

National Park Service
U.S. Department of the Interior



Everglades National Park
Florida

FINDING OF NO SIGNIFICANT IMPACT
PILOT SPREADER SWALE PROJECT
February 2009

Implementation of the project to investigate the efficacy of pilot spreader swales installation south of Tamiami Trail does not constitute an action that normally requires preparation of an environmental impact statement (EIS). The preferred alternative (selected action) will not have a significant effect on the human environment. Negative environmental impacts that could occur are short- or long-term and negligible to moderate in intensity. There will be no significant impacts on public health, public safety, threatened or endangered species, or other unique characteristics of the site. There are no unmitigated adverse impacts on sites or districts listed in or eligible for listing in the National Register of Historic Places. No uncertain or controversial impacts, unique risks, significant cumulative effects, or elements of precedence were identified. Implementation of the preferred alternative will not violate any federal, state, or local environmental protection law nor result in the impairment of park resources or values.

Based on the foregoing information, the National Park Service has been determined that an EIS is not required for this project and thus will not be prepared.

Recommended: _____

Dan B. Kimball

3-13-2009

Dan B. Kimball

Date

Superintendent, Everglades National Park

Approved: _____

Art Frederick

3/23/09

David Vela

Date

Director, Southeast Region

Attachments

- A. Comments Received and Responses to Comments Received
- B. Errata Sheets
- C. Statement of Findings for Wetlands

Introduction. The National Park Service (NPS), in collaboration with the U.S. Army Corps of Engineers (USACE), will undertake a pilot project to test the efficacy of constructing spreader swales immediately south of two culverts beneath a 10.7-mile stretch of the Tamiami Trail at the northeastern boundary of the Everglades National Park (ENP). The NPS was the lead agency in preparation of the Environmental Assessment (EA) for this project, and the USACE was a cooperating agency under the National Environmental Policy Act (NEPA). The purpose of this project is to determine if pilot spreader swales will increase hydrologic flow into ENP and if so, to determine the level of increased conveyance. These data will provide decision-makers with sufficient information to decide whether construction of additional spreader swales on ENP land is worth the financial cost and potential environmental effects. Additional NEPA analyses and documentation will be prepared prior to constructing additional swales.

Background. Completion of the Tamiami Trail roadway and canal in 1928 was heralded as an engineering feat and allowed access into a vast wetland wilderness that greatly influenced development of South Florida. Today, the Tamiami Trail remains an important transportation and commercial corridor along the northern boundary of ENP. However, largely unforeseen during the Trail's construction were the environmental consequences of essentially building a dam across the Everglades ecosystem. Eighty years later, environmental impacts of the Tamiami Trail are readily observable.

The Everglades National Park Protection and Expansion Act of 1989 (Expansion Act), 16 U.S.C. Part 410r-5 *et seq.*, expanded the boundaries of ENP to include 109,600 acres south of the Tamiami Trail, U.S. Highway 41, in Miami-Dade County. The Expansion Act also authorized the Secretary of the Army, in consultation with the Secretary of the Interior, "to construct modifications to the Central and Southern Florida Project to improve water deliveries into the park and shall, to the extent practicable, take steps to restore the natural hydrologic conditions in the park."

In 1992, the USACE published a General Design Memorandum (GDM)/Environmental Impact Statement (EIS) called Modified Water Deliveries to Everglades National Park (Mod Waters). This GDM partially satisfied the direction contained in the Expansion Act, but did not address modifications needed to provide full conveyance capacity under Tamiami Trail.

Spreader swales were suggested originally by the USACE as a potential means of providing increased water deliveries; however, the effectiveness and potential level of benefits remains unknown. Neither the 1992 GDM/EIS, the 2005 Revised General Reevaluation Report/EIS, nor the 2008 Final Limited Reevaluation Report/EA for the Tamiami Trail component included authorization for construction of spreader swales at the outlets of the existing culverts under Tamiami Trail. Questions remain on how much the swales will improve the flow in the culverts under Tamiami Trail. To date, no conclusive study has been done that substantiates the benefits of these features relative to their cost and ecological impacts.

The USACE has recommended that construction of spreader swales downstream of existing culverts under Tamiami Trail between levees L67 and L30 to provide improved flow into Northeast Shark River Slough. There are 19 sets of culverts beneath this stretch of the roadway. These culverts provide flow into the park during most of the year (depending on the stage of water in the L-29 canal, north of Tamiami Trail).

The purpose of the pilot spreader swale project is to determine if installation and functioning of spreader swales will be effective in contributing to the overall restoration

goals of the Mod Waters project by taking steps to restore the natural hydrologic conditions (increased flow and natural distribution) of Northeast Shark River Slough. Internal and public scoping resulted in identification of four project objectives for meeting the project purpose:

1. Provide data and information to the NPS and USACE to guide future planning and compliance efforts for enhancing flows and assessing potential ecological benefits in Northeast Shark River Slough.
2. Establish criteria for determining compliance with restoration goals of the Mod Waters project, including thresholds for water quality, quantity, and distribution of flows in Northeast Shark River Slough.
3. Define what monitoring, measurements, and modeling should be used to verify environmental benefits or degradation resulting from installation.
4. Determine the beneficial effects needed to justify the impacts to park natural and cultural resources from project implementation.

THE PREFERRED ALTERNATIVE (SELECTED ACTION)

The NPS Selected Action is described as “Alternative D, the Preferred Alternative” in Chapter 2 of the EA. There were no changes to Alternative D as described in the EA.

The Selected Action is a small component of the larger Modified Water Deliveries Project for ENP. While the pilot swale features were not identified as a component of the originally authorized 1992 plan, their implementation could be consistent with the purposes of the project for improving hydrologic conditions within ENP if found to have demonstrable benefits. The purpose of Mod Waters is to restore wetland functions within the park by modifying water deliveries to the park and altering water management operation outside of the park. The Mod Waters project is jointly funded by the NPS and USACE and is expected to be completed in 2012.

The Selected Action is an adaptive management strategy comprised of the following elements:

- 1) An initial phase of hydrologic modeling to simulate potential effects of the pilot spreader swales. Modeling will be conducted by the NPS in collaboration with the USACE and the South Florida Water Management District. Various models, such as physical models and/or numerical simulations, will be considered and ultimately implemented for this approach.
- 2) If the modeling results show no hydrologic benefits, the pilot spreader swales will not be constructed. Initially, a 10 percent flow improvement threshold will be used as the success criteria. However, final threshold criteria will be established following examination of the model output. The pilot spreader swales will be constructed only if the results of hydrologic modeling would be a positive indication of the performance of pilot spreader swales (i.e. increase the certainty that flow improvements would result from their implementation).
- 3) If the NPS determines that the potential benefits of spreader swales would justify the adverse impacts to park resources and financial costs, ENP will then consider the swale

features as a viable mechanism to improve flows to ENP and will issue a Special Use Permit to the USACE authorizing construction of two pilot spreader swales.

- a) The selection of culverts as pilot spreader swale locations will be based on criteria that include: 1) avoidance of wood stork colony restriction zones; 2) avoidance of private property, tribal residences, man made features, or historic/cultural properties; 3) avoidance of the footprint of the LRR 1-mile bridge; and 4) availability of a nearby culvert to serve as the control against which the effectiveness of the pilot spreader swale can be measured.
- b) Of the 19 sets of culverts, those considered feasible are 42, 43, 44, 46, and 51
- 4) If constructed, the swale footprints will be excavated to limestone aligned parallel to Tamiami Trail, perpendicular to marsh flow. The total surface area would range from 60,000 and 62,000 square feet. A monitoring plan will be implemented to measure hydrologic and ecologic responses resulting from the presence of the spreader swales.
- 5) If the pilot spreader swales prove ineffective, the sites will be rehabilitated to return them to pre-disturbance conditions. In addition to the site rehabilitation, the park will restore to functioning wetlands up to 4.3 acres of existing, abandoned roadbeds in the East Everglades Expansion Area to compensate for the loss of original wetland acreage and associated function...

OTHER ALTERNATIVES CONSIDERED

In addition to the preferred alternative, two other action alternatives and a No-Action Alternative were fully analyzed in the Pilot spreader Swale Project EA:

1. *The No-Action Alternative* included no changes to Tamiami Trail culverts or associated conditions. It was included to serve as the baseline for the NEPA analysis, but would not provide the opportunity to investigate the use of spreader swales to improve flows into the park. .
2. *A structural-only alternative* would have installed two pilot spreader swales without advanced modeling or an adaptive management approach. Given the uncertainty that swales will provide benefits and the potential adverse impacts, this alternative was not selected for implementation.
3. *A modeling-only alternative* would have employed enhanced modeling techniques to inform future decision-making about installation of multiple spreader swales in the project area. This option did not provide for adaptive installation of pilot swales in the event that modeling was favorable. This alternative was not selected for implementation.

Alternatives Considered and Dismissed

In addition to the alternatives that were analyzed, the NPS considered other options during early planning phases for the project. The following options were dismissed from full consideration because they did not meet the project objectives or could potentially generate unacceptable levels of natural and/or culture resource impacts.

1. *Other sites to test swale efficacy.* Spreader swales have been used to distribute water for marshes that are crossed by roads at other locations in South Florida. However,

there have been no studies documenting the impacts of these features or features similar to the swales being considered for evaluation in this pilot project. Since no data could be made available at any comparable sites, this option was dismissed.

2. *Locations outside ENP* were also considered as locations for conducting a pilot project. It was not possible to find sites similar enough to the project area to be used to evaluate results for the Tamiami Trail outlets, and this option was dismissed.
3. *Alternate pilot spreader swale design options* were considered during early project planning. Constructing the pilot spreader swales parallel to flow (perpendicular to Tamiami Trail) or including multiple spreader swales using a radial design were considered. Both options would have disturbed pristine areas beyond the vegetation haloes (the distinct plume of marsh vegetation directly south of the culvert sets) and had potentially unacceptable impacts on proposed wilderness and cultural resources. Given the uncertainty that benefits will result from construction, they were dismissed from further consideration.

RATIONALE FOR SELECTED ACTION

The Selected Action meets the following project objectives:

1. Provide information to the NPS and USACE regarding the potential for spreader swales to enhance flows.
2. Establish criteria for determining compliance with restoration goals of the Mod Waters project, including thresholds for water quality, quantity, and distribution of flows in Northeast Shark River Slough.
3. Define what monitoring, measurements, and modeling shall be used to verify hydrologic conditions resulting from installation.
4. Determine acceptable levels of impact to park resources should swales prove effective.
5. Provide information to determine the level of potential beneficial effects needed to justify the adverse impacts to park natural and cultural resources from project implementation.
6. Provide information required to determine if any potential benefits are worth the short-term and long-term costs incurred by the project.

Environmentally Preferred Alternative

Section 2.7 D. of the Handbook for the NPS Director's Order 12 (DO-12, Conservation Planning, Environmental Impact Analysis, and Decision-Making), states that the environmentally preferred alternative is the alternative that will promote national environmental policy as expressed in Section 101 of NEPA which includes the following six criteria:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;

3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources; and
6. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

The Council on Environmental Quality's Forty Questions (Q6a), further clarifies the identification of the environmentally preferred alternative, stating "ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves and enhances historic, cultural and natural resources." Alternative C, the "modeling only" alternative in the EA, best meets the criteria for the Environmentally Preferred Alternative.

1. Under Alternative C, the potential hydrologic impacts of spreader swales would be investigated using enhanced hydrologic modeling, without construction of the pilot swales themselves. This alternative would provide information for decision-makers without adverse impacts to park resources, and C would be more effective in meeting these six criteria than Alternatives A, B and D. Alternative A would provide no new data to inform the decision-making process regarding installation of spreader swales, thus making it less able to meet the criteria than Alternative C. The degree of uncertainty regarding the ability of spreader swales to provide measurable ecological benefits, coupled with the introduction of new disturbance associated with spreader swale construction would make Alternatives B and D less able to meet the criteria.
2. Because spreader swale construction would remove native vegetation, disturb wildlife, and potentially expand the habitat of exotic aquatic fauna and plant species in the park, Alternatives B and D would not meet Criteria 1 and 3. Alternative A would not contribute to ongoing Everglades restoration efforts, and thus would not support efforts to improve future resource conditions in the park. Under Alternative C, information on spreader swale performance would be provided, no construction would take place, and the environment would be better protected without the risk of unintended consequences. Thus, the "no construction" option of Alternative C best meets Criteria 1 and 3.
3. Although the potential to affect cultural artifacts during construction of the spreader swales would be low, better protection of these important resources would be achieved if no ground disturbance were to take place. Thus, Alternatives A and C better meet Criterion 4 in protecting cultural resources.
4. Installation of the spreader swales would require use of non-renewable energy, movement of dredged materials to a land fill or other disposal site, and installation (and subsequent removal) of fill materials to provide site access. Because construction activities such as these would not take place under Alternatives A and C, they would better meet Criterion 6.

MITIGATION

Under the Selected Action, best management practices and mitigation measures will be used to prevent or minimize potential adverse effects associated with the project. These practices and measures would be incorporated into the project construction documents and plans. Resource protection measures undertaken during project implementation will include, but will not be limited to, those listed below.

**TABLE I. MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES OF THE
SELECTED ACTION**

Potential Adverse Effect	Mitigation Measure or Best Management Practice
Direct effects from construction activities	Protection of all construction areas to confine potentially adverse activities to the minimum area required for construction. All protection measures will be clearly stated in the construction specifications, and workers will be instructed to avoid conducting activities beyond the construction zone.
Erosion resulting from construction-related surface disturbance	The contractor will be required to control erosion prior to, during, and following ground-disturbing activities. Standard erosion control measures will be used to minimize soil erosion. Erosion barriers will be inspected and maintained regularly to ensure effectiveness. The primary measure used to control storm water runoff will be installation of temporary silt fencing. Silt fences are made of synthetic fabric and are placed in drainage contours to trap sediment generated during construction.
Construction will affect areas previously undisturbed	Construction activities will take advantage, where possible, of sites where previous disturbance has already had adverse effects.
Contamination of soil by petrochemicals from construction equipment	Areas used for equipment maintenance and refueling will be minimized, and surface runoff in these areas will be controlled. Equipment will be checked frequently to minimize leaks and potential contamination.
Direct effects from construction on threatened and endangered species, wildlife, and habitat	All construction personnel will be advised of the potential presence of the Florida panther, Eastern indigo snake, Everglades Snail Kite, and wood stork to avoid disturbance or injury to these federally listed species. The NPS will use its best professional judgment in applying standard protection measures for the federally-listed species.
Wildlife disturbance resulting from construction activities, including noise	To reduce potential impacts on wildlife, construction activities occurring near sensitive habitats will be scheduled to minimize potential impacts during periods of breeding, nesting, and rearing of young. Construction will occur only during daylight hours to reduce effects on nocturnal foraging or rest.
Protection of cultural resources	To avoid damage to previously unknown archaeological resources, the Southeast Archaeological Center will conduct archaeological surveys and testing activities in previously un-surveyed and/or undisturbed areas prior to ground-disturbing activities. If any resources are encountered, adequate mitigation of project impacts (in consultation with appropriate agencies) or adjustment of the project design will take place to avoid or limit the adverse effects on prehistoric and historic archaeological resources. Include stop-work provisions in construction documents should archaeological or paleontological resources be uncovered.
Discovery of unknown archeological resources or human remains	If previously unknown archaeological resources are discovered, work will be stopped in the area of any discovery and the NPS will consult with affiliated tribes, pursuant to NAGPRA and the <i>Draft Park NAGPRA Plan of Action for Inadvertent Discoveries</i> , ENP and Associated Tribes (May 2008)

Potential Adverse Effect	Mitigation Measure or Best Management Practice
Public health and safety	Standard traffic control highway construction safety plans will be implemented. Traffic flow control, signage and flagging to protect visitor and staff safety during construction activities will be provided.
Wetland impacts	The NPS will maintain and operate the pilot spreader swales under the Exotic Vegetation Management Plan, and the ENP Hurricane Plan. Continued implementation of these resource management plans will minimize effects of swale maintenance on wetland resources.

WHY THE SELECTED ACTION WILL NOT HAVE A SIGNIFICANT IMPACT ON THE HUMAN ENVIRONMENT

As defined in 40 CFR §1508.27, significance is determined by examining the following criteria:

1. *Impacts that may have both beneficial and adverse aspects and which on balance may be beneficial, but that may still have significant adverse impacts which require analysis in an EIS.*

Whether taken individually or as a whole, impacts resulting from implementation of the project will not reach the level of significance which would require analysis in an environmental impact statement.

Implementation of the Selected Action will result in adverse impacts to natural resources, including water quality, vegetation, wetlands, wildlife, and special-status species. The extent and intensity of these effects is uncertain, but are expected to be long-term, localized, and minor. Local effects to wetlands could range up to local and moderate, however mitigation activities elsewhere in the park would off-set this. Impacts to special-status species are equivalent to a *may affect, not likely to adversely affect* Section 7 finding. Beneficial effects on local hydrology would be long-term, and are expected to be minor and localized. On balance, effects are expected to be adverse, but not significant.

2. *The degree to which public health and safety are affected.*

The project will have no measurable effects on public or park staff health and safety. Construction activities along Tamiami Trail will be accompanied by traffic management measures, signage, and markings necessary to continue safe passage along the road section adjacent to the project site.

3. *Any unique characteristics of the area (proximity to historic or cultural resources, wild and scenic rivers, ecologically critical areas, wetlands or floodplains, and so forth).*

If the pilot spreader swales are constructed, several acres (a maximum of 4.3 acres) of emergent wetlands downstream of the culverts will be affected by the physical footprint. These wetlands include mixed wetland hardwood – mixed shrubs, freshwater marsh-sawgrass, and freshwater marsh.

- At several culvert locations, flow from the Tamiami Trail culverts has formed ponds or open water (palustrine open water/emergent) wetlands (freshwater marsh);

- South of the ponds are palustrine forested or scrub-shrub wetland communities dominated by Carolina willow (*Salix caroliniana*) and pond apple (*Anona glabra*) (mixed wetland hardwoods – mixed shrub) also associated with flows from the culverts.
- Beyond the wetland forest vegetation is an expanse of palustrine emergent wetlands, dominated by sawgrass (*Cladium jamaicense*) and patches of cattails (*Typha latifolia*) on the northern edge of the sawgrass (freshwater marsh – sawgrass).

To compensate for the loss of wetland acreage and function, the park would rehabilitate 4.3 acres of existing, abandoned roadbeds in the East Everglades Expansion Area. The wetlands in the area to be rehabilitated are generally similar to those in the project area, including palustrine emergent (freshwater marsh – sawgrass) and palustrine scrub-shrub/forested (mixed wetland scrub-shrub and mixed hardwoods). All of these functions are currently degraded in the compensation area as a result of road construction and the presence of invasive plant species.

4. *The degree to which impacts are likely to be highly controversial.*

There were no highly controversial effects identified during the preparation of the environmental assessment or during the public review period. There are differing technical opinions on the degree of improved hydrologic conveyance provided by the spreader swales when compared to the conveyance capacity of the existing features, and the purpose of the project is to determine if installation and functioning of spreader swales would be effective in contributing to the overall restoration goals of the Mod Waters project.

5. *The degree to which the potential impacts are highly uncertain or involve unique or unknown risks.*

There were no highly uncertain, unique, or unknown risks associated with implementation of the selected action. The potential beneficial effects of spreader swales is uncertain and it is the purpose of the project to determine if installation and functioning of spreader swales would be effective in contributing to the overall restoration goals of the Mod Waters project.

6. *Whether the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*

Implementation of the project will neither establish a NPS precedent for future actions with significant effects, nor will it represent a decision in principle about a future consideration. Future proposals for installation of spreader swales will be evaluated through additional project-specific planning processes that incorporate requirements of NEPA and NPS Management Policies.

7. *Whether the action is related to other actions that may have individual insignificant impacts but cumulatively significant effects. Significance cannot be avoided by terming an action temporary or breaking it down into small component parts.*

The other projects and plans that have the potential to contribute to the cumulative effects of the pilot spreader swale project include:

- Park resource management plans: 1) the Exotic Vegetation Management Plan; 2) the Tamiami Trail Vista Clearing Project, and 3) the Draft General Management Plan/East Everglades Wilderness Study/Environmental Impact Statement (GMP/EIS).

- Regional water management projects in South Florida with the potential to alter or improve hydrology and water quality in or near the project area, such as: 1) the Modified Water Deliveries Project, 2) C-III Canal Project, 3) the Comprehensive Everglades Restoration Plan (CERP), and 4) the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project.

These other projects and plans, if funded and fully implemented, may result in minor to major, long-term, beneficial effects that will not be significantly reduced by the pilot spreader swale project.

8. *The degree to which the action may adversely affect properties in or eligible for listing in the National Register of Historic Places, or other significant scientific, archeological, or cultural resources.*

Implementation of the project would result in no adverse effect to historic properties. By letter dated January 12, 2009, the Florida State Historic Preservation Office (SHPO) concurred with the NPS's finding.

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat.*

Several federally-listed animal species could occur in the vicinity of the project area (Table 2). If construction proceeds under the Selected Action, the project *may affect, but is not likely to adversely affect* special-status species.

TABLE 2. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE ANIMAL SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status
MAMMALS		
West Indian Manatee	<i>Trichechus manatus</i>	Endangered
Florida panther	<i>Felis concolor coryi</i>	Endangered
BIRDS		
Wood stork	<i>Mycteria americana</i>	Endangered
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	Endangered
Everglades snail kite	<i>Rostrhamus sociabilis plumbeus</i>	Endangered
REPTILES		
Eastern indigo snake	<i>Drymarchon corais couperi</i>	Threatened
American alligator	<i>Alligator mississippiensis</i>	Threatened (S/A- similar in appearance to the American crocodile)

The proposed actions will not affect the West Indian manatee, Cape Sable seaside sparrow, or the Eastern indigo snake.

- Manatee have been sighted in the L-29 Canal once over the last 20 years, and have not been documented in the culvert pools south of Tamiami Trail. Because the project will not affect the L-29 Canal, there will be no effects to manatee.
- The Cape Sable seaside sparrow occurs several miles south and west south of the project area. There is no Cape Sable seaside sparrow critical habitat located within or adjacent

to the project area. The project will have no effect on the Cape Sable seaside sparrow or its habitat.

- The Eastern indigo snake is found in wet prairies and hardwood hammocks outside the project area. The *Standard Protection Measures for the Eastern Indigo Snake* (U.S. Fish and Wildlife Service (USFWS) 2006a) will be implemented during construction to mitigate any potential adverse effects to this species. The project will have no effect on the eastern indigo snake.

If spreader swales are constructed, disturbance and alternations in habitat may affect, but are not likely to adversely affect the Florida panther, wood storks, the Everglades snail kite, and the American alligator.

- The project area occurs in the Florida panther primary zone that supports the sole breeding population of Florida panthers. However, installation of the pilot spreader swales will not reduce suitable panther habitat appreciably. Construction disturbance could cause panthers to avoid the project area during installation, producing temporary effects. Thus, the proposed action may affect, but is not likely to adversely affect, the Florida panther.
- There are two wood stork colonies south of Tamiami Trail within the park. However, proximity to wood stork nesting and roosting sites was a criterion for eliminating pilot spreader swale locations. Wood storks could be exposed to construction noise during, but it is unlikely their nesting, roosting, loafing, and colony formation activities will be measurably affected. The long-term presence of the pilot spreader swales could result in a minimal loss of feeding and foraging sites. Therefore, the proposed action may affect, but is not likely to adversely affect the wood stork.
- Construction of the pilot spreader swales will not occur within the Everglade snail kite management zones. Culverts suitable for swale construction are outside the 500 meter limited activity buffer area of the Everglade snail kite. Effects could include disruptions in foraging and feeding activities that will occur during the approximate 2-month construction period. The contractor will be required to follow the NPS Draft Snail Kite Management Guidelines. Based on the limited scope of the pilot swale project, the proposed action is not expected to provide any short-term or long-term benefits to the Everglade snail kites. The project may affect, but is not likely to adversely affect, the Everglades snail kite.
- Alligators naturally occupy and maintain gator holes in the Northeast Shark River Slough. The presence of spreader swales may encourage alligators to inhabit the pilot swales and move out of natural ridge and slough or marsh habitats. The result of this behavioral change may prevent several alligators from maintaining natural gator holes. Although this behavioral change will not result in adverse effects in the alligators, gator holes are vital habitat and refuge for other wetland species. Thus, over the long-term, implementation of the proposed action may affect, but is not likely to adversely affect the American alligator.
- By letter dated February 23, 2009, the USFWS concurred with the NPS's determination that implementation of the preferred alternative "may affect, but is not likely to adversely affect" the Florida panther, wood stork, Everglade snail kite and American alligator and

will have “no effect” on the Eastern indigo snake, West Indian manatee, the Cape Sable seaside sparrow or its habitat.

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The selected action will not violate any Federal, State or local environmental protection laws.

Summary

On consideration of the criteria above, the NPS has determined there are no major adverse or beneficial impacts which will require further analysis in an environmental impact statement.

Impairment of Park Resources or Values

In addition to reviewing the list of significance criteria, the NPS Southeast Region Director has determined that implementation of the selected action will not constitute an impairment to ENP resources and values. This conclusion is based on a thorough analysis of the environmental impacts described in the project’s environmental assessment, relevant scientific studies, and the professional judgment of the decision maker guided by the direction in NPS Management Policies. As described in the environmental assessment, project implementation will not result in major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in the park’s general management plan or other relevant NPS planning document.

PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

Public Scoping

The public scoping process began in May 2008, with the publication of a notice of intent to prepare and EA in the *Federal Register* (Federal Register, Volume 73, Number 97).

A newsletter was distributed by electronic and conventional mail in May 2008 to the project mailing list of government agencies, organizations, businesses, and individuals. Respondents were encouraged to comment electronically on the NPS Planning, Environment and Public Comment website, by letter or in person at the open house. News releases and paid ads announcing the scoping open house were published in the Miami Herald and El Nuevo Herald on May 22, 2008.

On May 28, 2008, a public scoping open house was held at Florida International University’s Graham University Center, in Miami, Florida. Comments on the presentation content were received at the park, by electronic and conventional mail, at the NPS planning website, or in person. A certified court reporter transcribed the entire public hearing in which all comments were written into a typed document.

The NPS received a total of 18 responses during scoping for the Pilot Spreader Swales Project. The 18 responses contained a total of 50 comments on the management options, schedule and other concerns about the project. Five responses were received in opposition

to installation of the spreader swales. Reasons for opposition include: the use of swales as an unproven habitat restoration technique, the spreader swales will be an unnatural feature in the Everglades, the spreader swales will be an inappropriate use of time and money, and the NPS is not adhering to their restoration schedule. Eleven responses in support of pilot spreader swales included several reasons for encouraging the project, primarily centered on a desire for pursuit of any alternative that has the potential to increase hydrologic flow and subsequently aid in the restoration of ecologic balance in the Everglades.

Comments on the Pilot Spreader Swales Environmental Assessment

The EA was made available for public review and comment during a 30-day period ending December 9, 2008. A total of 15 responses were received, including 1 tribal, 2 Federal agency, 6 State or local agency, 2 organization, and 4 individual responses. On November 19, 2008, a public meeting was held at the South Dade County Regional Library, in Miami, Florida. A certified court reporter transcribed the public hearing in which all comments were written into a typed document.

A preference for Alternative B was expressed by many of the respondents who questioned whether additional modeling would improve decision making and would delay project implementation. Other respondents questioned the need for the project; questioned the criteria used for selecting culvert sets for the pilot project; questioned the elimination of alternatives; or questioned elements of the environmental analysis such as water quality.

Substantive comments on the EA and the NPS response are attached to this FONSI.

Agency Consultation

Representatives from the Florida SHPO are aware of the project and have been involved in consultations throughout the process. As part of the Section 106 process, the NPS also sent letters to the Florida SHPO and the Advisory Council on Historic Preservation on May 9, 2008. By letter dated January 12, 2009, the SHPO concurred with the NPS's finding that implementation of the preferred alternative will have no adverse effects on historic properties.

The USFWS personnel participated in a field inspection for the pilot swales project in December 2007 and in an interagency internal scoping workshop on May 15, 2008. Issues and concerns raised during the meetings by USFWS staff were incorporated into the development of the EA.

In accordance with Section 7 of the Endangered Species Act (16 United States Code 1531 *et seq.*), the NPS contacted the USFWS by letter on May 14, 2008, to initiate informal consultation and request verification of the list of threatened and endangered species that may occur within the project area. By letter dated February 23, 2009, the USFWS concurred with the NPS's determination that implementation of the preferred alternative "may affect, but is not likely to adversely affect" the Florida panther, wood stork, Everglade snail kite and American alligator and will have "no effect" on the Eastern indigo snake, West Indian manatee, the Cape Sable seaside sparrow or its habitat.

The park provided the Florida State Clearinghouse with the scoping notice for processing through the appropriate state agencies. Representatives from several State of Florida agencies have been engaged in consultations concerning the project. These include the Florida Department of Environmental Protection (FDEP), the South Florida Regional

Planning Council , Florida Department of Agriculture and Consumer Sciences, Florida Fish and Wildlife Conservation Commission, Florida Department of State, Florida Department of Transportation (FDOT), South Florida Water Management District and Miami-Dade County.

Three of the State agencies actively commented on the proposed project. The FDEP offered a full endorsement of moving forward with implementation of the pilot spreader swales project.

The Florida Fish and Wildlife Conservation Commission expressed concerns regarding the protection of special-status species such as the wood stork and Everglades mink, and it seeks designs that are sensitive to any impacts on threatened or endangered species.

The FDOT commented that the proposed project may have an impact on FDOT right-of-way, and therefore, asks for continued coordination throughout the NEPA process.

The remaining agencies did not submit comments.

Native American Tribes Consultation

A letter to initiate government-to-government consultations and provide information about the project was sent to the following tribes in May 2008: Miccosukee Tribe of Florida, Seminole Nation of Oklahoma, and Seminole Tribe of Florida. Representatives of the Miccosukee Tribe of Florida participated in an interagency scoping workshop on May 15, 2008, in the public scoping open house on May 28, 2008, and the public meeting on the EA on December 9, 2008.

ERRATA SHEET
PILOT SPREADER SWALE PROJECT ENVIRONMENTAL ASSESSMENT AND
WETLAND STATEMENT OF FINDINGS
EVERGLADES NATIONAL PARK

Text Changes to the Environmental Assessment

1. Executive Summary, page i, first paragraph, replace the first eight lines with “The U.S. Army Corps of Engineers (USACE) proposes a pilot project to construct spreader swales immediately south of two culverts found along a 10.7-mile stretch of the Tamiami Trail at the northeastern boundary of the Everglades National Park (ENP). The National Park Service (NPS) is the lead agency and the USACE is a cooperating agency under the National Environmental Policy Act (NEPA). The purpose of this project is to determine if pilot spreader swales would increase hydrologic flow into ENP and if so, determine the level of increased conveyance. These data will provide decision-makers with sufficient information to decide whether construction of additional swales on ENP land is worth the financial cost and potential environmental effects.”
2. Executive Summary, page ii, fourth paragraph, strike the text “/Environmentally Preferred Alternative.”
3. Executive Summary, page ii, fifth and seventh paragraphs, replace the word “rehabilitation” with “mitigation,” and replace the number “322,000” with “198,000”.
4. Alternative B, Cost, page 32, seventh paragraph, replace the word “rehabilitation” with “mitigation,” and replace the number “322,000” with “198,000”.
5. Alternative C, page 32, last paragraph, after the first sentence insert, “Modeling would be conducted by the NPS in collaboration with the USACE and the South Florida Water Management District.”
6. Alternative D, page 34, last paragraph, after the first sentence insert, “Modeling would be conducted by the NPS in collaboration with the USACE and the South Florida Water Management District.”
7. Alternative D, Cost, page 35, fifth paragraph, replace the word “rehabilitation” with “mitigation,” and replace the number “322,000” with “198,000.”
8. Table 4, Summary of the Impacts of the Alternatives, Alternative B, page 45, replace the last sentence in the first paragraph with, “It is expected that the total cumulative impacts to water quality would continue to be, beneficial, regional, moderate to major, and long-term”.
9. Table 4, Summary of the Impacts of the Alternatives, Alternative C, page 45, replace the last sentence in the first paragraph with, “It is expected that the total cumulative impacts to water quality would continue to be, beneficial, regional, moderate to major, and long-term”.
10. Table 4, Summary of the Impacts of the Alternatives, Alternative B, page 46, in the second sentence delete the words, “localized to”.
11. Table 4, Summary of the Impacts of the Alternatives, Alternative C, page 46, in the second sentence change “local” to “regional”.

12. Table 4, Summary of the Impacts of the Alternatives, Alternative B, page 47, in the first sentence insert “minor-“ before the word “moderate”.
13. Table 4, Summary of the Impacts of the Alternatives, Alternative B, page 47, in the last sentence in the first paragraph, replace “adverse, local, moderate, and long-term,” with “long-term, beneficial, and moderate to major”.
14. Table 4, Summary of the Impacts of the Alternatives, Alternative C, page 47, in the last sentence in the first paragraph, insert the words “to major” after the word “moderate”.
15. Table 4, Summary of the Impacts of the Alternatives, Alternative B, page 48, in the first sentence in the first paragraph delete “short-term” and in the second sentence delete “localized to”.
16. Table 4, Summary of the Impacts of the Alternatives, Alternative C, page 48, in the last sentence in the first paragraph, delete “localized to”.
17. Table 4, Summary of the Impacts of the Alternatives, Alternative B, page 49, replace the number “6.7” with “4.3”.
18. Soils, Impacts of Alternative B, page 79, sixth paragraph replace the number “6.7” with “4.3”, and replace the number “3.35” with “2.15”.
19. Vegetation and Wetlands, Impacts of Alternative B, page 86, third paragraph replace the number “6.7” with “4.3”.

Text Changes to the Wetland Statement of Findings

1. Wetland Statement of Findings, page 168, second paragraph, first line, insert the text “a pilot project” between the words “proposes” and “to”.
2. Wetland Statement of Findings, page 170, last paragraph, replace the number “6.70” with “up to 4.3”.
3. Wetland Statement of Findings, page 171, last paragraph, replace the word “rehabilitation” with “mitigation,” and replace the number “322,000” with “198,000.”
4. Wetland Statement of Findings, page 178, second paragraph, replace the number “6.7” with “4.3.”
5. Wetland Statement of Findings, page 178, Table, insert the word “Maximum” between the words “Total” and “Wetland”.
6. Wetland Statement of Findings, page 178, Table, replace the number range “1.38-6.7” with the number “4.3.”
7. Wetland Statement of Findings, page 178, third paragraph, replace the first sentence in the paragraph with “The area of each type of wetland vegetation affected would vary depending on the specific culvert sets used, but a maximum of approximately 4.3 acres of wetlands are expected to be impacted during implementation of this project.”
8. Wetland Statement of Findings, page 178, last paragraph, replace the number “6.7” with “4.3.”
9. Wetland Statement of Findings, page 179, third paragraph, replace the number “6.7” with “4.3.”

RESPONSE TO SUBSTANTIVE COMMENTS

The following table includes substantive comments that were received during public review of the Environmental Assessment (EA) and NPS responses to these comments. The substantive comments are presented as either direct excerpts (representative quotes) from the original comments or as text that has been paraphrased from the original comments. The comments and responses are organized according to the commenting agency, organization, or individual.

#	Name / Entity	Comment	Response
1	Thomas L. Poulsonthe vegetation downstream of the culverts is largely pond apple with almost no understory; thus there is no impediment to flow. For this reason I favor no expenditure of funds and no study i.e., Alternative A	The conditions described in the comment only represent the two eastern culverts. The vegetation downstream of the other culverts is generally denser and lower to the ground. At these culverts, it is more difficult to determine visually if there is an impediment to flow. The purpose of this pilot spreader swale project is to determine if installation and functioning of spreader swales would improve flow. The effect of vegetation, as well as other factors such as topography, is uncertain at this time, and the purpose of the proposed action is to improve knowledge of contributing factors. This knowledge would be applied to future decision making regarding full implementation of spreader swales in the project area.
2	Joel Trexler	Impacts of the two proposed swales on aquatic communities of the Northeast Shark River Slough may be limited because the spatial scale of the proposed swales is small relative to the landscape of the Northeast Shark River Slough. However, their addition sets a precedence that is arguably in the wrong direction for restoration of that ecosystem. If the area of deep-water habitat is kept small and the effort is run as an opportunity for reducing uncertainties of the type described above, some of the risks may be compensated by the promise of improved tools for future planning.	Construction and implementation of pilot spreader swales may provide additional refugia for exotic aquatic species and will have known environmental consequences such as loss of soils and wetlands. The extent of any potential damage from providing exotic refugia remains largely unknown because spreader swales have never been implemented within Northeast Shark River Slough in ENP. The monitoring and assessment program will be used to gather information regarding any potential increases in the abundance, diversity, and distribution of exotic aquatic species should these types of changes occur. Any potential benefits gained from implementation of the pilot spreader swales could then be weighed against known environmental impacts learned from the environmental monitoring program.

#	Name / Entity	Comment	Response
3	U. S. Army Corps of Engineers	Regrettably, we can not support the NPS's preferred alternative (Alternative D) as it relies on additional hydrologic modeling to decide whether to proceed with construction and monitoring of pilot spreader swales. Instead of Alternative D, Jacksonville District recommends that Alternative B (two pilot spreader swales) should be implemented as soon as possible to determine the ability of swales to increase flow from L-29 to ENP.	The NPS acknowledges the difference of opinion regarding the need for modeling. However, NPS policy requires a cautious approach to constructing the pilot project on NPS lands, and NPS believes that additional modeling is warranted. The modeling will be done coincident with pre-construction hydrologic monitoring and is proposed to be completed in such a manner as to not delay construction of the pilot swales, should the modeling results indicate that the pilot swales are warranted. The NPS also recognizes the limitations posed in additional modeling. However, given the wide range of estimates of the effects of spreader swales on hydrologic flow and the potential of spreader swales to adversely affect park resources, the opportunity to reduce uncertainty and improve decision making through improved modeling is the prudent course of action. The NPS has also proposed that the modeling be conducted in close collaboration with the USACE and the State of Florida Water Management District (SFWMD) to ensure technical agreement on the modeling assumptions, model selection, data input, proper use of more current topographic information, and review of model output to promote consensus opinion on the outcome of the modeling phase of the selected alternative.
4	U. S. Army Corps of Engineers	Prior modeling performed by both Jacksonville District and ENP has shown a large range of potential flow improvements that could occur from implementing spreader swales adjacent to (south of) Tamiami Trail. We have exchanged technical information on this issue, but this has not resulted in a consensus technical opinion on the effectiveness of spreader swales. While we agree that the existing models could be improved, the results would still be limited by the available input data and would likely be subject to the same differences of opinion that have prevented consensus to date.	
5	U. S. Army Corps of Engineers	New modeling based on current information will not provide additional information on the effectiveness of swales. Without the physical data to be obtained from the pilot project, we will not be able to assess the effectiveness of spreader swales and make a fully-informed recommendation regarding the impacts and benefits of additional spreader swales.	

#	Name / Entity	Comment	Response
6	U. S. Army Corps of Engineers	Jacksonville District acknowledges that the existing model could be enhanced with the inclusion of all culverts along the L-29 Borrow Canal, additional specification of spreader swales geometry, and improved representation of the frictional effect of vegetation on flow. ... However, these actions would still exceed the desired precision for any modeling result since more data (from a field study) would be necessary for more refined calibration. Therefore, it is our position that although an improved model could still be constructed, the results from it would not resolve uncertainties because the improved model would still not be as precise and reliable as the results from a pilot study. We also have concerns that agencies will continue to struggle with input parameters to modeling without physical data.	
7	U. S. Army Corps of Engineers	We also do not understand the rationale of selecting a No-Action alternative as "environmentally preferred." A NEPA document is not necessary to refine or develop new hydrologic models.....No action does not seem to be environmentally preferred when we are trying to find ways to improve flows into the park.	Alternative A is not the environmentally preferred alternative. As discussed on pages 36 and 37 of the EA, Alternative C is the environmentally preferred alternative because it best promotes the national environmental policy as expressed in Section 101 of NEPA. While Alternative A results in no adverse environmental impact, it would provide no new data to inform the decision-making process regarding the potential contribution of spreader swales to ongoing Everglades restoration efforts.
8	U. S. Army Corps of Engineers	We are concerned that the EA leaves open what model predicted results would be sufficient to lead to construction of the two pilot swales. Given the questions and concerns about additional modeling without empirical data it is unclear how modeling of the Preferred Alternative would then lead to implementation of the pilot spreader swales in support of a future decision to implement a more comprehensive spreader swale project along Tamiami Trail.	Please see response to Comments 3 through 6 above. Initially, a 10 percent flow improvement threshold will be used as the success criterion, as this is equivalent to the minimum LRR modeling assumption. However, final threshold success criteria will be established following an examination of the model output. Modeling would also provide information on the most effective configuration (size, depth, dimensions) to incorporate into the final swale design. The pilot spreader swales would be constructed only if the hydrologic modeling indicates that flow improvements would result from their implementation. The pilot spreader

#	Name / Entity	Comment	Response
			swales would then be constructed and monitored to quantify the hydrologic benefits. It is expected that the model results will provide a range of expected flow increases based on using a range of reasonable values for critical model parameters. If one of the modeled culverts has a range that equals or exceeds 10 percent, then the pilot swales will be recommended for construction. A similar process will be used to determine the effects of the pilot swales and provide a recommendation for a more comprehensive spreader swale project.
9	Florida Department of Environmental Protection (FDEP)	The FDEP supports expediting construction of spreader swales, but notes that Alternative B is the only alternative that meets all of the objectives of the project.	The NPS acknowledges FDEP's support for Alternative B. As discussed in Comments 3 through 6 above, the NPS believes that given the wide range of estimates of the effects of spreader swales on hydrologic flow and the potential of spreader swales to adversely affect park resources, reducing uncertainty and improving decision making through improved modeling is the prudent course of action prior to construction of pilot spreader swales.
10	Florida Department of Environmental Protection	Staff has expressed concerns that a number of potential locations for the two pilot swales were eliminated from further consideration based on screening criteria inconsistent with the MWD project and the previously defined constraints.	The wood stork secondary management zones were excluded as potential pilot spreader swale construction sites because there are other viable culvert sites outside the wood stork management zones. It is prudent to use sites outside the wood stork management zones to minimize any potential impacts to the endangered wood stork. Additionally, if the pilot spreader swales were constructed in the wood stork management zones, construction could potentially be restricted to dates outside the wood stork nesting season, which can extend from February through July. Restricting construction to non-nesting seasons could potentially limit our ability to construct the pilot spreader swales in a timely fashion.
11	Florida Department of Environmental Protection	The FDEP recommends locating at least one of the two pilot swales a higher flow culvert with measurable flow during average stage conditions. Based on environmental impacts associated with Tamiami Trail Bridge construction, staff also recommends co-locating the construction areas for the bridge approaches and the spreader swales to reduce impacts.	
12	Florida Department of Environmental Protection	Based on initial screening analysis presented, only culverts that currently do not deliver much flow to ENP are considered for the testing project. There may be varying hydrological responses associated with the affects when comparing high and low flow culverts. The FDEP	

#	Name / Entity	Comment	Response
		recommends locating at least one of the two pilot swales at one of the higher flow culverts where there is measurable flow during average state conditions.	pilot spreader swales in a timely fashion. Sites within the footprint of the 1-mile bridge were excluded as potential pilot spreader swale construction sites based on guidance from the USACE, which advised that constructing swales within the footprint of the bridge could potentially conflict with construction schedules as well as adversely affect collection of monitoring data associated with the pilot spreader swale project. Additionally, if the pilot spreader swales prove effective at improving flow conveyance, they would potentially need to be removed during the bridge construction. Thus, any potential benefits gained from the pilot spreader swales would be negated.
13	Florida Department of Environmental Protection	Some of the screening criteria used in location analysis are inconsistent with the MWD project and previously defined constraints. Specifically, new constraints are being developed that were not previously considered when evaluating potential locations for a bridge along the Tamiami Trail. ... Since the screening criteria were not applied to the location of the bridge, further details should be provided as to why selection criteria were chosen before eliminating these locations.	Additionally, NPS clearly acknowledges that there are different flow rates when comparing different culvert sets along the Tamiami Trail, as is described in the EA Appendix C.
14	Florida Department of Environmental Protection	Elimination of swale locations outside the primary wood stork protection area are inconsistent with what was done for the Tamiami Trail Eastern Bridge. The guidance provided by State of Florida Fish and Wildlife Conservation Commission (FWCC) for the Tamiami Trail states that construction is restricted only during the nesting seasons. Culvert locations 54 and 56 should remain under consideration.	
15	Florida Department of Environmental Protection	It is not clear why culverts 56 and 58, located along the approaches to the bridge were screened out. It may be better to co-locate the construction to reduce impacts.	
16	Florida Department of Environmental Protection	The proposed pilot project is not sufficient in scope to assess the best methods for improving distribution of water flow while increasing rate of flow. Staff suggest that testing of methods to improve water distribution and flow be much more robust, both in extent and types of mechanism to improve flow.	To expedite the project, the scope was limited to evaluating the ability of the swales to increase flow through the culverts. Evaluation of the ability of the swales or other mechanisms to increase distribution of water into Northeast Shark Slough is a much more difficult and time-consuming process.

#	Name / Entity	Comment	Response
17	Florida Department of Environmental Protection	Since the purpose of constructing pilot test swales is to resolve uncertainties associated with previous modeling efforts, such as the one suggested in preferred Alternative D, the Department supports moving forward with Alternative B. However, it is recommended that further evaluation including dye studies, vegetation removal or other in-situ measurements be incorporated into Alternative B or supplant the hydrologic monitoring component of Alternative D...The recommended evaluation would provide additional information as to the feasibility that modeling efforts may not.	The preferred alternative provides for hydrologic, ecologic, and water quality monitoring, which will be documented in subsequent monitoring plans and made available. The data gathered in the monitoring process, which also include topographic surveys, are expected to also improve the modeling efforts.
18	Florida Department of Environmental Protection	The SFWMD notes that the EA only considers construction of swales perpendicular to the flow and does not consider swales running in a southerly direction could be sinuous and could be cut from the south toward the north, thus avoiding impacts to the pond apple and other native trees that have grown downstream of the culverts.	As discussed in the EA section on Alternatives Considered and Dismissed, perpendicular swales would disturb previously undisturbed areas, have potential effects on cultural resource values near the project area, and disturb lands that the NPS has determined to be eligible for wilderness designation and that are currently being studied for wilderness designation. The NPS Management Policies direct that lands identified as being eligible for wilderness designation and wilderness study areas must be managed to preserve their wilderness character until the legislative process of wilderness designation has been completed. Until that time, management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation.
19	South Florida Water Management District	The proposed pilot project is not nearly sufficient in scope to assess the best methods for improving the distribution of flow while increasing the rate of flow.	The purpose of this project is to evaluate the pilot spreader swale designs proposed by the USACE to determine if installation and functioning of spreader swales would be effective in contributing to the overall restoration goals of the Mod Waters project. The scope was limited to evaluating the ability of the swales to increase flow through the culverts. Evaluation of the ability of the swales or other mechanisms to increase distribution of water into Northeast Shark Slough is a much more difficult and time-consuming process.

#	Name / Entity	Comment	Response
20	South Florida Water Management District	Proper testing of ways to improve the distribution and flow need to be much more robust, both in the extent and types of mechanisms to improve flow. To legitimately test a spreader swale with what we know about the extent of vegetation requires that the spreader swale extend at least half way to the next culvert set on both the east and west sides. The culvert sets have an average spacing of 3,000 feet, so the test swale should be at least 3,000 feet long. ... In addition, conveyance improvements such as cutting/burning of surface vegetation (no subsurface excavation) to create north-south paths to enhance flow should be evaluated. The north-south path conveyance improvement mechanisms could be evaluated at a separate culvert set location or as a second phase.	<p>Alternative designs, such as 3,000 foot-long swales, were not identified during the scoping process. If pilot spreader swales are constructed and their performance supports the construction of a full swale project, then further design refinements such as those suggested could be evaluated in a subsequent NEPA document.</p> <p>Topographic data have been collected at each of the culvert sets, and the preferred alternative prescribes a detailed hydrologic monitoring process. While vegetation clearing alone was not identified during the scoping process, it is expected that through the availability of this additional data and improved modeling, effects of methods such as vegetation clearing can be explored.</p>
21	South Florida Water Management District	The SFWMD does not agree with the modeling approach as there is not data on the small elevation changes that can result in meaningful differences in flow capacity. Construction and testing of actual conditions will allow field measurements of how flow moves in the swales and is conveyed into the marsh, while providing value experience and information on the implementation of the tested mechanisms.	Topographic surveys have been completed, and data will be used in modeling.
22	South Florida Water Management District	If the purpose is to more evenly distribute flow, then the spreader swales may be adequate; however, if the purpose is to increase the discharge rate through the same culverts, then channels running in a southern direction are more appropriate. A pilot project is not required to determine whether a perpendicular channel or a parallel channel is a better option for achieving a higher rate of discharge through the existing culverts.	<p>As discussed in the EA section on Alternatives Considered and Dismissed, perpendicular swales would disturb previously undisturbed areas, have potential effects on cultural resource values near the project area, and disturb lands that the NPS has determined to be eligible for wilderness designation and that are currently being studied for wilderness designation.</p> <p>As noted in response to Comment 18 above, lands identified as eligible for wilderness designation and wilderness study areas must be managed to preserve their wilderness character in the same manner as "designated wilderness" until Congress has completed the wilderness</p>
23	South Florida Water Management District	On page 156 of Appendix C it is clearly shown that individual culverts connected to a canal delivery roughly 11percent of the total flow, whereas	

#	Name / Entity	Comment	Response
	District	the other individual culverts deliver less than 5 percent of total flow.	designation process. See earlier responses to comments pertaining to the NPS maintaining the need for additional modeling.
24	South Florida Water Management District	No additional modeling is required to determine that the swales as proposed by ENP will be less hydraulically efficient than swales running south away from the L-29 into the NESRS.	
25	Florida Fish and Wildlife Conservation Commission (FWCC)	<i>Selection of screening criteria for imperiled species.</i> Wading bird rookeries are located immediate south of culverts 55 and 59, and these sites should be excluded. It is nevertheless possible that construction of spreader swales at culverts 54, 56, or 58 may benefit nesting efforts by maintaining flooded conditions and lengthening hydroperiods around the colonies, thereby enhancing foraging in the vicinity. We would support including these culverts in the test, with construction occurring outside the nesting season.	<p>Constructing the pilot spreader swales at Culvert 55 and Culvert 59 would locate the swales within a wood stork primary management zone and within a wood stork secondary management zone, respectively. Constructing the pilot spreader swales at either Culvert 54 and/or Culvert 56 would locate the swales within wood stork secondary management zones. Therefore, the approach set forth by the FWC to exclude only Culverts 55 and 59 does not coincide with the wood stork primary and secondary management zones set forth by the FWS.</p> <p>The NPS has excluded the wood stork secondary management zones as potential pilot spreader swale construction sites because other viable culvert sites are located outside the wood stork management zones. It is prudent to use sites outside the wood stork management zones to minimize any potential impacts to the endangered wood stork.</p> <p>Additionally, if the pilot spreader swales were constructed in the wood stork secondary management zones, construction would potentially be restricted to dates outside the wood stork nesting season, which can extend from February thru July. Restricting construction to non-nesting seasons could potentially limit our ability to construct the pilot spreader swales in a timely fashion.</p> <p>Please also refer to response to comments 10 through 15 for other reasons why sites were excluded from the pilot spreader swale construction.</p>

#	Name / Entity	Comment	Response
26	Florida Fish and Wildlife Conservation Commission	The Everglades mink is known to use all types of shallow wetland habitats. The FWC recommends that an experienced biologist survey areas near any construction sites with potential suitable habitat for Everglades mink to determine whether minks or their dens are present before initiating construction activities.	The NPS will coordinate with the FWC to discuss the need for a survey to determine the presence of active American minks at the proposed pilot spreader swale construction areas. Additional protection and/or mitigation measures will be determined by NPS should active minks or an active mink den be identified within a proposed pilot spreader swale construction site. Any survey methods will be required to be approved and permitted by the NPS.
27	Florida Fish and Wildlife Conservation Commission	<i>Concerns about alternative development, over-reliance on modeling, and further delays.</i> There have been repeated delays in implementing MWD components and this has translated into a delay in ecological benefits in NESRS, ENP and WCA3A. In considering the ability of the alternatives to produce data and contribute to adaptive management, our staff prefers Alternative B. Neither C nor D would guarantee the installation of passive conveyance feature that could help determine the hydraulic and ecological benefits. It would have been useful if additional structural alternative containing different construction methods, configurations, swale sizes, had been included as potential choices to be compared against Alternative B.	See previous responses to comments regarding the NPS maintaining the need for additional modeling. Under the preferred alternative, improved modeling would reduce uncertainty and improve decision making. Should modeling support the decision to move forward with the construction of pilot spreader swales, then additional, specific design alternatives will be considered based on the specific parameters of the culverts selected for construction of the pilot. The hydrologic modeling would occur on the same timeline as the pre-project monitoring, so no time would be lost in implementation and testing of the pilot swales due to this modeling. The modeling would be completed during pre-construction monitoring using the topographic surveys and additional hydrologic data.
28	Florida Fish and Wildlife Conservation Commission	It has long been the view of our staff that reliance on modeling with critical assessment of the models can provide fuel for unresolved scientific debates that might impede progress of Everglades restoration projects. To our knowledge, the tree island performance measure (Heisler et al 2002) is the only empirically based performance measure submitted as a predictor of conditions.	The NPS recognizes the limitations posed in additional modeling. However, given the wide range of estimates of the effects of spreader swales on hydrologic flow and the potential of spreader swales to adversely affect park resources, the opportunity to reduce uncertainty and improve decision making through improved modeling is the prudent course of action. Hydrologic monitoring data collected for the pilot project will be used to determine the efficacy of the constructed swales. Additionally, the NPS proposes that the modeling be conducted in close collaboration with the USACE and the SFWMD to ensure technical agreement on the modeling assumptions, model selection, data input, proper use of more

#	Name / Entity	Comment	Response
			current topographic information, and review of model output to promote consensus opinion on the outcome of the modeling phase of the selected alternative.
29	Florida Fish and Wildlife Conservation Commission	<i>Spreader swale location and design considerations.</i> We had previously asked that ENP consider the strategic placement of spreader swales at historic sloughs or aligned with the S-355 and other existing conveyance structures to augment hydraulic and ecological connectivity. We are disappointed, however, that no further analysis has been provided in the EA to help refine the locations for swale placement that would maximize connectivity. ... We would like to reiterate our support for selecting culvert 54 as one of the test sites, as it conveyed more than two times the volume of flow delivered by any of the culverts in the western sector.	Please refer to response to comments 10 through 15. Given the criteria used by the NPS for the selection of the swale pilot locations, the NPS staff have concluded that it is not advisable to consider the locations of the S-355 structures. Much of the flow through the outlets is governed by the stage in the L-29 canal, and actual operations of these structures, to date, is too infrequent for this to be a major factor affecting flow through the pilot swales.
30	Florida Fish and Wildlife Conservation Commission	None of the swale configurations address penetration of the higher topography immediately south of the Tamiami Trail. We had previously asked ENP to consider a swale orientation that penetrates through this unnatural ridge to provide greater benefits to NESRS that possible under default designs. We strongly encourage considering alternative configurations following completion of the topographic survey.	As discussed in the EA section on Alternatives Considered and Dismissed, perpendicular swales would alter previously undisturbed areas, extend beyond the existing vegetation haloes, and have potential effects on cultural resource values and lands under study for wilderness designation. As noted above, lands identified as eligible for wilderness designation and wilderness study areas must be managed to preserve their wilderness character in the same manner as "designated wilderness" until Congress has completed the wilderness designation process.
31	Florida Fish and Wildlife Conservation Commission	The total magnitude of improvements in the volume and distribution of flows over thousands of acres in ENP resulting from proposed spreader swales at all possible culvert locations should be a key consideration when evaluating local effects from the pilot project.	The pilot study is narrowly focused on the efficacy of just two pilot swales. Construction of additional swales would be evaluated in a separate NEPA planning and compliance process that would incorporate modeling results and physical findings from the test swales.

#	Name / Entity	Comment	Response
32	Florida Fish and Wildlife Conservation Commission	<i>Potential effects of deeper water refugia created by spreader swales.</i> Spreader swales may create some additional deeper water refugia for native fishes, alligators, turtles, and other aquatic wildlife. They may also help reduce wildlife mortality as semi-aquatic species in the northern reaches of ENP would not need to cross the Tamiami Trail to reach the L-29 Canal. Based on Trexler (2003) and Fury (1995) we would not expect these swales to have any measurable effect on the occurrence of exotic fishes in marsh habitats. Also, since excavation will not penetrate bedrock, we do not expect swales to provide thermal refugia for exotic fishes.	Please note that the EA also describes some potential negative consequences that these refugia may cause, such as loss of natural alligator holes in the natural marsh, increased predation on smaller native fish species, and proliferation of exotic apple snails. Since pilot spreader swales have never been implemented within Northeast Shark River Slough, the extent of the refugia and the environmental consequences of such structures remain largely unknown. The EA does not state that the spreader swales would provide thermal refugia for exotic fishes, but it does describe how the spreader swales would consist of deeper-water artificial structures that lack natural habitat features such as vegetation and peat soils.
33	National Parks and Conservation Association and The Everglades Foundation	...we believe that current evidence and previous similar experiments clearly indicate there would be no environmental benefit from the destruction of wetlands in ENP for either the pilot project or the large scale swales project.	The NPS has determined that given the wide range of estimates of the effects of spreader swales on hydrologic flow and that certain estimates point to the potential for beneficial effects to the park's natural systems, the preferred alternative provides a prudent approach to reducing uncertainty and improving decision making through improved modeling and, as warranted, subsequent development of pilot spreader swales.
34	National Parks and Conservation Association and The Everglades Foundation	...our organizations continue to fail to see any credible and demonstratable evidence of benefit from the proposal to create swales below the culverts under Tamiami Trail.	

#	Name / Entity	Comment	Response
35	National Parks and Conservation Association and The Everglades Foundation	...we also would like clarification from the NPS and the Army Corps of Engineers on the legal authority pursuant to which the pilot project would be conducted.	<p>The swales would potentially be constructed on NPS lands as part of the congressional directive to improve water deliveries to ENP as part of the modifications to the Central & South Florida (C&SF) project features associated with the implementation of the Modified Water Deliveries Project (Public Law 101-229 Sec. 104) While the swales would be modifications to the C&SF project, these features are passive, similar to other C&SF project within the boundary of the park, such as the stilling basin immediately south of the S-12D structure and L-67 extension canal. Therefore, it is unnecessary to remove the features from the park.</p> <p>Following the release of the NEPA decision document, a Special Use Permit (SUP) could be issued for the construction of the features within ENP. The permit would extend for the period of construction and would be similar to the permanent modifications made to the Taylor Slough bridges as part of the C-111 project implementation many years ago. Further, the wetlands modified by swale construction could be rehabilitated should it be determined that the features are ineffective in improving the conveyance of water through the Tamiami culverts. In addition, additional wetland mitigation may be provided within ENP for the loss of wetlands within the park as stated in the Statement of Findings associated and published with the EA. The proposed pilot swales would not be constructed in any lands that could be designated as wilderness in the future; this, too, is stated in the EA.</p>
36	National Parks and Conservation Association and The Everglades Foundation	...we see no specific authorization in Pub. L. 98-181 and related laws that allow the lands incorporated into the Park to contain project features.	
37	National Parks and Conservation Association and The Everglades Foundation	The specific authority to be utilized for this project appears to be under the Modified Water Deliveries Project (EA at 10). If so, then those lands involved in constructing the swales would become part of that project as well as part of the larger Central and South Florida Project; the multi-purpose objectives of these projects would then require that NPS remove those lands from the park, which in turn would require congressional approval.	
38		... if the NPS proposes to issue a special use permit using some existing authority, then the exercise of that authority must be consistent with the relevant regulations. For example, a right-of-way special use permit must be potentially revocable; the swales represent a permanent commitment of lands. Even if a special use permit is issued, NPS is obligated to treat the area as a wilderness until such time as GMP makes a final determination on	

#	Name / Entity	Comment	Response
		status. Therefore, NPS will need to prepare the requisite investigations for presentation to a Wilderness Committee. We note that as part of the implementation of the "Interim Operational Plan," special use permits, preceded by archeological and other investigations, were required for the installation of several monitoring wells, a far less significant land use that has been proposed in this instance.	
39	National Parks and Conservation Association and The Everglades Foundation	...we would like to ensure that the pilot project is subject to the following permitting and environmental review processes prior to its implementation, which we believe will help illuminate the concerns and problems with this project: 1) the CWA section 404 permitting process, and (2) the NPS special use permitting process, including Wilderness Committee approval.	Prior to construction of pilot spreader swales, all relevant permit requirements would be met, including appropriate mitigations.
40	National Parks and Conservation Association and The Everglades Foundation	No specific purpose for the project is identified.	As discussed on page 5 of the EA, the purpose of this pilot spreader swale project is to determine if installation and functioning of spreader swales would effectively contribute to the overall restoration goals of the Mod Waters project by taking steps to restore the natural hydrologic conditions (increased flow) of Northeast Shark River Slough.
41	National Parks and Conservation Association and The Everglades Foundation	No specific expected benefit is identified.	As stated on page 34 of the EA, under modeling in the preferred alternative, initially a 10 percent flow improvement threshold will be used as the success criterion, as this is equivalent to the minimum LRR modeling assumption.
42	National Parks and Conservation Association and The Everglades Foundation	In addition, none of the objectives state an actual hypothesis to be tested...It is hard to understand what this pilot project intends to achieve without any hypothesis or clearly defined objectives.	The pilot spreader swales would be constructed only if the hydrologic modeling indicates that the performance of pilot spreader swales would increase the certainty that flow improvements would result from their implementation. The pilot spreader swales would then be constructed and monitored to quantify the hydrologic benefits. It is the hypothesis of the pilot that if spreader swales are constructed, then flows through the culverts will increase by at least 10percent.

#	Name / Entity	Comment	Response
43		...there is neither scientific consensus as to the merits of the proposal, nor clear objectives to the testing process.	It is the lack of scientific consensus that forms the underlying need for this project. Objectives include resolving the divergence of opinions concerning the effectiveness of spreader swales, testing the ability of spreader swales to contribute to the overall restoration goals of the Mod Waters project, analyzing the potential environmental costs and benefits to support sound decision-making, and investigating the effectiveness of small-scale, incremental water deliveries. An initial success criterion, as determined by further modeling, is considered the minimum acceptable performance outcome that would support construction of the pilot spreader swales.
44		...we recommend studies along existing spreader systems, such as Alligator Alley.... We also recommend detailed investigations of the spreader systems below the S-12 structures.... We also suggest a thorough review of the findings of the joint report by the USGS and the NPS entitled "Road to Flamingo" which investigated the effectiveness of culverting along the main road.	As described on p. 35 of the EA, evaluation of other comparable projects were considered as an alternative to constructing pilot spreader swales. Examination of several candidate projects with swale features determined that none could provide a degree of scientific and technical input that would substantially reduce the range of professional opinion and provide consensus on the hydrologic effects of spreader swales associated with the Tamiami Trail culverts.
45		...the Corps must ensure wetland impacts are minimized and that any impacts are mitigated completely. Considering these wetlands occur inside the National Park boundaries, and provide a number of invaluable benefits to the system as a whole, the agency will need to consider extraordinary measures to provide the "in kind" mitigation necessary to offset the loss of these unique wetlands	Prior to construction of pilot spreader swales, all relevant permit requirements would be met, including appropriate mitigations.
46	Miccosukee Tribe	The Tribe is deeply concerned about the proposal in the EA to use a 10 percent flow management threshold modeling assumption as the success criteria to determine whether or not to construct the pilot project (Page 34). ... Using a modeling assumption from a full scale project for a small scale pilot project, which can not be	As stated on page 34 of the EA, initially, a 10 percent flow improvement threshold will be used as the success criterion, as this is equivalent to the minimum LRR modeling assumption. However, final threshold success criteria will be established following an examination of the model output. Model results will provide a range of expected flow

#	Name / Entity	Comment	Response
		readily modeled downstream, is improper. It appears that the bogus modeling proposal in the EA is designed to set the swale pilot project, and the future of swales, up for failure.	increases, based on using a range of reasonable values for critical model parameters. As long as one of the modeled culverts has a range that equals or exceeds 10 percent, then the pilot swales will be recommended for construction. A similar process will be used to determine the effects of the pilot swales and to provide a recommendation for a more comprehensive spreader swale project. This provides objective criteria in both the modeling and the monitoring to determine the effects of the swale on the culvert flow. The 10 percent value used by the USACE in the LRR is the most reasonable number to use at this time. During the modeling and monitoring evaluation process, if another objective criterion is developed, it will be used.
47	Miccosukee Tribe	Swales Improperly Segmented from Tamiami Trail NEPA process.... The swale/culvert alternative in the LRR/EA is a reasonable and cost effective alternative that should have been analyzed by the Corps in an SEIS. Instead, the analysis of swales is being conducted by the NPS in an EA in what appears to be a dead end process that will result in the small scale swale pilot project, and swales, never being implemented.	As stated in the Tamiami Trail LRR, the efficacy of swales would be tested in a subsequent NEPA process because there was insufficient information available to warrant their implementation as part of the LRR selected plan. This EA is the NEPA document that the LRR referred to, and the selected plan is designed to determine the efficacy of these features to improve flow to the park. No available information yet supports the implementation of these features as either reasonable or cost effective; the NPS believes that this study will accomplish that objective.
48	Miccosukee Tribe	Alternative C is Not Environmentally Preferred...The Tribe opposes Alternative C and totally disagrees with the NPS conclusion that no construction of the pilot swale project is better for the environment.	The NPS uses six specific criteria, provided by the Council on Environmental Quality, to determine the Environmentally Preferred Alternative. Using these criteria, NPS environmental professionals determined that Alternative C (the modeling-only alternative) was environmentally preferable to pursuing construction in the park prior to exhausting modeling options.
49	Miccosukee Tribe	The Draft EA criticizes (Page 67) the Corps' finding in a February 2007 analysis that, "with the addition of the spreader canal, the calibrated set of culverts experienced up to a 36 percent increase over historical flows." The increase in flows could even be as high as 50 percent, without	The NPS believes that we cannot rely exclusively on the results of the Corps' model as a basis for constructing the pilot swales. The NPS has identified major concerns with the assumptions that were applied in that model. The NPS believes that the modeling deficiencies identified in the EA can be overcome through the

#	Name / Entity	Comment	Response
		raising stages in the L-29 canal. The ENP provides only supposition, and no proof, for its finding that the Corps's analysis is incorrect.....The EA's reliance on the Manning formula is misplaced as it is inapplicable to the situation. An EA is supposed to be a full disclosure document, yet, ENP failed to include the documents that it cites on which it relied for review by the public. It also fails to include the technical comments that were provided by the Tribe's expert in it's one-sided review (see Exhibit A).	<p>selection of a more appropriate model and input of data that will be gathered through monitoring and the use of improved topographic data. Data and scientifically accepted facts are provided in the EA to support the concerns with the model assumptions. The document used to support the Manning's n reference is readily available from the USGS public web site and is referenced in the EA. Manning's n is used in the USACE model and will generally be used in any model of overland surface water flow.</p> <p>The referenced comments identify factors that could affect flow through the culverts. The NPS recognizes that there is a wide range of professional opinion about factors affecting flow and the efficacy of spreader swales. The purpose of the preferred alternative is to provide information that will improve knowledge of the factors and the effects on flow, and better inform decision making.</p> <p>Further, the NPS also proposes that the modeling be conducted in close collaboration with the USACE and the SFWMD to ensure technical agreement on the modeling assumptions, model selection, data input, proper use of more current topographic information, and review of model output to promote consensus opinion on the outcome of the modeling phase of the selected alternative.</p>
50	Miccosukee Tribe	...the Tribe questions the assumption in the EA that changes in hydrology from this local small scale project would be measurable in a regional context (Page 57).The monitoring process development and implementation must be fully transparent and involve the Miccosukee Tribe....The NPS must be careful not to violate FACA by adopting advice or recommendations of non-federal and non-governmental "stakeholders" as it appears to have done in the EA.	<p>Table 5 on page 57 does not present an analysis of environmental consequences of the alternatives. Instead, this table presents the methods that were used and the criteria applied in determining the magnitude of the environmental effects of the alternatives. For the results of the application of these methods, the reader is directed to the impact analysis text presented for each impact topic.</p> <p>The NPS is committed to sharing with all stakeholders the modeling and monitoring plan being developed as a part of the NPS preferred alternative.</p>
51	Miccosukee	The EA incorrectly assumes one mile Eastern Bridge will be built...As Judge	The only assumption made in the EA regarding the eastern bridge was related

#	Name / Entity	Comment	Response
	Tribe	Ungaro's order shows that assumption is far from being characterized as a done deal.	to the locations of the potential future swales to avoid existing facilities, areas of historical and cultural significance, and areas where impacts to endangered species may occur. While the eastern bridge is being legally contested, the bridge may still be constructed. The NPS believes that the prudent approach, given this uncertainty, is to locate the swale project outside the footprint of the bridge to avoid any potential conflicts associated with construction of the bridge and monitoring of the swales.
52	Miccosukee Tribe	The EA fails to disclose that Swales can improve water quality: Incredible, the Draft EA contains a more detailed water quality analysis for a small scale pilot project than the Tamiami Trail LRR/EA contained for a massive one mile bridge (Page 69-70).	The EA has been conducted in conformance with Department of the Interior and NPS (Director's Order 12) policy and guidance for the preparation of NEPA documents. Methods were established and data compiled that, in the best professional judgment of the NPS, address the issues and impacts that would be associated with pilot spreader swales.
53	Miccosukee Tribe	Potential Adverse Impacts Overblown: The Draft EA at table 27, Page 27, purports to analyze potential adverse effects from this small scale pilot project which is in sharp contrast to the failure of the Federal government to look at potential adverse impacts from construction of the one mile bridge in the Park in the Tamiami Trail LRR/EA.	Please also refer to response to Comment 56.
54	Claudio Riedi for the Miccosukee Tribe	We contend that to provide maximum effectiveness, all vegetation and sediment that has accumulated downstream of the culvert, and swales and garbage and TV sets. They should be removed because they do act in one way or another as a detriment to flow southward. This can be accomplished, of course, in part in the park's vista clearing project....that we hope will be implemented.	Should pilot spreader swales be constructed, vegetation, sediment, and any debris within the footprint of each swale would be cleared. While vegetation clearing alone was not identified during the scoping process as an alternative to improve flows, it is expected that through the availability of additional monitoring data and improved modeling, the effects of methods such as vegetation clearing can be explored.
55	Claudio Riedi for the Miccosukee Tribe	The Corps again, found that the addition of the spreader canal calibrated set of culverts are of concern and a 6 percent increase in historical flows. The increase in flows can be as high as 50 percent. The ENP provides only supposition and no proof.	It is not a purpose of the EA to demonstrate a proven forecast of performance. As discussed in the EA, there exists a broad range of professional opinion on the expected performance of spreader swales. The preferred alternative provides a prudent approach to reducing uncertainty and improving decision making through improved

#	Name / Entity	Comment	Response
			modeling and, as warranted, subsequent development of pilot spreader swales.
56	Claudio Riedi for the Miccosukee Tribe	The Draft EA failed to discuss that swales have been used in many applications to improve water quality. The Pilot project should be designed with water quality improvement in mind, and the water quality improvement should be assessed.	The proposed pilot spreader swales are not expected to provide water quality treatment. The swales are not designed as water retention or detention areas for water quality treatment but are rather designed to potentially increase flow through the upstream Tamiami Trail culverts. The proposed swales have been designed without soils or any vegetation, and therefore will not provide any bioretention water quality-type treatment. Other types of swales that are vegetated with rooted macrophytes, submerged aquatics, or periphyton can have bioretention capabilities that provide water quality treatment. However, the pilot spreader swales proposed for the Tamiami Trail are not vegetated and therefore cannot be compared to other vegetated swales with bioretention capabilities. However, a water quality monitoring plan has been developed that will examine any potential effects of the pilot spreader swales on water quality.

National Park Service
U.S. Department of the Interior

Everglades National Park
Florida



**STATEMENT OF FINDINGS FOR EXECUTIVE ORDER 11990
(PROTECTION OF WETLANDS)**

**PILOT SPREADER SWALE PROJECT
EVERGLADES NATIONAL PARK
February 2009**

Recommended:

Dan B. Kimball February 25, 2009
Dan B. Kimball, Superintendent, Date
Everglades National Park

Certified for Technical Accuracy and Servicewide Consistency:

Margoson FOR BILL JACKSON 2/25/09
Bill Jackson, Chief, Water Resources Division Date
By Director

Approved:

for *Art Frederick* 3/23/09
David Vela, Southeast Regional Director Date

Wetlands Statement of Findings for the Spreader Swales Pilot Project, Everglades National Park

Introduction

The National Park Service (NPS) has prepared and made available for public review, an Environmental Assessment (EA) for a Pilot Spreader Swale Project. The purpose of the spreader swale test project is to determine if spreader swales would increase hydrologic flow into Everglades National Park and if so, determine the level of increased conveyance. These data will provide decision-makers with sufficient information to decide whether construction of additional swales on Everglades National Park land is worth the financial cost and potential environmental effects associated with construction.

The U.S. Army Corps of Engineers (USACE) proposes a pilot project to construct spreader swales immediately south of two culverts found along a 10.7-mile stretch of the Tamiami Trail at the northeastern boundary of the Everglades National Park. The National Park Service (NPS) is the lead agency for preparation of this Statement of Findings and the USACE is a cooperating agency.

Executive Order 11990 – Protection of Wetlands – requires the National Park Service and other federal agencies to evaluate the likely impacts of actions on wetlands. The objectives of the Executive Order are to avoid, to the extent possible, the long-term and short-term adverse impacts associated with occupancy, modification, or destruction of wetlands, and to avoid indirect support of development and new construction in such areas, wherever there is a practicable alternative. The purpose of this Statement of Findings is to present the rationale for the location of the proposed plan in the wetlands of Everglades National Park and to document the anticipated effects on these resources.

Wetlands of Everglades National Park

Water flowing into the Everglades originates as overflow from Lake Okeechobee (Lodge 2005). Variable seasonal rainfall in the Okeechobee watershed dictates flows into the Everglades and the associated ecological functions and processes throughout the park. The gradient of the Everglades that facilitates the southward sheet flow from Lake Okeechobee is approximately 2 inches per mile (Lodge 2005). Thus, the Everglades ecosystem served as the historic floodplain for Lake Okeechobee. Water availability and duration are dominating factors that influence the features and processes of the Everglades wetland ecosystem. The wetland habitats of the Florida Everglades include the ridge and slough, cypress swamp, sawgrass prairie, and freshwater marshes, among others.

The historic Everglades ecosystem has been reduced in size and context over the last century. Nearly 50 percent of the Everglades wetlands have been lost to draining for agricultural and economical development (SFERTF 2008). Regional water management has drained and dried vast stretches of the wetland system. Transportation corridors (highway and railways) act as dams that trap flows, and canals and levees convey flows against the

natural drainage patterns (away from Florida Bay to the Atlantic Ocean). The project area, which encompasses a portion of Northeast Shark River Slough, is largely devoid of the historical flows. Without benefit of natural surface water flows from the north and largely dependent on the rainfall within this portion of the basin, the area is plagued with altered hydrology. Persistent drought and fire have also altered the ecosystem. Thus, the existing condition of the wetlands, and their associated functions, in and near the project area are severely degraded from natural conditions. Although the ecosystem has been adversely affected by development and long-term water management activities, the remaining portions of the Everglades ecosystem are still defined as wetlands, by both the NPS and by the USACE.

The dominant habitats in the project area (Northeast Shark River Slough) are emergent wetlands - the sawgrass prairie (freshwater marsh – sawgrass), the ridge and slough habitat (freshwater marsh), and forested and open water habitats (mixed wetlands – hardwoods and shrubs). These wetland may be inundated many months each year (Lodge 2005).

Project Description and Benefits

The proposed project (Preferred Alternative) is a small component of the larger Modified Water Deliveries Project (Mod Waters) for Everglades National Park. The purpose of Mod Waters is to restore wetland functions within the park by modifying water deliveries to the park and altering water management operation outside of the park. Mod Waters is jointly funded by the NPS and USACE and is expected to be completed in 2012.

Hydrologic analyses have shown that the Tamiami Trail roadway and the existing culverts beneath it act to impede the natural flow, quantity, timing, and distribution of water entering the Northeast Shark River Slough. The proposed project would investigate, using hydrologic modeling and potential installation of two pilot spreader swales, the ability to increase flows through the existing culverts into the park.

The USACE has recommended that construction of spreader swales downstream of existing culverts under Tamiami Trail between levees L67 and L30 to provide improved flow into Northeast Shark River Slough (see Figure 1).

FIGURE 1. VICINITY MAP OF PROPOSED PILOT SPREADER SWALE PROJECT AREA



There are 19 sets of culverts beneath this stretch of the roadway. Most of the culverts contain three equally sized pipes ranging from 42 to 60 inches in diameter, depending on location. These culverts provide flow into the park during most of the year (depending on the stage of water in the L-29 canal).

The Preferred Alternative for the pilot project includes an adaptive management approach using:

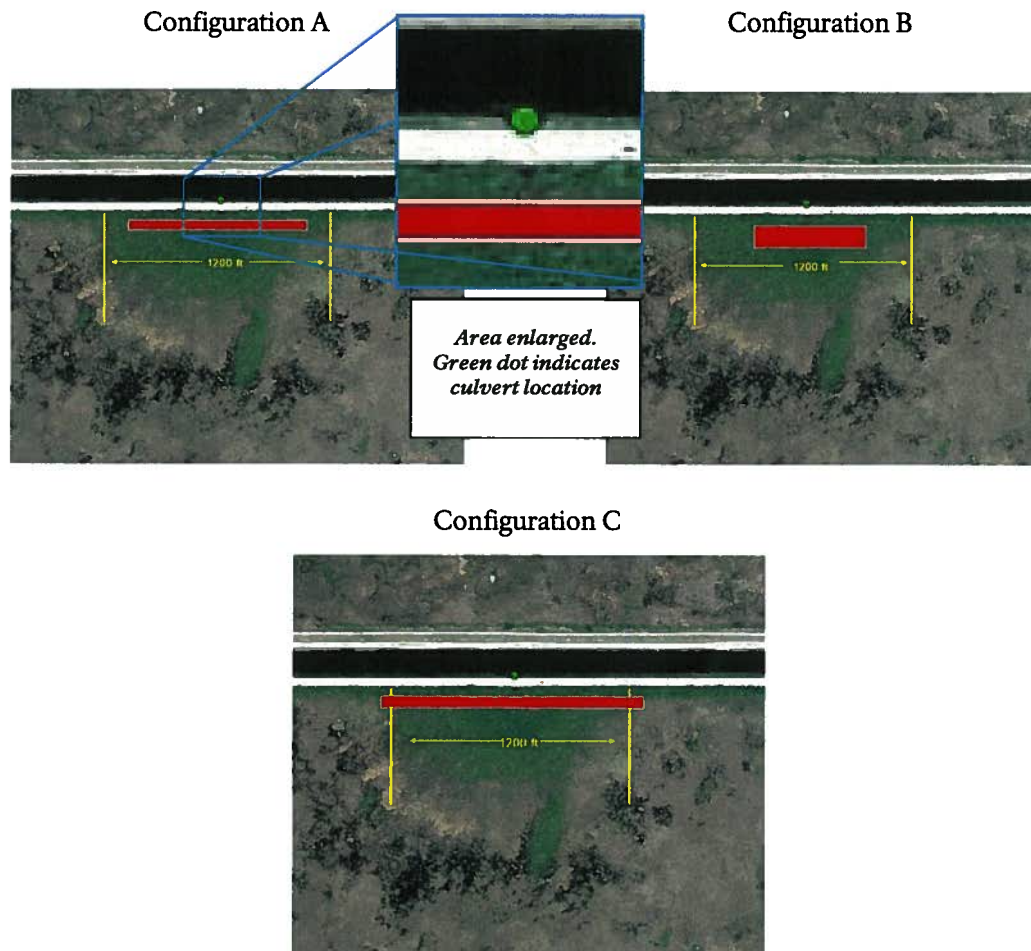
- 1) An initial phase of hydrologic modeling, including site-specific, baseline flow information. Hydrologic models would simulate potential effects of the pilot spreader swales. Various models, such as physical models and/or numerical simulations, would be considered and ultimately implemented for this approach.
- 2) If this enhanced modeling effort were to show that spreader swales could increase flows into the Northeast Shark River Slough a second phase of installation of two pilot spreader swales downstream of suitable culverts would be implemented.
 - a) The selection of culverts to serve as pilot spreader swale locations would be based on evaluation criteria that include:
 - i) Avoidance of wood stork colony restriction zones (54, 55, 56, and 59);
 - ii) Avoidance of private property, tribal residences, man made features, or historic/cultural properties (41, 45, 47, 48, 49, 50, 52, and 53);
 - iii) Avoidance of the footprint of the LRR 1-mile bridge (56, 57, 58); and
 - iv) Availability of a nearby culvert to serve as the control against which the effectiveness of the pilot spreader swale can be measured.
 - v) Culverts considered feasible are 42, 43, 44, 46, and 51 (Figure 1); these could also be used as controls.

- b) If the pilot spreader swales are constructed,
 - i) The swale footprint would be excavated to limestone;
 - ii) Pilot spreader swales would be aligned parallel to Tamiami Trail, perpendicular to marsh flow. There are three potential configurations with total surface area between 60,000 and 62,000 square feet.
 - iii) A monitoring plan would be implemented to measure hydrologic and ecologic responses resulting from the presence of the spreader swales.
- 3) In the event that the pilot spreader swales were ineffective in improving flows or generating ecological responses,
 - a) Rehabilitation of the sites would be undertaken to return the sites to pre-disturbance conditions; and
 - b) To compensate for the loss of wetland acreage and function, the park would rehabilitate up to 4.3 acres of existing, abandoned roadbeds in the East Everglades Expansion Area (Figure 3). The wetlands in the area to be rehabilitated are generally similar to those in the project area, including palustrine emergent (freshwater marsh – sawgrass) and palustrine scrub-shrub/forested (mixed wetland scrub-shrub and mixed hardwoods). The primary functions of the wetlands in the compensation area include surface and subsurface water storage, support of the biogeochemical processes (nutrient cycling, peat accretion, etc.), support of a characteristic plant community, and providing suitable habitat for native wildlife. All of these functions are currently degraded in the compensation area as a result of road construction and the presence of invasive plant species.

The roadbeds would be excavated to approximate original topography, road base and fill materials would be removed, and native wetland vegetation would be planted or seeded. The sites would be monitored and exotic plant species would be controlled under the Florida and South Caribbean Parks Exotic Plant Management Plan. Wetland functions that would be returned to the compensation sites include, surface and subsurface water storage, support of natural biogeochemical processes, and support of a native plant community that provides habitat for native wildlife. In addition, if the pilot spreader swales are shown to be ineffective in improving flows, the swale sites would be rehabilitated by filling the swales to approximately natural topography and planting or seeding native vegetation. If monitoring studies show that the spreader swales were not effective, the pilot swales and the East Everglades compensation sites will be restored within 24 months of this determination.

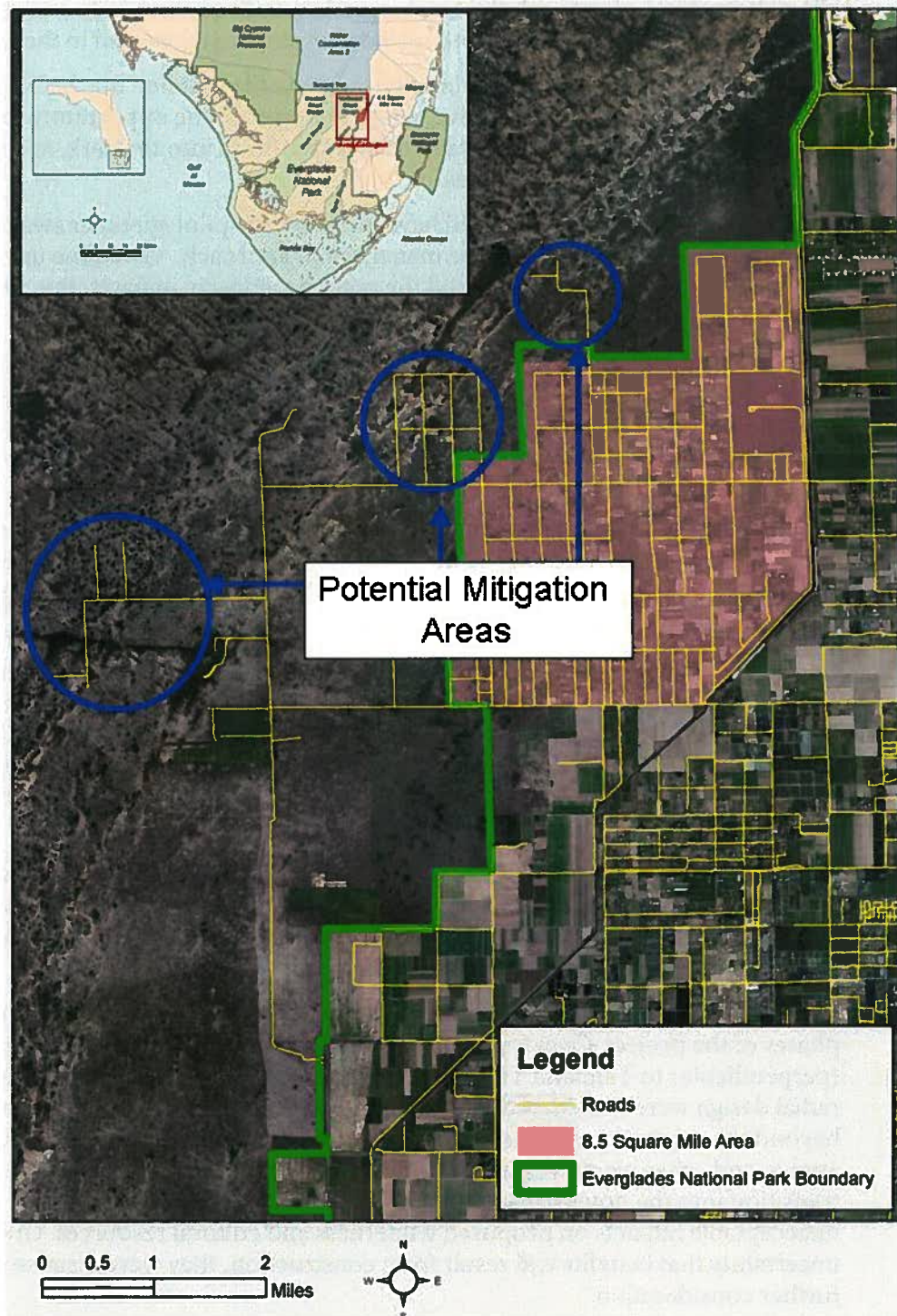
The \$198,000 approximate cost of rehabilitating the compensatory wetland mitigation site would be paid by the Modified Waters Project, a joint venture of the USACE and NPS.

FIGURE 2. PROPOSED CONFIGURATIONS FOR PILOT SPREADER SWALES



Wetland vegetation is present downstream of all the culvert sets. In addition, some exotic vegetation is present at most of the outlets; however, the abundance of these non-native species varies, and the majority of vegetation cover is by native species. Although the flows are altered from the natural pattern, the hydrology, soils, and vegetation of the project area are indicative of a wetland environment. (The National Wetlands Inventory maps for the project area are included as Attachment 1.)

FIGURE 3. POTENTIAL WETLAND COMPENSATION SITES



Alternatives Considered

Three action alternatives, along with the No Action Alternatives, were fully analyzed in the Pilot spreader Swale Project EA. Three other alternatives were addressed in the EA:

1. *The No Action Alternative* was included to serve as the baseline for the NEPA analysis. The No Action alternative would not provide the opportunity to investigate the use of spreader swales to improve flows into the park, and therefore did not meet the project objectives.
2. *A structural-only alternative* would have installed two pilot spreader swales without advanced modeling or an adaptive management approach. Given the uncertainty that swales will provide benefits and the potential adverse impacts, this alternative was not selected for implementation.
3. *A modeling-only alternative* would have employed enhanced modeling techniques to inform future decision-making about installation of multiple spreader swales in the project area. This option did not provide for adaptive installation of pilot swales in the event that modeling were favorable. This alternative was not selected for implementation.

In addition to the alternatives that were fully analyzed, the NPS considered other options during early planning phases for the project. The following options were dismissed from full consideration because they did not meet the project objectives or would potentially generate unacceptable levels of natural and/or culture resource impacts.

1. *Other sites to test swale efficacy.* Spreader swales have been used to distribute water for marshes that are crossed by roads (e.g., L-31E Canal and C-111 spreader canal, U.S. 27 between WCA-2 and WCA-3B, I-75 in WCA-3B, and the old Tamiami Canal downstream of the S-12 structures). There have been no studies documenting the impacts of small-scale features, such as the swales being considered for evaluation in this pilot project.
2. *Locations outside Everglades National Park* were also considered as potential locations for conducting a pilot project. It was not possible to find a site similar enough to the project area to be able to evaluate the results in a manner that could be readily transferred to the Tamiami Trail outlets.
3. *Alternate pilot spreader swale design options* were considered during early planning phases of the project. Constructing the pilot spreader swales parallel to flow (perpendicular to Tamiami Trail) or including multiple spreader swales using a radial design were considered. Both options would have disturbed pristine areas beyond the vegetation haloes (the distinct plume of bay heads, willowheads, pond apples, and other marsh vegetation directly south of the culvert sets that eventually transition into the downstream sawgrass community) and had potentially unacceptable impacts on proposed wilderness and cultural resources. Given the uncertainty that benefits will result from construction, they were dismissed from further consideration.

The Project and the Everglades National Park Northern Boundary

The Tamiami Trail (US Highway 41) defines the northern boundary of Everglades National Park. The highway runs generally east-to-west. The project area is defined as immediately south of the Tamiami Trail between levees L67 and L30 – a distance of approximately 10.7 miles. The Florida Department of Transportation (FDOT) owns the roadway and controls the adjacent, variable-width, right-of-way. In the project area, the boundary of Everglades National Park runs parallel to the southern right-of-way for the highway. No boundary survey for either the right-of-way or the authorized boundary of Everglades National Park is currently available.

Wetlands and Wetland Functions in the Project Area

Most of Everglades National Park is prone to frequent and continual flooding due to low elevation, lack of extensive physical relief, and freshwater hydrologic inputs (rainfall, overland sheet flow, and direct surface water discharges). The project is thus an area that is subject to seasonal inundation. Lands impacts by the project are described below.

If the pilot spreader swales were to be constructed, the emergent wetlands that would be affected by the physical footprint include mixed wetland hardwood – mixed shrubs, freshwater marsh- sawgrass, and freshwater marsh.

- At several locations, flow from the Tamiami Trail culverts has formed ponds or open water (palustrine open water/emergent) wetlands (freshwater marsh);
- South of the ponds are palustrine forested or scrub-shrub wetland communities dominated by Carolina willow (*Salix caroliniana*) and pond apple (*Anona glabra*) (mixed wetland hardwoods – mixed shrub) also associated with flows from the culverts.
- Beyond the wetland forest vegetation is an expanse of palustrine emergent wetlands, dominated by sawgrass (*Cladium jamaicense*) and patches of cattails (*Typha latifolia*) on the northern edge of the sawgrass (freshwater marsh – sawgrass).

The primary functions of the wetlands in the project area include surface and subsurface water storage, support of the biogeochemical processes (nutrient cycling, peat accretion, etc.), support of a characteristic plant community, and providing suitable habitat for native fish and wildlife. All of these functions are currently degraded in the project area as a result of regional flood control and water management, and the presence of invasive plant and animal species. The spreader swale pilot project will determine if installation of these features would provide increased flow through the existing culvert sets and improve wetland conditions in portions of the Northeast Shark River Slough.

Palustrine emergent wetlands downstream of the culvert openings provide water storage, support for biogeochemical processes, and fish and wildlife habitat. The water storage function has been degraded by the damming effect of the Tamiami Trail and altered sheetflow distribution and timing.

Nutrients (nitrogen and phosphorus) flowing into the wetlands from the L-29 Canal are taken up by vegetation in the park. Phosphorus, in particular, alters the natural sawgrass community by supporting growth of cattails. This species is common downstream of the

culvert openings, but would not occur in a healthy sawgrass community. Thus, the sawgrass habitat has been degraded from natural conditions, but is still home to a variety of fishes, birds, reptiles, amphibians, and invertebrates.

The palustrine forested and open water wetlands in the project area provide water storage, a forest vegetation community, support for biogeochemical processes, and fish and wildlife habitat.

The water storage function has been degraded through the damming effect of the Tamiami Trail and altered sheetflow timing and distribution. The vegetation community is degraded by invasion of Brazilian pepper (*Schinus terebinthifolius*). This invasive exotic species makes up five to 30 percent of forest cover in the area.

Forested and open water habitats are used by a variety of birds, fishes, and other wildlife. However, the habitat has been degraded by previous described disturbances and altered hydrologic processes. This habitat has also been altered by excavation and filling during Tamiami Trail construction and repairs. Aquatic habitat in the open water wetland (ponds) is degraded by the presence of numerous exotic fish species and elevated nutrient levels.

The Northeast Shark River Slough is a main water flow-way for the central and southern Everglades. Although this area has been degraded and its size reduced by development and regional water management activities, the dominant vegetation types are the palustrine emergent/open water (sawgrass and cattails) and palustrine scrub/shrub/forested (willow and pond apple) (Lodge 2005).

Special Status Species

Seven federally listed animal species have the potential to occur in the vicinity of the project area. These species, and their status, are outlined in the table below.

TABLE 1. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE ANIMAL SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status
MAMMALS		
West Indian Manatee	<i>Trichechus manatus</i>	Endangered
Florida panther	<i>Felis concolor coryi</i>	Endangered
BIRDS		
Wood stork	<i>Mycteria americana</i>	Endangered
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	Endangered
Everglades snail kite	<i>Rostrhamus sociabilis plumbeus</i>	Endangered
REPTILES		
Eastern indigo snake	<i>Drymarchon corais couperi</i>	Threatened
American alligator	<i>Alligator mississippiensis</i>	Threatened (S/A- similar in appearance to the American crocodile)

The proposed actions would not affect the West Indian manatee, Cape Sable seaside sparrow, or the Eastern indigo snake

- Manatee have been sighted in the L-29 Canal on one occasion over the last 20 years. This species has not been documented in the culvert pools south of Tamiami Trail. It is highly unlikely that a manatee would be encountered in the project area because the project would not affect the L-29 Canal. No effect on the manatee would be expected.
- The Cape Sable seaside sparrow does not occur in the project area. This species occurs several miles south and west south of the project area, in the marl prairie west of the Shark River Slough. There is no Cape Sable seaside sparrow critical habitat located within the project area. The project is expected to have no effect on the Cape Sable seaside sparrow or its habitat.
- The Eastern indigo snake is found in wet prairies and hardwood hammocks and has not been observed in the project area. The *Standard Protection Measures for the Eastern Indigo Snake* (USFWS 2006a) would be implemented during construction. These measures would mitigate any potential adverse effects to this species. The proposed action is expected to have no effect on the eastern indigo snake.

If spreader swales are implemented, construction disturbance and alternations in habitat may affect, but is not likely to adversely affect the Florida panther, wood storks, the Everglades snail kite, and the American alligator.

- The project area occurs in the Florida panther primary zone that supports the sole breeding population of Florida panthers. Telemetry data indicate that Florida panthers have ranged along the Tamiami Trail, and have been killed by vehicles on the roadway. Installation of the pilot spreader swales would not reduce suitable panther habitat appreciably. However, construction disturbance could cause panthers to avoid the project area during installation, producing temporary effects. Thus, the proposed action may affect, but is not likely to adversely affect, the Florida panther.
- There are two wood stork colonies south of Tamiami Trail within the park. However, proximity to wood stork nesting and roosting sites was a criterion for eliminating pilot spreader swale locations. Although wood storks could be exposed to construction noise during installation, it is unlikely their nesting, roosting, loafing, and colony formation activities would be measurably affected. The long-term presence of the pilot spreader swales could result in a minimal loss of feeding and foraging sites. Therefore, the proposed action may affect, but is not likely to adversely affect the wood stork.
- Construction of the pilot spreader swales would not occur within the Everglade snail kite management zones. Culverts suitable for swale construction are outside the 500 meter limited activity buffer area of the Everglade snail kite (USACE and NPS 2008). Project effects could include disruptions in foraging and feeding activities that would occur during the approximate 2-month construction period. The contractor will be required to follow the *NPS Draft Snail Kite Management Guidelines* (2006). Based on the limited scope of the pilot swale project, the proposed action is not expected to provide any

short-term or long-term benefits to the Everglade snail kites. The project may affect, but is not likely to adversely affect, the Everglades snail kite.

- Alligators naturally occupy and maintain gator holes in the Northeast Shark River Slough. The presence of spreader swales may encourage alligators to inhabit the pilot swales and move out of natural ridge and slough or marsh habitats. The result of this behavioral change may prevent several alligators from maintaining natural gator holes. Although this behavioral change would not result in adverse effects in the alligators, gator holes are vital habitat and refuge for other wetland species. Thus, over the long-term, implementation of the proposed action may affect, but is not likely to adversely affect the American alligator.

Wetland Impacts of the Preferred Alternative

Using project area wetland maps overlain by concept-level drawings of the pilot spreader swale design options, construction of two spreader swales would result in up to 4.3 acres of wetland disturbance. Wetland impacts are based on long-term presence of the swales and development of a construction access easement.

Wetland Impacts	Acres
Freshwater marsh – sawgrass (palustrine emergent/open water)	1.33 – 3.54
Mixed wetland hardwood – mixed shrub (palustrine scrub-shrub/forested)	0.053 – 3.16
<i>Total Maximum Wetland Impacts</i>	4.3

The area of each type of wetland vegetation affected would vary depending on the specific culvert sets used, but a maximum of approximately 4.3 acres of wetlands are expected to be impacted during implementation of this project. The swales themselves would be maintained as open water to facilitate maximum flow volume. Substrate would be removed, potentially to bedrock, leaving little to no growth medium for wetland vegetation. Thus, they are not anticipated to provide wetland functions, aside from water storage and distribution.

Upon completion, the test and control culverts would be monitored for increased flow rates, and routine environmental monitoring would be implemented.

- If the pilot spreader swales are effective in increasing flows through the culverts into the Northeast Shark River Slough, they would remain in place. A routine maintenance program (sediment removal when necessary and vegetation management) would be implemented. By improving hydrologic conditions, the pilot spreader swales could have beneficial wetland impacts downstream. If positive ecological response (increased water depth and hydroperiod, increased abundance of native wetland species, improved habitat for native wildlife) are recorded beyond the swales, these wetland benefits would account for compensation of wetland functions lost in the spreader swales themselves.

- If the spreader swales are determined to be ineffective in increasing flows through the culverts into the Northeast Shark River Slough, the sites would be rehabilitated. Excavated areas would be filled to approximate original topography and native wetland vegetation would be planted or seeded. However, removal of the peat and muck substrate during construction would result in long-term loss of function, regardless of the rehabilitation effort. Thus, the project would compensate for any long-term loss of wetland acreage and function by rehabilitating up to 4.3 acres of previously disturbed and degraded wetland communities with similar functions.

Justification for Use of Wetlands

There are no practicable non-wetland alternatives for the construction component of the proposed action (Preferred Alternative). The purpose of the project is to investigate the potential for benefits using spreader swales to increase and distribute flows into the wetland environments of the Northeast Shark River Slough. The areas adjacent to the roadway, and the park lands to the south, are all designated wetlands. Alternative, non-wetland locations would not provide the information needed to determine swale efficacy.

Conclusion

The National Park Service has concluded that the plan, as outlined above, and in detail in the Pilot Spreader Swale Environmental Assessment, will provide valuable information in determining if spreader swales would be an effective component of Mod Waters in bringing increased flows into Everglades National Park. Hydrologic analyses show that the existing roadbed and culverts beneath it impede natural flow, quantify, timing, and distribution. The project will evaluate the potential role of a small-scale component in improving hydrologic conditions in the Northeast Shark River Slough.

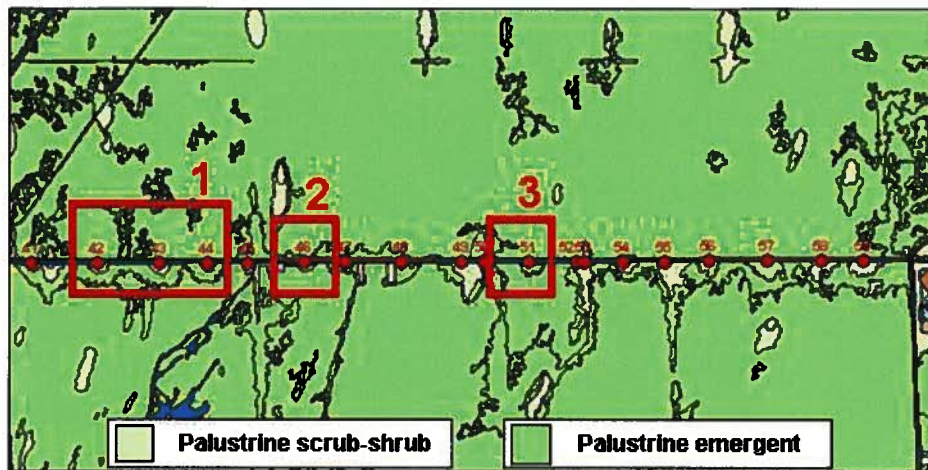
The project would adversely affect up to 4.3 acres of wetland habitat south of Tamiami Trail by removal of vegetation, excavation to bedrock, and maintenance of the swales as open water. The swales would be monitored for beneficial and adverse impacts to hydrology and natural resources. If the swales are effective, they would be retained and managed to provide continuous increased flows. Downstream wetland benefits would compensate for the loss of wetland function within the swale footprint. If the spreader swales were not effective, the sites would be filled and revegetated. Wetland acreage and function loss would be compensated by removal of existing roadbed in the Everglades Expansion Area and rehabilitation of the wetland communities.

The NPS finds that the proposed action (preferred Alternative) is consistent with the service-wide no net loss of wetland policy and is acceptable under Executive Order 11990 for the protection of wetlands.

References

- Lodge, T.E. 2005. The Everglades Handbook. Understanding the Ecosystem (second edition).
- National Park Service 2006. Management Policies 2006. U.S. Department of the Interior. Washington, DC.
- National Park Service 2008. Director's Order #77-1 (Revised): Wetland Protection . U.S. Department of the Interior. Washington, DC. 4 pp.
- SFERTF. 2008. South Florida Ecosystem Restoration Task Force TRACKING SUCCESS 2008: Biennial Report of the South Florida Ecosystem Restoration Task Force 2006-2008. Draft. <http://www.sfrestore.org/>

Project Area

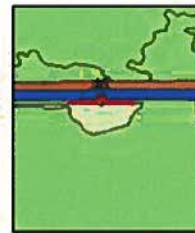
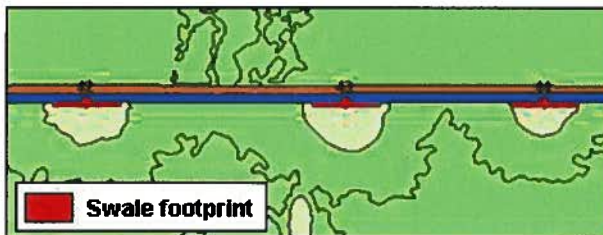


Configuration A- 1030x60 ft swale, bench, and access road

1

2

3



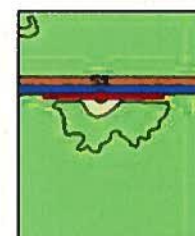
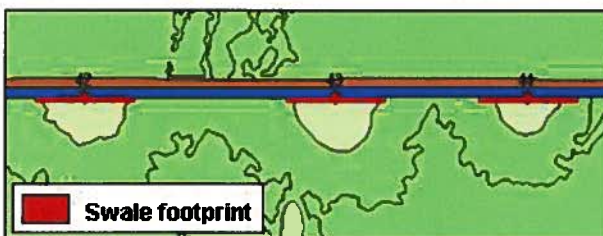
Vegetation Impacted (ac)	Culvert				
	42	43	44	46	51
Palustrine scrub-shrub	1.449	1.396	1.396	0.108	0.838
Palustrine emergent	0.000	0.053	0.053	1.341	0.612

Configuration B- 1555x60ft swale, bench, and access road

1

2

3



Vegetation Impacted (ac)	Culvert				
	42	43	44	46	51
Palustrine scrub-shrub	1.731	1.813	1.493	0.302	0.838
Palustrine emergent	0.424	0.342	0.662	1.852	1.317

