United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

March 6, 2008

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Dear Dr. Griffith:

The U.S. Fish and Wildlife Service (Service) has prepared this Planning Aid Letter (PAL) to accompany the Limited Reevaluation Report (LRR) for the Tamiami Trail component of the Modified Water Deliveries (MWD) to Everglades National Park (ENP) project in accordance with the Fish and Wildlife Coordination Act (FWCA) of 1958, as amended (16 U.S.C. 661 et seq.), and the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This letter does not constitute the report of the Secretary of the Interior as required by section 2(b) of the FWCA, nor does it constitute a biological opinion under section 7 of the ESA. The purpose of this PAL is to provide planning technical assistance to the interagency team as they proceed with selecting an alternative for Tamiami Trail modifications that satisfies the goals and objectives of the MWD to ENP project.

Introduction

The primary purpose of the MWD to ENP project is to re-establish the hydrologic and ecological function of the historic Shark River Slough (SRS) flow path between Water Conservation Area 3A (WCA-3A), WCA-3B and North East Shark River Slough (NESRS) in ENP. In a 1992 General Design Memorandum (GDM), the U.S. Army Corps of Engineers (Corps) outlined a plan wherein water would be delivered from WCA-3 to the Levee-29 Borrow Canal (L-29) and from there to NESRS through the existing culverts under U.S. Highway 41 (Tamiami Trail). Subsequent hydrological analyses determined that the stages required in L-29 to convey increased flows could damage and/or overtop Tamiami Trail under certain conditions (Corps 2001). Two efforts since the 1992 GDM have sought to identify a feasible plan to modify Tamiami Trail: (1) the Draft General Reevaluation Report/Supplement to the 1992 Final Environmental Impact Statement (GRR/SEIS) on MWD to ENP (Corps 2001); and (2) the Revised General Reevaluation Report/Second Supplemental Environmental Impact Statement (RGRR/SEIS) and its ROD for the Tamiami Trail Modifications (Corps 2005, 2006). Both of these documents evaluated several alternatives and arrived at recommended plans. However, due to rising construction costs and other considerations the Corps was directed to produce a LRR to evaluate both previous and new alternative designs with consideration of new cost estimates.

The Service, together with ENP, appreciates this opportunity to provide the following evaluation of alternatives included in the LRR and recommendations regarding the most environmentally beneficial plan.

Environmental Assessment

In this section we summarize the environmental assessment conducted by the team using 10 hydrologic and ecological performance metrics. To highlight differences between the modifications to Tamiami Trail, scores for each alternative are summarized and presented in Table 1. It is important to note that the tools and methodology applied in this assessment differ from those used in the 2005 RGRR. Time and resource constraints during the current assessment precluded the application of a hydraulic numerical model to generate hydrologic output for the suite of proposed alternatives. Instead, the Corps developed a spreadsheet application to analyze different design stages within the L-29 and resultant change in downstream NESRS hydrology. Output from the application included flow to L-29 and NESRS stage at selected ENP hydrologic monitoring locations from 1992 to 2006. These hydrologic outputs were summarized and used as surrogates for the ecological assessment of alternatives.

Alternatives

Currently, there are 26 alternatives that vary in structural complexity from using existing culverts to complete bridging of the road, along with incremental increase in L-29 design stage. To keep this letter brief, the alternatives have been categorized by the extent of roadway modification and L-29 stage. With the exception of the No Action alternative, 19 additional culvert sets and spreader swales are included in each of the other alternatives. For further detail of each alternative please refer to the LRR.

Category 1: No Roadway Raising – L-29 stage remains at 7.5 feet (ft) National Geodetic Vertical Datum (NGVD). This group includes the No Action alternative and alternatives that add additional culverts with spreader swales, add spreader swales south of existing culverts, or add up to 1 mile of bridging.

Category 2: Roadway Improvements – Raise Roadway Crown to 11.05 ft. This group includes alternatives that would allow L-29 stages to reach 8.0 ft NGVD. Alternatives include raising the low points of the road, adding additional culverts with spreader swales, or adding up to 3 miles of bridging.

Category 3: Roadway Improvements – Raise Roadway Crown to 11.55 ft. This group includes alternatives that would allow L-29 stages to reach 8.5 ft NGVD. Alternatives include raising the entire road, adding culverts with spreader swales, or adding up to 3 miles of bridging.

Category 4: Roadway Improvements – Raise Roadway Crown to 12.75 ft. This group includes alternatives that would allow L-29 stages to reach 9.7 ft NGVD. Alternatives include raising the entire roadway, raising the roadway and adding culverts with swales, or adding up to 10.7 miles of bridging.

Category 5: Structural Alternatives and/or Road Realignment – Raise Roadway Crown to 12.75 ft. This group of alternatives would allow L-29 stages to reach 9.7 ft NGVD. Alternatives include a northern alignment of Alternative 14 (Corps 2005), a northern alignment with 1 mile of bridging, a northern alignment with 1 mile of bridging and relocation of the L-67 levee, an ENP-proposed alternative using the current alignment with 1 mile of bridging and relocation of the L-67 levee, or pump stations along the L-29.

Assumptions

The environmental benefits quantified in this analysis are potential benefits whose realization will depend on development of future operational criteria and the implementation of Comprehensive Everglades Restoration Plan (CERP) projects to support additional flows to NESRS. Additionally, we assume that wet season stages can be used as a surrogate for other hydrologic metrics such as hydroperiod, recession rates, and drydown frequencies, which could not be predicted adequately using the Corps' spreadsheet application. For the purposes of this evaluation, the Service has used performance measures (PMs) developed by staff at ENP to evaluate wet season stages, since ENP is responsible for management of natural resources within the boundary of the evaluation area.

Performance Measures

1. Average annual flow volume. This quantitative hydrologic metric was calculated based on the Corps' spreadsheet application output and is the estimated annual average flow volume.

2. Potential connectivity between WCA-3B marsh and NESRS, as a percentage of total project length. This metric quantifies the direct marsh connection between the L-29 and NESRS marsh as a function of linear length of bridge constructed.

3. One-in-ten year total maximum discharge. This quantitative hydrologic metric was calculated based on the Corps' spreadsheet application output and is the estimated 1-in-10 year annual maximum discharge event. The annual maximum 7-day running average flow was ranked and a return period was then calculated.

4. Number of sloughs crossed by bridges. This quantitative metric was calculated based on a simple ratio of the number of sloughs beneath bridges to the total number of sloughs south of Tamiami Trail. Slough locations were determined by 1940s aerial photographs and High Accuracy Elevation Data transects north and south of Tamiami Trail.

5. Difference between average velocity in marsh and average velocity at road. This quantitative metric was calculated based on the Corps' spreadsheet application output and is the ratio of the estimated water velocity near the road to the water velocity in the marsh.

6. Flows from L-29 into the deep sloughs of NESRS. The benefits of different bridge lengths and locations were assessed considering each bridge location. A representative "marsh capacity" was estimated on 200 ft wide intervals using the U.S. Geological Survey helicopter ground elevations and Manning's "n" based flow equation used in the South Florida Water Management Model. The location of each bridge is then used to calculate the marsh capacity directly connected by a bridge opening. This marsh capacity for the bridge is then divided by the marsh capacity of the approximately 11 mile width of NESRS from the L-67 Extension to the L-31N levee (North American Datum 83 horizontal coordinates from 763,500 to 821,250) and expressed as percentage (Corps 2005).

7. Hydrologic suitability for slough vegetation: number of days water depth > 2.0 ft during the wet season peak (1 August – 31 October). This quantitative hydrologic metric was calculated based on the Corps' spreadsheet application output and describes the estimated total number of days water depth exceeds 2.0 ft during the wet season peak at ENP monitoring stations NESRS1 and NESRS2.

8. Hydrologic suitability for slough vegetation: number of days water depth > 3.0 ft during the wet season peak. This quantitative hydrologic metric was calculated based on the Corps' spreadsheet application output and describes the estimated total number of days water depth exceeds 3.0 ft during the wet season peak at ENP monitoring stations NESRS1 and NESRS2.

9. Hydrologic suitability for slough vegetation: average water depth during the wet season peak. This quantitative hydrologic metric was calculated based on the Corps' spreadsheet application output and describes the estimated average water depth during the wet season peak at ENP monitoring stations NESRS1 and NESRS2.

10. Reduction in wildlife mortality. This metric describes the estimated reduction in vehicular wildlife mortality and is derived from the length of roadway removed.

Benefits Analysis Results

The predicted Tamiami Trail benefits, presented in Table 1, summarize the results of the PM analyses for the 26 alternatives. The alternative with the highest raw value for each PM was assigned a value of 100 percent; the remaining alternatives were then given a percentage score relative to the maximum. The "Total PM Score" column in Table 1 provides a sum of all percentage scores for the 10 PM categories.

Overall, the 10.7-mile bridge alternative at the 9.7 ft L-29 stage (Alternative 4.2.4) was the highest scoring alternative. Likewise, the lowest ranking alternative was the No Action alternative at the 7.5 ft L-29 stage. The alternatives that add spreader swales or culvert sets with spreader swales at the 7.5 ft L-29 stage yield the smallest predicted benefits as compared to the No Action alternative.

Alternatives containing bridging options, higher stages in L-29 and increased length of bridging provide greater benefits compared to those alternatives lacking bridges and at lower L-29 design stages. For instance, adding a 1-mile western bridge at the 7.5 ft L-29 stage provides an 80 point increase in the total PM score as compared to adding culvert sets with spreader swales at the 7.5 ft L-29 stage. Increasing the L-29 stage from 7.5 ft to 9.7 ft for the 1-mile western bridge provides an increase of 284 points in the total PM score. Likewise, increased L-29 design stages for otherwise comparable alternatives provide consistently higher total PM scores. At the 9.7 ft L-29 stage, the 10.7-mile bridge alternative provides a 385 point increase in the total PM score relative to the 3-mile bridge alternative, and a 497 point increase in the total PM score benefit relative to the 1-mile western bridge alternative.

Potential Benefits to Endangered Species

The primary objective of the MWD to ENP project is to restore the quantity, quality, timing, and distribution of water deliveries to ENP. Redistribution of flow across the broader SRS and Tamiami Trail flow path will restore NESRS as a functional ecological component of the southern Everglades ecosystem (Service 1990, 1991, 1999; Corps 1992, 1999, 2000). Based on the metrics used in the environmental benefits section above, an alternative that includes at least 1 mile of bridge and raises the roadway to allow L-29 design stages to 8.0 ft will provide the flow necessary to begin achieving the benefits to species and their habitats described in this section.

As noted previously, the Corps' spreadsheet application is limited in spatial extent (*e.g.*, NESRS) and unable to simulate dry season recession rates or the frequency and duration of water level dry down below ground surface. This limits our ability, at this time, to conduct a thorough ecological evaluation using existing performance measures for threatened and endangered species. Instead, potential ecological benefits to threatened and endangered species are inferred from changes in flows and wet season stages in NESRS, as predicted by the Corps' spreadsheet application. The sections below provide brief narratives describing the anticipated potential benefits for each species from increasing flow to NESRS. These narratives concentrate on the potential benefit of restoring flows to NESRS consistent with system-wide ecological restoration as defined during the Restudy (Corps 1999.

A thorough threatened and endangered species analysis has already been initiated. The Corps has recently provided the Service with key information regarding potential project impacts. We are currently reviewing this information and will complete consultation in a timely manner consistent with project time lines.

Wood stork

It is widely believed that hydrologic restoration of NESRS and eastern ENP is essential to significant recovery of wading bird populations in ENP (Tabb 1963; Service 1990, 1991, 1999; Corps 1992, 1999; Ogden et al. 1992). The population declines observed throughout ENP in the 1960s coincides with the hydrologic isolation of NESRS and subsequent lowering of water levels in the upstream Everglades ecosystem by the compartmentalization of WCA-3 (Leach et al. 1972; Corps 1992; U.S. Department of Justice 1999). Reintroduction of flows to NESRS will likely increase stages in the Rocky Glades and Taylor Slough. This movement towards historic seasonal flow distributions will increase water depths and hydroperiods within these areas that will improve the quality and quantity of forage fish that support wood stork *(Mycteria americana)* nesting colonies in their current as well as historic locations.

Additional information regarding wading bird colony protection zones delineated by the Service, for protection of the colonies during construction, will be provided in subsequent PALs.

Cape Sable seaside sparrow

Since 1992, the decline in the overall Cape Sable seaside sparrow *(Ammodramus maritimus mirabilis)* population has been significant, and there has been no evidence of improvement (Pimm et al. 2002; Service 2006a; Elderd and Nott 2007). Subpopulation A of the sparrow, located in Northwest Shark River Slough (NWSRS) has been impacted by high water levels from both natural rainfall events and large, unseasonable S-12 discharges (Pimm et al. 2002; Pimm and Bass 2002; Service 2006a; Eldred and Nott 2007). This area once supported nearly half of the total sparrow population from 1981 to 1992 (Service 1999, 2002, 2006a; Pimm et al. 2002; Pimm and Bass 2002; Elderd and Nott 2007). Redistributing 55 percent of the current SRS water budget into NESRS will undoubtedly benefit NWSRS by reducing S-12 A, B and C discharges during the early wet season. In addition, decreased total S-12 wet season discharges could reduce wet season water depths and possibly decrease hydroperiods to be more consistent with species and habitat needs. Additionally, the reintroduction of flows to NESRS and increased stages downstream is expected to help reestablish historic hydroperiods in the eastern marl marshes of the Rocky Glades and Taylor Slough, benefiting eastern subpopulations of the sparrow.

Everglade snail kite

The Everglade snail kite *(Rostrhamus sociabilis plumbeus)* has experienced pronounced population fluctuations over the past 30 years. These fluctuations are primarily associated with the regulation of water levels by the C&SF project and natural meteorological trends (Nicholson 1926; Howell 1932; Bent 1937; Sprunt 1945, 1954; Stieglitz and Thompson 1967; Service 1990, 1991, 1999; Corps 1992). Specifically, in WCA-3A snail kites have been impacted by the maintenance of unnaturally high stages (Kitchens et al. 2002; Martin et al. 2003; Service 2006a). This condition is believed to have reduced suitable nesting substrate and foraging opportunities. The loss of over half of the wetlands in central and southern Florida

during the last century, coupled with habitat degradation and fragmentation to many remaining wetlands, has increased the importance of WCA-3A in sustaining the overall kite population. Redistributing 55 percent of the current SRS water budget into NESRS, when combined with future operational improvements to WCA-3, is expected to reduce unnaturally high wet season stages in WCA-3A that have been impacting nesting substrate and reducing foraging opportunities. Additionally, restoration of the historic SRS flow way will enhance the function of wetland snail kite habitat in WCA-3B and NESRS.

Conclusions

Restoration of the historic SRS flow distribution will ultimately benefit fish and wildlife and their habitats including threatened and endangered species. Similar to the conclusions drawn in previous FWCA reports (Service 2003, 2005, 2006b) on the Tamiami Trail component of the MWD to ENP project, we have determined that the 10.7-mile bridge alternative will provide the greatest environmental benefit. However, given Congressional guidance with respect to this project we support the Corps' selection of an alternative that, at a minimum, raises the L-29 design stage to at least 8.0 ft and includes up to 1.0 mile of bridge. The selected alternative will meet the requirements of the WRDA Managers Amendment while providing a reasonable increase in environmental benefits.

The selected alternative with an L-29 design stage of 8.0 ft and at least 1.0 mile of bridge is consistent with future CERP projects. This limited bridging alternative also provides the opportunity for addressing key restoration uncertainties using Incremental Adaptive Restoration, if implemented in conjunction with other MWD features such as L-67 A and L-67-C levee conveyance and removal of the L-29 levee and/or borrow canal.

In summary, the modification of the Tamiami Trail to allow increased flows to NESRS is a critical step required to make progress towards restoration of the Everglades ecosystem. We commend the Corps' sustained efforts to complete this component of the MWD to ENP project. We pledge our continuing support in planning of restoration projects to maximize opportunities and minimize potential adverse effects to the natural system. For assistance or if you have questions regarding this letter, please contact me or Fish and Wildlife Biologist Kevin Palmer at 772-562-3909, extension 280.

Sincerely yours,

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South Florida Ecological Services Office

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Table 1. Tamiami Trail Limited Reevaluation Report Benefit Matrix.

	ALTERNATIVES	% Average Annual Flow Volume (ac-ft)	Potential connectivity of WCA-3B Marsh and NESS, percent of total length	% One in ten year maximum discharge (cfs)	% Number of sloughs crossed by bridges	% Differences between average velocity in marsh and average velocity at road	Flows into NESS provided via bridge (%)	% Total number of days at NESRS1 and NESRS2 water depth > 2 ft. during wet season peak	% Total number of days at NESRS1 and NESRS2 water depth > 3 ft. during wet season peak	% Average water depth at NESRS1and NESRS-2 during wet season peak (ft.)	% Reduction in wildlife mortality (# average annual deaths avoided)	Total PM Score
Category 1: L-29 design stage 7.5 ft, No roadway raising												
1.1	no action (19 culvert sets)	37.4%	0.00%	33.0%	0.00%	1.80%	0.00%	2.81%	0.00%	57.5%	0.00%	133
1.2	spreader swales (30ft x 1000ft)	39.1%	0.00%	33.6%	0.00%	2.50%	0.00%	2.42%	0.00%	58.4%	0.00%	136
1.3	add culvert sets (19 - 3x5ft dia) with swales (2)	39.8%	0.00%	33.0%	0.00%	3.30%	0.00%	2.55%	0.00%	58.8%	0.00%	138
1.4a	add 1-mile eastern bridge	43.1%	9.00%	36.2%	9.52%	26.0%	11.0%	3.30%	0.00%	61.9%	9.34%	209
1.4b	add 1-mile western bridge	43.1%	9.00%	36.2%	9.52%	26.0%	20.0%	3.30%	0.00%	61.9%	9.34%	218
Category 2: L-29 design stage 8.0 ft, Roadway improvements - Crown 11.05 ft												
2.1	raise road (low points only)	50.8%	0.00%	40.7%	0.00%	1.80%	0.00%	11.0%	0.00%	67.7%	0.00%	172
2.2.1	raise low points, add culverts with swales	53.2%	0.00%	40.7%	0.00%	1.80%	0.00%	23.3%	0.00%	69.9%	0.00%	189
2.2.2a	raise road, add 1-mile eastern bridge	58.0%	9.00%	40.8%	9.52%	26%	11.0%	46.7%	0.27%	73.5%	9.34%	284
2.2.2b	raise road, add 1-mile western bridge	58.0%	9.00%	40.8%	9.52%	26%	20.0%	46.7%	0.27%	73.5%	9.34%	293
2.2.3	raise low points, add 2-mile + 1-mile bridges	62.0%	28.0%	42.1%	19.0%	65%	42.9%	63.1%	0.27%	76.5%	28.0%	427
Category 3: L-29 design stage 8.5 ft, Roadway improvements - Crown 11.55 ft												
3.1	raise road	64.3%	0.00%	42.5%	0.00%	1.80%	0%	76.6%	0.37%	77.9%	0.00%	263
3.2.1	raise road, add culverts with swales	67.1%	0.00%	43.4%	0.00%	1.80%	0%	82.6%	0.46%	79.6%	0.00%	275
3.2.2a	raise road, add 1-mile eastern bridge	72.0%	9.00%	47.3%	9.52%	26%	11%	84.3%	0.64%	83.2%	9.34%	352
3.2.2b	raise road, add 1-mile western bridge	72.0%	9.00%	47.3%	9.52%	26%	20%	84.3%	0.64%	83.2%	9.34%	361
3.2.3	raise road, add 2-mile + 1-mile bridges	75.3%	28.0%	47.3%	19.0%	65%	42.9%	84.3%	1.46%	85.4%	28.0%	477
Category 4: L-29 design stage 9.7 ft, Roadway improvements - Crown 12.75 ft												
4.1	raise road	86.8%	0.00%	55.4%	0.00%	1.80%	0.00%	84.4%	74.0%	93.4%	0.00%	396
4.2.1	raise road, add culverts with swales	88.4%	0.00%	57.1%	0.00%	1.80%	0.00%	84.4%	89.4%	94.2%	0.00%	415
4.2.2a	raise road, add 1-mile eastern bridge (RGRR)	91.3%	9.00%	57.2%	9.52%	26.0%	11.0%	84.4%	100%	95.1%	9.34%	493
4.2.2b	raise road, add 1-mile western bridge (RGRR)	91.3%	9.00%	57.2%	9.52%	26.0%	20.0%	84.4%	100%	95.1%	9.34%	502
4.2.3	raise road, add 2-mile + 1-mile bridges (RGRR)	92.4%	28.0%	59.1%	19.0%	65.0%	42.9%	84.4%	100%	95.6%	28.03%	614
4.2.4	10.7-mile bridge (RGRR)	100%	100%	100%	100%	100%	100%	100%	99.3%	100%	100%	999
Category 5: L-29 design stage 9.7 ft, Structural alternatives or road realignment												
5.1	northern alignment of Alt 14	92.4%	28.0%	59.1%	19.0%	65.0%	42.9%	84.4%	100%	95.6%	28.03%	614
5.2	northern alignment with 1-mile bridge	91.3%	9.00%	57.2%	9.52%	26.0%	20.0%	84.4%	100%	95.1%	9.34%	502
5.3	northern alignment with 1-mile bridge and relocation of L-67 levee - Crown 13.00ft	100%	9.00%	100%	9.52%	13.0%	20.0%	37.1%	29.4%	75.2%	9.34%	403
5.4	current alignment with 1-mile bridge and relocation of L-67 levee - Crown 13.00ft	100%	9.00%	100%	9.52%	13.0%	20.0%	37.1%	29.4%	75.2%	9.34%	403

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