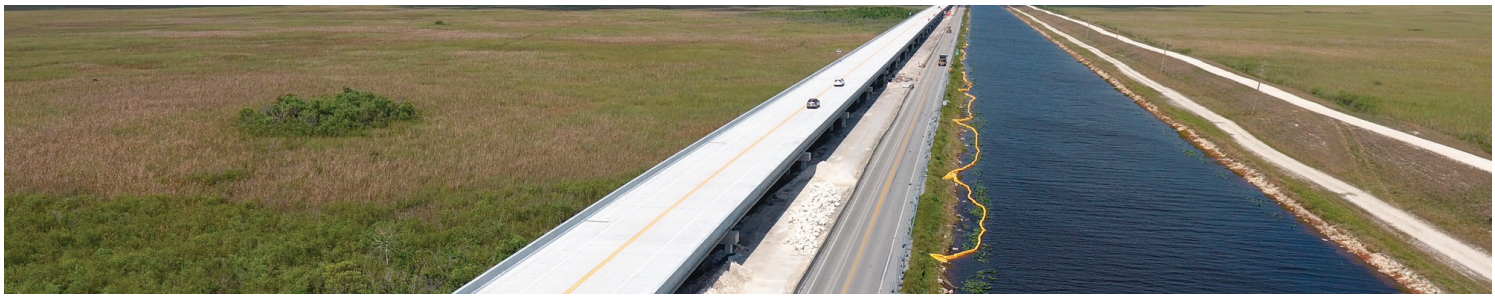
# Tamiami Trail Modifications: Next Steps: Phase 2

National Park Service
U.S. Department of the Interior

South Florida Natural Resources Center
Everglades National Park



## Introduction

Re-establishing sheetflow and marsh connectivity through the removal of barriers that obstruct natural water flows, is a key tenet in Everglades restoration. Tamiami Trail, a historic roadway connecting Tampa and Miami, has long been recognized as a barrier to Everglades water flow. The 25-mile portion of this roadway that crosses the Everglades wetlands west of Miami acts as a dam, limiting the volume and distribution of water flowing southward into Shark River Slough, the major freshwater drainage basin within Everglades National Park (ENP).

In 2008 the Army Corps of Engineers developed a plan to construct a 1-mile bridge and partially raise the eastern 10.7-miles of this roadway, as part of the Modified Water Deliveries Project (MWD). These changes were completed by 2013, and are a good first step toward increasing water flows (see figure 1A). Unfortunately water levels in the adjacent L-29 canal will still be kept low, because the historic roadway was built directly on top of Everglades muck soil. While the muck has consolidated over time, increased L-29 water levels contributes to roadway instability and traffic safety problems. In March 2009 Congress approved an Omnibus Appropriations Act, which directed the National Park Service (NPS) to immediately evaluate the feasibility of additional bridging and roadway improvements beyond the MWD Project.

## The Tamiami Trail Next Steps Phase 1 Project

The objectives from the 2009 Omnibus Bill included: (1) increasing marsh connectivity between ENP and upstream Water Conservation Areas (WCAs), (2) restoring more natural water flow rates and distributions, and (3) re-establishing ridge and slough habitat within ENP, by reconnecting historic sloughs that were severed by the existing roadway. The 2011 NPS recommended plan included up to 5.5-miles of additional bridging, and complete reconstruction of the remaining roadway. The roadway reconstruction would eliminate the instability problems, by removing the unsuitable subbase, and also raise the finished road elevation by 3 feet to accommodate L-29 canal water levels of up to 9.7 feet, as specified in the Comprehensive Everglades Restoration Plan (CERP). In 2012 the NPS Director approved the Tamiami Trail Next Steps (TT:NS) Phase 1 plan, which focused on 2.6-miles of western bridging and adjacent roadway improvements. These roadway improvements were designed to match the location of a new upstream water flow and marsh connection, created by removing a portion of the L-29 levee, as recommended in the Central Everglades Planning Project. Construction on the TT:NS phase 1 project began in late 2016, and the work is expected to be complete in January 2019 (see figure 1B).

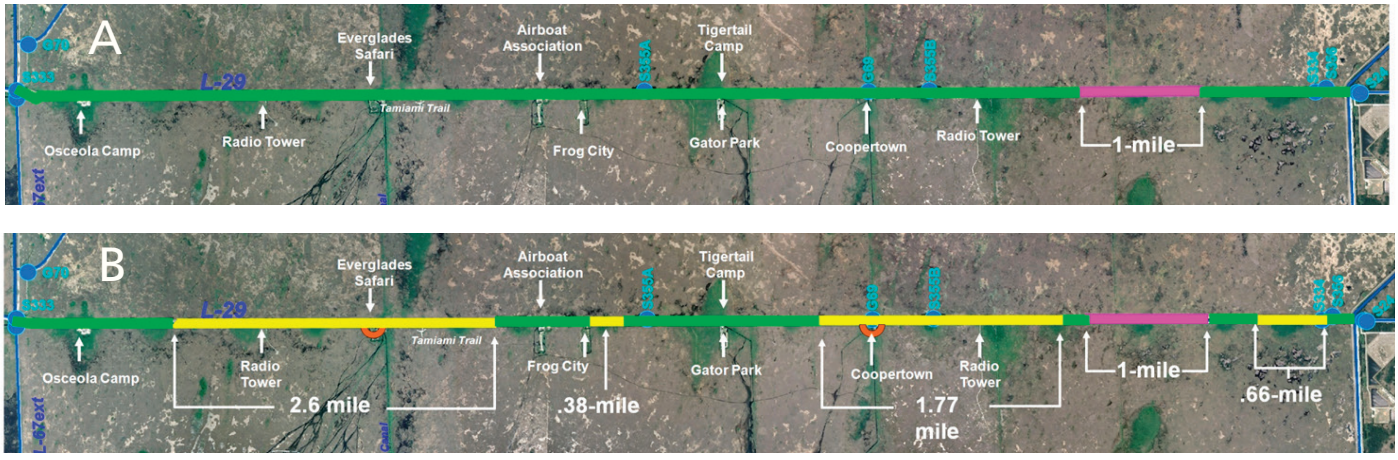



Figure 1A. The Modified Water Deliveries, Tamiami Trail modifications, with the 1-mile bridge (purple) and partial reconstruction of the roadway. Figure 1B. Tamiami Trail Next Steps recommended plan (Alternative 6e), with up to 5.5-miles of additional bridging (yellow) and complete reconstruction of the remaining roadway.

## Planning for Tamiami Trail Next Steps Phase 2

Once TT:NS Phase 1 is complete approximately 4 miles of the eastern Tamiami Trail roadway will have been bridged or reconstructed, which leaves 6.7 miles of the remaining roadway to be improved. Our highest priority is to reconstruct the remaining roadway to accommodate the 9.7 foot CERP design high water criteria, which will allow us to pass the required peak flows, while avoiding impacts to roadway stability. Reconstructing and raising the roadway to approximately 13 feet eliminates the roadway sub-base saturation problem, which translates into essentially unrestricted water flows through the eastern and western bridges.

The flow restoration benefits associated with additional TT:NS Phase 2 bridging can be addressed by examining how transparent the roadway is to water level differences across the roadway (i.e. the head differential between the upstream L-29 canal and the downstream ENP marsh). Since the L-29 canal helps to equilibrate water levels upstream of Tamiami Trail, lowering the water level or head differential between the L-29 canal and the marsh also lowers the risk of flooding in adjacent developed areas.

Figure 2 shows how the head differential between the upstream L-29 canal and a point 10,000 feet downstream in the NESRS marsh, changes in response to increases in total bridge length. This analysis indicates that during average flow conditions (the red line) the head differential between the L-29 canal and the marsh drops to approximately 0.1 feet with a total bridge length of approximately 10,000 feet, or 1.9 miles. During peak flow conditions (the blue line) the head differential drops to approximately 0.2 feet with a total bridge length of approximately 16,000 feet, or 3 miles. This analysis suggests that adding additional bridges during the TT:NS Phase 2 effort would have a relatively modest benefit in turns of making the roadway more transparent to water flows.

## Adding Additional Conveyance Features to Improve Flow Distributions

Studies of the pre-drainage vegetation and hydrology of the Everglades indicate that the historic pattern of the ridge and slough landscape within NESRS was rather uniform and the current culverts are thought to accurately represent this historic ridge and slough patterning (McVoy, et. al.,2012). Unfortunately, decades of flow diversions and drainage has flattened this wetland landscape, so we must work with the topography that currently exists. The success of our efforts to restore the ridge and slough landscape is dependent on the localized ground surface elevations and a few remnant slough communities, and we took this into account in the placement of the eastern (MWD) and western (TT:NS Phase 1) bridging. Several additional low lying areas are still present away from these bridges which may represent remnant slough communities. We will be examining these areas in detail during Phase 2 planning, as promising sites to locate additional smaller scale conveyance features.

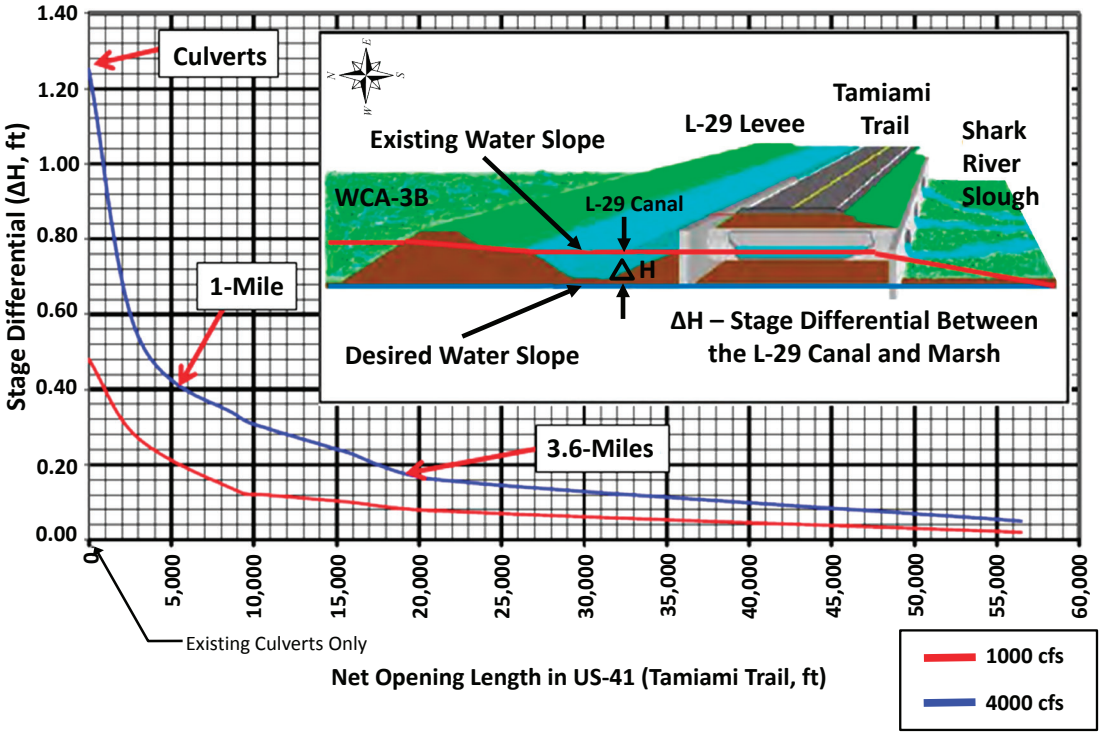



Figure 2. Stage differential (between the L-29 canal and a point 10,000 feet to the south), versus total bridge length. After the Tamiami Trail Next Steps Phase 1, we will have a total bridge length of approximately 16,000 feet (sources Army Corps of Engineers, Tamiami Trail design study, 2006).