practicable. For example, in the case of temperature, discharge will be pumped from the most climate-friendly depths whenever such an action is known to be both reasonably beneficial and possible.

11. A more detailed analysis of effects to listed species should be incorporated into the final PIR/EA. The effects of the action section in the dPIR/EA do not contain much of the information presented in our draft FWCA report.

Response: More details have been added to the analysis. However, impacts are not anticipated to be significant, and therefore, the document is written to cover each topic appropriately.

B. Other Fish and Wildlife Resources

12. We recommend that the Corps and District consult with the Service and the FWC during detailed design of intake structures to minimize the threat of entrainment and impingement on aquatic resources by incorporating appropriate screening or other “fish friendly” intake designs.

Response: Concur

13. Both the Service and FWC should be consulted in the event that colonial or solitary wading bird nests are observed within the construction footprint.

Response: Noted. Language will be included in the construction contract.

14. Florida burrowing owls (*Speotyto cunicularia floridana*) are known to inhabit ruderal areas, such as canal banks and road berms, in the vicinity of the project. If owls are observed within the Site 1 Impoundment construction footprint, the FWC should be consulted.

Response: Burrowing owl surveys will be conducted prior to construction to identify nesting burrows. If owls are identified on site, survey results will be coordinated with the FWC for recommendations on practical management and avoidance to impacts to this species.

15. Incorporate, to the maximum extent practicable, clusters and/or individual trees or snags to afford perching, nesting, and roosting structure for wildlife. Leaving this type of structure in the impoundment would also enhance recreational opportunities.

Response: It is not sound engineering nor safe for the allowance of trees within reservoir embankments because of potential for piping (roots loosening compaction or forming conduits with death and decay) that may lead to breaching of reservoir. However, with excess of borrow material that may be considered unusable for embankment construction, tree islands may be a possible feature within the reservoir. However, quantity of this material is unknown until the detail design phase when more geotechnical data becomes available. When quantities (volumes) are calculated, a design may be drafted for discussion between interested agencies for effectiveness.

16. Design the portion of the property north of the proposed ASR pilot project and west of the impoundment as a natural wetland. This would include exotic removal and restoration of a more natural hydroperiod. This area is a remnant forested sawgrass wetland and has the capacity to provide a functioning wetland community with minimal active restoration actions. The Corps stated that a stability analysis of the reservoir embankment would have to be completed before this recommendation could be incorporated, however, the response fell short of a commitment to do such an analysis.

Response: The Draft Engineering Appendix states “needs” versus required. Text has been changed since to “required” (Section: Impoundment Embankments).

17. Incorporate wetland vegetation and littoral shelves into both the impoundment and the seepage canal. Incorporation of submerged and emergent aquatic vegetation will improve water quality and provide habitat for fish, amphibians, and reptiles. The Corps response to this comment indicated that littoral shelves in the interior of the impoundment were not compatible with the project purpose, however, they did not commit to the design recommendations for the seepage canal on the eastern boundary of the project.

Response: The Draft Engineering Appendix includes design of the littoral shelf for the seepage canal. Littoral shelves within the reservoir remains a possibility with unusable borrow material collected during excavation of embankment construction material. However, quantity of this material is unknown until the detail design phase when more geotechnical data becomes available. When quantities (volumes) are calculated, a design may be drafted for discussion between interested agencies for effectiveness.

18. Minimize dry-down of the impoundment cells in the operational plan to reduce potential contaminant mobilization and soil oxidation where the minimization of dry-downs does not affect the ability of the project to provide benefits to natural system hydroperiods.

Response: Concur. The operation plan (Draft Operating Manual) is to draw water down to meet demands until average storage depth is ± 1 -foot for water quality purposes. The one-foot storage may of course fall further due to evapotranspiration; however, it does afford additional time till next rainfall event or extends period of soil saturation if water level does fall to reservoir bottom. Additionally, deepwater refugia areas will provide virile "wells" for microbes that have the ability to break down pollutants once the storage pool again rises above minimal water levels.

19. Provide approximately 10 percent of the impoundment area as deep-water refugia, at a depth of 4 feet below impoundment floor elevation. Under the selected plan, the Site 1 Impoundment would be subject to wide variations in water level. Severe draw downs of the impoundment could lead to significant fish kills. Deep-water refugia provide important habitat for aquatic wildlife (e.g. fishes, herpetofauna, and aquatic invertebrates) during periods when the surrounding area is dry and act as a "seed source" of aquatic organisms upon subsequent re-flooding of the reservoirs. Deep-water refugia may also provide temporary feeding grounds for avian species such as wading birds and enhance nutrient removal from the water column by allowing uninterrupted submerged aquatic vegetative growth.

Response: The ten-percent figure is well documented since early WPA Feasibility efforts. The footprint already contains some below average grade pockets for deepwater refugia. Construction of embankments and other features will necessitate excavation within the reservoir footprint, all contributing toward the desire percentage. It will not be known what quantity of material will be required excavated to construct the project features until the detail design phase (best judgment regarding quantities is included in the Engineering Appendix). At that time, a deepwater refugia design may be developed with interested agencies and discussed for effectiveness. For the PIR, it has been left undocumented due to lack of detail information on usability of borrow material for embankment construction, but a rough sketch illustrated

approximately eight-percent coverage.

20. As projected dissolved oxygen (DO) levels fall toward the low end of the range acceptable for fish, we recommend that features to improve DO levels within the impoundment be investigated during the detailed design phase. The draft WPA Feasibility Report and Supplemental Environmental Impact Statement, section 7.10, states that the Site 1 Impoundment is projected to release effluent with DO concentrations approximately 34 percent lower than those of inflow waters (Inflow = 4.90 milligram per liter [mg/L]; Effluent = 3.09 mg/L) (Corps 2001) indicating that resident water would also have a low DO concentration.

Response: Concur. Aeration methods and techniques shall be explored.

C. Water Quality Monitoring Plan

21. We recommend the implementation of a water quality monitoring plan in the Hillsboro Canal. This type of monitoring plan has also been recommended for the ASR pilot project. The implementation of a water quality monitoring plan will enable the team to determine if measures incorporated into impoundment design are improving the quality of discharged water. The Corps indicated, in their response that a water quality monitoring plan would be a requirement of the CERPRA and National Pollution Discharge Elimination System permits. We believe these requirements will not include sufficient downstream monitoring to determine the project's success in altering the salinity regime and reducing nutrients in the estuarine portion of the Hillsboro Canal and AIW. We continue to recommend that the water quality monitoring plan be expanded to include all parameters discussed during development of the ecological monitoring plan.

Response: Concur. A water quality monitoring plan has been drafted.

D. Ecological Monitoring Plan

22. We recommend the implementation of an ecological monitoring plan. This will assist the team in the determination of effects of construction and operation of the impoundment on fish and wildlife resources present on the site and in adjacent areas including LNWR and WCA 2. The Corps' response indicated that an ecological monitoring plan would be developed, however, the purpose of that plan is to only monitor for project performance. Additional parameters brought up in earlier discussions, emails, and teleconferences will not be included in this plan. The Service continues to recommend a separate plan be developed to monitor ecological success of the project.

Response: System-wide ecological monitoring will be performed by RECOVER AAT in accordance with the Monitoring and Assessment Plan. Project specific monitoring will include ensuring the implemented alternative functions as designed and in accordance with the operational plan and meets all regulatory requirements. In addition, recommendations to add additional monitoring to the downstream Hillsboro Estuary will be recommended to RECOVER for inclusion to the MAP. The monitoring plan is in accordance with the latest guidance. It is

located in Annex D.

E. Contaminants

23. The Service recommends that trash and debris piles are removed as proposed. This will ensure that potential contaminant issues will be minimized or eliminated. A pre-construction survey of this site should also be performed to ensure that no unauthorized use of contaminants has occurred since the completion of the HTRW. If new information indicates risk of contaminant exposure not previously addressed, additional soil or sediment sampling may be recommended.

Response: Concur. Recommend that such activities be included in site development portion of Specifications. During the detail design phase a Plan & Specification level survey will be performed over the entire project site that will note all physical debris that remains.

G. Other Recommendations

24. Wetland impacts will occur with construction of the impoundment. Impacts to wetland habitats have been quantified. Approximately 1,773.7 acres of Corps jurisdictional wetlands will be filled as a result of project implementation. This quantification of unavoidable impacts along with any offsetting wetland benefits, including any on-site wetland restoration, should be included in the final PIR/EIS.

Response: Concur that acreage affected will be discussed in the Clean Water Act Section 404 (b) (1) analysis. However, the Federal project will not include mitigation for wetlands impacts in the impoundment footprint, as discussed in the Restudy. The Greater Everglades benefits generated by CERP far outweigh the individual CERP component adverse impacts on wetlands, as discussed on Restudy Chapter 9, Paragraph 6. Under the Acceler8 Program, the SFWMD has applied for a Corps Section 404 Permit, and will probably include mitigation for wetlands impacted in the Site 1 footprint, but this mitigation is not a Federal action. Any mitigation required by the Corps 404 Permit to the State will not be eligible for Federal cost-share. The results of the wetland delineation conducted after release of the PIR for the purposes of the Acceler8 Site 1 Impoundment permit has been included in the Final PIR, including the quantification of the on-site wetlands.

25. Construction, operation, and maintenance of the impoundment offer some opportunity for an increase in the spatial extent of exotic plant species. We recommend that exotic plants be controlled or eradicated at the site.

Response: Concur. Exotic/nuisance species control on federal project sites have standard construction and maintenance provisions for exotic and nuisance species control and would be implemented.

26. We recommend that the impoundment be managed in a manner consistent with adaptive management principles. Incorporation of sound science through careful monitoring should drive

operational and/or other changes to increase and/or improve project benefits to the natural system, including the estuarine area east of the G-56 and between the Boca Raton and Hillsboro Inlets.

Response: Concur. The monitoring east of G-56 is being recommended to RECOVER for incorporation into the MAP. See monitoring plan in Annex D. The RECOVER Leadership Group has determined that all Greater Everglades benefits will be monitored through the MAP, not by individual CERP projects.

27. Although the land is currently unavailable, an in-ground storage project to the south of the Site 1 Impoundment (southern compartment) should be pursued as a future CERP project to further increase the amount of water that can be stored to meet demands for water supply in this vicinity to further reduce demands on the natural system.

Response: Thank you for your recommendation. As you know the southern compartment is not included in the present Project Implementation Report.

28. Annex C contains documentation for the Project Assurances required for CERP PIRs. We recommend the following changes to this section of the PIR:

- a. update of the assurances section in the final PIR to be consistent with forthcoming Guidance Memorandum Number 3 (“Savings Clause Requirements”) and Guidance Memorandum Number 4 (“Identifying Water Needed to Achieve the Benefits of the Plan”);

Response: The assurances section has been updated to be as consistent as possible with the requirements of Guidance Memoranda Numbers 3 and 4, particularly with respect to the display of information and results. However, the modeling that was performed to evaluate the project assurances requirement was completed prior to the formal posting of Draft GM 4 (April 2005). Additional regional modeling (SFWMM) and post-processing of model results would need to be undertaken to make the assurances analysis entirely consistent with the requirements of GM4, and is not scheduled to be undertaken at this time. Furthermore, since GM4 is only a draft and the Site 1 Impoundment PIR is scheduled to be finalized prior to the final adoption of the programmatic guidance memoranda, undertaking additional modeling does not appear to be an efficient use of agency resources at this time.

- b. further clarify of the possible uses for “excess” water that is made available by a project but is not identified as beneficial for the natural system, including possible use of this water by future CERP projects;

Response: The assurances analysis performed for individual projects after the selected plan has been identified is not a system-wide plan formulation analysis. As such, no specific uses were considered for water that the project produces which is not beneficial for the protection of fish and wildlife (e.g., additional water retained in LNWR and/or flowing from LNWR to WCA 2A). There are a multitude of possible uses for this water, including beneficial use by fish and wildlife

elsewhere in the natural system if the additional water can be conveyed to locations needing additional water at the appropriate times, agricultural and municipal water supply, and resource (saltwater intrusion) protection.

- c. discuss the differences between the versions of the regional water management model used in plan formulation versus project assurances;

Response: Modeling from the C&SF Project Comprehensive Review Study (Restudy), the Water Preserve Areas Feasibility Study, and the 2000 Lower East Coast Water Supply was used for plan formulation and evaluation. Version 3.5 of the SFWMM was used for Restudy and WPA Feasibility Study modeling. Version 3.7 of the SFWMM was used for LEC (2000) modeling. Version 5.4 of the SFWMM was used for assurances modeling. Additional information about the different versions of the model may be found at <http://www.sfwmd.gov/org/pld/hsm/models/sfwmm/>.

- d. document the models used for the project assurances analyses using RECOVER performance measures, a table of modeling assumptions, a summary of the regional water budget, and a water budget summary for the local project area including LNWR; and

Response: RECOVER evaluation performance measures (PMs) were not evaluated as part of the assurances analysis. A subset of RECOVER PMs was used for plan formulation and evaluation work leading to the identification of the selected plan and also by the RECOVER Evaluation Team in performing their system-wide evaluation. Assumptions and water budget information for the different versions of the SFWMM used for the plan formulation and water budget information produced by the model runs assurances work are documented at <http://www.sfwmd.gov/org/pld/hsm/models/sfwmm/>.

- e. additional technical documentation described in Section IV.B.6 of this report.

Response: Section IV.B.6 of the Final Fish and Wildlife Coordination Act Report prepared by the U.S. Fish and Wildlife Service, South Florida Ecological Services Office, contains comments and recommendations similar to those discussed above. The section also contains many additional comments and recommendations.

With respect to the procedures outlined in Draft GMs 3 and 4, the “Assurances” analysis work completed for the Site 1 Impoundment PIR is as consistent as possible with those procedures, considering that the procedures are still draft, and the draft GMs were not finalized for public review and comment until April 2005, approximately three months after the Draft PIR for Site 1 was completed. The Service’s recommendation to perform an updated analysis is noted. The Assurances analysis was updated after completion of the draft PIR, but the work that was performed in order to deliver the PIR to meet the project schedule is not entirely consistent with the GMs. Furthermore, the GMs have not yet been finalized, and it is conceivable that the procedures outlined in the GMs may be revised.

In Section IV.B.6, the Service also specifically recommended: additional evaluations of effects on water supply; graphical displays of volumes of water as a time series of the 36-year period of simulation; and that additional water budget information be displayed. Due to the schedule for preparing the final PIR, the project team was unable to prepare the additional information and evaluations recommended by the Service.

The Service's recommendations about beneficial effects in WCA 2A are noted. In general, the project team concurs that the project does not create significant beneficial effects in WCA 2A, and may create potentially adverse effects, depending upon the indicator being evaluated. However, the retention of additional water in the natural system is a fundamental objective of the CERP, and this project performs that function, despite the project team's inability to identify for the additional water retained in the natural system beneficial uses for the protection of fish and wildlife.

The reduction of the discharge of North Springs Improvement District's water is included in the selected plan, including the draft project operations manual. This increment of water is pertinent to the assurances analysis, as the capture and redistribution of this water to be used for basin water supply or resource protection is a function of the Site 1 Impoundment Project. The Everglades Forever Act does not require that such discharges cease; the EFA only requires that waters within the Everglades Protection Area meet applicable water quality standards and that there must be a schedule and a strategy for addressing discharges into the Everglades Protection Area to ensure that such discharges comply with water quality standards.

29. All model runs used in the dPIR/EA should be fully documented including the model used, version, run date, source code, etc. If multiple models are used, the relationship between the models and their assumptions should be explained.

Response: Additional modeling documentation has been provided in the Final PIR Engineering Appendix.

30. We recommend that any statements regarding project benefits and impacts be reviewed for consistency with the overall dPIR/EA evaluation, and that an explanation be provided for any differences noted between benefits or impacts seen in the assurances modeling and those seen during evaluation of the selected alternative.

Response: Noted.

31. The Service recommends the Corps and District investigate public outreach and interpretive opportunities on the Site 1 Impoundment. Passive recreation other than gas powered vessels could be compatible with the project purpose. Where feasible, these opportunities should be investigated and implemented. We would be available to assist in this endeavor and recommend that the FWC also be involved.

Response: Noted.

32. The future without project scenario should be reevaluated in accordance with future land use designations in Palm Beach County. The assumption that the site will be high density residential and commercial development is not warranted given that Palm Beach County has the future land use designation as residential with no more than 1 unit per 10 acres.

Response: Surrounding properties to the Site 1 Impoundment are high density residential. Zoning laws for properties acquired would not be changed by county zoning ordinances as they are taken out of County Planning. In addition, the future without scenario was developed and discussed with the interagency team, including the FWS; it was approved in a Feasibility Scoping Meeting; it was evaluated during alternative formulation and presented in comparison with all alternatives at the Alternative Formulation Briefing. The FWS has been partners in planning development at each of these steps and has provided coordination under Fish and Wildlife Coordination Act in the form of Planning Aid Letters. The Service has not presented concerns regarding this basic definition of future without project in the past and thus, has expressed concurrence with how it has been defined.

33. The dPIR/EA indicates in several sections that water may be discharged from the impoundment to WCA 2A. It is our understanding that the impoundment is not intended to discharge into WCA 2A, and we therefore recommend that references to such discharges be removed from the PIR.

Response: The Impoundment will not discharge at any time into the WCAs. The text has been corrected.

34. Since the ecological monitoring plan will not monitor the effects of the project on the ecological resources in the watershed, the Corps should provide more detail in the operations plan to assure the Service and FWC that predicted effects to fish and wildlife resources will be realized by the project as the model results indicate.

Response: No agency or person can provide assurance that predicted effects on flora and fauna will be fully realized as demonstrated in model results. Models are tools used to assist in good decision making capacities. Operations will be continually monitored with proposed and existing gauges to obtain desired results or improvement on expectations if possible. A section in the Draft Operating Manual called Water Control Data Acquisition System Plan (WCDASP) provides information regarding operational monitoring of the project.

35. We understand that the ecological monitoring plan will not provide sufficient monitoring in the estuarine area to adequately assess the effects of the project in this area. RECOVER, the Corps, or District should provide resources to increase water quality monitoring in this area to a minimum of monthly water quality monitoring at Broward County Stations 1, 2, and 33.

Response: Concur. Recommendation is being made to RECOVER.

36. The Corps and District should investigate the use of innovative roadway material similar to geo web. This type of material was used in Big Cypress National Preserve and Pelican Island

National Wildlife Refuge. Its construction allows water to travel through it both horizontally and vertically, reducing maintenance and construction costs.

Response: The Corps and District will investigate the appropriate usage of this product for this project and others where environmental restoration is an objective.

37. Dissolved oxygen levels in the Hillsboro Canal are below State water quality standards. The opportunity to improve this aspect of water quality should be investigated during detailed design of the impoundment.

Response: Concur. Aeration-inducing features at the point of discharge may be included in the design/construction of the reservoir. With a high degree of certainty, an appreciable amount of DO increase would be anticipated to occur in the canal immediately downstream of the reservoir. However, there is some concern that discharge quantities may not be large enough to positively impact (with regards to DO) any significant portion of the canal in the long term. In order to arrive at the "blended" concentration of DO at a significant distance downstream of the reservoir, the use of a simple model (calculations, spreadsheet, or other) that predicts the equivalent of a weighted average-- C_F ($Conc_{FINAL\ DO} = [(C_1Q_1 + C_2Q_2)/(Q_1 + Q_2)]$ --will be required. The basic question is whether or not periodic releases from proposed culvert S-526A (max. 700 cfs) will be adequate to positively influence DO levels in the constant flow of the improved portion of Hillsborough Canal (expected to have a flow-rate range of 500 to 1500 cfs).