

SECTION 5.0 FORMULATION OF ALTERNATIVE PLANS

5.1 INTRODUCTION

The planning process consists of a series of steps that identifies or responds to problems and opportunities associated with the Federal objective in the selection of a recommended plan. The process involves an orderly and systematic approach to making determinations and decisions at each step so that the public can be fully aware of the basic assumptions employed, the data and information analyzed, the areas of risk and uncertainty, the reasons and rationales used, and the significant implications of each alternative plan. Steps in this process are:

- The identification of problems, opportunities and constraints associated with the Federal objective.
- The inventory, forecast, and analysis of resource conditions within the planning area relevant to the identified problems and opportunities.
- The formulation of alternative plans through the establishment of goals and objectives, and the identification of planning requirements
- The evaluation of the effects of the alternative plans.
- The comparison of alternative plans.
- The selection of a recommended plan based on the comparison.

The final recommended plan must be consistent with the original MWD project purpose: *...to take steps to restore natural hydrologic conditions to the extent practicable in the Everglades National Park.* Consistency is defined as the ability of the plan to pass the peak flows expected under MWD in a natural spatial configuration.

In achieving this, each of the alternatives was evaluated according to criteria specified in the Constraints Section (4.6) of this document. The alternatives and the criteria were developed from meetings, discussions, and coordination with representatives of affected or interested agencies, organizations, and the public.

5.2 FEDERAL OBJECTIVE

The objective of this project is to identify a technical solution to the Tamiami Trail component of the MWD Project that is also compatible with the expected hydraulic conveyance of CERP as modeled by the Restudy and for the Everglades National Park Protection and Expansion Act of 1989. The project must provide for the conveyance of MWD flows of 4,000 cfs.

5.3 PLANNING GOALS AND OBJECTIVES

Given the problems and opportunities of the existing condition and those forecast for the future without project condition, the goal of this project is:

To provide modification features to Tamiami Trail needed to convey increased flows created by the Modified Water Deliveries Project (provisions in the General Design Memorandum prepared under authorization of the Everglades National Park Protection and Expansion Act of 1989 to design actions to improve water deliveries to ENP) under Tamiami Trail to Everglades National Park.

In order to achieve a technical solution to the Tamiami Trail component of the MWD project, the team identified the objectives that any such solution should attain (see Table 10). The following planning objectives were established to address the problems and realize the opportunities identified, and to serve as guidelines for the formulation and evaluation of alternative plans.

- **Objective 1. Maximize compatibility for future CERP actions.** Evaluations of how an alternative complies with possible operational changes and the alternative's CERP compatibility are considered. This includes the ability of the alternative to be augmented with the CERP features of de-compartmentalization, ecological connectivity, and promotion of sheet flow. Additionally, the potential for an alternative to restrict future CERP actions is considered.
- **Objective 2. Avoid or Minimize impacts associated with construction.** The impacts to traffic, residents, businesses, wildlife, etc., along Tamiami Trail must be evaluated. The types of disruptions and the length of the construction schedule for completion of each alternative are included in this evaluation.
- **Objective 3. Avoid or Minimize adverse socioeconomic impacts.** Socioeconomic impacts include social impacts to Native Americans and other residents, economic impacts to businesses and individuals, and the maintenance of the way of life chosen by persons in the project area. The ability of each alternative to avoid or minimize detrimental socioeconomic effects is evaluated.
- **Objective 4. Restore and enhance ecological function.** This project is part of the MWD project to promote hydrological restoration for ecological benefits to the Everglades. As a result, the benefits realized from each alternative, as well as the ecological costs of each alternative, must be considered.
- **Objective 5. Avoid or Minimize impacts to recreation facilities.** Recreational activities include fishing, boating, wildlife viewing, etc., by visitors to the project area. The ability of each alternative to avoid and/or minimize adverse impacts or to enhance recreation is examined.

- **Objective 6. Avoid or Minimize permanent/temporary loss of wetlands.** To the extent possible, the project should minimize both permanent and temporary losses of wetlands. The number of acres of wetlands that would be incorporated into the highway right-of-way is considered.
- **Objective 7. Formulate a cost effective plan within ENP's budget.** Estimating the cost of a project takes into account its entire life cycle cost. The recommended plan must be cost effective (not necessarily the least cost alternative). The cost effective alternative is one in which no other alternative provides the same benefit for a lower cost or more benefit for the same cost.) It must also be within the budget of Everglades National Park to construct, operate and maintain.
- **Objective 8. Avoid or Minimize conveyance impacts to the L-29 Canal.** The L-29 Canal functions in both a water supply and flood control capacity, as well as a recreational fishery and habitat for wildlife. Each alternative must be evaluated to ascertain adverse effects on the ability of the canal to convey water for these functions.

The final recommended plan must provide for the unimpeded conveyance of water from the L-29 Canal north of the Tamiami Trail to NESRS and ENP south of the Tamiami Trail, as stated by the 1992 GDM. The final recommended plan must be consistent with improved water deliveries to ENP as part of the effort to meet the original MWD project goal.

Each of the alternatives was evaluated according to the above objectives. The goals and objectives were developed from meetings, discussions, and coordination with representatives of affected or interested agencies, organizations, and the public.

5.4 PERFORMANCE MEASURES

Performance measures are quantitative or qualitative indicators of how well (or poorly) an alternative meets a specific objective. A set of performance measures was developed as the basis for evaluation of the various alternatives for this project. These performance measures have specific metrics related directly to each of the project objectives.

5.4.1 Objective 1. Maximize Compatibility for Future CERP Actions

- **PM1. Flexibility for Increased Flows, Stages, and Capacity Associated with CERP Actions.** Implementation of CERP may result in higher flows and higher stages of water in the L-29 Canal as part of hydrological restoration of the Everglades. This qualitative performance measure assesses the potential for alternatives to allow the higher flows and stages of water that may be associated with the authorized CERP flows.
- **PM2. Addition of Features to Achieve Full Sheet Flow to ENP.** This is a qualitative measure of the difficulty of adding features to promote the sheet flow of water to ENP. This performance

measure would include the potential for increasing sheet flow by removal of any unused portions of the existing Tamiami Trail roadway embankment.

- PM3. Ease of Adding Features to Improve Decompartmentalization.** This qualitative assessment determines the ability of an alternative to aid in reducing the isolation of compartments and management areas within the Everglades. It also includes minimizing addition of construction barriers (such as the L-29 Levee and Canal), as well as the removal of barriers consistent with CERP objectives
- PM4. CERP Compatibility (Ecological Connectivity).** This is a qualitative measure of the compatibility of the various alternatives with CERP proposals to remove barriers isolating biological populations. The ability of an alternative to allow degradation of the L-29 Levee, remove the Tamiami Trail embankment, and fill the L-29 Canal under CERP are among features evaluated for each alternative.
- PM5. Potentially Degradable Linear Footage of Roadbed.** This performance measure is the length of the potentially degradable roadbed embankment that would be retained under each alternative. The unit of measurement is linear feet.
- PM6. Minimal Retrofit Needed.** This is a qualitative measure of the retrofit required for each alternative to enable the implementation of CERP objectives.
- PM7. Potential Wetland Acreage Restored.** This is a quantitative measurement of acreage that could be restored to wetlands with each alternative. Wetland restoration areas include those for restoration only in conjunction with this project (i.e. degradation of existing Tamiami Trail and associated restoration), but do not include restoration of existing business sites; it is assumed that these sites could be restored regardless of the alternative selected.

5.4.2 Objective 2. Minimize Construction Impacts

- PM1. Ability to Meet MWD Implementation Schedule and Satisfy RPA Requirements.** This is a qualitative assessment of the ability of each alternative to meet the Federal schedule for implementing the MWD program and to comply with flow requirements for the Cape Sable seaside sparrow.
- PM2. Temporary Impacts of Construction Duration on the Miccosukee Tribe and Businesses.** The lengths of time that construction would affect the Tigertail and Osceola camps and businesses near the project area are assessed.

- PM3. Duration of Construction.** The amount of time required for the construction of each alternative is considered. The unit of measurement is months.
- PM4. Allowances for Turbidity Control.** This is a measure of the ability of each alternative to allow installation of features to control turbidity in runoff from construction areas.
- PM5. Need for Phasing of Construction to Avoid Impacts to Wood Storks during Nesting Season.** This is a qualitative assessment of each alternative for the need to phase road construction to minimize disturbances during wood storks nesting season.
- PM6. Ability for Maintaining Adequate Distances from Road Construction to Wood Stork Primary Zones.** Alternatives are qualitatively assessed for their ability to allow acceptable distances from wood stork primary zones during road construction.
- PM7. Ability for Maintaining Adequate Distances from Road Construction to Wood Stork Secondary Zones.** Alternatives are qualitatively assessed for their ability to allow acceptable distances from wood stork secondary zones during road construction.
- PM8. Ability for Maintaining Adequate Distances from Road Construction to Snail Kite Nesting Locations.** Alternatives are qualitatively assessed for their ability to allow acceptable distances from snail kite nesting locations during road construction..

5.4.3 Objective 3. Minimize Adverse Socioeconomic Impacts

- PM1. Impacts to Businesses or Private Properties.** Alternatives are qualitatively assessed for likely impacts on existing businesses. Among factors considered are duration of reduced traffic flow in the construction phase; reduced physical access in the construction phase; physical access following construction; extent of roadway encroachment on business parking and facilities during construction; and the extent of roadway encroachment on business parking and facilities after construction.
- PM2. Impacts on Access and Privacy at the Tigertail Camp.** Alternatives are qualitatively measured to assess the impacts to the Tigertail Camp for access, privacy, and encroachment both during the construction phase and after construction are completed.
- PM3. Impacts on Access and Privacy at the Osceola Camp.** Alternatives are qualitatively measured to assess the impacts to

the Osceola Camp, including access, privacy, and encroachment both during and after the construction phase.

- PM4. Exceedence of FDOT Noise Approach Criteria at Tigertail Camp.** Alternatives are assessed with regard to predictions for exceedences of FDOT Approach Criteria at the Tigertail Camp. If there were exceedences beyond the future without project alternative, it would be necessary to consider noise abatement measures.
- PM5. Exceedence of FDOT Noise Approach Criteria at Osceola Camp.** Alternatives are assessed with regard to predictions for exceedences of FDOT Approach Criteria at the Osceola Camp. If there were exceedences beyond the future without project alternative, it would be necessary to consider noise abatement measures.

5.4.4 Objective 4. Restore Ecological Function

- PM1. Wetland Functional Units.** Wetland functional unit losses or gains associated with each alternative are quantified using the Wetland Rapid Assessment Procedure methodology. This is a measurement of the area and value of wetlands incorporated into the highway right-of-way.
- PM2. Linear Footage of North-South Ecological Connectivity.** The length of hydrologic connectivity between the L-29 Canal and ENP is measured for each alternative. This is the combined width of new bridges or breaches in the existing Tamiami Trail roadway embankment. The unit of measurement is linear feet.
- PM3. Exotic Vegetation Removed.** The extent of exotic vegetation removal under each alternative is measured. Removal of exotic vegetation would be during construction where the alignment shifts to the south of the existing Tamiami Trail. For Alternative 3, exotic vegetation would be removed at the locations of breaches in the existing roadway. The unit of measurement is linear feet.
- PM4. Hydrologic Restoration of NESRS.** This is a qualitative measurement of the capability of each alternative to meet the requirements for hydrologic restoration of NESRS.
- PM5. Area with Affected Flow Magnitude.** Per information obtained from DOI, "It is widely believed that the magnitude and direction of flow through the Everglades landscape are critical factors in the development and maintenance of Ridge and Slough micro-topography..." and that "shorter flow openings force higher velocities in the structures and immediately downstream, while the longer flow openings have spatially far-reaching, though less severe, effects." This performance measure identifies the area

qualitatively. This DOI information is included for evaluation purposes. The Corps has not validated the methodology.

- PM6. Difference between Average Velocity at the Road and Average Velocity in the Marsh.** Per information obtained from DOI, "The difference between mean velocities at the road and in the marsh is used as an indication of the severity of the effect on flow magnitudes." These data are measured qualitatively. The Corps does not necessarily agree or disagree with the methodology used to develop the data. The Corps has not validated the methodology.

5.4.5 Objective 5. Minimize Impacts to Recreation Facilities

- PM1. Maintenance of Access for Visitor Use.** Alternatives are qualitatively assessed for their ability to allow access by visitors for recreation purposes. Among factors considered are the extent and duration of restrictions or the elimination of access both during the construction phase and after construction is completed.
- PM2. Duration of Temporary Access Impacts.** The length of time of limited access to portions of the project area during the construction phase of the project is assessed for each alternative. The unit of measurement is months.
- PM3. Access to Fishing from the Tamiami Trail.** Alternatives are qualitatively assessed to evaluate impacts to bank fishing from either side of the existing roadway.
- PM4. Access to Fishing in the L-29 Canal.** Alternatives are qualitatively assessed to evaluate impacts to bank and boat fishing in the L-29 Canal. This includes access to the L-29 Levee for bank fishing.
- PM5. Maintain Boating Accessibility to Francis S. Taylor Wildlife Management Area (WCA-3B).** Alternatives are qualitatively compared to assess access to WCA-3B for recreational boating, including airboats.

5.4.6 Objective 6. Minimize Permanent/Temporary Loss of Wetlands

- PM1. Permanent Loss of Wetland Acreage.** This is a quantification of permanent wetland impacts associated with each alternative. The unit of measurement is acreage.
- PM2. Temporary Loss of Wetland Acreage during Construction.** This is a quantification of temporary wetland impacts associated with each alternative. The unit of measurement is acreage.