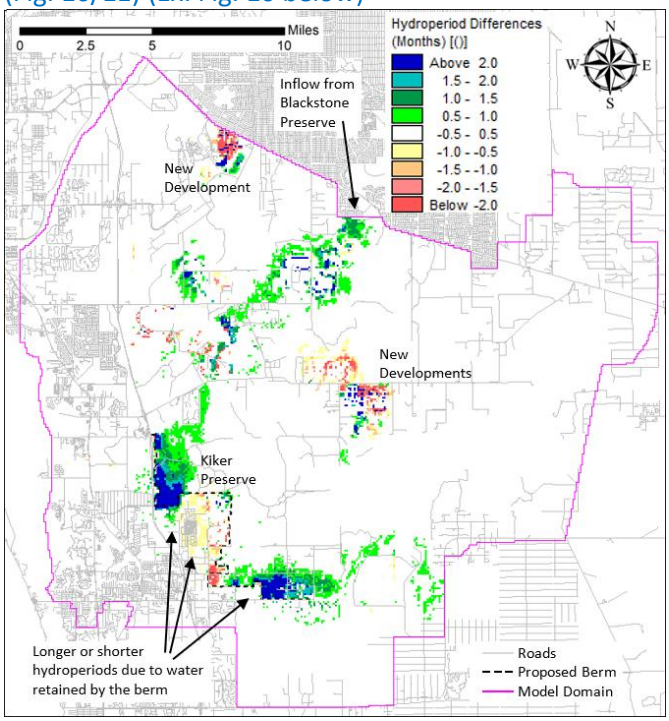
SLCWI Hydrological Modeling Project
Draft Report Comments
Responses in blue/italics

General Comments

1. Make sure all acronyms are defined the first time they appear anywhere in the report including LiDAR and DEM
    - *Addressed: All acronyms have been defined at first mention in the text. Those acronyms mean:*
        i. *LiDAR: Light Detection and Ranging (pg. 13 v.1)*
        ii. *DEM: Digital Elevation Model (pg. 12 v.1)*
2. Maps lack references like roads, preserves, etc., so are hard to read.
    - *Addressed: A roads shape file has been added to the figures that show scenario results.* (Fig. 10/11) (Ex: Fig. 10 below)



3. Reference is made to the Lee Stormwater Master Plan, but there does not seem to be such a plan. It appears the conceptual projects incorporated into the SLCWI model were from the Lee Flood Mitigation Plan. Whatever the source of the ECwP assumptions, this should be clarified.
    - *Addressed: All references to Lee Stormwater Master Plan have been replaced with Southern Lee County Flood Mitigation Plan, which is the title of the AIM's report. This was done in the final report body, and also in Appendix J: (pg.16 v.1, pg. 26- Results v.1)*
4. There are instances of the word "hydrologicalal". Please find all occurrences and correct as needed.
    - *Addressed: (pg. 3-4, 18 v.1)*
5. Once all edits are made, page numbers need to be adjusted accordingly.
    - *Addressed*
6. Pg. 7, 2nd sentence: change collected to collect
    - *Addressed*

7. Pg. 13, 3rd paragraph from the bottom needs to formatting
    - *Addressed*
8. Pg. 15, Existing and Pre-development conditions maps need to be assigned a Figure #
    - *Addressed*
9. Pg. 17, needs a Figure # (like in Appendix)
    - *Addressed*
10. Pg. 18, 1.3 4: state "the proposed conceptual project"
    - *Addressed*
11. Pg. 27, may want to include discussion of not only purchase of private pits but also the opportunity to lease pits for storage – could assist with storage until acquisition funding is available or proposed projects are in place. Another thought is County/City/State incentives for developers, for example, increased density for creating additional storage on site.
    - *Addressed*

Existing Conditions with Projects (ECwP)

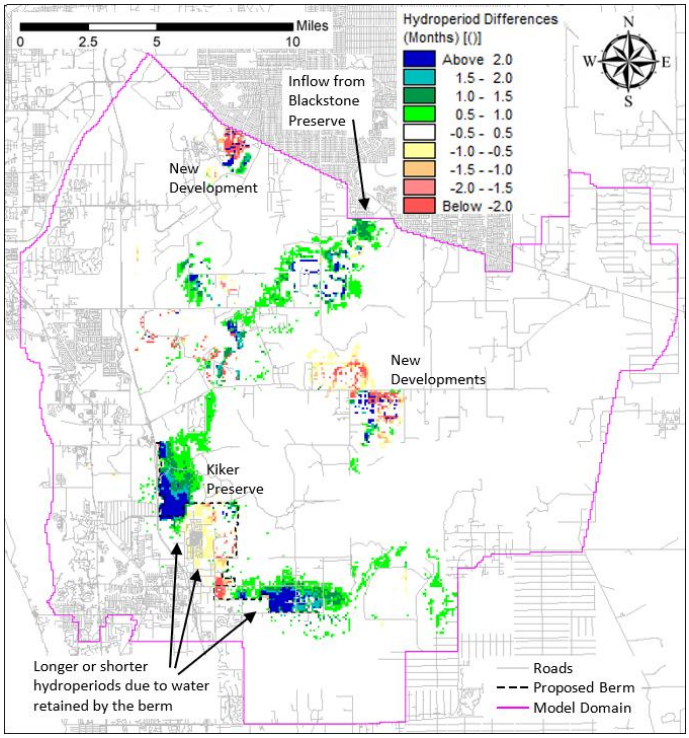
12. Do not make assumptions about reader knowledge (ex: describing Lee Co. stormwater projects that are modeled before diving into results-pulling from original description of the projects in Lee Co. report and citing literature where it is pulled from)
    - *Addressed:* Brief definitions are in the final report and a reference was added to *Appendix J:* (pg. 18 v.1) *The Existing Conditions (ECwP) Model included urban developments that have been permitted and have started construction, as well as some of the high-priority projects from the Lee County's Flood Mitigation Plan. Lower-priority projects from the Lee County Flood Mitigation Plan were not included because implementation for the lower priority projects is uncertain. The high-priority Flood Mitigation Plan projects included in the ECwP model are summarized below:*

- ***1.3.4: Alico Mine Lake Interconnects (West)**. This proposed conceptual project consists of connection of an existing stormwater pond on the Southwest Florida International Airport to a number of mining pits north and south of Alico Road. This proposed conceptual project is intended to reduce flooding by capturing stormwater in the pond and mining pits.*
- ***1.3.7: Blackstone Drive to Alico Mine Lakes Drainageway**. The proposed conceptual project 1.3.7 conveys excess stormwater drainage flow from Blackstone Drive area in Lehigh Acres lying south of SR 82 to the existing Alico Mine Lakes. The originally proposed project is conceived with a control structure that would allow gravity-driven flows. There is not always a positive hydraulic gradient for the surface water to flow south, so for this study, the original proposed structure has been replaced by a 10-cfs pump as a refinement modification to the proposed project.*
- ***1.3.8: Alico Mine Lake to Halfway Creek Drainageway**. The proposed conceptual project 1.3.8 utilizes the existing mine lakes in the WildBlue development currently under construction lying north of Corkscrew Road for storage, conveys water into the Flint Pen Strand preservation area, and directs excess flow towards the Halfway Creek bridge under the I-75. The replacement of some culverts under Corkscrew Roads is proposed as part of this project.*
- ***1.3.11: East I-75 Overland Flow Collection Drainageway**. The proposed conceptual project 1.3.11 connects existing borrow pit lakes (also referred to here as ponds) east of I-75 to the conveyance structures under I-75. The project consists of creating a collector drainageway that would direct overland flow and equalize water levels at each I-75 crossing to fully utilize each structure. Control structures with overflow elevations ranging from 18 to 19 ft-NAVD would be installed in the berm.*

- ***1.3.13 CREW-Flint Pen Strand Hydrological Restoration****. The proposed conceptual project 1.3.13 would develop a water storage area located within the boundaries of Kiker Preserve, Flint Pen Strand, and the Southern Corkscrew Regional Ecosystem Watershed (Southern CREW). The project objective is to hold excess stormwater upstream of the proposed berm until downstream developed areas have drained following a large storm event. This area would be contained within a perimeter berm and will have remotely operated control outflow gated structures to maintain the water level within desirable ranges. The berm configuration used in this modeling effort was obtained from a second berm alignment proposed as part of additional flood mitigation studies conducted for Lee County and was the latest information available at the time of the scenario analysis.*

  Figure 9 *illustrates the location of the projects listed above. Note that the proposed projects listed above were modified to reflect recent development. In addition, some hydraulic structures were modified, removed, or added in this study to maintain and/or enhance hydrologic restoration of natural areas, including wetlands, while not diminishing the level of added flood protection. Finally, two other future projects (namely the new Corkscrew Crossing conveyance and hydroperiod restoration at the south end of Corkscrew Swamp Sanctuary) were added in the ECwP model.*

13. Please provide some discussion on the projects that were not included in the ECwP model. Why they were not included? A couple that were not included may have a significant impact to the ECwP model results.
    - *Addressed: The following language was included in the Future Conditions Scenarios section (pg. 17 v.1): Note that the projects from the Lee County Flood Mitigation Plan used in this analysis were higher priority projects that are being evaluated in greater detail by Lee County. Other projects mentioned in the Lee County Flood Mitigation Plan that are not being evaluated further as of mid-2021 have not been included in this analysis because there is insufficient information to include those projects in this analysis.*
    - *Text from Appendix J: Other projects recommended in the Lee County Flood Mitigation Study were not included because they had lower priority ranking. The hydrologic model developed as part of this project can be used in the future to evaluate the hydroperiod impacts of additional flood mitigation projects proposed by Lee County.*
14. Difference Maps: Emphasize that yellow and red areas on difference maps don't necessarily represent negative impacts. In many cases, the red areas are actually hydrological flowway restorations
    - *Addressed: Additional text was added (pg. 20 v.1): The shorter hydroperiods in developed area are due to a combination of increased land elevations in the developed areas as well as drainage of those lands to adjacent stormwater management facilities. Hydroperiods adjacent to the developed areas are therefore longer due to the routing of water from the developed lands and subsequent outflows from the stormwater management areas.*
    - *Addressed: text from Appendix J: Shorter hydroperiods are seen in the new development known as "The Place" and north of it likely due to restoration of historic flow-ways that had been blocked by agricultural activity that preceded that development.*
15. Difference Maps: Change "23 ft Berm" to "Proposed Berm"
    - *Addressed: This change was made throughout the document figures. (Fig. 10)*

- 

16. It appears the alignment of the 23 ft berm (proposed berm) has shifted to the south and creates a new impoundment just north of Bonita Beach Rd & east of Logan Blvd. Please provide some discussion on why this new alignment was chosen and what benefit to the flood protection level of service or other benefits that maybe realized with this shift.
    - *Addressed: The following text was added to the description of project 1.3.13 (pg. 18 v.1): The berm configuration used in this modeling effort was obtained from a second berm alignment proposed as part of additional flood mitigation studies conducted for Lee County and was the latest information available at the time of the scenario analysis. Note that the proposed projects listed above were modified to reflect recent development. In addition, some hydraulic structures were modified, removed, or added in this study to maintain and/or enhance hydrologic restoration of natural areas, including wetlands, while not diminishing the level of added flood protection.*
    - Text from *Appendix J*: *A more recent ICPR modeling study for the Southern Lee County Flood Mitigation Plan [Streamline Technologies, 2020] suggested a second berm alignment labeled as "B2", which was shown previously in Error! Reference source not found.. According to that study, the berm alignment B2 is shorter and holds more water. It also maintains natural flow patterns and minimizes hydroperiod impacts near the Lee/Collier County line [Streamline Technologies, 2020]. Thus, the berm alignment B2 is the choice implemented in the ECwP model. All refinements to Lee County projects modeled retained/did not diminish the flood protection provided by the projects.*
17. Were all 16 SE Lee Flood Mitigation projects were included in the ECwP model.
    - *Similar to comment number 7 above. Addressed:* The following language was added to the Future Conditions Scenarios section (pg. 17 v.1): *Note that the projects from the Lee County Flood Mitigation Plan used in this analysis were higher priority projects that are being evaluated in greater detail by Lee County. Other projects mentioned in the Lee County Flood Mitigation Plan that are not being evaluated further as of mid-2021 have not been included in this analysis because there is insufficient information to include those projects in this analysis.*

- *Text from Appendix J: Other projects recommended in the Lee County Flood Mitigation Study were not included because they had lower priority ranking. The hydrologic model developed as part of this project can be used in the future to evaluate the hydroperiod impacts of additional flood mitigation projects proposed by Lee County.*

18. There may be water quality implications of "large capacity drainageways" within modeled conceptual projects.
    - *Addressed: The following text was included in the description of project 1.3.13 (pg. 18 v.1): The project objective is to hold excess stormwater upstream of the proposed berm until downstream developed areas have drained following a large storm event. This area would be contained within a perimeter berm and will have remotely operated control outflow gated structures to maintain the water level within desirable ranges.*
    - *The large capacity drainageways included in the Lee County Flood Mitigation Plan are conceptual in nature and may have different dimensions after the completion of more detailed investigations. The idea of the Flood Mitigation projects is to have "large capacity drainageways" when extreme flood conditions occur to remove flooding waters faster. This infrequent situation is not necessarily opposed to water quality concerns/issues that may occur during low-intensity more-frequent storms. As when analyzing flood mitigation versus hydroperiod increase, we believe that those goals can be reached if the drainage system is designed and managed accordingly.*
19. It is not clear if the stormwater water storage area project on Kiker Preserve and throughout the Flint Pen CREW lands will match the hydrologic restoration needs of these wetlands or if flood storage will result in inappropriate or unnatural levels of water storage (ecologic vs. flood protection objectives in this project)
    - *Addressed: The following text was added to Recommended Future Modeling Section (pg. 30 v.1):*
    - *Use Model to Refine Proposed Flood Mitigation Projects*
      This model could be used in parallel with more detailed studies of the higher-priority projects recommended in the Lee County Flood Mitigation Plan. Evaluation of wetland hydroperiod impacts of proposed projects will aid in the final design of the proposed flood mitigation projects, and this type of evaluation can be used to facilitate the project review during the environmental permitting process. Then once stormwater project details are beyond conceptual phase, update the future conditions model.
    - *Completed analysis suggests that additional storage may be necessary to improve wetland hydroperiods in those areas that hydroperiods shorter than optimum. The additional storage in natural areas could consist of reducing drainage associated with remnant ditches in public lands and/or low berms with controlled outflow structures to attenuate peak flows and extend wetland hydroperiods.*
20. There are important restored wetlands on CSS that Audubon is obligated via permits to maintain proper hydrology for and significant coordination is already occurring with landowners on CSS' north, including Verdana. It is difficult to see how this project affects this area.
    - *Addressed: The following text was added to Recommended Future Modeling Section (pg. 30 v.1):* Conduct Additional Field Surveys and Update Model with the Additional Field Data
21. Overall, it is difficult to understand at this point what the effects of the large primary berm for the Flint Pen water storage project and also the several secondary cross berms proposed. While there could be good hydrologic benefits for CSS, Flint Pen Strand and other currently impacted wetlands, there is also significant risk of undermining hydrology for flood protection benefits or other unforeseen consequences. This seems to be a "compartmentalization" project in the Western Everglades while the central Everglades are trying to decompartmentalize.

- *Addressed: The following text was added to Recommended Future Modeling Section (pg. 30 v.1): Cross berms in locations where wetland hydroperiods are most severely impacted would have the highest priority, and the details associated with the design should be closely coordinated between wetlands scientists, hydrologists, and design engineers. Potential alignments for these berms could be along existing ATV trails that have lower elevations than surrounding lands.*

22. There are questions about the hydrologic effects of reducing freshwater flows to Estero Bay, especially as ET increases and Sea Level Rise could increase salinity in estuaries.
    - Addressed: *The following text was added to Recommended Future Modeling Section (pg. 30 v.1): 4) Update Future Conditions with Updated Climate Data to Run Added Simulations*
      Additional climate change simulations would be beneficial. First, additional modeling to tease out the impacts of climate change (increased ET) versus increased PWS pumping would be helpful. Also, it would be useful to run more scenarios to evaluate rainfall changes with climate change given the widespread implications of hydroperiod change within the model domain. Given the uncertainty of rainfall predictions with climate change, it would be helpful to understand the relative role of rainfall and ET. Understanding these extremes would help to frame predictions. Due to the significant ecological impacts of reduced hydroperiod to wetlands such as the Corkscrew Swamp, the findings could be used to form specific guidance on measures that can be taken in advance (management, engineering, and/or policy) to buffer climate change impacts (e.g., options for water storage, additional restoration measures).
23. Does model address improving dry season ecology integrity as well as ECwP focuses primarily on flood protection projects?
    - *Addressed: The following text was added to Recommended Future Modeling Section (pg. 30 v.1): Hydrologic Preservation and Restoration versus Flood Mitigation. This modeling study affirms that flood mitigation can be achieved while preserving water resources and wetland hydroperiods, with enhanced water management that optimizes projects to achieve multiple objectives. Flooding events occur typically during the wet season when the water table levels are higher and there is less storage inside and above the ground. The project proposed in the Lee County Stormwater Management Master Plan are intended to mitigate flooding by increasing conveyance and storage.*
    - *Addressed: Text from Appendix J: This study was focused on multiyear simulations to assess seasonal water level variations, and it was not intended to evaluate the impact of the proposed projects or scenarios on flood stages during extreme rainfall storm events.*
    - *The modeling study evaluates the hydrologic impacts during both wet and dry season conditions. The study findings can be used during more detailed assessments of projects recommended by the Lee County Flood Mitigation Study.*

Future Condition Model without Land Use Change Scenarios (FCM0)

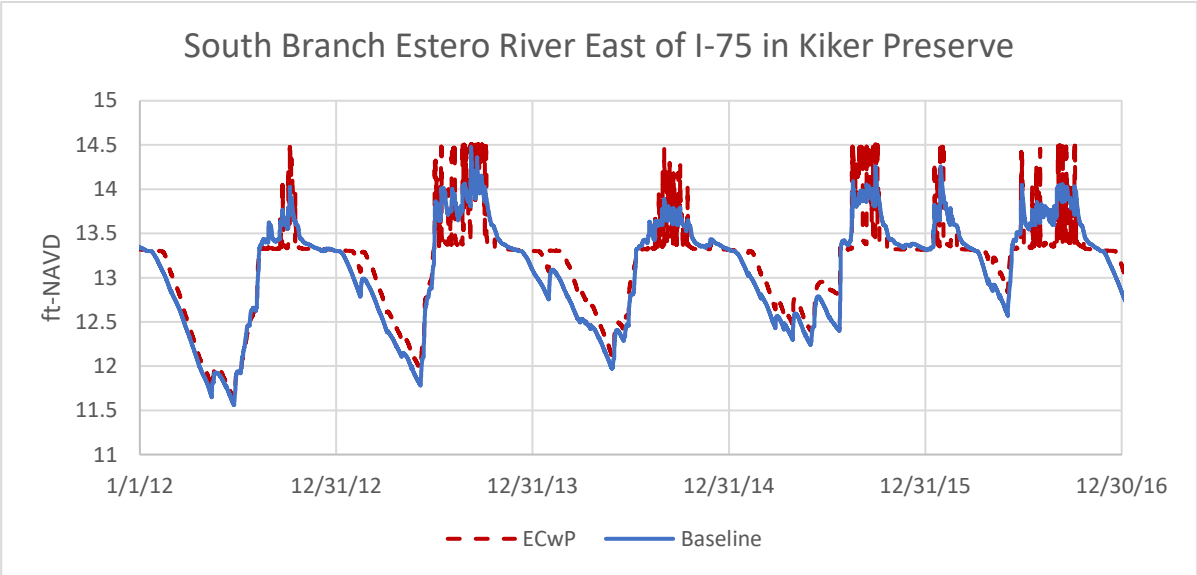
Future Conditions Models (FCM1, FCM2, FCM3)

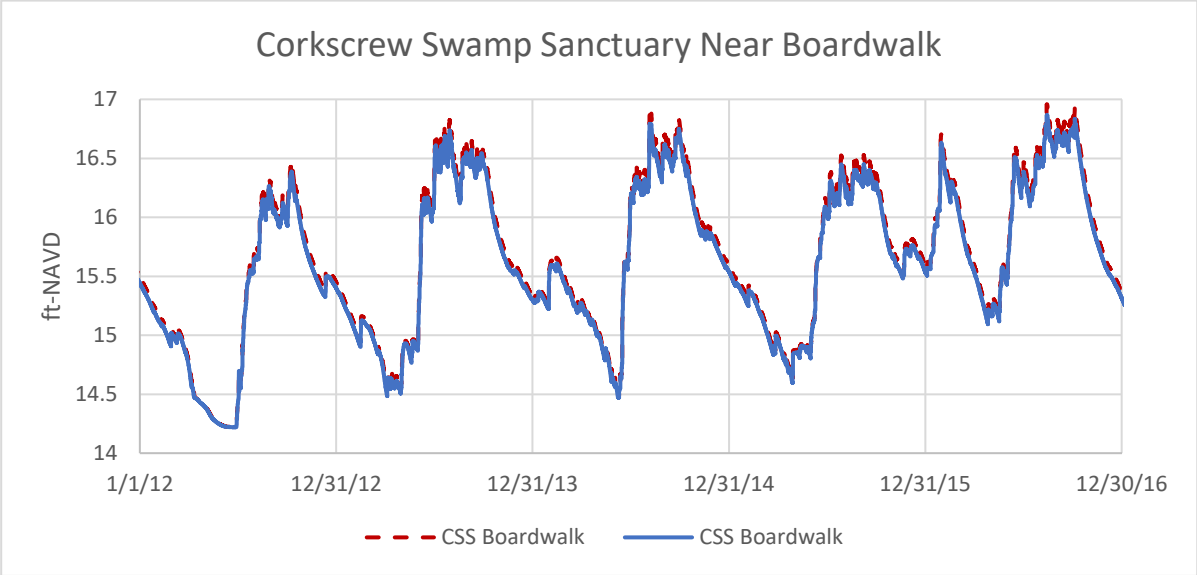
24. Is there a way to see some hydrographs that would show the relative draw-downs during the peak of the dry season with the different scenarios that were run? There is a worry about the idea of fires in these natural area systems later in the dry season. Extending the hydroperiod can be very helpful, but it still would be very useful to know how low the water table goes during the dry season in the different scenarios.
    - *Addressed: The following text was added to Recommendations Section (pg. 27 v.1): Where existing natural areas have wetland hydroperiods less than optimum, green*

infrastructure of created berms and filter marshes could be added to enhance natural wetland hydroperiods and to minimize fire risk.

- *Addressed: Throughout CREW (and other inland marshes and prairies), reducing hydroperiod can encourage the spread of Carolina willow which may increase evapotranspiration even further. Hydroperiod reductions throughout CREW will have significant impacts on fire (both land managers' ability to conduct prescribed fire and risk of catastrophic wildfire). These changes in vegetation/land cover and their potential impacts (including exacerbating hydroperiod reduction), as well as the uncertainty of rainfall overall, emphasizes the need for hydrological preservation and restoration.*
- *Addressed: (Fig. 10-14) Maps included the difference in water table levels at the peak and the end of the dry season. This helps to explain if the water levels will be lower or higher at the end of the dry season as a result of the projects and/or climate change.*

Selected graphs were generated for five years of the simulation (period truncated so that differences between scenarios are easier to understand) and are shown below:





Results

25. The Airport Mitigation Park is being used for wetland habitat compensation to offset wetland and listed species habitat impacts per the South Florida Water Management District (SFWMD) Permit No. 36-00080-S and U.S. Army Corps of Engineers (COE) Permit No. 199301156 (IP-MN). Since the Mitigation Park is held to certain permit criteria, need assurance that the hydrology (depth and duration) of the Mitigation Park will not be adversely impacted as a result of the projects outlined in the study. These impacts could include either increases or decreases in hydrology.
    - *Addressed: Figure 10 of the final report demonstrates that wetland hydroperiods in LCPA Site H are improved for the ECwP scenario.*
    - *Addressed: Stated in Appendix J, input files for Lee County Flood Mitigation Scenario 1.3.7 were modified to protect wetland hydroperiods in LCPA mitigation properties.*
26. It appears that no changes to hydrology are anticipated within the RSW boundary. This is especially important for the future parallel runway project footprint.
    - *Addressed: Stated in Appendix J, input files for Lee County Flood Mitigation Scenario 1.3.7 were modified to protect wetland hydroperiods in LCPA mitigation properties.*
    - No changes to hydrology are anticipated within the RSW boundary

Recommendations

Recommended Future Projects

27. This section should outline that the focus is to try to meet historic needs of wetlands and natural systems, but also to plan for the future of more flashy systems and need for additional storage to accommodate climate impacts. Above and beyond what is needed to restore historic needs but also accommodate changing systems.
    - *Addressed: The following text was added to Recommendations Section (pg. 27 v.1): As a result of this project and the modeling results, a number of proposed projects and additional modeling activities are recommended that would advance the work of the South Lee County Watershed Initiative. The objective of the recommendations presented below is to provide additional storage to offset possible future hydroperiod changes that may result from climate change.*
28. Throughout CREW (and other inland marshes and prairies), reducing hydroperiod can encourage the spread of Carolina willow which may increase ET even further. Changes in vegetation/land cover and their impacts should be mentioned, as these changes may exacerbate hydroperiod reduction.
    - *Addressed: Throughout CREW (and other inland marshes and prairies), reducing hydroperiod can encourage the spread of Carolina willow which may increase evapotranspiration even further. Hydroperiod reductions throughout CREW will have significant impacts on fire (both land managers' ability to conduct prescribed fire and risk of catastrophic wildfire). These changes in vegetation/land cover and their potential impacts (including exacerbating hydroperiod reduction), as well as the uncertainty of rainfall overall, emphasizes the need for hydrological preservation and restoration.*
    - *Addressed: (Fig. 10-14) Maps included the difference in water table levels at the peak and the end of the dry season. This helps to explain if the water levels will be lower or higher at the end of the dry season as a result of the projects and/or climate change.*
    - *Addressed: The following text was added to Recommendations Section (pg. 27 v.1): The objective of the recommendations presented below is to provide additional storage to offset possible future hydroperiod changes that may result from climate change.*

29. Hydroperiod reductions throughout CREW will have significant impacts on fire (both land managers' ability to conduct prescribed fire and risk of catastrophic wildfire). Include some mention of this implication and recommendations on mitigating fire risk.
    - *Addressed: The following text was added to Recommendations Section (pg. 27 v.1): Where existing natural areas have wetland hydroperiods less than optimum, green infrastructure of created berms and filter marshes could be added to enhance natural wetland hydroperiods and to minimize fire risk.*
    - *Addressed: Throughout CREW (and other inland marshes and prairies), reducing hydroperiod can encourage the spread of Carolina willow which may increase evapotranspiration even further. Hydroperiod reductions throughout CREW will have significant impacts on fire (both land managers' ability to conduct prescribed fire and risk of catastrophic wildfire). These changes in vegetation/land cover and their potential impacts (including exacerbating hydroperiod reduction), as well as the uncertainty of rainfall overall, emphasizes the need for hydrological preservation and restoration.*
30. Due to the significant ecological impacts of reduced hydroperiod in the Corkscrew Swamp, specific guidance would be helpful on measures that can be taken in advance (management, engineering, and/or policy) to buffer climate change impacts (e.g., options for water storage, additional restoration measures).
    - *Addressed: The following text was added to Recommendations Section (pg. 27 v.1): Where existing natural areas have wetland hydroperiods less than optimum, green infrastructure of created berms and filter marshes could be added to enhance natural wetland hydroperiods and to minimize fire risk.*
    - *Addressed: In the Recommendations for Future Projects section for both Grey and Green Infrastructure (pg. 27 v.1). Suggestions were provided that that can be considered to address possible changes associated with climate change.*
31. There should be a consideration in the recommendations and conceptual strategies for restoration that looks at removing developments and structures that are in frequently inundated floodplains, such as eastern Bonita Springs. There are federal buyout programs for such purposes and will likely be more in the future. The drainage and other ecological compromises needed to protect high risk flood plain developments can be a major cause for overdrainage of upstream wetlands and water resources.
    - *This study is a technical document and is not within the scope of this project to make policy recommendations.*

Grey/Green Infrastructure

32. Please add a section on use of culverts to recommendation section. You leave it open all wet season, and at the end of the wet season you close the structure to mimic what the hydroperiod should be.
    - *Addressed: In the Recommendations for Future Projects section for both Grey and Green Infrastructure (pg. 27 v.1): Having water control structures that can be remotely operated to hold more water back in dry season to raise water levels in natural areas while opening to allow more flow in flooding during wet season would allow for more precise water management that better balances these two objectives.*
33. There is some concern regarding a heavy reliance on grey infrastructure like pumps, weirs, gates, berms and other engineered restoration methods. These are expensive to maintain and install, although clearly such strategies are needed in many of South Florida altered watersheds.
    - *Addressed: In the Recommendations for Future Projects section for both Grey and Green Infrastructure (pg. 27 v.1). Green Infrastructure – Restoring Wetland Hydroperiods in Existing Wetlands. Where existing natural areas have wetland hydroperiods less than*

optimum, green infrastructure of created berms and filter marshes could be added to enhance natural wetland hydroperiods.

- If passive water control structures cannot achieve the desired hydroperiods with climate change, then operable structures may be necessary and recommendations are listed under the Grey Infrastructure sub-heading.

34. Please make a not to address concern over possible hydrologic impacts of buried shell layer conduits in using mining lakes for storage.
    - *Addressed: In the Recommendations for Future Projects section for both Grey and Green Infrastructure (pg. 27 v.1). Since these mining pits are privately owned, it is expected that this recommendation will depend greatly on having sufficient funds to lease or purchase those mining pits and further investigations into their suitability for these purposes.*
    - *Further investigations to evaluate buried shell layer conduits is currently being evaluated in greater detail by Audubon and SFWMD.*

Recommended Future Modeling

MIKE SHE Modeling as a Living Tool

35. Please recommend that there be further analysis of the Lee County projects.
    - *Addressed*: *In Recommended Future Modeling (pg. 30 v.1): This model could be used in parallel with more detailed studies of the higher-priority projects recommended in the Lee County Flood Mitigation Plan*.
36. Please provide some discussion on the projects that were not included in the ECwP model. Why they were not included? A couple that were not included may have a significant impact to the ECwP model results.
    - *Similar to question 13. Addressed: The following language was included in the Future Conditions Scenarios section (pg. 17 v.1): Note that the projects from the Lee County Flood Mitigation Plan used in this analysis were higher priority projects that are being evaluated in greater detail by Lee County. Other projects mentioned in the Lee County Flood Mitigation Plan that are not being evaluated further as of mid-2021 have not been included in this analysis because there is insufficient information to include those projects in this analysis.*
    - *Text from Appendix J: Other projects recommended in the Lee County Flood Mitigation Study were not included because they had lower priority ranking. The hydrologic model developed as part of this project can be used in the future to evaluate the hydroperiod impacts of additional flood mitigation projects proposed by Lee County.*
37. Future Modeling Recommendation: Future modeling efforts should include additional hydrologic and hydraulic detail to better understand the effects of the proposed B2 alignments, particularly the shift to the south towards Bonita Beach Rd. The additional detail will show how the new alignment maintains natural flow patterns and minimizes hydroperiod impacts in the region. Multiple alternatives for the berm may need to be considered in future modeling to analyze flooding and environmental impacts.
    - *Addressed*: *In Recommended Future Modeling (pg. 30 v.1): Use Model to Refine Proposed Flood Mitigation Projects. This model could be used in parallel with more detailed studies of the higher-priority projects recommended in the Lee County Flood Mitigation Plan. Evaluation of wetland hydroperiod impacts of proposed projects will aid in the final design of the proposed flood mitigation projects, and this type of evaluation can be used to facilitate the project review during the environmental permitting process.*

Then once stormwater project details are beyond conceptual phase, update the future conditions model.

- *Addressed*: *Addressed: The following text was added to the description of project 1.3.13 (pg. 18 v.1)*: *The berm configuration used in this modeling effort was obtained from a second berm alignment proposed as part of additional flood mitigation studies conducted for Lee County and was the latest information available at the time of the scenario analysis.*
- *Appendix J: A more recent ICPR modeling study for the Southern Lee County Flood Mitigation Plan [Streamline Technologies, 2020] suggested a second berm alignment labeled as "B2", which was shown previously in Figure 3. According to that study, the berm alignment B2 is shorter and holds more water. It also maintains natural flow patterns and minimizes hydroperiod impacts near the Lee/Collier County line [Streamline Technologies, 2020]. Thus, the berm alignment B2 is the choice implemented in the ECwP model.*

38. To better evaluate the hydrologic changes of the proposed scenarios, please provide the following comparisons between Existing, Existing with project, and Future conditions:
    - For Alico Mine Lake Interconnects (West) - the stage and flow hydrographs comparison at the inlet and outlet locations.
    - For Blackstone Drive to Alico Mine Lakes - the stage and flow comparison at the inlet and two outlets locations.
    - For Alico Mine Lake to Halfway Creek Drainageway - the stage and flow comparison at the two inlets and one outlet locations.
    - For East I-75 Overland Flow Collection Drainageway - the stage and flow comparison at the added culverts and control structure locations.
    - For CREW-Flint Pen Strand Hydrologic Restoration - the stage and flow comparison at the key project locations.
    - In addition to those key project locations, the report should also provide the surface water stage and flow hydrographs at major surface water outlets (such as Imperial river) and key control structure locations (such as Kehl canal structures), and Corkscrew Bird Rookery Bridge.
    - The report should provide groundwater stage hydrograph comparisons between Existing, Existing with project and Future conditions at the key project areas and locations
    - *Addressed: In Recommended Future Modeling (pg. 30 v.1): For hydrograph plots of proposed vs existing conditions, it would be advantageous to break the existing 10-year simulation period into 1-yr increments to provide added information showing model performance (surface water flows and stages, and groundwater elevations). A simple programming script (Matlab, Python, R, etc.) can be put together to take a spreadsheet with many years of data and generate plots of individual years. This effort to produce additional plots and such a spreadsheet would provide an important added outcome to the overall modeling effort.*
39. Future work recommendation-complete the in-depth survey of the Corkscrew Swamp region and incorporate the results into the model's DEM.
    - *Addressed: In Recommended Future Modeling (pg. 30 v.1): Complete the in-depth survey of land elevations in the Corkscrew Swamp region, incorporate the results into the model's DEM, and recalibrate the model with the revised topography.*

40. One of the most important factors related to the future conditions modeling is comparison of results between maximum hydrological restoration, maximum development, or the hybrid scenario to help guide future planning or modeling.
    - *Addressed: In Results Section (pg. 26 v.1): Future Scenarios that meet Project Goals- Maximum Restoration (FCM1) and Intermediate Restoration (FCM3) future conditions scenarios both provide opportunities to increase wetland hydroperiods in existing conservation lands and increase water storage for aquifer recharge, which the Maximum Development scenario would not provide. Therefore, pursuing Intermediate to Maximum Restoration is advisable to support natural system needs and public water supplies.*
41. For future conditions, update model once the stormwater project details are beyond conceptual phase.
    - *Similar to question 35. Addressed: In Recommended Future Modeling (pg. 30 v.1): This model could be used in parallel with more detailed studies of the higher-priority projects recommended in the Lee County Flood Mitigation Plan*.
42. Recommendation for hydrograph plots, if the 10-year period is too broad, break into 1-yr chunks to show model performance (surface water flows and stages, and groundwater elevations). This effort may result in numerous additional plots.
    - *Similar to question 38. Addressed: In Recommended Future Modeling (pg. 30 v.1): For hydrograph plots of proposed vs existing conditions, it would be advantageous to break the existing 10-year simulation period into 1-yr increments to provide added information showing model performance (surface water flows and stages, and groundwater elevations). A simple programming script (Matlab, Python, R, etc.) can be put together to take a spreadsheet with many years of data and generate plots of individual years. This effort to produce additional plots and such a spreadsheet would provide an important added outcome to the overall modeling effort.*
43. Consider showing a comparison between the baseline and each potential scenario, instead of all potential scenarios combined.
    - *Addressed: In Recommended Future Modeling (pg. 30 v.1): Conduct Additional Simulations to Isolate Effects from Each Change between Baseline Scenario and Other Scenarios. Additional simulations are recommended to compare each factor between the baseline and each potential scenario, instead of all potential scenarios combined.*
44. Additional modelling to untangle the impacts of climate change (increased ET) and increased PWS pumping would be helpful to understand if maximum PWS withdrawals are reasonable in the face of increased hydrologic stress from climate change. If reducing maximum PWS withdrawals can help keep CREW and CSS wetlands more hydrated, perhaps alternatives for PWS should be considered.
    - *Addressed in Appendix J (Fig. 7 & 8, pg. 27). Additionally, the hydroperiod and wet season water depth maps for the baseline future conditions (FCM0) are presented in Appendix E and F. The difference maps after including climate change and future pumping (i.e., FCM0 minus ECwP) are shown in Figure 16. Appendix G includes groundwater level difference maps during wet and dry season periods.*
    - *Addressed: In Recommended Future Modeling (pg. 30 v.1): Update Future Conditions with Updated Climate Data to Run Added Simulations. Additional climate change simulations would be beneficial. First, additional modeling to tease out the impacts of climate change (increased ET) versus increased PWS pumping would be helpful*
    - *According to the water budget table presented in Appendix J, the reduction in ET is more dominant in the regional scale than the increase in PWS pumping by year 2050. In an annual basis over the entire model domain, PWS will increase in 0.38 inches and the*

actual ET by 2.05 inches. However, locally, around the extraction wells from the shallower aquifers, the effect of the increase in the PWS rate may affect more the wetland hydroperiods and water depths.

- *The FCM0 scenario uses the permitted PWS pumping rates under the assumption that alternative water sources (such as deep aquifers) will be used to complete the future demand. Wetlands are not affected in the model if the PWS pumping from alternative sources increases.*

45. Additional scenarios should be run to evaluate rainfall changes with climate change given the widespread implications of hydroperiod change within the model domain. Given the uncertainty of rainfall predictions with climate change, it would be helpful to understand the relative role of rainfall and ET. For example, is +10% rainfall enough to reverse the drying seen due to increased ET? Or, what would be the additive impact of -10% rainfall and increased ET? Understanding these extremes would help to frame predictions.
    - *Addressed: In Recommended Future Modeling (pg. 30 v.1): Update Future Conditions with Updated Climate Data to Run Added Simulations. Additional climate change simulations would be beneficial. First, additional modeling to tease out the impacts of climate change (increased ET) versus increased PWS pumping would be helpful. Also, it would be useful to run more scenarios to evaluate rainfall changes with climate change given the widespread implications of hydroperiod change within the model domain. Given the uncertainty of rainfall predictions with climate change, it would be helpful to understand the relative role of rainfall and ET. For example, is +10% rainfall enough to reverse the drying seen due to increased ET? Or, what would be the additive impact of -10% rainfall and increased ET? Understanding these extremes would help to frame predictions. Due to the significant ecological impacts of reduced hydroperiod to wetlands such as the Corkscrew Swamp, the findings could be used to form specific guidance on measures that can be taken in advance (management, engineering, and/or policy) to buffer climate change impacts (e.g., options for water storage, additional restoration measures).*
46. Please address connection to the SW Florida Comprehensive Watershed Plan and its extensive modeling and restoration project conceptual designs. This may be important to consider for future modeling scenarios.
    - *Addressed: In the Recommendations for Future Projects section for both Grey and Green Infrastructure (pg. 27 v.1). After reviewing the SW Florida Comprehensive Watershed Plan Report- All projects are consistent with the recommendations.*
47. Any way that this tool can be further used (transportation planning, land use planning, etc.) – it would be good to make those recommendations
    - *Addressed: In Recommended Future Modeling (pg. 30 v.1): The future conditions model produced by this project should be updated periodically with future development, transportation planning, and land preservation changes incorporated.*
48. Include discussion of not only purchase of private pits but also the opportunity to lease pits for storage – could assist with storage until acquisition funding is available or proposed projects are in place. Another thought is County/City/State incentives for developers, for example, increased density for creating additional storage on site.
    - *Addressed: In the Recommendations for Future Projects section for both Grey and Green Infrastructure (pg. 27 v.1). Since these mining pits are privately owned, it is expected that this recommendation will depend greatly on having sufficient funds* ***to lease*** *or purchase those mining pits and further investigations into their suitability for these purposes.*