new alternatives (seven and eight) have been developed, a modification of Alternative 5 (5C) has been added, and Alternative 6 has now been formally accepted. Also, a new bridge alternative, "Alternative 9 ", with a 2.7-mile span length, intermediate between that of Alternatives 6 and 7, is being floated by the Department of the Interior as a possible compromise. Since we have previously been informed by your staff that any alternatives with bridge expanses much longer than what is deemed necessary to convey Mod Water flows are considered to be outside of your authority for this project, we have opted not to discuss the tentative "9a" and "9b" alternative options any further. For a short description of these 18 alternatives and their associated options, please refer to Table 1. Our three major areas of concern with regard to the potential impacts of this project remain as follows: (1) impacts to existing recreational facilities and access points of the Francis S. Taylor Wildlife Management Area (WCA-3B), (2) impacts to fish and wildlife resources, and (3) potential loss of Everglades marsh.

Impacts to Existing Recreational Facilities and Access Points

Those concerns that were previously addressed pertaining to potential impacts to FWC recreational facilities and access points under Alternatives 1 through 5 remain (please refer to our previous PAL [attached] dated February 23, 2001 and to our Florida State Clearinghouse letter to Ms. Jasmin Raffington dated January 16, 2002), and also apply to the three new alternatives (Alternatives 6, 7, and 8) added in this document. Since the PAL, we have learned of an additional boat ramp, and also now provide supplementary information on the identification numbers of FWC boat ramps within or adjacent to the project area. We know of three boat ramps in the project area that provide access to the marsh of Francis S. Taylor Wildlife Management Area (FSTWMA). The westernmost ramp (#135) is located immediately east of the S-333 structure on the L-29 Levee and has unimproved parking capable of accommodating about ten vehicles. A popular marsh access ramp owned by the South Florida Water Management District is located on the L-29 Levee at Recreation Site No. 1, immediately south of the S-334 structure, and has unimproved parking. A third concrete boat ramp of unknown origin, previously unidentified, is located in a swale on the L-29 Levee opposite the Airboat Association of Florida. Of the three FWC maintained boat ramps that provide access to the canal system within the project area, two are located at Recreation Site No. 4. One of these (#96), immediately north of the S-333 structure, provides access to the popular L-67A canal, while the other boat ramp (#161), at the juncture of the L-67A and L-67C levees, provides access both to the L-67C canal and to the marsh in the "pocket" of WCA-3B. The remaining boat ramp (#153), located at Recreation Site No.2, is the sole access point for the eastern 11-mile stretch of the L-29 Canal.

A cursory look at the recreational fishing pressure along much of the 11-mile stretch of the L-29 Canal that is being examined under this project suggests that use may be relatively low, except near the S-334 and S-333 structures (FWC, unpublished data). However, changes that are soon anticipated to occur with implementation of the conveyance features of the Mod Waters Project, as well as certain features of the Comprehensive Everglades Restoration Plan (CERP),

are likely to improve hydrological connections between the L-29 Canal and the marsh interface, as well as prolong adjacent marsh hydroperiods both to the north and to the south of the L-29 Canal. Consequently, such predicted hydrological changes combined with the addition of new water management structures (bridges, culverts, weirs, etc.) are likely to lead to an increase in local sport fish populations, followed by an increase in recreational fishing demand and concomitant changes in angler distribution patterns along this eastern stretch of the Tamiami Trail. It should be noted that prior to the construction of the L-67 and L-29 levees, this section of the Tamiami Canal (precursor to the L-29 Canal) was one of the premiere fishing areas in the Everglades. Creel surveys conducted during a study in 1960 (Game and Fresh Water Fish Commission [GFC], unpublished report) revealed that the first four miles of the Tamiami Canal west of the L-30 canal received an exceptional amount of use, and that the 11-mile stretch west of the L-30 canal received considerably more fishing pressure than the 9 miles of the Tamiami Canal west of the present-day L-67 Canal. The imminent decline of this great fishery, effected through a separation of the Tamiami Canal from the marsh with the completion of the L-29 Levee, was predicted in the aforementioned GFC report.

Besides recreational access for sport fishing purposes, the airboat ramps provide access to the natural resources of the Everglades marsh contained within the Francis S. Taylor Wildlife Management Area. Recreational frogging, airboating, and seasonal hunting are the primary activities pursued here. Recreational use of these access points may be relatively high during short hunting seasons, particularly when game population levels allow a liberal harvest. For instance, there were 140 airboat permits issued for an approximately 3-week deer season in the FSTWMA in 1984, and 156 permits issued the following year. Although deer population levels in WCA-3B are anticipated to decline under the projected deeper water regime that will occur with the implementation of Mod Waters and CERP, overall recreational use of the area for frogging, general airboating, duck hunting, and fishing is expected to increase. The potential impacts associated with each group of alternatives are listed as follows.

Alternatives 2a, 2b to 2b6, 4a, and 4b to 4b6. This document describes creative water quality treatment options b1 to b3 of Alternatives 2 and 4 as encroaching into the L-29 Canal. We understand from statements made by your staff that it will be necessary to maintain the water supply conveyance capacity of the L-29 Canal for some undefined period of time, which would necessitate maintaining deeper water conditions in this section of the canal. Nevertheless, the above-mentioned water quality treatment options would encroach into the south portion of the L-29 Canal and require widening of the canal to the north. This option would essentially eliminate any existing littoral zone on the south bank of the canal and would result in the loss of boat ramp #153 and impact Recreation Site No. 2 located on the north bank of the L-29 Canal. In the event that a boat ramp is impacted, the Army Corps of Engineers (COE) would be responsible for building a replacement ramp at a new location to be selected by the FWC.

Alternatives 3a and 3b. A reduction in available parking space for recreational users on the north side of the L-29 Canal would negatively impact recreational access to the canal.

Recreation Site No. 2 would probably be negatively affected or eliminated by this northerly road alignment.

Alternatives 5a, 5b, and 5c. The effects of the new subalternative 5c are essentially the same as for Alternatives 5a and 5b, in that recreational access to all sites on the north bank of the L-29 Canal will not be affected. However, the entire south bank of the L-29 Canal would be inaccessible during the 4-year construction period. Following completion of the bridge, only culvert outfalls located within the first mile on the east end and within the last one-half mile on the west end of the project would potentially be available for angler use. This loss of access to the south bank of the L-29 Canal from the Tamiami Trail could possibly be ameliorated by the provision of some degree of fishing access from the elevated bridge span.

Alternatives 6a and 6b. Although approximately 4 miles of the southern bank of the L-29 Canal would be unavailable to bank anglers, the remaining 6 miles should still be accessible, as well as the entire northern canal bank. However, the employment of creative water quality treatment options 6b1 to 6b3 could potentially impact the L-29 Canal, as described previously under Alternatives 2 and 4. As in Alternative 5, less opportunity would be lost if fishing access were possible from the bridge span. The feasibility of providing limited fishing access from designated portions of such extensive bridge spans should be explored as a means of reducing public fishing access losses. All existing boat ramps would remain accessible under this alternative. Culvert outfalls south of the roadway would not be accessible during highway construction (18-24 months) in Alternative 6a, and would be plugged under Alternative 6b. The addition of eight box culverts at designated low points in Alternatives 6a and 6b may provide additional angler opportunities.

Alternatives 7a and 7b. Recreational access to all boat ramps and the north bank of the L-29 Canal would remain intact, while fishing access to the south bank of the canal would be blocked during the 2-year construction period. Most of the culvert outfall structures would be accessible during and after construction in Alternative 7a, but all would be filled and eliminated in Alternative 7b. Although the preliminarily selected preferred alternative is Alternative 7a, the decision as to whether additional water quality treatment will be required has not yet been officially decided. Should Alternative 7b be selected, it is not known how the channeling of all water outflows through the single 3,000-foot gap will affect the L-29 Canal fishery. Also, special attention would need to be given to the siting of construction staging areas so that access is not blocked to the three boat ramps and parking facilities associated with the popular Recreation Site No. 4 that provides access to the L-67 canals and FSTWMA, or to the boat ramp facility (#90) located 200 yards west of the S-12D structure.

Alternatives 8a and 8b. Alternative 8a should not impact existing recreation access sites, and could provide new fishing opportunities at the 24 additional box culverts, particularly

if the culvert outfalls are scalloped out to improve the passage of water into northeast Shark River Slough. Alternative 8b would require filling the existing culverts, and could result in a loss of fishing opportunities unless the 40 new box culverts are constructed in a way that creates shallow collection basins at the outfalls.

Impacts to Fish and Wildlife Resources

Of particular concern are the impacts that an alternative could have on state-listed species of wildlife or important habitat components. There are three historic wading bird rookeries containing species listed by the state as endangered or species of special concern, recent records of endangered snail kite nests in southern WCA-3B, a number of records of the threatened Everglades mink along the highway corridor, and a single documented occurrence of the endangered West Indian manatee in the L-29 Canal. In addition, other listed species such as the limpkin and roseate spoonbill (both listed as species of special concern) utilize marsh areas, and the least tern (threatened) forages in canal habitats that could be impacted under certain alternatives. The potential impacts that could occur are listed by alternative groups as follows.

Alternatives 1 and 2a. The temporary road for detouring traffic while proposed bridge #3 is under construction would encroach into the pond apple forest at the Tamiami West wading bird colony, on the south side of the Tamiami Trail, that provides nesting substrate for white ibis, tricolored herons, little blue herons, snowy egrets, and wood storks. Consequently, a portion of this forested area would be eliminated as a nesting substrate for an unknown number of years. Any heavy construction activity that would be expected to occur within 600 meters of a known rookery location, including construction of the temporary road, should be conducted outside of the wading bird nesting season, which normally extends from early February to the onset of the rainy season.

Alternative 2b. This alternative encroaches to a greater extent (average of 51 feet) into the marsh south of the existing Tamiami Trail, with incursions of 5 to 6 additional feet at bridge approaches. Consequently, this alternative would have a greater permanent impact on the Tamiami East and Tamiami West wading bird colonies due to a greater permanent loss of nesting substrate as well as a decrease in the amount of buffer capacity available. The Everglades mink has been documented to use both natural and artificial upland areas for denning purposes; therefore, this alternative could potentially impact mink denning areas that may occur in either native upland areas or at the artificially created upland areas where the airboat concession and radio tower sites are located. Option 2b1, which shifts the alignment to the north, is only a slight improvement over Alternative 2b.

The 2b creative water quality treatment options of 2b2 to 2b6 (Table 1) result in much more modest incursions into the two Tamiami wading bird colonies; however options 2b2 and 2b3 would eliminate littoral zone elements on the south shore of the L-29 Canal, eliminate reptile oviposition and basking sites on the south shore of the canal, and could result in the entrapment of terrestrial animals attempting to cross the canal.

Alternatives 3a and 3b. Both of these alternatives and the various 3b options presented would result in the loss of a significant amount of high quality wildlife habitat. The woody vegetation supporting the Frog City wading bird colony, which has been documented to contain nesting tricolored and little blue herons (both species of special concern), would be either eliminated or severely impacted by the road alignment, which would encroach further into the marsh at this point in order to avoid the Tigertail Camp. This northerly diversion of the road around the Tigertail Camp would also impact a high quality tree island (WRAP score of 0.83) that may also have a special cultural value to the Tigertail family. The relocation of a high-speed highway to the north of the L-29 Levee would result in much greater wildlife mortality during high water episodes in WCA-3B than presently occurs. There could be dens of the Everglades mink in the L-29 Levee or on adjacent tree islands that are impacted, as well.

Alternatives 4a and 4b. Both of these alternatives would produce significant incursions into the Tamiami West and Tamiami East wading bird rookeries, as well as eliminate important swamp forest habitat along the remainder of the corridor. Although options 4b1-4b6 would reduce the amount of encroachment from Alternative 4b, they are only slightly better than Alternative 2b. The Everglades mink has been documented to use some of the man-made upland sites along this alignment for denning purposes, and could potentially be impacted by construction activity.

Alternatives 5a, 5b, and 5c. These alternatives are believed to be the most beneficial to wildlife, with little known impacts. These alternatives would leave important rookery vegetation intact on both sides of the Tamiami Trail and reduce potential impacts to mink denning areas. Road-related mortality of the Everglades mink, with at least 14 documented occurrences, would essentially be eliminated. However, the leaving in place of renovated sections of the old roadbed under Alternatives 5a and 5b could possibly provide suitable habitat for Everglades mink and oviposition sites for alligators and other egg-laying reptiles, as well as provide safe havens for terrestrial wildlife during high water periods.

Alternatives 6a and 6b. Alternative 6a would produce impacts to the two Tamiami rookeries as described for alternatives 1 and 2a, above. Alternative 6b and its various options would result in impacts to these rookeries and to the L-29 Canal identical to those

described under Alternative 2b, above. Road-related mortality of the Everglades mink and other wildlife would be eliminated at the four-mile bridge, and mink survival could be further enhanced by providing elevated wildlife crossing shelves under the east and west ends of the extended bridge. Mink denning areas could also be protected by avoiding the need to encroach upon the upland sites south of the existing road. Mink habitat could actually be improved by planting the abandoned upland sites south of the Trail with shrubs and trees so as to resemble native Everglades tree island communities.

Alternatives 7a and 7b. Alternative 7a would have negligible permanent impacts on the two Tamiami rookeries, but Alternative 7b would result in impacts as described above for Alternative 2b. However, we believe that greater ecological and wildlife benefits may be derived from these alternatives by a shift of the 3,000-foot bridge to the east of the Blue Shanty Canal. This would result in water discharges onto a land surface with a slightly lower average ground elevation and would be more centrally located in present day northeastern Shark River Slough. This location may likewise facilitate the safe passage of wildlife, especially if the bridge were equipped with a wildlife shelf.

Alternatives 8a and 8b. Alternative 8a would likewise have little effect on the two Tamiami rookeries, as long as new box culverts are not constructed at the rookery locations. Alternative 8b would produce impacts similar to those described for Alternative 2b. The additional box culverts under these alternatives, if placed at strategic locations, could improve the passage of aquatic and semiaquatic fauna across the roadway, especially if animal barriers were erected to deflect animals to the culvert crossings.

Potential loss of Everglades marsh and connectivity effects

In order to ascertain the potential impacts that each alternative iteration would pose to the functionality of wetlands, a multi-agency team was assembled to apply the Wetland Rapid Assessment Procedure (WRAP) to the various wetland plant communities in the Tamiami Trail corridor. The results of this assessment found that the functional value of wetland communities immediately north of the L-29 Levee in WCA-3B were of somewhat higher quality (average score of 0.74) than similar wetlands situated immediately south of the Tamiami Trail in the Everglades Expansion Area of Everglades National Park (average score of 0.62).

Alternatives 1, 2a, 2b to 2b6, 4a, and 4b to 4b6. The nine water quality treatment options of 4b through 4b6, 2b, and 2b1 were predicted to result in the loss of from 34 (2b1) to 64 (4b) wetland functional units in the Everglades Expansion Area, whereas Alternative 4a (without water quality treatment) was little better, with a predicted loss of 40 wetland functional units (Table 1). By comparison, Alternative 2a, using the existing

highway alignment and four new bridges, resulted in a relatively low loss of wetland function (10 units) at a substantially lower cost than the 2b2 to 2b6 water quality treatment options. Each of these alternatives physically connect the L-29 Canal to the marsh in Everglades National Park for only 2.5% of the entire project corridor length (i.e., create a 2.5% marsh-canal interface) by means of the four new bridges; however, creative water quality treatment options b1 to b3 of Alternatives 2, 4, and 6 would encroach into the L-29 Canal.

Alternatives 3a and 3b. The seven water quality treatment options of 3b through 3b6 presented for Alternative 3 were predicted to result in the loss of from 15 to 30 wetland functional units in WCA-3B, whereas Alternative 3a (without water quality treatment) was predicted to result in the loss of 19 functional units (Table 1). Although north-south connectivity for these alternatives is stated to be 10%, the primary purposes of the eight bridges that supposedly create this connectivity are to cross the L-29 Canal, and to span the two S-355 and three weir water conveyance structures on the L-29 Levee. Connectivity between the L-29 Canal and wetlands to the south would be no greater in Alternative 3 than under Alternatives 2 or 4, since no additional breaching of the Tamiami Trail is included under this alternative.

Alternatives 5a, 5b, and 5c. This suite of alternatives performs the best in that there is actually a net gain in functional units of wetlands (from 29 units in 5b to 45 units in 5c) compared to the base condition. Connectivity under Alternatives 5a (98%) and 5c (nearly 100%) are excellent, but if in situ water quality treatment is required (5b), connectivity would decrease markedly to 75% due to the need to leave sections of the old highway bed in place for dry retention. From a purely ecological perspective, without regard to cost or authority, Alternative 5 appears to exhibit the best overall performance.

Alternatives 6a and 6b. Alternative 6a would result in the loss of only 6.6 wetland functional units (< 10 acres) whereas Alternative 6b would result in significantly greater losses (22.8 functional units) due to the broad footprint necessary for water quality treatment. Alternative 6a is also estimated to result in about a 36% opening of the entire 10.7-mile length of the Tamiami Trail corridor, providing for a significant improvement in aquatic connectivity. Alternative 6b would provide a reduced level of connectivity (27%) due to the necessity to leave portions of the old Tamiami Trail for water quality treatment.

Alternatives 7a and 7b. Alternative 7a would result in a minimal loss of only 3.4 functional units (5 acres) of marsh. In contrast, the acreage demand for standard water quality treatment along 10 miles of roadway in Alternative 7b would result in wetland losses approaching 50 functional units (72 acres). Both of these alternatives would result in a 5% increase in the connectivity of the L-29 Canal to Everglades marshes in the south

near the western end of the project area. The ground elevation of the Everglades marsh at the western end of the project area appears to be slightly higher than at other locations to the east. If this is actually the case, the aquatic connectivity between the L-29 Canal and the marshes south of the Tamiami Trail would be severed sooner during low water conditions than would occur if such an opening were situated at a point east of the Blue Shanty Canal. Aquatic connectivity may even be reduced beyond current levels during periods of low water if Alternative 7b were selected, since the existing culverts would be filled in.

Alternatives 8a and 8b. Alternative 8a would likewise produce a minimal loss of only 3.5 wetland functional units, resembling Alternative 7a. However, wetland losses under Alternative 8b would be considerably greater (46.6 functional units). These alternatives rely on additional box culverts to convey Mod Waters flows, and would increase connectivity between the L-29 Canal and the marsh south of the roadway by a mere 0.4%. These alternatives are not compatible with the CERP concept of removing the Tamiami Trail as an impediment to flow by elevating portions of the roadway.

Features for reducing road-related wildlife mortality

In an effort to obtain some data that could be used for evaluating the need for highway features that could be employed to reduce road-related wildlife mortality, and that could be used as an aid in determining the placement of such features along the project corridor, biologists from the FWC, the U.S. Fish and Wildlife Service, and the COE conducted a preliminary survey of wildlife mortality along five miles of the Tamiami Trail corridor. Remains representing 411 individual animals were found during a walking survey of 3 miles of the Tamiami Trail on December 19-20, 2000 (Tables 2, 3, and 4) and of 2 miles on April 18, 2001 (Tables 5 and 6). During these single visit surveys, an average of 82 wildlife deaths were recorded per mile. If this same level of mortality is extrapolated for the entire 10.7 mile road corridor, the number of road-kill casualties observable on a given day would equal 880 individuals. However, since 60% of the survey length was surveyed during the coldest part of the year when reptile activity is at its lowest point, and since many carcasses are quickly scavenged from the road before they can be counted, we believe that the actual mortality would likely be several times greater than this. For example, during December, an average of 2 dead snakes and 1 alligator were documented per mile of highway; these numbers increased dramatically, following a marsh dry-down in April, to an average of 22 dead snakes and 7 alligators per mile. Recent data collected by FWS staff similarly suggests that there may be an increase in road-killed snakes during the autumn (Mike Abney, pers.comm.) An Arizona study (Kline and Swann 1998) attempting to quantify wildlife road mortality found that only 24% of road-killed animals recorded during all-night surveys were discovered on surveys the following day. Likewise, a daily walking survey of a section of central Florida secondary highway found that most road-killed snakes were present for only a

day or two, with few remains detectable for as long as two weeks (Kristin Wood, pers com.). During our study, aquatic turtles were the most commonly encountered taxa group, accounting for 66% of the total recorded mortality, followed by snakes (13%), birds (10%), mammals (5.5%), alligators (4.5%), and frogs (1%). A total of 21 species were identifiable from the remains, including 4 turtles, 7 snakes, the alligator, 4 birds, and 5 mammals. Due to the tendency for turtle shell fragments to persist for long periods of time along the road, their prevalence may have actually been less than suggested in our surveys. Aquatic or semiaquatic reptiles dominated the survey with only one terrestrial snake (*Elape guttata*) detected. Of the mammals found, only the river otter and the marsh rat were semiaquatic. The other road-killed mammals, requiring an upland habitat component, included the raccoon, the opossum, and the armadillo.

The construction of animal barriers along the Tamiami Trail corridor in between the bridges or culverts on both sides of the road could aid in reducing road-related wildlife mortality. Perhaps a barrier based on the design currently being used at Payne's Prairie State Preserve south of Gainesville, Florida would serve well here also. The review of an unpublished evaluation by Dick Franz (1996) on the effectiveness of different barrier heights ranging from one to four feet suggests that a 2-foot barrier would be sufficient for deterring all turtles, all small snakes and most large-bodied aquatic snakes, all ranid frogs, most alligators, and all rabbits. The addition of a six-inch overhang would further increase the effectiveness of this barrier. It would be difficult to exclude arboreal animals such as raccoons, opossums, treefrogs, and rat snakes, and potentially large alligators, even with the 4-foot barrier design. Furthermore, the 4-foot barriers would be a difficult obstacle for bank fishermen to traverse, especially if an over-hanging lip is present. The scenic vistas of the Everglades from the highway would likewise be greatly reduced by a 4-foot barrier. For these reasons, and the high cost ($124.24/ linear foot) associated with constructing the higher concrete barriers, we recommend that a 2-foot barrier height be considered in project design. Further cost reductions could be achieved by using alternate barrier materials such as a low field fence with aluminum flashing at the base.

Since most mammal mortality was documented in the first and last mile of the project corridor (Tables 3 and 4, Mike Abney pers. comm.), we believe that the use of wildlife underpasses and diversion fences to connect the L-30 to the L-31 Levee and the L-67A to the L-67 Extension Levee would help alleviate much of the mammalian mortality. A wildlife crossing at the L-30 Levee would be of most value since no crossing of the L-29 Canal currently exists here, and because the L-30 and L-31 levees must remain in place for flood protection. Neither would this location impede boat use of the L-29 Canal. A successful and economical design used on State Road 29 by the Florida Department of Transportation to allow safe passage for the Florida panther consists of a 50-foot concrete slab bridge placed in the highway alignment, providing a 24-foot-wide passageway with a clearance height of 8 feet. The diversion fences for channeling animals to the crossings should be of a small mesh design and extend for one-half mile on each side of the underpass. The only other section of road surveyed that exhibited a

trend of greater mammal mortality and where the greatest number of historic Everglades mink road-kills have been documented was the 1-mile section centered at the Blue Shanty Canal (Table 5). Consequently, if the western end of the bridge expanse were relocated to the vicinity of the Blue Shanty Canal, the installation of a bridge shelf there could create a safe passage corridor for large mammals (including the endangered Florida panther), medium-sized mammals and other wildlife that utilize this tree-lined agricultural canal that traverses the Tamiami Trail. A shelf width of 10 to 15 feet placed at an elevation slightly above the mean high water line would accommodate the larger animals as well as the small.

Furthermore, an improved highway design will most likely lead to faster driving speeds by motorists, which may necessitate strict enforcement of posted speed limits and stiff fines to insure that wildlife mortality does not increase.

Concerns and Recommendations

Given the stated authority limitations of the COE and the financial limitations of Everglades National Park to implement alternatives such as Alternative 5 or 6 for the Tamiami Trail portion of the Mod Waters project, Alternative 7a, or a derivative thereof, would appear to be the most reasonable interim alternative to implement prior to the approval of a more permanent solution under CERP. Although implementation of Alternative 7a will not entirely remedy all of the predrainage flow characteristics that existed prior to construction of the Tamiami Trail, it is anticipated to be capable of handling a shift in the bulk of Shark River flow volumes that will be channeled from the west side of the L-67 Levee to the east and into northeastern Shark River Slough.

Lacking in-house hydrological expertise, we must rely on the COE's modeling results, which indicate that a design high water level of 9.3 feet is sufficient for protecting the integrity of the Tamiami Trail road base, as the basis for our support of Alternative 7a. We note that the approved CERP conceptual plan, Alternative D-13R, as designed, is not expected to return the Everglades entirely to its historical flow regimes. The CERP plan may, in fact, need to be improved upon in order to reduce unnaturally high water levels and inundation periods that have been predicted under Alternative D-13R for WCA-3B. However, should any re-evaluation by the COE suggest that the design high water level of 9.3 feet would not be adequate to efficiently move flood water out of WCA-3B, then we would favor the adoption of a higher criterion to lessen the likelihood of deleterious flooding impacts upon the wildlife and vegetative communities of WCA-3B.

In summary, we offer the following recommendations concerning the alternatives under consideration, including possible improvements to Alternative 7a, the preliminary preferred alternative.

1 We support the idea of selecting an alternative that would be as compatible as possible with the upcoming CERP Decompartmentalization Project, and recommend that a real estate agreement between the COE and the Florida Department of Transportation for the Tamiami Trail be pursued in lieu of raising the profile of the roadway. We understand that such an agreement is expected to occur when the COE completes its design and specification plans for the project.

2. We understand that water quality treatment will probably not be required at this time since the impervious surface of the highway is not expected to significantly increase. Due to the potential for significant losses of high quality wetlands, impacts to important wildlife habitats, impacts to bank fishing, and possible incompatibility with CERP that would occur by including water quality treatment, we support the implementation of a water quality monitoring plan to ascertain whether treatment would be desirable in the future.

3. We are concerned about the potential reduction in public recreational access to the FSTWMA and fishing sites along the Tamiami Trail that could occur under Alternatives 3a, 3b, and the water quality treatment options b1 to b3 of Alternatives 2, 4, and 6, since such access is anticipated to decline as a result of restoration activities associated with both the Conveyance and Seepage component of Mod Waters and with the Decompartmentalization of WCA-3A Project of CERP. We are pleased to see at this time that, apart from a temporary lack of access to the south bank of the L-29 Canal during construction, Alternative 7a is expected to have minimal impacts on recreational use. However, special attention will need to be given to the siting of construction staging areas so that access is not blocked to the three boat ramps and parking facilities associated with the popular Recreation Site No. 4, the boat ramp and parking facility at Recreation Site No. 1, or to the boat ramp facility located west of the S-12D structure.

4. Of the viable alternatives being considered for this project, Alternative 7a would appear to have the least amount of impact on fish and wildlife resources. However, we believe that greater ecological and wildlife benefits may be derived from this alternative by a shift of the bridge from the proposed site one mile east of the L-67 Levee to a location east of the Blue Shanty Canal. If feasible, the placement of the western end of the bridge span, equipped with a wildlife crossing shelf beneath it, at a location immediately east of the Everglades Safari Airboat concession could aid in the reduction of wildlife mortality, particularly of the threatened Everglades mink.

5. Since wading bird and snail kite nesting patterns, as well as Everglades mink territories may vary with the prevailing hydrological conditions, surveys should be conducted on an annual basis by qualified biologists to determine whether any nesting efforts of state and federally protected bird species, or mink dens, would potentially be affected, prior to the commencement of construction activities. There is, in particular, a need for the COE to support a detailed study of the status and current distribution of the threatened Everglades mink along the Tamiami Trail corridor prior to the completion of the CERP Decompartmentalization Phase 1 project plan.

6. Alternatives 2b, 3a, 3b, 4a, 4b, 6b, 7b, and 8b produce an unacceptable amount of wetland functional loss, result in permanent impacts to wading bird rookeries, and have the potential to impact the threatened Everglades mink population; therefore, we recommend that they be removed from further consideration as ecologically viable alternatives.

7. Results from our preliminary wildlife mortality surveys and historical information suggest that there is a need for a more detailed wildlife mortality study on this portion of the Tamiami Trail prior to the completion of the Decompartmentalization Phase I project design plans. We are pleased that the COE is now supporting such a wildlife mortality study through the U.S. Fish and Wildlife Service, and hope that some nighttime surveys will be incorporated to document the potential effects of nocturnal or early morning scavengers on road-kill results.

8. Any reduction in recreational access or use of the Francis S. Taylor Wildlife Management Area that occurs in connection with this project would need to be compensated for on terms amenable to the FWC. We urge that the COE devise a program whereby the development of the recreational potential, adequate to meet anticipated public-use requirements, is more fully incorporated into project plans.

Sincerely,

Brian Barnett

Brian S. Barnett, Interim Director
Office of Environmental Services

BSB/DTT
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Enclosures

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Table 1. Description of Alternatives being considered for the Tamiami Trail Project and their effects on wetland extent and function as determined by the Wetland Rapid Assessment Procedure.

Alternative	Description	Acres Lost	Functional Units Lost- / Gained+
1	Existing alignment and profile with 4 new bridges without water quality treatment	-1.6	-2.9
2a	Existing alignment with raised profile and 4 new bridges without water quality treatment	-11.8	-10.1
2b	Existing alignment with raised profile, 4 new bridges, with standard dry detention water quality treatment	-86.0	-37.5
2b Options	"Creative" water quality treatment options		
2b 1	Shift alignment to north and compress swale with wall elements/south side	-44.6	-33.6
2b 2	Shift alignment to north and compress swale with wall elements/north side	-8.0	-8.4
2b 3	Shift typical section north encroaching approximately 50 ft. into L-29 Canal	-8.0	-8.4
2b 4	Grass strips	-8.0	-8.4
2b 5	Exfiltration trenches with curb and gutter	-8.0	-8.4
2b 6	Exfiltration trenches with shoulder gutter	-7.9	-8.3
3a	New north alignment in WCA-3B with raised profile and 8 new bridges without water quality treatment	-14.3	-18.8
3b	New north alignment in WCA-3B with raised profile, 8 new bridges, and standard dry detention water quality treatment	-28.9	-30.2
3b Options	"Creative" water quality treatment options		
3b 1	Modified 2b 1 Option	-22.8	-25.4
3b 2	Modified 2b 2 Option	-10.6	-16.0
3b 3	Modified 2b 3 Option	-13.5	-18.2
3b 4	Grass strips	-9.6	-15.2
3b 5	Same as 2b 5	-10.3	-15.8
3b 6	Same as 2b 6	-10.4	-15.9

Alternative	Description	Acres Lost	Functional Units Lost (-) / Gained
4a	New south alignment with raised profile and 4 new bridges without water quality treatment	-68.4	-40.4
4b	New south alignment with raised profile, 4 new bridges, and standard dry detention water quality treatment	-103.9	-64.4
4b Options	"Creative" water quality treatment options		
4b 1	Modified 2b 1 Option	-62.6	-36.5
4b 3	Modified 2b 3 Option	-62.5	-36.5
4b 4	Grass strips	-61.3	-35.6
4b 5	Same as 2b 5	-62.6	-36.5
4b 6	Same as 2b 6	-62.5	-36.5
5a	Elevated roadway within existing right-of-way without water quality treatment	57.3	39.3
5b	Elevated roadway within existing right-of-way with water quality treatment	43.0	29.5
5c	Elevated roadway within existing right-of-way, without water quality treatment, with degradation of the existing highway embankment	65.9	45.3
6a	Existing alignment with raised profile, 4-mile bridge and 8 new box culverts without water quality treatment	-9.6	-6.6
6b	Same as alternative 6a with standard dry detention water quality treatment	-33.3	-22.8
6b Options	"Creative" water quality treatment options		
6b 1	Same as Option 2b 1 applied to remaining roadway	-30.4	-20.9
6b 2-6b 5	Same as Option 2b 2 - 2b 5 applied to remaining roadway	-4.8	-3.3

Alternative	Description	Acres Lost	Functional Units Lost- / Gained+
7a	Existing alignment with raised profile and 3000-foot bridge without water quality treatment	-5.0	-3.4
7b	Existing alignment with raised profile and 3000-foot bridge with standard dry detention water quality treatment	-72.4	-49.5
7b Options	"Creative" water quality treatment options		
7b 1	Same as Option 2b 1 applied to remaining roadway	-10.4	-7.2
7b 2	Same as Option 2b 2 applied to remaining roadway	-5.0	-3.4
7b 3	Same as Option 2b3 applied to remaining roadway	-10.4	-7.2
8a	Existing alignment with raised profile and 24 additional culverts without water quality treatment	-5.1	-3.5
8b	Existing alignment with raised profile and 40 additional culverts with standard dry detention water quality treatment	-68.0	-46.6
8b Options	"Creative" water quality treatment options		
8b 1& 8b3	Same as Options 2b1& 2b 3 applied to remaining roadway	-15.9	-7.5
8b2	Same as Option 2b2 applied to remaining roadway	-5.1	-3.5
" 9a"	Existing alignment with raised profile, 2.7-mile bridge and 8 new box culverts without water quality treatment	-2.8	-1.9
"9b"	Existing alignment with raised profile, 2.7-mile bridge and 8 new box culverts with standard dry detention water quality treatment	-39.1	-33.4

Table 2. Wildlife remains identified along Tamiami Trail, one-half mile on each side of Agricultural Canal at Coopertown, located four miles west of S-334 (December 19, 2000).

NORTH SIDE OF TAMIAMI TRAIL			
Class	East ½ mile	West ½ mile	Total
Turtles	16	12	28
Snakes	1	2	3
Frogs	1	1	2
Alligators	0	0	0
Birds	0	0	0
Mammals	0	1	1
Unidentified	1	4	5
SOUTH SIDE OF TAMIAMI TRAIL			
	East ½ mile	West ½ mile	Total
Turtles	4	6	10
Snakes	0	3	3
Frogs	0	0	0
Alligators	0	1	1
Birds	4	1	5
Mammals	0	0	0
Unidentified	2	1	3

TOTAL: 61

Table 3. Wildlife remains identified along one mile of Tamiami Trail beginning at the Flight 592 Memorial adjacent to the L-67 Canals and ending ½ mile east of Osceola Camp (December 20, 2000).

NORTH SIDE OF TAMIAMI TRAIL			
Class	East ½ mile	West ½ mile	Total
Turtles	11	7	18
Snakes	0	0	0
Frogs	0	0	0
Alligators	0	0	0
Birds	3	0	3
Mammals	0	1	1
Unidentified	0	0	0

Table 3. Continued

SOUTH SIDE OF TAMIAMI TRAIL			
Class	East ½ mile	West ½ mile	Total
Turtles	5	4	9
Snakes	0	0	0
Frogs	0	0	0
Alligators	1	1	2
Birds	1	0	1
Mammals	2	4	6
Unidentified	2	2	4

TOTAL: 44

Table 4. Wildlife remains identified on December 20, 2000 along one mile of Tamiami Trail beginning at the L-30 Canal extending one mile west and ending at a bank of culverts (Begin: UTM 550299 N; 2849310 E End: 548615 N; 2849297 E).

NORTH SIDE OF TAMIAMI TRAIL			
Class	East ½ mile	West ½ mile	Total
Turtles	38	20	58
Snakes	0	0	0
Frogs	0	0	0
Alligators	0	0	0
Birds	3	0	3
Mammals	3	0	3
Unidentified	0	1	1
SOUTH SIDE OF TAMIAMI TRAIL			
	East ½ mile	West ½ mile	Total
Turtles	18	4	22
Snakes	0	0	0
Frogs	0	0	0
Alligators	1	1	2
Birds	1	2	3
Mammals	2	1	3
Snakes	1	1	2

TOTAL: 97

Table 5. Wildlife remains identified by FWC on April 18, 2001, along one mile of Tamiami Trail (between culverts #44 to #46 at the Blue Shanty Canal [culvert #45]).

NORTH SIDE OF TAMIAMI TRAIL			
Class	East ½ mile	West ½ mile	Total
Turtles	18	3	21
Snakes	1	0	1
Frogs	0	0	0
Alligators	2	2	4
Birds	0	0	0
Mammals	0	1	1
Unidentified	1	1	2
SOUTH SIDE OF TAMIAMI TRAIL			
Turtles	19	12	31
Snakes	4	2	6
Frogs	0	0	0
Alligators	2	1	3
Birds	3	3	6
Mammals	1	5	6
Unidentified	1	0	1

TOTAL: 82

Table 6. Wildlife remains identified by FWC on April 18, 2001, along one mile of Tamiami Trail (between culverts #56 to #54 at the Tamiami West woodstork colony [culvert #55]).

NORTH SIDE OF TAMIAMI TRAIL			
Class	East ½ mile	West ½ mile	Total
Turtles	16	20	36
Snakes	5	3	8
Frogs	2	1	3
Alligators	1	2	3
Birds	4	6	10
Mammals	0	0	0
Unidentified	1	1	2
SOUTH SIDE OF TAMIAMI TRAIL			
Turtles	9	15	24
Snakes	23	7	30
Frogs	0	0	0
Alligators	2	2	4
Birds	4	3	7
Mammals	0	0	0
Unidentified	0	0	0

TOTAL: 127

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FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

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August 11, 2005

Colonel Robert M. Carpenter
District Engineer
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Re: Supporting documents for the Draft Revised General Reevaluation Report/Supplemental Environmental Impact Statement (RGRR/SEIS) for the Tamiami Trail, Modified Water Deliveries to Everglades National Park, Miami-Dade County

Dear Colonel Carpenter:

The Habitat Conservation Scientific Services Section of the Florida Fish and Wildlife Conservation Commission (FWC) has coordinated agency review of the supporting documents being used to craft the Draft Revised General Reevaluation Report/Supplemental Environmental Impact Statement (RGRR/SEIS) for the Tamiami Trail Project of Modified Water Deliveries to Everglades National Park (MWD). These documents include the MWD Tamiami Trail Modifications Benefits Analysis, results from RMA-2 modeling of bridge lengths in Tamiami Trail, an Alternative Optimization Report prepared by Everglades National Park (ENP Report), and a Tamiami Trail Road-kill Survey report prepared by the U.S. Fish and Wildlife Service (FWS). Our comments and concerns on the Tamiami Trail Project are included in the following preliminary supplemental Fish and Wildlife Coordination Act Report (FWCAR), which is being submitted under the authority of the Fish and Wildlife Coordination Act of 1958.

Background

This project is one of four components that have arisen from the original 1992 Modified Water Deliveries General Design Memorandum. The other highly interrelated components include flood protection of the 8.5 Square Mile Area residential development along the eastern side of Northeast Shark River Slough (NESRS); conveyance of water between Water Conservation Area (WCA)-3A, WCA-3B, and NESRS; and an overall operational plan for the newly constructed water control structures.

Project Description

The reason that the 2003 GRR/SEIS is being revised is that new information regarding probable damage to the Tamiami Trail was raised during and subsequent to the public and agency review of the final report, leading to a determination by the U.S. Army Corps of Engineers (COE) that the recommended plan did not contain all of the features necessary for implementation. Recent modeling indicates that an increase in the design high-water stage for the L-29 canal from 9.3 ft to 9.7 ft would be necessary, accompanied by the need for a different, and potentially more costly, method such as raising the road to mitigate effects to the Tamiami Trail. Compounding this added expense, worldwide cost of construction materials increased greatly, resulting in substantial increases in cost estimates for the alternatives. Due to these cumulative increases in costs, the tradeoffs between benefits and costs were reanalyzed for the purpose of determining whether a different alternative might make better use of limited funds.

Of the nine basic alternatives previously addressed by our FWCAR dated June 24, 2003, three have been retained for re-evaluation, and a new alignment has been proposed for one of these. Those retained for further evaluation include: Alternative 9, the 3,000-foot bridge located east of the Blue Shanty Canal (the previous Tentatively Selected Plan) with a higher roadway elevation; Alternative 10, a centrally located 4-mile bridge with a higher roadway elevation ("central 4-mile bridge"); Alternative 11, an eastern 4-mile bridge with a higher roadway elevation ("east 4-mile bridge"); and Alternative 17, a 10-mile bridge. The central 4-mile bridge is a slight realignment of Alternative 6a from the 2003 GRR/SEIS, and had been considered by Everglades National Park (ENP) and the COE as a strong contender for the new tentatively selected plan. However, further increases in construction cost estimates led the COE once again into alternative formulation to take into consideration shorter bridge lengths at various locations. Six additional alternatives were identified and are as follows: Alternative 12, a centrally located 3-mile bridge ("central 3-mile bridge"); Alternative 13, a centrally located 2-mile bridge ("central 2-mile bridge"); Alternative 14, a 2-mile bridge on the west end of the project area and a 1-mile bridge on the east end ("2-mile west/1-mile east bridges"); Alternative 15, a 1.3-mile bridge on the west end of the project area and a 0.7-mile bridge on the east end ("1.3-mile west/0.7-mile east bridges") ; and Alternative 16, three 3,000-foot bridges in the central portion of NESRS (Figure 1). We understand that the COE is now proposing the 2-mile west/1-mile east bridge (Alternative14) as the new Tentatively Selected Plan. The western 2-mile bridge would begin approximately 1.5 miles west of the L-67 Levee and extend to the east of the Blue Shanty Canal, requiring one access ramp to the Everglades Safari airboat concession located on the Blue Shanty Canal. The eastern 1-mile bridge would begin approximately 1.5 miles west of the L-31 N levee and extend to the west for 1 mile, capturing an old north-south agricultural canal. This bridge would lie between, and equidistant from, the two wading bird rookeries located immediately south of the Tamiami Trail. For our comments concerning Alternative 17, the 10-mile bridge (previously known as Alternative 5), please refer to our previous FWCAR dated June 24, 2003.

Our three major areas of concern with regard to the potential impacts of this project remain as follows: (1) impacts to existing recreational facilities and access points of the Francis S. Taylor Wildlife Management Area (WCA-3B), (2) impacts to fish and wildlife resources, and (3) potential loss or degradation of Everglades marsh. Many of our comments and concerns on the

Tamiami Trail feature have been conveyed previously to the COE in a letter dated March 17, 2004 (attached), to James C. Duck; in a review of a preliminary draft GRR/SEIS via a preliminary FWCAR (attached) dated June 24, 2003; through a Planning Aid Letter (PAL) dated February 26, 2001; and via the Florida State Clearinghouse in a letter dated January 16, 2002, to Ms. Jasmin Raffington. Our comments in this current letter focus on Alternatives 10 through 16, as well as the ecological benefits to be expected from each. We have already reviewed the design for the 10-mile bridge in our FWCAR dated June 24, 2003.

ENP Report and Benefits Analysis Procedures

The MWD Tamiami Trail Modifications Benefits Analysis was constructed largely from the ENP Report through two collaborative interagency workshops held by the COE in May and July, 2005. Although the ENP report integrated a great deal of historical and ecological information, its direct applicability to the Tamiami Trail RGRR is limited by a number of its assumptions. A screening process was therefore conducted by the interagency team whereby the number of performance measures (PMs) in the ENP Report was reduced from 33 to 12 PMs. The remaining 12 PMs address four important characteristics of ENP: hydrology, ridge and slough processes, vegetation, and fish and wildlife resources. An additional hydrologic PM for restoring water deliveries to ENP was added during the July workshop, resulting in a total of 13 PMs. The quantitative and qualitative values for the PMs were converted into scores (0 to 7) for each of the PMs. These scores were added together to produce an index of the quality of restoration for each alternative. Average annual habitat unit benefits were then calculated for each of the alternatives for relative comparison. The details of the above processes are explained in the COE document entitled "MWD Tamiami Trail Modification Benefits Analysis Procedures August 2005."

Although we support the overall objectives upon which the 13 performance measures for calculating benefits are based, we do not necessarily agree with all the hypotheses that the ENP Report used to justify the selected PMs. For example, we agree that the restoration of ridge and slough processes is an appropriate objective, and that the performance measure to reverse filling in of sloughs is appropriate. However, we do not believe that there is sufficient scientific evidence to support the higher water depths that the report suggests would be necessary to re-create ridge and slough habitat. The report states that the 100% restoration goal for the area downstream of the 4-mile centrally located bridge would require water depths greater than 2 feet for 80 - 100% of the time in the sloughs. On the contrary, we have supporting evidence from the current Everglades system that extreme high water depths of relatively long duration lead to a deterioration of ridge and slough landscape features and to declines in their associated wildlife populations. Southern WCA-3A has experienced severe degradation of its ridge components (sawgrass ridges and tree islands) due to excessive depths and durations during the past 40 years (Heisler et al. 2002, McPherson 1973, Patterson and Finck 1999). The Heisler et al. study found that marsh water levels exceeding 2.0 feet led to tree island flooding impacts demonstrated by a statistically significant ($P < 0.0001$) reduction in tree and shrub species richness. If we agree that tree islands, ridges, and sloughs are all defining components of a restored Everglades, then clearly more work needs to be done to reconcile the recommendation for a hydroperiod that promotes ridge and slough maintenance while also supporting tree islands.

The other objectives being used to calculate habitat units for alternative comparisons include restoring water deliveries to ENP, restoring vegetative communities, and restoring fish and wildlife resources. There appear to be credible sources of both historical and ecological information presented in the ENP Report that could be used to help evaluate the ecological benefits of the five remaining alternatives for conveying flows through the Tamiami Trail. These include hydrologic connectivity, velocity distributions downstream of the bridges, ground elevation, historic flow information, and historic slough locations based on an unpublished 1917 survey by J. W. King.

Comparison of the 4-Mile Bridge Alternatives (Alternatives 10 and 11) to a 3,000-Foot Bridge (Alternative 9)

The implementation of a 4-mile bridge alternative would provide for greater compatibility between MWD and the proposed Comprehensive Everglades Restoration Plan (CERP) Decompartmentalization ("Decomp") project by reducing the amount of retrofitting needed for the Tamiami Trail in that project. Information contained in the COE's Benefits Analysis determined that the central 4-mile bridge (Alternative 10) would produce 32,674 average annual habitat unit benefits and the east 4-mile bridge (Alternative 11) would produce 28,549 unit benefits. In contrast, the 3,000-foot bridge would only produce 12,453 average annual habitat unit benefits. Unfortunately, the COE has indicated that there are no longer sufficient funds to construct a 4-mile bridge.

The greater bridge lengths in Alternatives 10 and 11 would have augmented the hydrologic connectivity between the L-29 canal and ENP marshes to the south, facilitating the movement of aquatic biota between these two areas. As stated in the ENP Report, this enhanced connectivity may lead to improvements in micro-topography in the ridge and slough system in the long term by creating a larger area with open water or sparse vegetation. When water depths are shallow, such habitats are known to harbor greater fish densities and to be more productive foraging sites for wading birds (J.A. Surdick 1998). Improved foraging habitat should benefit the wading bird rookeries located in the vicinity of the Tamiami Trail. For additional comments on connectivity effects, please refer to our previous letter dated June 24, 2003.

The Tamiami Trail road-kill survey conducted by the FWS in 2002-03 documented 991 road-killed vertebrates along two miles of selected transects over 13 monthly sampling periods. Reptiles including turtles, snakes, and alligators were the most commonly found carcasses, constituting 84% of the total, while mammals, birds, and amphibians comprised the remaining 14% of the road-killed animals. Based on the two miles of transects surveyed in the FWS Tamiami Trail road-kill survey, there was an average of 262 road-kills/mile/year. An extrapolation of this data to a 4-mile bridge alternative may reduce the risk of wildlife mortality by seven-fold, resulting in 900 fewer road-killed animals per year than would occur with the 3,000-foot bridge alternative. Both the central and the east 4-mile bridge alternatives would result in a reduction of present road-related wildlife mortality by approximately 37% compared to only 5% reduction by the 3,000-foot alternative. If additional box culverts in these alternatives are strategically placed, further reductions in wildlife mortality could be realized. The FWS survey also reinforces the need for placement of a wildlife crossing at the juncture of

the L-30 and L-31 levees. For more details of our suggestions for reducing road-related mortality, please refer to our previous letter dated June 24, 2003.

Analysis by the COE using the RMA-2 hydrologic model was conducted to evaluate the velocity distribution of flows south of the Tamiami Trail for the different bridge configurations. The COE estimated that velocities in excess of 0.1 feet/second (ft/sec) would be excessive and destructive to the maintenance of the ridge and slough habitat. The RMA-2 modeling results predicted that 411 acres of marsh would be negatively affected by the 3,000-foot bridge, compared to only 98 acres by the central 4-mile bridge and 105 acres by the east 4-mile bridge. The ENP Report identified a lower velocity threshold of 0.045 ft/sec to evaluate differences between alternatives. Using this criterion, velocities greater than 0.045 ft/sec were estimated to negatively affect 1,649 acres under the east 4-mile bridge alternative and 438 acres under the central 4-mile bridge alternative. Although it is assumed that more natural flow velocities would provide greater benefits to aquatic biota, the appropriate target flow velocities, as well as the extent of benefits and their relative importance to wildlife populations is difficult to ascertain.

Another potential issue concerning the greater bridge lengths under Alternatives 10 and 11 is the longer construction time required. Under Alternative 7a (the 3,000-foot bridge) in the 2003 GRR, the construction period was estimated to last 24 months, whereas the length of time for completing construction of any one of the new alternatives is estimated to take 36 months. We hope that any additional time needed to complete the Tamiami Trail modifications does not delay the COE's ability to implement the portion of MWD that will be addressed under the Combined Structural and Operational Plan.

Comparison of central 4-mile (Alternatives 10) and east 4-mile bridge (Alternative 11)

Future plans under Decomp would remove the southern portion of the L-67A levee and the L-29 levee, facilitating sheetflow through the western portion of WCA-3B into NESRS. Alternative 10, with its more centrally located bridge, would provide the most direct routing for these future flows, and, we are hopeful, would reduce potential flooding impacts to WCA-3B.

According to the ENP Report, the average ground elevation at the central 4-mile bridge location is somewhat lower than it is at the east 4-mile bridge location. Culvert flow data during the peak of the 1947 flood were used to demonstrate that 51% of the flows across the Tamiami Trail occurred at the central location, while only 37% of the flows occurred at the eastern location. Information compiled by the COE using recent USGS survey data for ground surface elevations in NESRS 1,000 feet south of the Tamiami Trail confirms the more general ground elevation information contained in the ENP Report. A graphical presentation of this survey data depicts two "deep" sloughs at ground surface elevations less than 6.0 feet NGVD at both the east 4-mile bridge location and the west 4-mile bridge location (Figure 1). The ENP Report likewise analyzes historic photographs from 1917 in the project area and determines that a greater number of "deep" sloughs historically occurred at the central location than at the eastern location. We believe that further benefits could be accrued by placing additional box culverts at historic slough locations, particularly in the deep centrally located slough at Frog City.

The east 4-mile bridge could lead to greater impacts to the Tamiami East and Tamiami West rookery sites located immediately south of the roadway. Several listed species of wading birds, including the white ibis (*Eudocimus albus*), tricolored heron (*Egretta tricolor*), little blue heron (*Egretta caerulea*), and snowy egret (*Egretta thula*) (all state-listed as species of special concern), and the wood stork (*Mycteria americana*) (state- and federally listed as endangered) are known to nest in these colonies (T. Towles, FWC, personal observation, 1997). The FWS roadkill survey documented the mortality of wood storks and snowy egrets along the current roadway. An elevated bridge could lead to an increased risk of wading bird strikes by passing traffic, and reduce productivity through the visual disturbance created by traffic passing within the sight of canopy-nesting wading birds.

The Everglades mink (*Mustela vison evergladensis*) is listed as threatened by the FWC, and approaches the eastern limits of its distribution in the project area. The greatest number of historic Everglades mink roadkills documented for this portion of the Tamiami Trail was in the western portion of the project area, and specifically centered at the Blue Shanty Canal (Smith 1980). Consequently, the central location of Alternative 10, spanning the Blue Shanty Canal, may reduce the risk of Everglades mink road-related mortality to a greater extent than would the more easterly alignment of Alternative 11.

According to the RMA-2 analysis conducted by the COE, the central 4-mile bridge would result in fewer acres being negatively affected by relatively high flow velocities than would occur with the east 4-mile bridge. Using the COE's criterion of 0.1 ft/sec, an additional 187 acres of marsh would be affected by higher velocities in the central bridge alignment than in the eastern bridge alignment. No velocity estimates were calculated for Alternative 11 in the ENP Report.

Comparison of 2-mile west/1-mile east bridges (Alternative 14), a 3-mile central bridge (Alternatives 12), a 2-mile central bridge (Alternative 13), and a 3,000-foot bridge (Alternative 9)

Results of the Benefits Analysis demonstrated that the combined hydrologic and ecologic average annual lift of the 2-mile west/1-mile east alternative (28,371 habitat units [hu]) was slightly greater than the 3-mile central bridge alternative (27,973 hu), but the 2-mile central bridge alternative also demonstrated a considerable amount of lift (22,422 hu). All of these alternatives exceeded the performance of the 3,000-foot bridge (12,453 hu) by quite a margin. The 2-mile west/1-mile bridge design was shown to provide slightly greater hydrologic average lift (24,522 hu) than a single 3-mile bridge (23,998 hu). Improvements in hydrologic connectivity between the L-29 Canal and NESRS and in the distribution of flows from west to east along the Tamiami Trail in the 2-mile west/1-mile east bridges alternative were the primary contributors to this lift. The 2-mile west/1-mile east bridges alternative, with a connectivity value of 34%, offers greater connectivity than does a single central 3-mile bridge, with a value of 30%. As stated in the ENP Report, such enhanced connectivity may lead to improvements in micro-topography in the ridge and slough system in the long term by creating a larger area with open water or sparse vegetation. When water depths are shallow, such habitats are known to harbor greater fish densities and to be more productive foraging sites for wading birds (J.A. Surdick 1998). The creation of such habitat improvements at the eastern bridge location of

Alternative 14 may be of particular benefit to wading birds due to the two rookeries that would be situated at both the east and west ends of this bridge. The 2-mile west/1-mile east bridge alternative was also more effective in re-creating the normal east to west distribution of flows that would occur if the Tamiami Trail did not exist. This alternative matched 59% of the natural east to west distribution, whereas both the 3,000-foot bridge and the central 3-mile bridge matched 57% of the east to west distribution, and the single 2-mile bridge matched only 51% of this distribution. The redistribution of flows is important since it is a primary overarching objective of the MWD project.

We also learned from engineering staff of the South Florida Water Management District (SFWMD) that additional bridge capacity along the eastern reach of the L-29 canal may facilitate the transfer of greater quantities of water from WCA-3B into the L-29 canal and NESRS, which may help reduce the severity of extreme high water predicted to occur in eastern WCA-3B under the Combined Structural and Operational Plan. Flows from the L-29 canal under a 1-mile bridge into the three relatively deep sloughs in the east during dry conditions would also provide for a more uniform and gradual recession rate and reduce unnatural dry downs, possibly enhancing wading bird nesting success. There may also be a greater capacity in the eastern than in the western portion of NESRS for receiving flows due to the greater amount of subsidence that has occurred in the east since 1946 (from 2 to 3 feet) than in the west (none to 2 feet) (Scheidt et al. 2000). Such physical and hydrological characteristics that act to increase the conveyance of flows from the L-29 canal to the south, and augment the capacity of the L-29 canal to receive flows from WCA-3, would be considered as beneficial to Everglades habitat in both WCA-3 and in NESRS.

Both the 2-mile west/1-mile east bridge and the central 3-mile bridge alternatives would result in a reduction of present road-related wildlife mortality by approximately 29% compared to 19% for the central 2-mile bridge, and only 5% reduction by the 3,000-foot alternative. If additional box culverts in these alternatives are strategically placed, further reductions in wildlife mortality could be realized. Based on the two miles of transects on the Tamiami Trail roadway surveyed in the FWS Tamiami Trail road-kill survey, there was an average of 262 road-kills/mile/year. An extrapolation of this data to a three-mile bridge alternative may reduce the risk of wildlife related mortality by more than five-fold, resulting in 635 fewer road-killed animals per year than would occur with the 3,000-foot bridge alternative. The 2-mile bridge alternative may reduce the risk of wildlife related mortality by more than three-fold, resulting in 374 fewer road-killed animals per year than would occur with the 3,000-foot bridge alternative. For more details of our suggestions for reducing road-related mortality, please refer to our previous letter dated June 24, 2003.

The 2-mile west/1-mile east bridges, central 3-mile bridge, and central 2-mile bridge alternatives would not be expected to have any adverse effects on the two Tamiami Trail wading bird rookeries. The 2-mile west/1-mile east bridge alternative avoids potential impacts by locating the eastern 1-mile bridge in between the two wading bird rookeries. The increased flows and hydroperiods to be expected by this bridge alignment may improve foraging habitat for wading birds nesting in these colonies.

The greatest number of historic Everglades mink road-kills documented for the eastern portion of the Tamiami Trail was centered at the Blue Shanty Canal (Smith 1980). Since the western 2-mile bridge of Alternative 14 spans the Blue Shanty Canal, the risk of Everglades mink road-related mortality may be reduced. The reconnection of the linear and natural "upland" and aquatic features associated with the Blue Shanty may also facilitate safe passage for other terrestrial and aquatic wildlife that utilize the Blue Shanty as a travel corridor.

Information contained in the COE's Benefits Analysis determined that the RMA-2 modeling results predicted that 295 acres of marsh would be negatively affected by velocities > 0.1 ft/s under the 2-mile west/1-mile east alternative, compared to 411 acres affected by the 3,000-foot bridge alternative. The 3-mile and 2-mile bridge alternatives would affect somewhat fewer acres than the 2-mile west/1-mile east bridge. Since the ecological significance of these higher velocities is difficult to define and the acreage affected is relatively minor considering the larger benefits to be derived through lengthening inundation periods over much of NESRS, these relatively minor effects would be acceptable for any of the alternatives presently being considered.

Although the implementation of a 2-mile west/1-mile east bridge alternative would not provide as many benefits as a 4-mile bridge, it is believed to offer a sufficient amount of compatibility between MWD and future restoration under the Decomp project, and would reduce the amount of retrofitting needed for the Tamiami Trail under Decomp. We also understand that the central 3-mile bridge and 2-mile west/1-mile east bridge alternatives, as it now stands, both exceed the cost limitations for the project. In the event that construction costs further limit the length of bridge than can be built, we believe that the results obtained from the Benefits Analysis would support as a minimum either the 1.3-mile west/ 0.7-mile east bridge alternative or the 2-mile central bridge alternative as being adequate to convey and distribute MWD flows to ENP. We furthermore believe that the additional benefits identified in the split bridge alternatives warrant maintaining this design and that at least one-third of the total bridge length should be apportioned to the east portion of NESRS. This ratio would improve the redistribution of flows to the full breadth of NESRS, and would improve connectivity between the L-29 canal and ENP to a greater extent than would be afforded by a single bridge span.

Recreation concerns

Those concerns that were previously addressed pertaining to potential impacts to FWC recreational facilities and access points under Alternatives 1 through 8 (see attached June 24, 2003 preliminary FWCAR) remain. The only public recreational access that is anticipated to be lost under either Alternatives 12 or 14 would be the permanent loss of access to three miles of the south side of the L-29 canal and to culvert outfall sites on the south side of the Tamiami Trail for bank anglers. It is assumed that there would also be a temporary loss of access to the south bank of the remaining seven miles of the roadway during the construction period. Perhaps the reduced access to the south bank of the L-29 canal could be compensated for by providing scenic view pull-offs on the two bridges that could also serve as fishing platforms. The increase in connectivity between the L-29 canal and ENP marshes under either three-mile bridge alternative may enhance the recreational fishery value of the L-29 canal to a greater extent than would the

connectivity created by a 3,000-foot bridge. We further understand that Alternatives 12 and 14 would not affect vehicular access to the L-29 Levee or boat access to the L-29 canal.

Other related issues

We understand that water quality treatment for the roadway will probably not be required at this time since the impervious surface of the highway is not expected to significantly increase. On the other hand, we understand that an expensive water quality treatment system is being incorporated into the construction design for the bridge spans. We would support best management practices, such as using stormceptors or similar technologies for improving water quality of stormwater being discharged while minimizing wetland impacts. We encourage further investigation into cost effective treatment technologies for reducing bridge stormwater runoff, so that the bridge lengths and associated ecological benefits can be maximized.

We recognize that some private property issues related to increasing flood stages and possibly to rights of ways south of the Tamiami Trail are under resolution at the present time. We hope that these issues can be satisfactorily resolved such that the ecological benefits of project implementation can be realized in a timely manner.

Concerns and Recommendations

The stated authority limitations of the COE and the financial limitations of ENP will likely preclude them from implementing the more ecologically preferred alternatives, such as Alternatives 10 or 17 for the Tamiami Trail portion of the MWD project. Therefore, Alternative 14, or a derivative thereof, would appear to be the most reasonable interim alternative to implement prior to the approval of a more permanent solution under CERP. In our preliminary FWCAR for the GRR, dated June 24, 2003, we had previously agreed that a 3,000-foot bridge length would suffice due to fiscal constraints at that time. Should budget shortfalls for this project occur, we would continue to support the construction of one or more bridges intermediate in combined length between two and three miles, in order to avoid any further delays in completing the Tamiami Trail, and ultimately the MWD project. In summary, we offer the following recommendations concerning the alternatives under consideration.

1. We continue to support the idea of selecting an alternative that would be as compatible as possible with the upcoming CERP Decomp project, and reduce costly retrofitting of the Tamiami Trail in the future. Contingent on funding commitments from the Department of the Interior, we believe that Alternative 14 best addresses this compatibility.

2. Of the two most promising alternatives now being considered for this project, Alternative 14 would appear to offer the most benefits for fish and wildlife resources while avoiding potential impacts. This alternative would reduce the risk of wildlife mortality at the Blue Shanty Canal, particularly that of the threatened Everglades mink, since this canal would

bridge. This alternative would also avoid possible impacts to two important wading bird bridge between them.

3. Although Alternative 14 is expected to eliminate three miles of bank access along the south bank of the L-29 canal and cause a temporary loss of access to the remainder of the south bank during construction, we consider these impacts to be minimal when compared to some other alternatives. However, special attention will need to be given to the siting of construction staging areas so that access is not blocked to the three boat ramps and parking facilities associated with the popular Recreation Site No. 4, the boat ramp and parking facility at Recreation Site No. 1, or to the boat ramp facility located west of the S-12D structure.

4. Wading bird and snail kite nesting patterns, as well as Everglades mink territories, may vary with the prevailing hydrological conditions, during the multiple years that construction will likely be occurring. Therefore, surveys should be conducted by qualified biologists on an annual basis over the period of active construction to determine whether any mink territories or nesting efforts of state- and federally protected bird species would potentially be affected.

If you or your staff would like to coordinate further on the recommendations contained in this report, please contact me at 850-488-6661, or email me at maryann.poole@MyFWC.com, and I will be glad to help make the necessary arrangements. If your staff has any specific questions regarding our comments, I encourage them to contact Dr. Joseph Walsh at our office in Vero Beach (772-778-5094; email joe.walsh@MyFWC.com).

Sincerely,

Mary Ann Poole

Mary Ann Poole, Director
Office of Policy and Stakeholder Coord.

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ENV 1-3-2
Enclosures (2)
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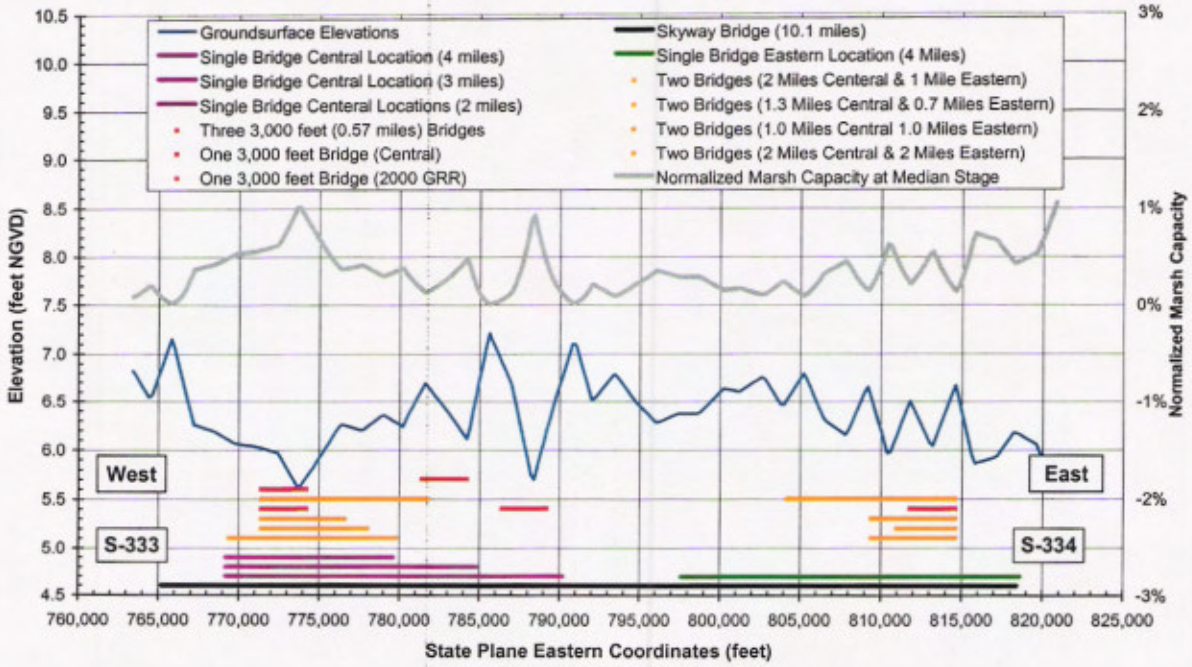

FIGURE 1
Proposed Bridge Locations and Normalized Marsh Capacity at the Median Stage of 7.5 feet NGVD

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