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Final External Peer Review Report for Tamiami Trail Limited Reevaluation Report

By

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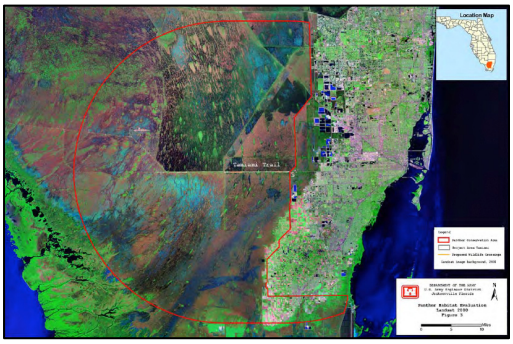

Prepared for
U.S. Army Corps of Engineers
Rock Island District

Contract No. W911NF-07-D-0001
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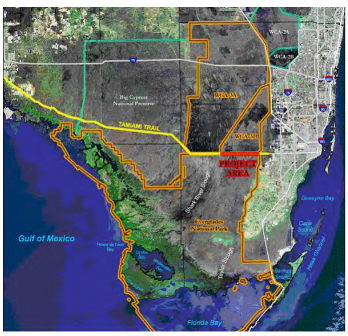

FINAL

EXTERNAL PEER REVIEW REPORT

for

Tamiami Trail Limited Reevaluation Report

Prepared by

Battelle
505 King Avenue
Columbus, Ohio 43201

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Department of the Army
U.S. Army Corps of Engineers
National Planning Center of Expertise
Coastal Storm Damage Reduction
Rock Island District

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Tamiami Trail Limited Reevaluation Report

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) has been directed by Congress to develop the Tamiami Trail Limited Reevaluation Report (TT LRR). The Tamiami Trail is located in South Florida, running along the northern edge of Everglades National Park (ENP). To strengthen quality control processes and help ensure that the TT Limited Reevaluation is supported by the best scientific and technical information, an external peer review (EPR) process has been implemented by USACE to complement the internal technical review (ITR). This final report describes the EPR process, summarizes final comments of the EPR panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report.

Four panel members were selected for the EPR from more than 30 identified candidates. The potential external reviewers were screened for potential conflicts of interest and expertise relative to predetermined technical criteria. These criteria focused on cost engineering and construction management, planning/plan formulation, ecological evaluation, and hydraulic engineering. The reviewers selected were from academe or were independent engineering consultants. Corresponding to the technical content of the TT LRR, the areas of technical expertise of the selected peer reviewers included: engineering (civil, cost/construction, and hydraulic, with an emphasis on highway and bridge projects in wetland ecosystems); planning/plan formulation (multi-objective public works projects in sensitive wetland habitats); ecology of wetland flora and fauna; and habitat evaluation procedures (including impacts of complex multi-objective public works on sensitive wetland habitats, ecosystem output evaluations).

The peer reviewers were provided an electronic version of the TT LRR and supporting documentation on April 21, 2008, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. The peer reviewers had three weeks for the review of the documents. Approximately 280 individual comments were received from the EPR panel in response to the charge questions.

Following the individual reviews of the TT LRR and supporting documentation by the EPR panel members, a consensus discussion was conducted to review key technical comments, discuss charge questions in which there were conflicting responses, and reach consensus on the final comments to be provided to USACE. The final comments were documented according to a five-part format that included, (1) nature of the comment, (2) basis for the comment, (3) significance of the comment (high, medium, or low), (4) cross-referencing of the comment if related to another comment, and (5) a recommendation on how to resolve the comment. Overall, 12 final EPR comments were identified and documented. Of the 12 final comments, three were

identified as having high significance, five were identified as having medium significance, and four comments were identified as having a low level of significance.

The panel agreed that a tremendous amount of highly focused technical work went into the background of this project. From the civil engineering, roadway construction, and cost standpoint, the report does a very good and thorough job of comparing the costs of the physical design alternatives. However, the panel felt that the background work related to ecological impacts has not been incorporated well, neither technically nor organizationally, into the report. Overall, the panel concluded that this is a good project and its implementation should improve ecological conditions in the North East Shark River Slough (NESRS). The project's actual value, however, needs to be affirmed through post-construction monitoring.

In addition, the panel had the following comments about the TT LRR:

- The approach for the environmental analysis, the engineering analysis, and the cost engineering is sound;
- The performance measures were clearly defined;
- The development of alternatives was systematic and well done;
- Cost seems to be uniformly applied as an evaluation criteria for all alternatives;
- The study presents the best alternative within the imposed cost limitation;
- The analysis conducted to select the best alternative was sound.

Table ES-1 summarizes the final comments by level of significance. Clarifications of each comment are contained in Appendix A of this report.

Table ES-1. Overview of 12 Final Comments Identified by the TT LRR EPR Panel

#	Comment:
Significance – High	
1	Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.
2	The project report assumes that there will be a sufficient amount of source water to raise the elevations in the L-29 Borrow Canal.
3	The report does a poor job of describing the overall general pattern of water flow through the system and describing what areas will be impacted by different alternatives.
Significance – Medium	
4	There is considerable uncertainty about the origin of ridge and slough topography in the Everglades and how best to restore it in areas where it is degraded. This report does not address these uncertainties and does not contain persuasive justifications for the validity of the performance measures used for estimating the ecological benefits of restoring ridge and slough processes and ultimately ridge and slough topography.
5	Within the context of evaluating the alternatives, clarification is needed regarding third-party costs related to the project.
6	The report organization and presentation need improvement. The report includes numerous inconsistencies, lacks some references, and some figures are unclear.
7	The two performance measures developed to estimate the restoration of "Fish and Wildlife Resources" are of little relevance for predicting the impacts of a Tamiami Trail Modification project on North East Shark River Slough fish or wildlife populations.
8	The introduction needs a better description of how the models were used. Specifically, it is unclear if the spreadsheet model was used only to compare alternatives or if it is being used in a predictive capacity.
Significance – Low	
9	The report sometimes does not make clear that hydrologic and other indirect measures are used as surrogates for ecological processes and communities.
10	The potential for releasing mercury as a result of the project construction should be addressed.
11	Within the context of evaluating alternatives, the road user costs (RUCs) should be included in the cost estimate.
12	The report should briefly describe potential secondary impacts.

1. INTRODUCTION

1.1 Background of Report Reviewed

The U.S. Army Corps of Engineers (USACE) has been directed by Congress to develop the Tamiami Trail Limited Reevaluation Report (TT LRR). The Tamiami Trail is located in South Florida, running along the northern edge of Everglades National Park (ENP). Due to the past history in South Florida and specifically to Tamiami Trail, natural water deliveries into the lower ENP have been altered and have reached a level that will not sustain the ecosystem benefits once provided by the natural hydrologic regime. The purpose of the TT LRR is to present the results of a Reevaluation of primarily existing information presented in previous reports related to the Tamiami Trail project. The Reevaluation attempts to address how to move forward in a cost-effective manner to restore water deliveries to as close a natural hydrologic regime as is currently practicable, given the modified hydrologic system where this project is being proposed. Specifically, the TT LRR provides planning, engineering, and implementation details of the recommended restoration plan to allow final design and construction to proceed subsequent to the approval of the plan. The TT LRR scope was to prepare a decision document that identifies several plans for attaining the ecosystem benefits that Congress intended in a cost effective manner. The TT LRR analyzes the work done in past reports in an effort to lower the working cost. In addition, as part of the TT LRR effort, an ecosystem output model was developed and used to compare alternatives for the TT LRR.

To strengthen quality control processes and help ensure that the TT Limited Reevaluation is supported by the best scientific and technical information, an external peer review (EPR) process has been implemented by USACE to complement the internal technical review (ITR). This final report describes the process for the EPR of the TT LRR by an external panel of experts, summarizes final comments of the panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report. Detailed information on the comments is provided in Appendix A.

1.2 Purpose of External Peer Review

The purpose of EPR, in general, is to strengthen USACE's quality control processes for the development of decision documents in support of its Civil Works program. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

To help ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes EPR to complement the ITR, as described in the Department of the Army, U.S. Army Corps of Engineers, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, and CECW-CP Memorandum dated March 30, 2007. In this case, the EPR of the TT LRR was conducted and managed using contract support from an independent 501(c)(3) organization (Battelle Memorial Institute; hereafter Battelle) to ensure independent objectivity, along with a high degree of flexibility and responsiveness, which was essential for USACE to meet deadlines.

2. METHODS

This section describes the methodology followed in selecting external peer reviewers, and in planning and conducting the EPR. The EPR was conducted following procedures described in USACE's guidance cited above (Section 1.2) and in accordance with the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. Supplemental guidance on evaluation for conflicts of interest used the National Academies' *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports*, dated May 12, 2003.

2.1 Planning and Schedule

Table 1 defines the schedule followed in execution of the EPR.

Table 1. Schedule

Action	Completed by Date
Notice to proceed received	March 6, 2008
Potential external peer reviewers identified and screened	April 4, 2008
EPR panel selected and contracts completed	April 18, 2008
Final TT LRR, supporting documentation, and charge sent to EPR panel	April 21, 2008
Individual comments from the EPR panel completed	May 13, 2008
EPR panel consensus meeting	May 19, 2008
Final EPR comments completed	May 23, 2008
Working draft peer review report completed	May 28, 2008
EPR panel provides comments on working draft peer review report	May 30, 2008
Final peer review report submitted to USACE	June 2, 2008
USACE provides clarifying questions to Battelle	July 2, 2008
EPR Panel provides responses to clarifying questions	August 2, 2008

2.2 Identification and Selection of External Peer Reviewers

Battelle initially identified more than 30 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, 14 external peer review candidates confirmed their interest and availability, and 16 candidates declined either due to the schedule and anticipated level of effort, disclosed conflicts of interest, or because they did not have the technical expertise being sought.

Preliminary information about the 14 available reviewers, including their expertise, level of previous engagement in applied evaluations, and requested rates of compensation, was evaluated by Battelle. USACE reviewed the list of candidates to determine if there were potential conflicts

of interest that had not been revealed to Battelle. The reviewers were primarily from academic institutions, but consultants (company-affiliated and independent) or experts associated with industry, non-governmental organizations, and non-USACE government agencies were also considered.

The credentials of the peer reviewers were evaluated according to the overall scope of the TT LRR, focusing on four key areas: 1) cost engineering and construction management, 2) planning/plan formulation, 3) wetland ecology/restoration and habitat evaluation procedures, and 4) hydraulic engineering as related to public works projects and wetland ecosystem restoration. Detail on these technical criteria, as well as other areas of expertise considered, is provided in Table 2.

Table 2. Technical Criteria/Areas of Expertise for Potential External Peer Reviewers

Cost Engineering/ Construction Management/Planning	Planning/Plan Formulation	Wetland Ecology/Restoration	Hydraulic Engineering/ Wetland Restoration
• Engineering (civil and hydraulic) • All phases of highway and bridge projects • Highway and bridge construction industry and practices	• Complex multi-objective public works projects with competing trade-offs • Corridor projects with high public and interagency interests • Impact of public works projects on sensitive habitats • Wetland ecosystem restoration evaluation	• Wetland ecosystem components including vegetation and fauna • Ecological interaction and spatial requirements of system components • Impact of public works projects on sensitive habitats • Complex multi-objective public works projects with competing trade-offs • Corridor projects with high public and interagency interests	• Engineering (civil and hydraulic) • Highway and bridge projects • Wetland ecosystem restoration

The following additional factors were considered:

- Participation in previous USACE technical review committees
- Other technical review panel experience
- Southeastern U.S. and/or Florida experience
- Familiarity with Everglades ridge and slough landscape
- Familiarity with U.S. Fish and Wildlife Service Habitat Evaluation Procedures.

The peer reviewers were additionally screened for the following *potential* exclusion criteria or conflicts of interest:

- Involvement in any USACE Tamiami Trail project, including but not limited to producing the TT LRR, related technical and supporting appendices, and models pertaining to the Tamiami Trail;
- Involvement in other Modified Water Deliveries to ENP projects (e.g., 8.5 Square Miles Area, Combined Structural and Operating Plan);
- Current USACE employee;
- Current employee of a cooperating agency for Everglades Restoration Efforts (e.g., South Florida Water Management District, Everglades National Park Service, U.S. Geological Survey, National Oceanic and Atmospheric Administration) and currently working on Everglades Restoration Projects;
- Current Member of the South Florida Ecosystem Restoration Task Force;
- Other USACE affiliation [Scientist employed by the USACE (except as described in National Academy of Sciences criteria, see Engineering Circular 1105-2-4 section 9d)];[a]
- A significant portion (i.e., greater than 80%) of personal or company revenues within the last 3 years came from USACE contracts for Projects specific to South Florida;
- Current or future financial interests in Tamiami Trail-related contracts/awards from USACE;
- Any publicly documented statement made by the reviewer or reviewer's firm advocating for or against the subject project;
- Other possible perceived conflict of interest for consideration, e.g.,
    - Former USACE employee
    - Repeatedly served as USACE technical reviewer.

In selecting final peer reviewers from the list of potential peer review candidates, an effort was also made to select experts who best fit the criteria presented in Table 2 and the factors described above. Based on these considerations, four peer reviewers were selected from the potential list (see Section 3 for names and biographical information on the selected peer reviewers). Battelle established subcontracts with the peer reviewers indicating their willingness to participate and confirmed the absence of conflicts of interest (through a signed conflict of interest form).

2.3 Preparation of the Charge and Conduct of the Peer Review

A charge for peer review, which contained specific questions regarding the TT LRR and supporting documentation, was developed to assist the EPR panel. The draft charge was prepared by Battelle with input from USACE and guidance provided in USACE's guidance *Peer*

[a] Note: Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE funding have sufficient independence from USACE to be appropriate peer reviewers. See the OMB memo p. 18, "….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

Review of Decision Documents (EC1105-2-408) and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. A draft charge was submitted to the USACE for consideration and evaluation. The USACE edited the draft questions and recommended eliminating some questions. The charge was finalized based on the USACE's input. The charge was presented in comment-response table format, and was organized according to the order of the documents to be reviewed. The charge consisted of approximately 85 questions on six report sections and six appendices. The EPR panel was instructed to respond to the charge questions within the comment-response form table. The final charge is shown in Appendix B of this report.

The peer reviewers were provided with electronic copies of the draft final charge, TT LRR and supporting documentation on April 21, 2008. The peer reviewers had three weeks for the review of the documents.

2.4 Review of Verbatim Comments

Approximately 280 verbatim (i.e., individual) comments in response to the charge questions were received from the individual EPR panel members. Battelle reviewed these comments to identify overall recurring themes, potential areas of conflict, and other impressions of the report. As a result of this review, Battelle developed a preliminary list of 20 overall comments and discussion points that emerged from the EPR panelists' verbatim comments, including 14 negative and six positive comments. In addition, seven comments that were conflicting among the various reviewers were identified for further discussion by the panel. Each reviewer's verbatim comments were shared with the EPR panel.

2.5 External Peer Review Panel Consensus Discussion

Battelle convened a consensus discussion conference call with the EPR panel on May 19, 2008. The purpose of the consensus discussion was to allow the exchange of technical information among the panel experts, many of whom are from diverse scientific backgrounds. This information exchange ensured that the EPR report represents the consensus of the panel and avoided isolated or conflicting information and analyses. The main goal of the consensus discussion was to review the overall comments and ascertain and confirm their importance to the EPR panel, remove points having a lack of consensus, identify and add any missing issues of high-level importance to the EPR panel, and finally, reach consensus on the final comments to be provided to USACE.

The panel discussion resulted in 12 overall consensus comments. A summary explaining each consensus comment organized by level of significance, as defined by the EPR panel, was also prepared and distributed to the EPR panel by Battelle in a memorandum dated May 19, 2008. The memorandum provided a detailed approach for developing the final comments for the TT LRR and supporting documentation.

In addition to reaching consensus on the final comments to be provided to USACE, the EPR panel discussed responses to seven specific charge questions where there appeared to be disagreement among the reviewers. The disagreement was resolved and the comment was either

incorporated into the final comments or determined to stand as is (i.e., was not important enough to include as a final comment).

2.6 Preparation of Final Comments

The EPR panel used the 12 overall consensus comments as a basis for preparing the final comments. A memorandum was distributed on May 19, 2008 to the EPR panel providing detailed instructions on developing the final comments. A summary of the directive is provided below:

- Lead Responsibility: A lead reviewer was assigned for each consensus comment, who was responsible for coordinating the development of the final comment and submitting it to Battelle by May 26, 2008. Lead assignments were modified by Battelle at the direction of the EPR panel. To assist each lead in the development of the final comments, Battelle distributed individual verbatim comments in the comment-response table format, a summary detailing each consensus comment (in the memorandum), an example final comment following the five-part structure (described below), and a template for the preparation of the final comments.

- Directive to the Lead: Each lead was encouraged to communicate directly with other reviewers, as needed, to contribute to a particular consensus comment. If a significant comment was identified that was not covered by one of the original 12 overall consensus comments, the appropriate lead was instructed to draft a new consensus comment. If a consensus comment was related to another consensus comment, the lead was to cross-reference them.

- Format for Final Comments: Each final comment was presented as part of a five-part structure, including:

    1. Nature of comment (i.e., succinct summary statement of concern)
    2. Basis for comment (i.e., details regarding the concern)
    3. Significance (high, medium, low) (see description below)
    4. Comment cross-referencing
    5. Recommendation (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each final comment:

    - High — Describes a fundamental problem with the project that could affect the recommendation or justification of the project
    - Medium — Affects the completeness or understanding of the reports/project
    - Low — Affects the technical quality of the reports but will not affect the recommendation of the project.

- Guidance for Developing the Recommendation: The recommendation was to include specific actions that the USACE should consider to resolve the comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed, etc.).

As a result of this process, 12 final comments were prepared. Battelle reviewed and edited all final comments for clarity and adherence to the requested final comment template format. The final EPR comments were assembled and are presented in Appendix A.

3. BIOGRAPHICAL INFORMATION ON EXTERNAL PEER REVIEWERS

Potential peer review candidates were identified through Battelle's EPR Database, targeted internet searches using key words (e.g., technical area, geographic region), search of websites of local universities or other compiled expert sites, and through referrals from candidates who declined. A draft list of screened (for availability, technical background, conflict) potential reviewers was prepared by Battelle and provided to USACE. The final list of peer reviewers was determined by Battelle.

An overview of the credentials of the four reviewers selected for the EPR panel and their qualifications in relation to the technical evaluation criteria is presented in Table 3. Reviewer identities were unknown to the USACE authors of the TT LRR and supporting documentation during the EPR process. More detailed biographical information regarding each candidate and his or her technical areas of expertise is presented following the table.

Table 3. EPR Panel: Technical Criteria and Areas of Expertise

Name	Affiliation	Primary Areas of Expertise				Other Technical Criteria			
		Cost (Civil) Engineering/ Construction Mgmt	Hydraulic Engineering	Planner/Plan Formulation	Wetland Ecologist/ Ecological Evaluation	Sensitive Habitat Impacts	Wetland Restoration	Large Public Works (Bridge/Highway) Projects	South Florida Experience
	Totals →	2	1	1	2	2	3	3	2
Thomas R. Cuba	Delta Seven Inc.			x	(x)	x	x		x
Ralph Ellis, Jr.	University of Florida	x						x	x
Peggy Johnson	Penn State University	(x)	x				x	x	
Arnold van der Valk	Iowa State University				x	x	x	x	x

Note: (x) in parentheses indicates this reviewer is not the primary expert recruited for this category, but has expertise in this area.

Thomas R. Cuba, Ph.D., CEP, CLM
Role: This reviewer was chosen primarily for his expertise in planning and plan formulation.
Affiliation: Delta Seven Inc., St. Petersburg, FL

Dr. Cuba earned a bachelors degree in Zoology from Texas A&M University and a Doctorate in Marine Science from the University of South Florida. He has served as a Naval Intelligence Officer, the Division Administrator of The Pinellas County Division of Environmental Resources Management, and on the Board of Directors for a variety of non-profit organizations including the Florida Audubon Society and the Association of Environmental Professionals. He has taught at Florida Atlantic University, St. Leo University, and the University of South Florida where he retains an appointment as a Research Adjunct. Dr. Cuba continues teaching summer courses in reef and restoration ecology through the Tropical Research Center of Mote Marine Lab. He is currently the Chief Scientist at the consulting firm of Delta Seven Inc and participates as a Research Scientist at Stillwater Research Group, a not for profit dedicated to pure research into ecological matters.

Ralph D. Ellis, Jr., Ph.D., P.E.
Role: This reviewer was chosen primarily for his expertise in cost engineering and construction management.
Affiliation University of Florida, Gainesville, Florida

Dr. Ellis is currently an Associate Professor at the University of Florida, Department of Civil and Coastal Engineering, where he teaches Construction Engineering and Engineering Management. In his current position he is also actively engaged in performing research on both regional and national projects. Prior to joining the University of Florida, he gained 15 years of industrial experience as a construction project manager and as a corporate officer. Many of the construction projects that he successfully managed were for the USACE. Dr. Ellis is a registered professional engineer in Florida. He has served in an appointed position to the Industry Advisory Panel for the US Department of State, Bureau of Overseas Building Operations. He is currently a member of the Board of Directors of the Construction Institute of the American Society of Civil Engineers.

Peggy A. Johnson, Ph.D.
Role: This reviewer was chosen primarily for her expertise in hydraulic engineering.
Affiliation: Pennsylvania State University, University Park, PA

Dr. Johnson is a Professor of Civil Engineering and the Head of the Civil and Environmental Engineering Department at Pennsylvania State University. She conducts research in the areas of hydraulic engineering, particularly bridge scour, stream restoration, reliability analyses, and river mechanics. In 1992, Dr. Johnson won the National Science Foundation Young Investigator award and in 1995, she won the NSF Presidential Faculty Fellow award. She has published numerous papers on a variety of river issues, including bridge scour, sediment transport, stream restoration, and the probability of failure due to scour and flooding. She recently developed a stream stability assessment method for use at bridge-stream intersections for the Federal Highway Administration. Other recent projects include the design of vanes and weirs for protecting bridge foundations for the state of Maryland, and testing of laboratory models to assess the use of in-stream structures, such as vanes, to reduce sedimentation maintenance of

bridge openings in northern Pennsylvania. She has published more than 40 journal articles on incorporating road crossings in stream restoration projects, improving the urban stream restoration effort, the physiographic characteristics of bridge-stream intersections, and the design and implementation of in-stream structures to control sediment, flow, and debris.

Arnold van der Valk, Ph.D
Role: This reviewer was chosen primarily for his expertise in ecology and ecological evaluations.
Affiliation: Iowa State University, Ames, IA

Dr. van der Valk is a Professor of Ecology in the Department of Ecology, Evolution & Organismal Biology at Iowa State University. His research is concerned primarily with the restoration and creation of wetlands, with a focus in wetland and restoration ecology, especially the impact of water level changes on wetland vegetation, the role of tree islands in the Everglades, natural re-vegetation of restored wetlands as a model system for the investigation of the early stages of wetland succession, and the effectiveness of restored wetlands as sinks for nutrients in agricultural runoff. His ongoing studies focus on the revegetation of restored wetlands in the prairie pothole region and in South Florida (Kissimmee River and Everglades). Most recently his research has focused on the role of tree islands as nutrient (phosphorus) sinks in the Everglades. Dr. van der Valk has authored numerous books and other publications on wetland ecology, currently serves as Editor-in-Chief of *Plant Ecology* (formerly *Vegetatio*), and has served in editorial roles for *Ecology* and the *Proceedings of the Iowa Academy of Sciences*. He has shared his expertise on wetland ecology as a representative for the International Wetlands Conferences, National Wetland Technical Council, Scientific Advisory Committee of the Institute for Wetland and Waterfowl Research's Kissimmee River Restoration Project of the South Florida Water Management District, Wetlands Research, Inc., North American Wildlife Foundation, National Wildlife Federation, and the South Florida Water Management District among others. Dr. van der Valk holds Ph.D. and M.Sc. degrees in Botany (Plant Ecology) from the North Carolina State University and the University of Alberta, Canada, respectively.

4. RESULTS – SUMMARY OF PEER REVIEW COMMENTS

The panel agreed that a tremendous amount of highly focused technical work went into the background of this project. From the civil engineering, roadway construction, and cost standpoint, the report does a very good and thorough job of comparing the costs of the physical design alternatives. However, the panel felt that the background work related to ecological impacts has not been incorporated well, neither technically nor organizationally, into the report. Overall, the panel concluded that this is a good project and its implementation should improve ecological conditions in the North East Shark River Slough (NESRS). The project's actual value, however, needs to be affirmed through post-construction monitoring.

In addition, the panel had the following comments about the TT LRR:

- The approach for the environmental analysis, the engineering analysis, and the cost engineering is sound;

- The performance measures were clearly defined, but the link between some ecological performance measures and hydrology was poorly documented;
- The development of alternatives was systematic and well done;
- Cost seems to be uniformly applied as an evaluation criteria for all alternatives;
- The study presents the best alternative within the imposed cost limitation;
- The analysis conducted to select the best alternative was sound.

As a result of the consensus discussion process, the EPR panel identified 12 final comments, segmented into rankings of high, medium, and low significance. In total, as shown in Table 4, three were identified as having high significance, five were identified as having medium significance, and four comments were identified as having a low level of significance.

As indicated in Table 4, the majority of the comments focus on areas viewed by the reviewers as needing improvement, additional discussion, or that were omitted. The final EPR comments in their entirety are included in Appendix A.

Table 4. Overview of 12 Final Comments Identified by the TT LRR EPR Panel

#	Comment:
Significance – High	
1	Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.
2	The project report assumes that there will be a sufficient amount of source water to raise the elevations in the L-29 Borrow Canal.
3	The report does a poor job of describing the overall general pattern of water flow through the system and describing what areas will be impacted by different alternatives.
Significance – Medium	
4	There is considerable uncertainty about the origin of ridge and slough topography in the Everglades and how best to restore it in areas where it is degraded. This report does not address these uncertainties and does not contain persuasive justifications for the validity of the performance measures used for estimating the ecological benefits of restoring ridge and slough processes and ultimately ridge and slough topography.
5	Within the context of evaluating the alternatives, clarification is needed regarding third-party costs related to the project.
6	The report organization and presentation need improvement. The report includes numerous inconsistencies, lacks some references, and some figures are unclear.
7	The two performance measures developed to estimate the restoration of “Fish and Wildlife Resources” are of little relevance for predicting the impacts of a Tamiami Trail Modification project on North East Shark River Slough fish or wildlife populations.
8	The introduction needs a better description of how the models were used. Specifically, it is unclear if the spreadsheet model was used only to compare alternatives or if it is being used in a predictive capacity.
Significance – Low	
9	The report sometimes does not make clear that hydrologic and other indirect measures are used as surrogates for ecological processes and communities.
10	The potential for releasing mercury as a result of the project construction should be addressed.
11	Within the context of evaluating alternatives, the road user costs (RUCs) should be included in the cost estimate.
12	The report should briefly describe potential secondary impacts.

Appendix A

Final Peer Review Comments on the Tamiami Trail Limited Reevaluation Report

Comment 1:

Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.

Basis for Comment:

It is the stated intent of the project to induce ecological changes to the vegetation, topography, and faunal use. It is also clear from the Limited Reevaluation Report (LRR) that the ability to predict these changes is somewhat limited. Similarly, it is clear from the LRR that other projects, such as degrading various levees, are also being contemplated and even planned. An effective data collection and management (monitoring) program with a good geospatial distribution of sample points and targeted functions, such as forage areas, fish populations, depth of organic material in sloughs, velocities, discharges related to rainfall and to the actual operational history, maintenance activity (culvert cleaning or repair), etc., would be extremely beneficial in validating this project and in substantiating the predicted direct, cumulative, and secondary effects of future actions under consideration. Monitoring and data collection should also address the Northwest Shark River Slough because the project will reduce water to that system by 45%.

Significance – High:

The project represents an opportunity to dramatically increase the understanding of how this particular ecosystem will respond to manipulations. That knowledge will directly affect the efficacy of all future decisions.

Comment Cross-referencing:

(2) Comment: *The project report assumes that there will be a sufficient amount of source water to raise the elevations in the L-29 Borrow Canal.* This comment links to consensus comment #2, especially with reference to degrading projects and how they may affect water sources.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A strong, if only outlined, plan to assess the effects that the implementation of this action has on the affected area, with the understanding that the affected area extends beyond the study area and the assessment area. To be effective, the data collection and management (monitoring) plan should extend for several years (at least 5) beyond the completion of construction of the last cumulative element.

Comment 2:

The project report assumes that there will be a sufficient amount of source water to raise the elevations in the L-29 Borrow Canal.

Basis for Comment:

It is clear from the TT LRR that some of the structures are gravity operated and others are operated manually or by sensors. One structure is equipped with a pump for returning water to the canal above the structure. It is obvious that the levels in the L-29 Borrow Canal (L-29BC) are controlled by the cumulative effect of the operational schedules of the structures. It is also apparent that the waters have demands such as irrigation. The LRR does not address the operational schedule of these structures nor does it include a reference to a commitment by the operational entity. Questions of the prioritization of environmental need as it relates to other needs have arisen.

Significance – High:

The issue is considered of high significance because without source water to the L-29BC, the project cannot perform as designed.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* Water levels within all source compartments should be monitored.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Structure operations summary. (Details would be lengthy and unwarranted.) A summary should be supplied for each structure contributing to the L-29BC water levels.

Comment 3:

The report does a poor job of describing the overall general pattern of water flow through the system and describing what areas will be impacted by different alternatives.

Basis for Comment:

This comment is based on a need to better understand what we are trying to change and what area(s) will be impacted by different alternatives. The primary issue lies in the lack of clear explanation of the present and expected flow patterns. For example, Figure 1-2 indicates that the Shark River Slough lies fully east of L67. Other figures show a different configuration. In addition, canals and structures are labeled in various figures throughout the document; however, these figures do not give the reader the understanding of flow direction. In fact, no one figure contains all the structures, even within a given subarea. All levees, canals, and downstream roads could act to direct flow and should be shown on the figures. Thus, it is difficult to determine how the different bridge locations and sizes might impact this very important flow pattern. It is also not clear that all levees, roads, canals, and structures are labeled. How the flows from the bridge will positively affect the ecosystem 8 or 9 miles to the west of the bridge opening, and not necessarily downstream, is not readily apparent. There is a presumption that a bridge at either end (east or west) without a bridge at the other end, will result in rehydration of both ends of the project area. Much of this may be resolved by improving the description, figures, and maps of the current and expected flow patterns.

Significance – High:

The understanding of where the water comes from, where it will go, and how it is controlled is critical to the validity of the performance measures.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* Post-construction monitoring will tell us how well the completed project achieves the flows that were predicted and desired.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A flow vector map (or series) that shows the present direction of flow, particularly south of the road;
- A flow vector map that shows the expected flow directions, particularly for the four finalist alternatives;
- Improved figures that are consistent in their depiction of where the Shark River Slough lies and its primary flow pattern; and
- A series of maps that show all structures, culverts, levees, canals, and roads that might influence flow.

Comment 4

There is considerable uncertainty about the origin of ridge and slough topography in the Everglades and how best to restore it in areas where it is degraded. This report does not address these uncertainties and does not contain persuasive justifications for the validity of the performance measures used for estimating the ecological benefits of restoring ridge and slough processes and ultimately ridge and slough topography.

Basis for Comment:

The TT LRR has three main environmental planning objectives (page 4-6), one of which is to "Restore processes that produce and maintain ridge and slough topography." The three performance measures selected for restoring ridge and slough processes are number of sloughs crossed by bridges (2.A), difference in average water velocity in the marsh and at the road (2.B), and flows into North East Shark River Slough (NESRS) via bridge (2.C).

The LRR fails to describe what exactly these ridge and slough processes are. Subsequently, how these performance measures will impact ridge and slough forming processes is not explained in either the LRR or in Appendix E. The underlying assumptions and the degree of uncertainty associated with these performance measures are never discussed and fully evaluated. Unfortunately, there is considerable uncertainty associated with each of them. What the likelihood is that the various alternatives considered will actually restore the ridge and slough topography is not addressed.

The first performance measure is the number of sloughs crossed by bridges (2.A), and it is justified as a performance measure because "Situating a bridge directly upstream of a degraded slough would maximize the potential for storm flow velocities to maintain sloughs by removing excess organic sediment …" (page E-5). The justification assumes that ridge and slough formation and/or maintenance is a result of erosion and deposition. There is no compelling scientific evidence to support this assumption. In Appendix E, the whole rationale for this measure is given in just one line with not a single reference to a published or unpublished study in support of it. If scouring of organic matter from sloughs immediately downstream of the bridge does occur, this material would presumably be deposited in sloughs further south. This potential secondary effect is not discussed.

The second performance measure is the difference in average water velocity in the marsh (6,000 ft from bridge) and at the road (2.B). This use of difference in flow velocity is even more poorly justified as a performance measure of ridge and slough processes than is the number of sloughs crossed. In fact, as defined, this performance measure is the inverse of the previous one. The discussion of this measure states that high velocities at the bridge are bad because they cause scour that would result in the deposition of sediment fans (page E-6). "The ideal situation is for the ENP lands to have marsh like velocities from the bridge south" (page E-5). There is no explanation of how this performance measure is linked to ridge and slough processes. No published or unpublished studies are cited that justify the use of this performance measure. This is disturbing because this performance measure is one of the four used to screen the various project alternatives.

Should these two apparently conflicting measures be resolved, the extent of the effect of the first (high velocity) southward will be limited once the flows reach the second (low velocity) target, severely limiting the first's effect throughout the assessment area and calling into question the projected increase in habitat units.

The third performance measure (2.C) that is putatively related to ridge and slough processes is "flows into NESRS provided via bridge." Increased flows, and presumably duration of high water, in sloughs are expected to promote the growth of "open water vegetation." Although only a surrogate measure of potential changes in slough hydrology, this performance measure can be linked to ridge and slough processes using the existing literature on primary production and litter decomposition in the Everglades [see Givnish et al. (2007) and references therein; McVoy and Tarboton (2004) cited in Tarboton et al. (2004)]. Unfortunately, no effort was made to present the scientific foundation of this performance measure.

The expectation is high in the LRR that increasing discharge from the L29 canal into NESRS will eventually result in the restoration of its ridge and slough topography. Because of the uncertainties about the process of ridge and slough formation and how best to restore them, it is essential that post-project monitoring be done to document whether this actually occurred or not (i.e., see Consensus Comment #1).

In summary, one of the supposed ecological benefits of the proposed project, restoring ridge and slough processes, has been estimated on the basis of poorly justified and sometimes contradictory assumptions about how hydrology and ridge and slough forming processes are linked. Links between duration of flooding and flow velocity and ridge and slough processes have been postulated and justified in the published literature on the Everglades, but almost none of this literature is used or even cited. Only performance measures for which a reasonable link between hydrology and ridge and slough processes should be used. In the LRR and Appendix E, only one performance measure, 2.C, is linked to ridge and slough processes in any meaningful way.

References:

Givnish et al. (2007) Vegetation differentiation in the patterned landscape of the central Everglades: Importance of local and landscape drivers. *Global Ecology and Biogeography* 17:384–40.2.

Tarboton et al. (2004) Habitat Suitability Indices for Evaluating Water Management Alternatives, South Florida Water Management District, West Palm Beach, Florida.

Significance – Medium:

Although the three selected performance measures for the restoration of ridge and slough processes are poorly justified and to some extent contradictory, it is likely that increasing the volume of water discharged into NESRS will benefit the restoration of its ridge and slough topography to some extent. Thus, although the performance measures chosen are flawed and inadequately justified, they are sufficient for comparative purposes. It is unlikely that developing alternative performance measures of restoring ridge and slough processes would

alter the outcome of the selection process.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* Because of the considerable uncertainties associated with performance measures of ridge and slough processes, it is essential to monitor the effect the project had on restoring ridge and slough topography.

(12) Comment: *The report should briefly describe potential secondary impacts.* Secondary effects of downstream deposition of excess organics removed by increased water flow in sloughs are related to this comment.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded:

- In Appendix E, there needs to be a discussion of current theories, and evidence for and against them, about processes that control ridge and slough development and maintenance with an emphasis on how these processes are influenced by duration and depth of flooding and by water velocity.
- A justification for performance measure 2.A is needed and it needs to be reconciled with performance measure 2.B. If this reconciliation cannot be done, performance measure 2.A should be deleted from the list of performance measures used in the evaluation of project alternatives.
- A more detailed justification for performance measure 2.B is needed that explains how it is linked to ridge and slough processes. Because high velocities at the bridge could locally scour away this topography, the possible negative impacts of constructing a bridge on ridge and slough topography should be considered.
- For performance measure 2.C, how it relates to ridge and slough processes needs to be discussed in more detail in light of the most recent theories on ridge and slough formation and maintenance. One possible approach that could be used is the habitat suitability indices as described in Tarboton et al. (2004).

Comment 5

Within the context of evaluating the alternatives, clarification is needed regarding third-party costs related to the project.

Basis for Comment:

The TT LRR provides a reasonably clear discussion of real estate acquisitions required for each alternative (Appendix F).

Six privately owned parcels have been identified as affected by the project and have been authorized for acquisition. The owners are:

- Florida Power and Light
- Radio One
- Jesse E. and Sally L. Kennon (Coopertown)
- Stan Carlin and M. A. Carlin (Gator Park)
- Helen V. Farace (Everglades Safari)
- Lincoln Financial Media.

Generally, acquisitions related to these parcels are either permanent easements or temporary construction easements. These real estate costs, most of which are to be borne by Department of Interior (DOI), have been addressed in the alternative evaluations. The real estate cost discussion also includes a separate category of costs listed as "damages." Given the descriptions of the effects of flooding on the private properties, it appears likely in some cases that future business operations may be impacted. Consequently, the project cost to the private businesses may be more than the real estate value. For example, the revised site configurations may require modifications to the remaining site and structures. Acquisition of the entire parcel might be more practical. Understanding that real estate acquisition is a process of negotiation, more detail clarifying what has been included in the damages cost estimate category would be helpful.

Temporary construction easements are indicated for most of the business access points to the raised road section. The LRR implies that necessary permanent modifications to the access roadways will be performed as part of the construction contract. A clarification of this issue would be helpful.

The airboat ecotourism business associated with three of the businesses (Coopertown, Gator Park, and Everglades Safari) is estimated to bring in 300,000 visitors annually. The LRR acknowledges the possibility of some loss of business income to adjacent businesses during the construction period. These negative impacts can be mitigated with access management activities during construction. However, these third-party cost should be considered when evaluating alternatives.

Significance – Medium:

This comment is considered to be of medium significance because the implication is that these issues have been addressed. However, additional clarification in the report would be an improvement.

Comment Cross-referencing:
None.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: • Additional detail and clarification on third-party "damages" cost; • Clarification that access modifications will be included in the construction scope; • Clarification and confirmation that temporary business loss costs have been considered in evaluating alternatives.

Comment 6

The report organization and presentation need improvement. The report includes numerous inconsistencies, lacks some references, and some figures are unclear.

Basis for Comment:

The TT LRR is poorly organized, introduces concepts in a haphazard manner, is supported by unclear graphics, and contains a large number of inconsistencies. The result is that the reader is left to piece the details of the plan together on his own. This comment is based in the premise that the plan should be understandable by readers with only a rudimentary knowledge of the Everglades and the existing drainage system. An incomplete and brief series of examples is included:

1. Figure ES-1 on page ii refers to S-333 and S-334 in the caption but these are not shown in the figure. The caption also refers to the study area, which also is not in the figure. Later, the reader learns that the study and project area are not the same as the assessment area, which is also different from the area used by the spreadsheet model. The Shark River Slough is located in the graphic to the West of the Project Area, setting the stage for misinterpretations of references to NE or NW Shark River Slough in subsequent reading. The interested, but as yet uninformed, reader does not know where S-333 and S-334 are and probably does not even know what they are. The informed reader, who knows what they are, may not know which side is upstream and how they operate.

2. Consistency: Table 4-3, page 4-21 includes a column titled "Average Annual Cost per HU." Later (page 4-40, section 4.5.3.1.), HU is equated to "output." Subsequently, Tables 4-10 and 4-11 list average annual cost per output. The values in the latter two tables are not the same as the values in the first table. The change in nomenclature and inconsistency in values creates confusion. Compounding the confusion is the fact that the actual habitat units remain the same among the tables.

3. The use of literature values in lieu of study values may be acceptable, but the value of relying on the literature is reduced when the constituents are so vastly different as those in Tables 3-1 and 3-2.

4. The Annex, and most documents dealing with compliance with various laws, often state that the plan is in compliance or that the stated concern is insignificant. Simply stating that there is no adverse impact is not a proof. Citations would be beneficial. See Annex A, sections 2.2.4 and 2.3.2.2 as examples.

5. Fig 4-2 does not have a legend and the labels are unclear. The resolution of Fig 4-3 makes it unintelligible.

Significance – Medium:

It is apparent that correcting these problems will not change the outcome of the decision. It is valuable because correcting these now will save countless hours in later years when other readers, not having the benefit of the supporting documents or the existing staff, will struggle to

determine the intentions of the LRR.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* Monitoring will be eased if it is clear what is to be monitored.

(2) Comment: *The project report assumes that there will be a sufficient amount of source water to raise the elevations in the L-29 Borrow Canal.* A more clear presentation would have made the missing operational element apparent from the beginning.

(3) Comment: *The report does a poor job of describing the overall general pattern of water flow through the system and describing what areas will be impacted by different alternatives*. The review team still does not have a good presentation of overall flow vectors.

(4, 7, 8, 9, 10, 12) A clear presentation or appropriate citations could obviate the comments entirely.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded:

- Conduct an editorial and quality control review consistent with standards of editing provided to other publications. Prepare the document with the standards of English Composition as a guide. Lay foundations, build, connect, and conclude.

Comment 7

The two performance measures developed to estimate the restoration of "Fish and Wildlife Resources" are of little relevance for predicting the impacts of a Tamiami Trail Modification project on North East Shark River Slough fish or wildlife populations.

Basis for Comment:

There are long-standing concerns about the decline of wildlife in the Everglades, especially wading birds. The two performance measures used to estimate wildlife benefits from various project alternatives do not deal with any species or group of species that are of concern. The only wildlife benefits assessed are an assumed decrease in road kill for unspecified animals (4.A) by constructing a bridge or bridges and an assumed increase in unspecified animals moving into North East Shark River Slough (NESRS) under the bridge from WCA-3 (4.B). These performance measures are functionally circular and are not directly related to fish and wildlife populations.

Because there are 261 animal deaths per mile of road per year (E-11), it is assumed that constructing a one mile bridge will automatically reduce animal deaths by this amount. (This assumes that animals will never use the bridge for any purpose.) The data presented do not indicate whether animals killed were moving into or out of NESRS. If these animals include a variety of avian species, the assessment may be completely erroneous. The assessment does not address the predicted increase in faunal populations that are presumed to occur when the project is completed. If this prediction is true, then the number of animals killed on the remaining roadway may increase. In any case, the number of animals killed annually is insignificant compared to the total number of animals found in NESRS and WCA-3. As a measure of the estimated benefits of various alternative projects on animal populations, this performance measure is trivial, is possibly erroneous, and is based on a circular argument.

Performance measure 4.B, potential connectivity of WCA-3B marsh and NESRS, is also simply a function of the total length of bridges that will replace roadway. No evidence is presented that animal populations in NESRS have been adversely affected by the building of the Tamiami Trail, especially due to the road reducing the number of animals that historically migrated from what is now WCA-3A into NESRS. The report ignores that animals can still migrate into NESRS from the east, west and south. Increased migration from NESRS into WCA-3A as a result of inserting a bridge or bridges along the Tamiami Trail is not considered. Consequently, the potential spread of exotic species like pythons from Everglades National Park into WCA-3 is ignored.

The performance measure of connectivity, 4.B, is based on the potential future project of degrading the L-29 Levee. It is noted, however, in Appendix E and ignored in the rest of the report that "…this marsh to marsh connectivity would also require degrading the L-29 Levee that encloses WCA-3 impoundments. Degrading the L-29 levee is not authorized under the Modified Water Deliveries (MWD) legislation." (E-12). As far as we are aware, degrading the L-29 Levee is also not contemplated as part of the Comprehensive Everglades Restoration Plan (CERP). In short, this is an indefensible performance measure because it is based on another project that is never likely to happen. Nevertheless, this performance measure was used as one

of four screening measures.

In short, the two performance measures used to estimate the benefits to animal populations in NESRS of various TTM alternatives are trivial (4.A), possibly erroneous (4.A), based on circular arguments (4.A and 4.B), and are unjustifiable (4.B). Although it is likely that some animal species will benefit from inserting a bridge or bridges along Tamiami Trail, neither the animal species that would benefit nor how much populations of these species would benefit are addressed in the report.

Significance – Medium:

Both performance measures are simply functions of bridge length. Consequently, they are inherently of little use in evaluating project alternatives. In addition, performance measure 4.A provides at best only a trivial estimate of animal benefits and 4.B is based on an assumption about the future degradation of the L-29 levee. Although the benefits to animal populations were estimated poorly, this does not affect the justification for the project or invalidate the overall evaluation of the alternatives. In reality, some animal species would benefit from most of the alternatives proposed and this benefit would probably be to some extent a function of the total length of the bridge(s).

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* Because the actual benefits to fish and wildlife of the TTM project alternatives were not estimated, such benefits will need to be demonstrated by post-project monitoring as proposed in Comment #1.

Recommendations for Resolution:

To resolve these concerns, the report would need to be modified:

- Drop the current performance measures, 4.A and 4.B;
- Develop more suitable performance measures that focus on species or groups of species of concern such as wading birds, alligators, deer, etc.

Comment 8:

The introduction needs a better description of how the models were used. Specifically, it is unclear if the spreadsheet model was used only to compare alternatives or if it is being used in a predictive capacity.

Basis for Comment:

The report states that "The spreadsheet model does a very good job of interpreting the general trends that increased inflows would produce within NESRS as measured at the NESRS2 monitoring gage. However, stage predictions should not be considered absolutes from this analysis. This analysis is a simplification of a very complicated system developed for a [sic] comparison purposes among all of the different alternatives." It is not clear from this statement if the model was used to make predictions of water levels resulting from the project that occur in other sections of the document. Thus, the stated intended purpose may have been at odds with the apparent use.

Significance – Medium:

A clearer understanding of how the model was used and the level of reliability of the results would help to determine the reliability of the alternatives.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* Post-construction monitoring will help to determine the level of accuracy provided by the model.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A brief summary of the model (perhaps in the introduction or at the beginning of Chapter 4), describing its use(s) in evaluating the alternatives, and the reliability of the evaluations based on the model results.

Comment 9:

The report sometimes does not make clear that hydrologic and other indirect measures are used as surrogates for ecological processes and communities.

Basis for Comment:

Of the ten performance measures (E-3) used in the evaluation of alternatives, five are hydrological measures (water depth, duration of flooding, water velocity, etc.) that are assumed to be linked to ridge and slough processes (2.B and 2.C) or to restoring vegetation (deep marsh) communities (3.A, 3.B, and 3.C). These assumed linkages are in some cases problematic (see Comment # 4). In fact, with the arguable exceptions of performance measures 4.A and 4.B (see Comment # 7), there are no direct ecological performance measures.

In the report, instead of using the designator of a performance measure from Appendix D, e.g., 3.B, in some tables, e.g., Tables 4-6 and 4-13, "ridge and slough process" and "slough vegetation suitability" are used as headings. This is misleading because there are no direct performance measures of either, such as a predicted change in the area of deep marsh vegetation.

Because most of the estimated ecological benefits are based on assumed relationships between hydrology or some other indirect measure and ecological processes or communities, these benefits are far from certain. Consequently, post-project monitoring is needed to be sure that such benefits actually accrued from the project.

Significance – Low:

This is a minor editorial problem in the report.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.*

(4) Comment: *There is considerable uncertainty about the origin of ridge and slough topography in the Everglades and how best to restore it in areas were it is degraded. This report does not address these uncertainties and does not contain persuasive justifications for the validity of the performance measures used for estimating the ecological benefits of restoring ridge and slough processes and ultimately ridge and slough topography.*

(7) Comment: *The two performance measures developed to estimate the restoration of "Fish and Wildlife Resources" are of little relevance for predicting the impacts of a Tamiami Trail Modification project on North East Shark River Slough fish or wildlife populations.* Both comments discuss the problems of using hydrologic and other measures as surrogates for ecological processes and communities.

Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: • The designator of a performance measure, or a brief description of it, should be used consistently in the report as in Table 4-5.

Comment 10:
The potential for releasing mercury as a result of the project construction should be addressed.
Basis for Comment:
Mercury contamination has been for many years a concern in the Everglades, but is not mentioned in the report. Although it can reasonably be assumed that replacing one mile of roadway with a bridge will not alter the amount, if any, of mercury entering the Everglades from Tamiami Trail, it is possible that in situ mercury may be released because of disturbances to soils caused by construction activities. This possibility is not addressed in the report.
Significance – Low:
It is unlikely that the proposed Tamiami Trail Modification will have long-term consequences for mercury inputs into Everglades National Park. Including a discussion of the potential for mercury release due to construction activities is primarily needed to reassure fishermen and others that the potential for a short-term spike in mercury has been considered in the TT LRR.
Comment Cross-referencing:
None.
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to include: • A short discussion of the potential for releasing *in situ* mercury in the project footprint and immediately downstream from it due to construction activities.

Comment 11:

Within the context of evaluating alternatives, the road user costs (RUCs) should be included in the cost estimate.

Basis for Comment:

There is no indication within the discussion of costs in the TT LRR that Road User Costs (RUCs) have been considered. While RUCs do not directly affect project funding requirements, in transportation project planning it is recommended practice to include RUCs in comparing alternative design approaches.

The calculation of RUCs provides information enabling the designer to make better informed decisions in regards to staging, allowable work hours, project delivery method, and the actual design itself. Therefore, before a scheme is finalized, traffic volumes should be evaluated on a 7 day 24 hour basis. Staging should be evaluated for potential queues. Often, queues can be avoided by simply allowing lane closures only during non-peak hours. If the proposed design alternative reveals substantial RUCs, an alternative scheme that reduces these costs may be a better choice.

More specifically, planners and designers should consider RUCs as a factor in decision making with regard to:

Evaluation of Design Alternatives
Selection of Traffic Control Plan (TCP) Phasing
Selection of Project Delivery Options.

The Alternative Plans considered in the LRR are similar in scope. All include a 1-mile bridge structure. Given the similarity, RUCs may not be a determining factor in alternative selection. Nevertheless, good practice suggests that a basic analysis be performed. It is reasonable to assume that differences in stage elevations among alternatives may require differences in road section mitigation and consequently different work zone lengths. The LRR should confirm that RUCs have been considered and were not a determining factor in alternative selection.

Significance – Low:

It does not appear likely that RUCs would influence alternative selection or affect required project funding; however, to be complete it should be addressed.

Comment Cross-referencing:

None.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A confirmation that a basic RUC analysis has been performed for each alternative and that RUC is not a determining factor in alternative selection.

Comment 12:

The report should briefly describe potential secondary impacts.

Basis for Comment:

Section 5.22 on page 5-51 contains one paragraph on secondary impacts, which refers the reader to discussions "throughout Section 5" for details. Section 5 contains a very lengthy and complete discussion of cumulative impacts and discussions of direct and cumulative impacts to listed species, but secondary impacts are obscured. The TT LRR defines secondary impacts well, but fails to mention that these may be either inside or outside the study area or the Everglades National Park. Secondary impacts may be either positive or negative. It is recognized that neither cumulative nor secondary impacts can be quantified and may only be described in somewhat speculative terms. The value, in particular in this instance, is in defining parameters that the team or other interested parties may choose to evaluate during and after project implementation (see Comment 1), which could significantly increase the knowledge and understanding of either the Everglades or the secondarily impacted study site. Examples discussed as potential secondary impacts include:

1. East Coast reefs. If less water is discharged to the East Coast of Florida, presumably with a lowered load, local nearshore waters may experience an improvement.

2. The North West Shark River Slough (SWSRS), west of the L67, will have the hydraulic load reduced by 55%. This may be a primary impact and it may be addressed elsewhere, but since it is outside the assessment area, discussing it as a secondary impact may be warranted.

3. The southern Everglades will experience an alteration in water flow unless it can be shown that evapotranspiration and groundwater recharge will account for all the additional water south of the assessment area boundary. The additional water could be addressed as an offsite secondary impact. Increased inputs of fresh water into Florida Bay, if any, could be an important secondary benefit of the project.

4. The southern Everglades supports fauna of interest, in particular the American Crocodile. The habitat of these species may or may not be altered, even if only shifted geospatially, by the alteration of the geographical location or intensity of the salinity gradient between the Everglades and the marine fringe.

5. Geospatial shifts in nesting and foraging habitats of wading, diving, and predatory birds may occur.

6. The Northeast Shark River Slough (NESRS) tree islands may be affected by post project changes in water depths. Levels can be expected to be higher in the NESRS and lower in the NWSRS.

7. WCA-3A and WCA-3B can be expected to have altered hydrology, which may constitute a secondary effect.

Significance – Low:

The significance to this particular plan is low, but a more thorough examination and discussion of potential secondary effects is very desirable. The significance to future plans, similar plans, work being conducted by others, and the monitoring recommended in Comment 1 is high.

Comment Cross-referencing:

(1) Comment: *Each of the processes and functions included in the performance measures directly or as contributing functions should be monitored under a plan with significant geospatial dispersion.* A well designed monitoring program could add detail to the level of both positive and negative secondary affects.

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A complete, if speculative, list of expected or potential positive and negative secondary affects, the hypothesized causative agent, and a general description of the potential outcome.

Appendix B

Charge to the Tamiami Trail Limited Reevaluation Report EPR Panel

Comprehensive Everglades Restoration Plan
Modified Water Deliveries to Everglades National Park
Tamiami Trail Modification Limited Reevaluation Report (TT LRR)

Charge Questions

General

Are the assumptions that underlie the economic, engineering and environmental analyses sound?

In general terms, are the models and planning methods sound? (A separate review of the model component is being conducted concurrently.)

Are the interpretations of analysis and conclusions based on the analysis reasonable?

Main Report

1.0 Introduction

Comment on the completeness and clarity of the introduction. Has the need for the project, goals and objectives of the project, constraints and actual project plan for the Tamiami Trail Modification been adequately addressed? Was the information provided in the introduction consistent with that presented in later sections?

2.0 Current Alternative and Cost Update

Comment on the process used in estimating the costs and identifying the factors causing the cost increases.

Were any other cost increase factors omitted? If so, please discuss why these factors should be considered.

Identify and comment on the validity of any major assumptions used in the estimate.

Comment on whether you agree with the findings of the cost increase analysis.

Please comment on whether the report clearly states why the 2005 alternatives and the cost update are presented and how they are related to the new alternatives presented in Section 4.

Please comment on whether the cost components presented on Page 2-1 are sufficient for estimating the total cost.

Please comment on whether the methodology implemented to update the costs is adequate and the cost figures are reasonable.

3.0 Existing and Future Conditions

Are the existing geological and soil conditions in the project area accurately described?

Are the contributors to south Florida hydrology comprehensively listed? Are any contributors missing?

Are the purposes of the Water Conservation Areas (WCAs) accurately described?

Provide any primary water quality concerns in the project area that were not discussed.

Is the list (Table 3-1) of major constituents of highway runoff complete?

Are the physical characteristics of the Shark River Slough accurately described?

Are the plant communities of the project area comprehensively listed and accurately described?

Are all the protected species that may be found in the project area listed? If not, which were omitted?

Do the descriptions of the protected species accurately portray their natural history?

Explain whether the construction and alteration of Tamiami Trail have been accurately described. Are descriptions of the condition of culverts, the need for road surface maintenance, and average daily traffic along the Tamiami Trail accurate?

Were any affected recreation activities omitted? Please comment on whether "personal observation" of bank fishing recreation activities provides sufficient data/evidence.

Are the archaeological and cultural resources within the project area accurately described? Were there any omissions?

Please comment on whether the derivation of the traffic and noise data presented in Tables 3-2 and 3-3 is adequately presented.

Please comment on whether information about economics/socioeconomics is sufficient and appropriate data are used.

4.0 Formulation and Evaluation of Alternatives

Explain whether or not you agree with how the alternatives were formulated and developed and the rationale that was used. Comment on Table 4-2: Reevaluation Alternatives. Were differences between the new alternative and those introduced in the 2005 report explained adequately?

Comment on the method used to evaluate the alternatives. Please cite specific examples of exception or marginal evaluation factors used in the evaluation. Comment on Table 4-3 Tamiami Trail Plan Formulation Matrix.

In addition to commenting on the evaluation of alternatives, please provide specific comments on the cost analysis, benefit analysis, comprehensive everglades restoration plan compatibility analysis, schedule implementation and screening results.

Identify and comment on the validity of any major assumptions used in the formulation and evaluation of the alternatives.

Please comment on whether an adequate quantitative description of "ecosystem decline," if it can be measured, is needed.

Although the Tamiami Trail Modification is not a transportation project, were transportation-related impacts, such as traffic flow during the various stages of construction, considered for each alternative? If not, please explain.

Were the evaluation processes used appropriate given Tamiami Trail's functional highway class? Please comment.

Please comment on whether the evaluation process considered the cost related to work-zone delays for the alternatives that include roadway improvement and/or disruption.

Please comment on the completeness and validity of the methodology of estimating costs implemented in Section 4 and its comparability with the method used in Section 2.

Please comment on the cost estimates presented in Table 4-5 and their possible relationship with the cost estimates shown in Table 4-3.

Please comment on the efficiency measurement numbers presented in Table 4-10 and their relationship with the numbers presented in other tables.

Please comment on whether the risk and uncertainty involved in engineering and real estate, which was not considered for one of the alternatives in the 2005 report (see lines 11-19 on Page 2-8), have been considered in the new alternatives.

5.0 Environmental Effects

Please identify and comment on what safety impacts from wildlife disturbances surrounding the project area were considered, including the impact of wildlife movement on roadway safety.

Do you agree with the inference that there will be no effects on geological conditions or soils from the project?

Are the effects on surface water from each of the project alternatives accurately described?

Is there sufficient documentation to support the conclusion that the project is expected to contribute a net beneficial cumulative impact?

Is there sufficient documentation to support the conclusions that there will be no effects to or from hazardous, toxic, or radioactive waste? If not, please comment.

Explain if you agree or not with the potential changes in average annual flows and peak flows from each of the project alternatives?

In your opinion, are the potential impacts to parklands from each of the project alternatives accurately described? If not, what is missing?

Are the potential changes in ecological connectivity from each project alternative accurately described?

Is the amount of wetlands loss due to each project alternative accurately described?

Are the impacts to protected species and other wildlife described accurately and are the suggested mitigation measures ample to prevent adverse impacts to protected species?

Is the potential impact of the Action Alternatives on air quality adequately addressed?

Please comment on whether the description of bank fishing activities, which will be lost after the construction is completed, is sufficiently broad or specific to explain the effects of alternatives on public recreation.

Please describe whether the impacts of the Action Alternatives on the area's cultural resources are adequately addressed.

Please comment on whether the description of "depending on how the bridge is constructed …" (see lines 15 and 22 on Page 5-18) is sufficiently specific to explain the effects of alternatives on aesthetics. Were the aesthetic impacts accurately described?

Please comment on the size of the multipliers generated from the IMPLAN model and whether the results from the IMPLAN model are sufficiently specific to explain the benefits that may be realized from the project.

Were cost estimates for effects on businesses addressed? For example, please discuss whether a cost estimate is needed for businesses that need to build a transition ramp to link with the raised highway as a result of the impacts from the selected alternatives.

Please comment on whether the information related to the potential reduction in number of visitors and economic losses from tourists businesses during the construction period is sufficiently specific to explain the impacts of alternatives on ecotourism.

Is the determination accurate that this project will have no impacts to environmental justice issues or children?

Is the determination accurate that the project would not cause the permanent removal or consumption of any renewable resources?

Are the potential secondary impacts (both beneficial and adverse) of the project adequately discussed?

Is the compatibility this project with federal, state, and local objectives accurately described?

Are the potential conflicts and controversies surrounding this project accurately described? Identify and comment on any potential conflicts and controversies that were omitted or inadequately addressed.

6.0 Tentatively Selected Plan

Are the project costs provided complete and accurate to the best of your knowledge? Please explain.

Is there sufficient documentation to support the approach for the project implementation?

Identify and comment on the validity of any major assumptions used in the selection of this recommended plan.

Are the assumptions and implications related to construction on Tamiami Trail adequately discussed? Does the document describe how and when traffic flow will be maintained during construction? Were the direct and indirect costs considered? Was traffic safety considered and addressed?

Based on your area of expertise, were any costs omitted from the cost estimate?

Is the relationship between the cost savings explained in other parts, such as Section 4, of the report and cost savings reported in Section 6 (including in tables) clear?

Please comment on the reasonableness of the major assumptions and the escalated total costs presented in Table 6-3.

Please comment on whether costs that may be incurred by businesses during and after the construction, such as building ramp or access roads and reduction in tourists and bank fishing activities mentioned in Section 5, were addressed. Please comment on whether

the report needs to provide the total economic benefits versus the multipliers as presented in Section 5.12.

7.0 Recommendation

Address the extent to which the recommendation is consistent with the findings of the economic analysis.

Comment on the consistency of the recommendations with the evaluation of alternatives and environmental assessment.

Annexes

ANNEX A CZM CONSISTENCY, 404(b)(1) EVALUATION AND STATEMENT OF FINDINGS

Discuss if you agree or disagree that the proposed plan meets the requirements of and guidelines of the Section 404 (b)(1) concerning the discharge of dredged or fill material into the waters of the United States.

ANNEX B US FISH AND WILDLIFE SERVICE CONSULTATION

Not applicable

Appendices

APPENDIX A Project Background

Does this Appendix accurately and comprehensively describe the purposes and current statuses of the various parts of the project, including the 8.5 Square Mile Area flood mitigation, conveyance and seepage control features, and the Tamiami Trail modification?

APPENDIX B Engineering

Was accessibility for aquatic and other wildlife adequately considered for the recommendation and alternatives?

Please discuss the consideration of bridge flow during high water level and other conditions. Were minimum requirements met?

Given the steep slope (2:1) recommended, please discuss whether adequate erosion control measures were considered.

APPENDIX C Cost Engineering

Please comment on the completeness and reasonableness of the risk analysis and the major estimate assumptions.

Was the confidence interval chosen appropriate for the analysis?

Please comment on whether the escalated cost estimates have been reported and are verifiable in this appendix and in the report.

APPENDIX D Hydrology

Does the spreadsheet model developed to evaluate the effects that different stage conditions would have on the project area include the correct assumptions?

Was the calibration of the spreadsheet model accurately conducted?

Do the model outputs for the project alternatives seem reasonable?

APPENDIX E Benefits Analysis

Description of the Performance Measures

Comment on the completeness, ease of understanding, and appropriateness of the ten performance measures used in the analysis process.

Performance Measures Values for the Alternatives and Habitat Units and Benefits

Explain whether or not you agree with the results of the performance measures values for the alternatives and the habitat units and benefits. Specifically address the information contained in Tables E-3, E-4, and E-5.

Performance Comparison

Comment on the results of the performance comparisons of the hydrologic performance, ecologic performance, and the overall performance summary.

APPENDIX F Real Estate Plan

Does the plan adequately address all real estate interests and requirements?

Are the real estate cost estimates reasonable?

APPENDIX G Scoping Comments

Not applicable

APPENDIX H Prior NEPA Coordination

Not applicable

APPENDIX I FHWA 4f Exemption

Not applicable