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TAMIAMI TRAIL MODIFICATIONS: NEXT STEPS

Potential Effects on Adjacent Areas

South Florida Natural Resources Center
Everglades and Dry Tortugas National Park
Homestead, FL

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Rationale for Evaluating Potential Impacts

- No new regional modeling and no operational evaluations due to time constraints imposed by Congress
- NEPA: (1) Use best available scientific information to assess potential effects, (2) Identify related projects
- Modeling over last several years for Tamiami Trail and MDW projects (CSOP) demonstrates potential effects on WCA-3 and areas east of NESS when canal stages in the L-29 Canal are raised from 7.5’ to 9.7’.
- The potential effects will be included in the Discussion Section of the EIS and NOT included in the benefits analysis

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Topics

- Regional Basis for Concern
- Related Projects
- Potential Effects to:
  - o *L-29 and Northeast Shark Slough*
  - o *Seepage Control*
  - o *Water Conservation Area 3A*
  - o *Water Conservation Area 3B*

Regional Concerns

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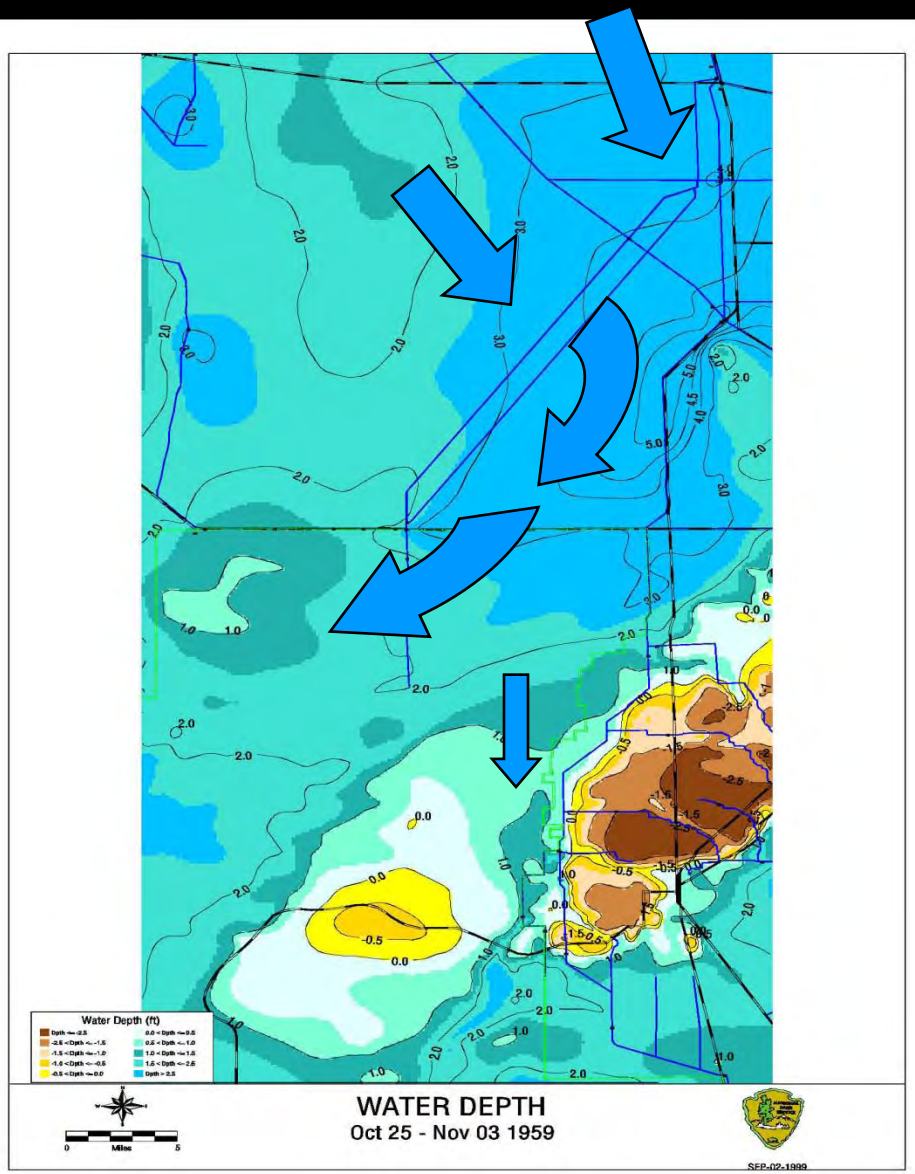
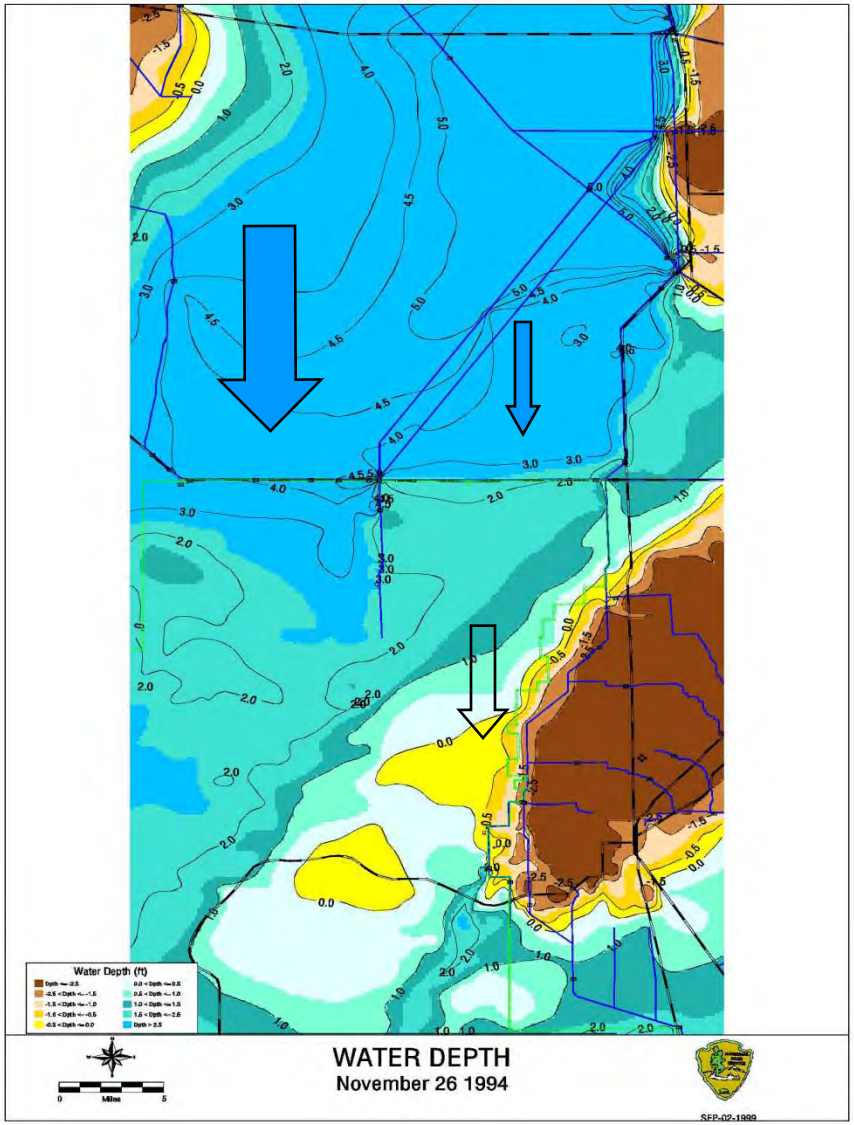
Pre-WCA Hydrology (November, 1959)



Post-WCA Hydrology (November, 1994)



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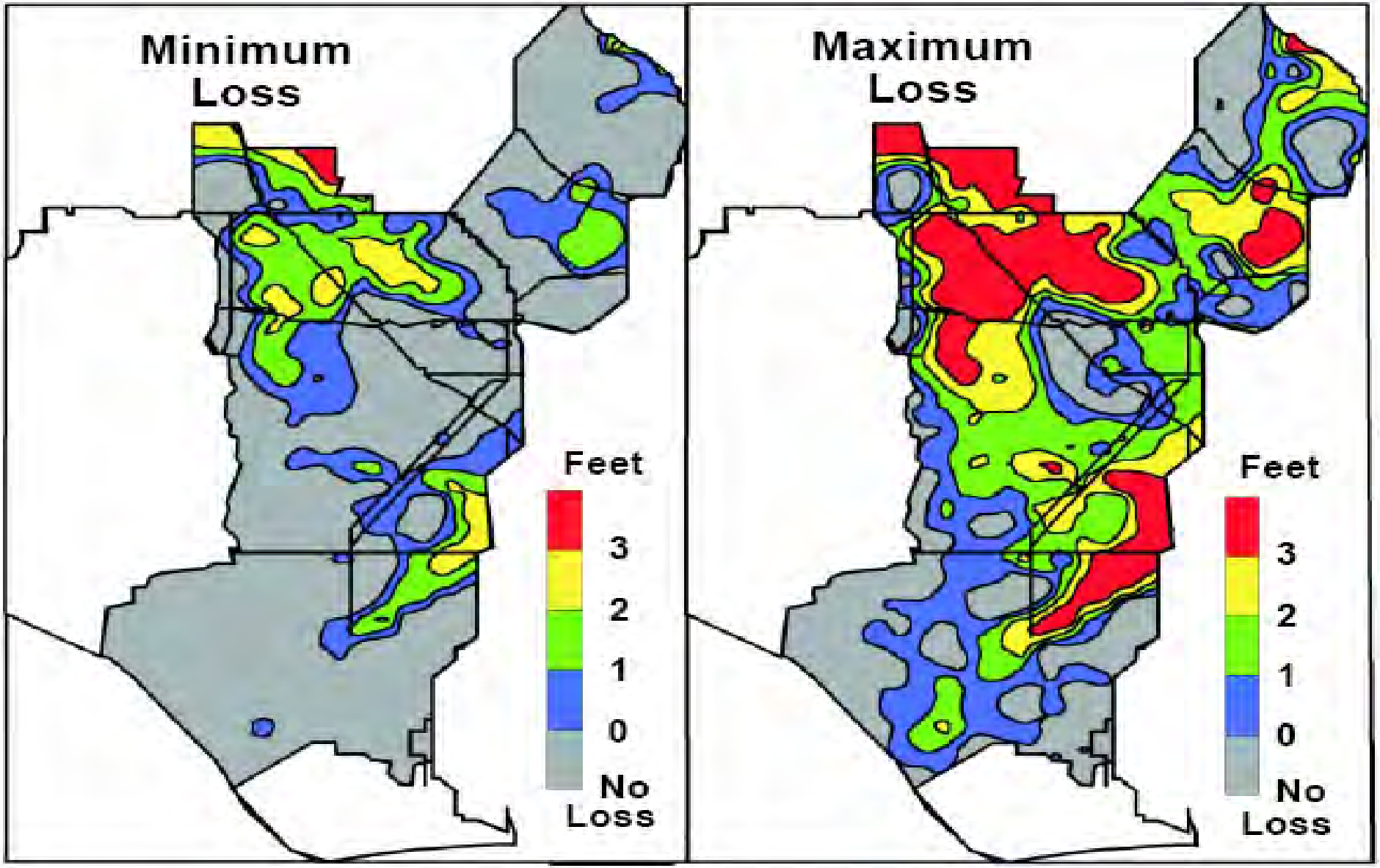
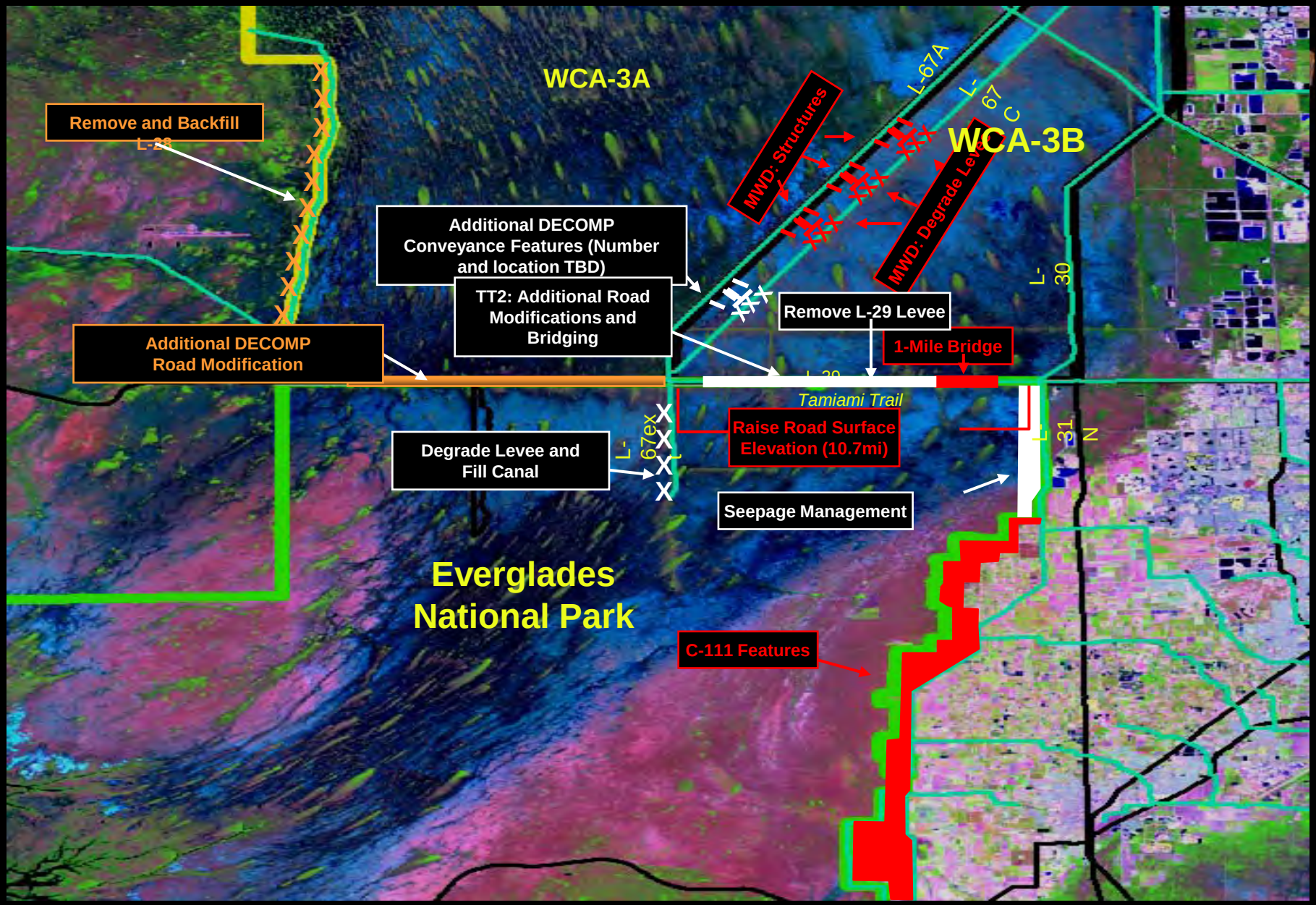
Soil loss in feet across the Everglades from 1946 to 1996 (Scheidt et al. 2000).



Related Projects



Phase 1		Conveyance and Seepage Control, Tamiami Trail 1 (TT1), C-111
Phase 2		Tamiami Trail 2 (TT2), DECOMP (L-67A&C/L-29), Seepage Mgmt.
Phase 3		DECOMP (L-28, Additional TT Road Modifications)

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Advantages of Reviewing CSOP Modeling to the Tamiami Trail: Next Steps Project

- All Alternatives reviewed in CSOP Modeling assumed a canal stage in L-29 of 9.7 ft (same for TTM: Next Steps Project)
- Conditions modeled represented near-term operational conditions including:
  - *Pre-CERP conditions*
  - *No additional water from regional system*
  - *Seepage management provided by S-356*
  - *Operational constraints in CA3B*

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CSOP Alternatives: Performance Evaluation Summary

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 5R
Deliver MWD Conveyance Volumes through WCA-3B to NESRS		√		√	√	√
Reduce Extreme High-Water Conditions throughout WCA-3A		√	√			√
Limit Increase in High-Water Conditions in WCA-3B	√				√	√
Deliver MWD Volumes to NESRS	√	√	√	√	√	√
Minimize Increase in Extreme Low-Water Conditions in WCA-3A	√			√	√	√
Reduce Low-Water MFL Exceedance Frequency in WCA-3B	√			√	√	√
Reduce Low-Water MFL Exceedance Frequency in SRS	√	√	√	√	√	√
Limit Potential Demand Cutbacks for LOSA Water Supply	√	√		√	√	√
Limit Potential Demand Cutbacks for LEC Water Supply	√			√	√	√
Maintain Level of Service, L-30	√					√
Maintain Level of Service, L-31N (G-211)			√			√
Maintain Level of Service, L-31N (8.5 SMA)						√
Maintain Level of Service, L-31N (S-176)	√		√	√	√	√
Reduce Flows to SDCS; Minimize Inter-Basin Transfer		√	√		√	√
Utilization of C-111 Detention Reservoirs as 'Hydraulic Ridge'	√		√	√	√	√
Reduce Damaging Discharges to Barnes Sound	√	√			√	√
Improve Flow Distribution for Taylor Slough / Florida Bay	√		√	√	√	√

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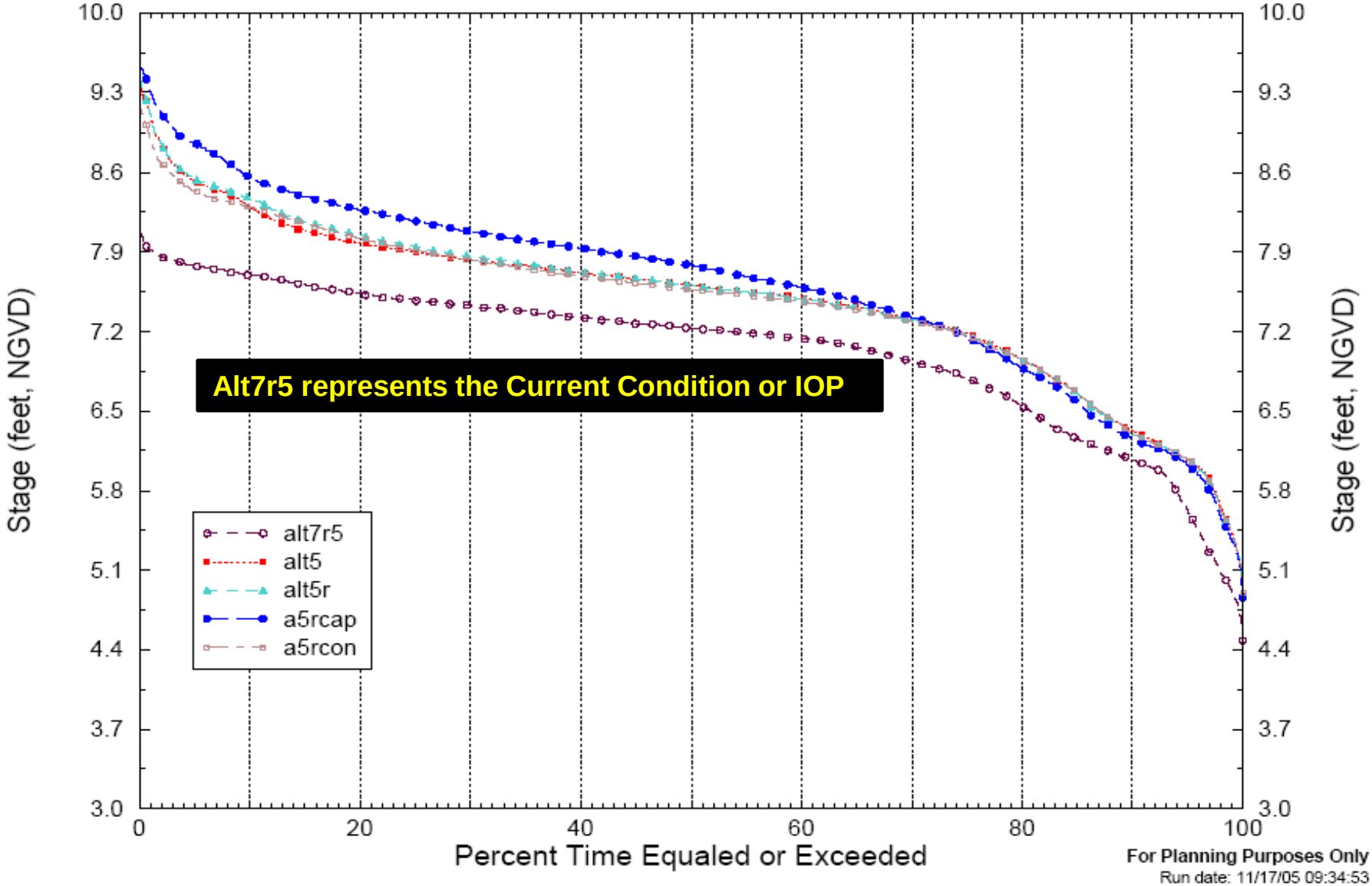
L-29 and Northeast Shark Slough

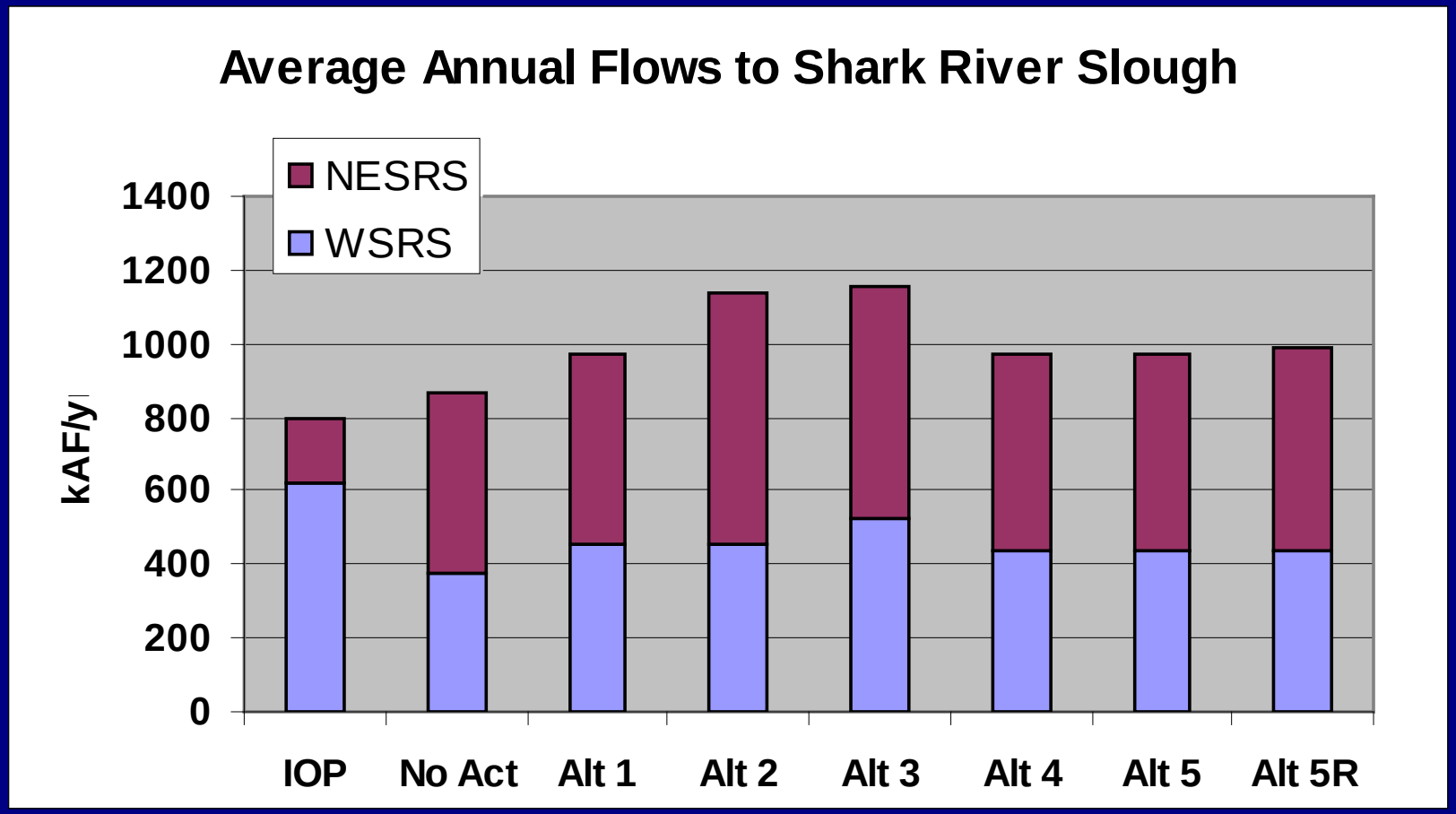
Stage Duration Curves for L−29 Canal at S−334



For Planning Purposes Only
Run date: 11/17/05 09:34:53
SFWMM V5.5.6
Script used: hyd_dur.scr, V1.10
Filename: L−29_S−334_dai_stgdur.fig

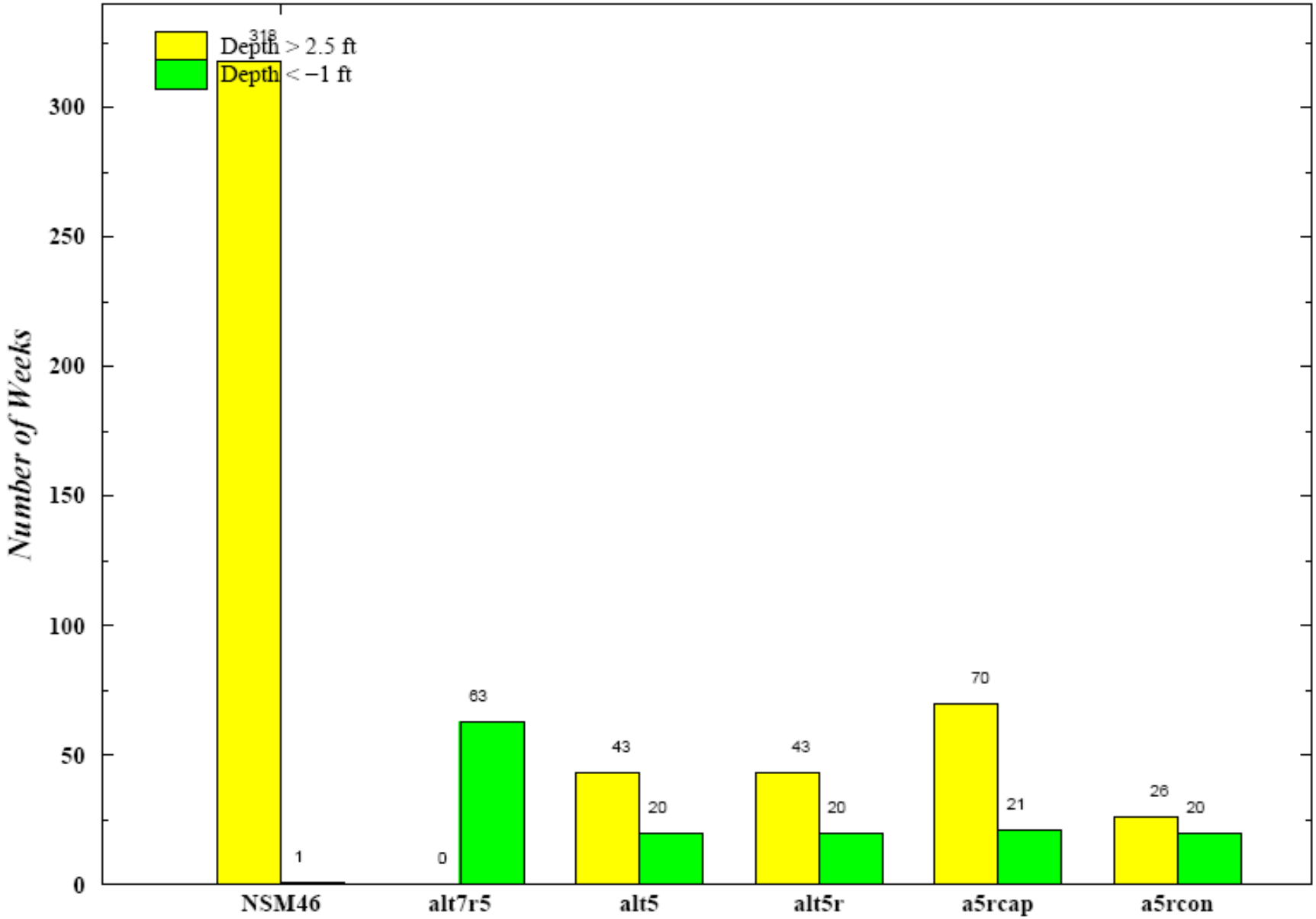
SFWMM P.O.S. 1965 − 2000

Restoration of water deliveries to NE Shark River Slough…Volume



Number of Weeks High/Low Water Depth Criteria Exceeded

Indicator Region 129 (R19C22−23 R20C22−26 R21C22−26)



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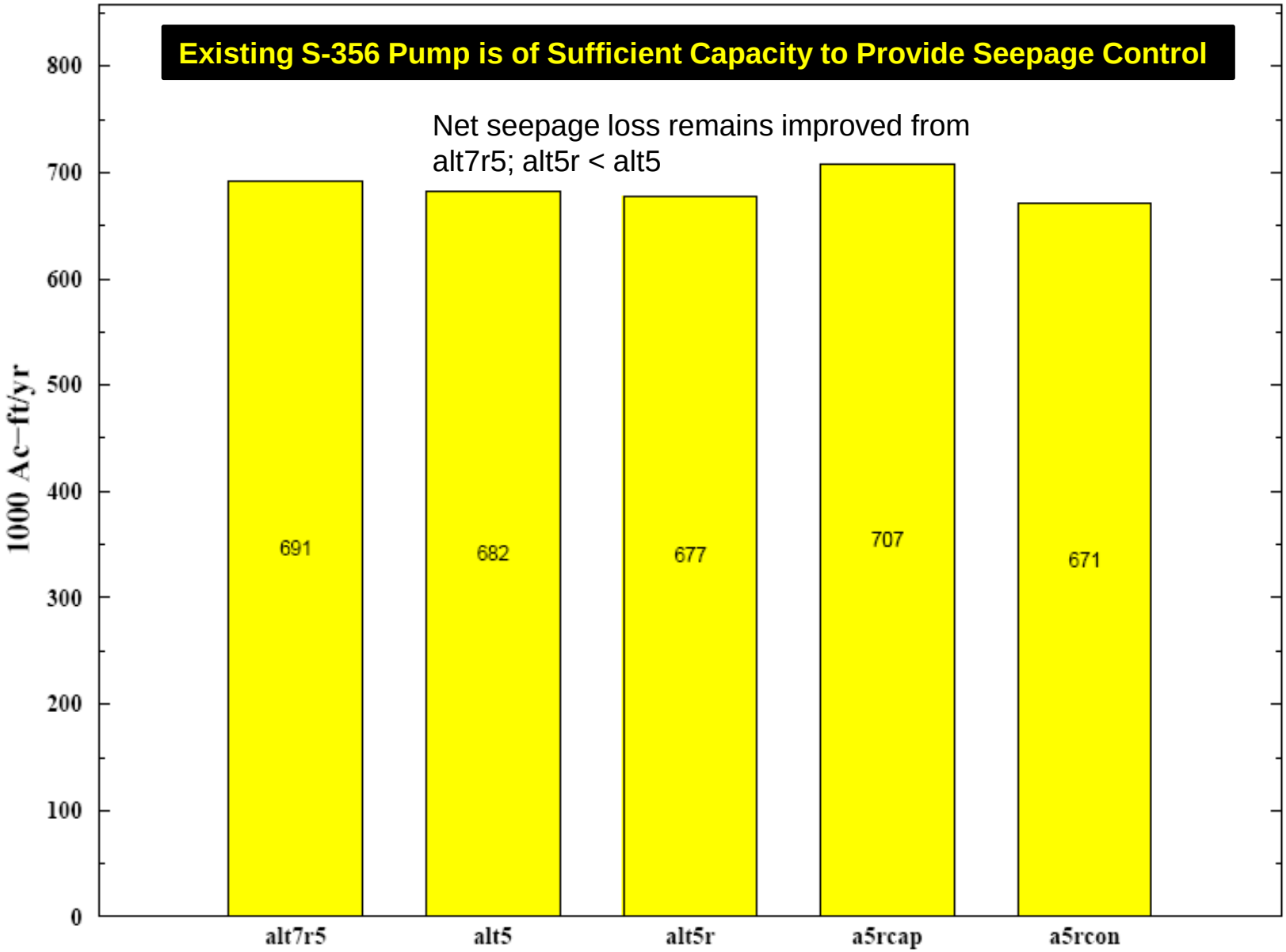
Seepage Control

Average Annual Net Seepage Loss for L30+L31N−S356

from WCA3 and ENP to LEC for 1965 − 2000 Simulation Period



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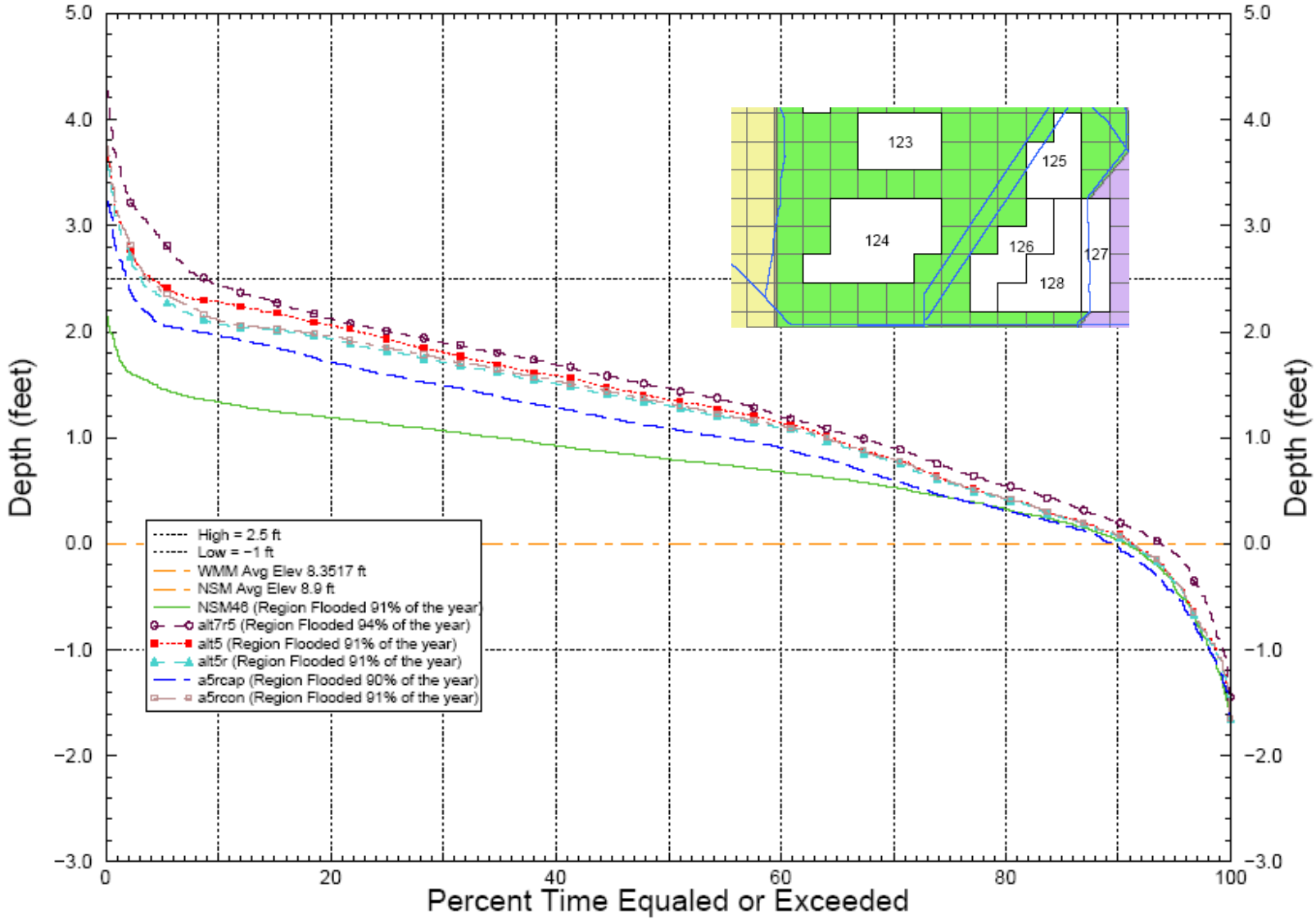
Water Conservation Area 3A

Normalized Weekly Stage Duration Curves for WCA−3A South Central

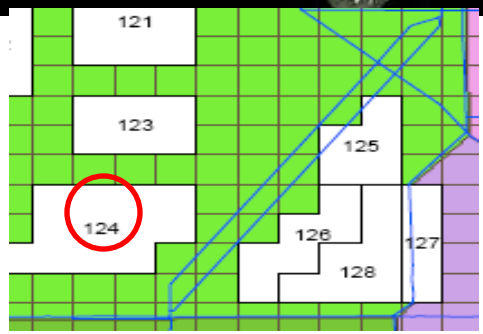
Indicator Region 123 (R28C19−21 R29C19−21)



Note: Normalized stage is stage referenced to Land Elevation. Thus, values above zero indicate ponding while values below zero indicate depth to the water table.

Run date: Thu Nov 17 10:13:31 EST 2005
For Planning Purposes Only
SFWMM V5.5.6

Duration of High Water in WCA-3A IR124 (weeks)



Run	> 2.5 feet	> 2.0 feet
NSM V4.6	002 (000%)	027 (005%)
Existing	439 (100%)	503 (100%)
1992 GDM	153 (035%)	398 (079%)
ALT2	087 (020%)	230 (046%)
ALT5R	190 (043%)	462 (092%)

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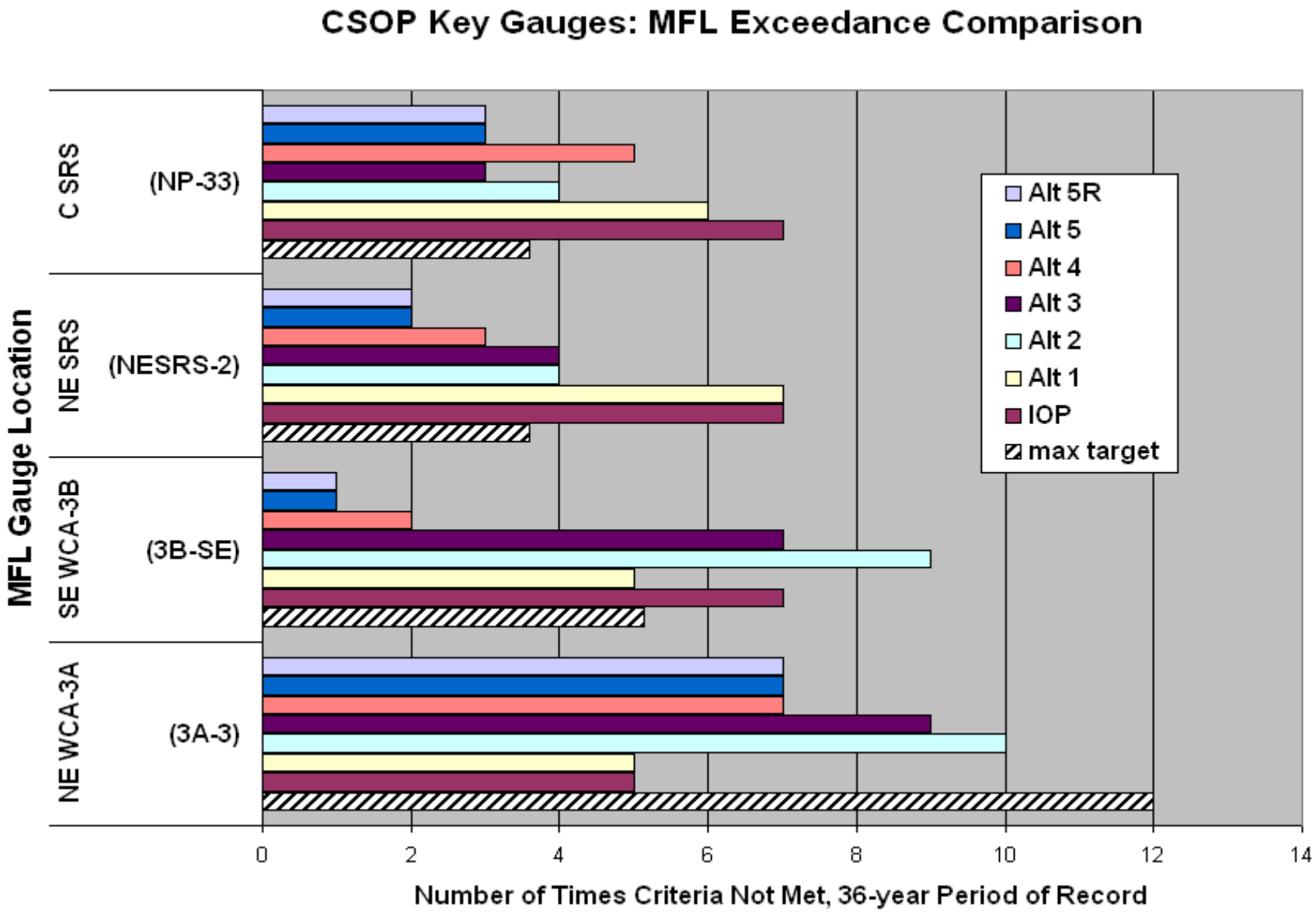
Minimum Flows and Levels

- MFLs are the minimum water levels and/or flows adopted by the District Governing Board as necessary to prevent significant harm to the water resources or ecology of an area resulting from water withdrawals permitted by the District.

Minimum Flows and Levels (MFLs)



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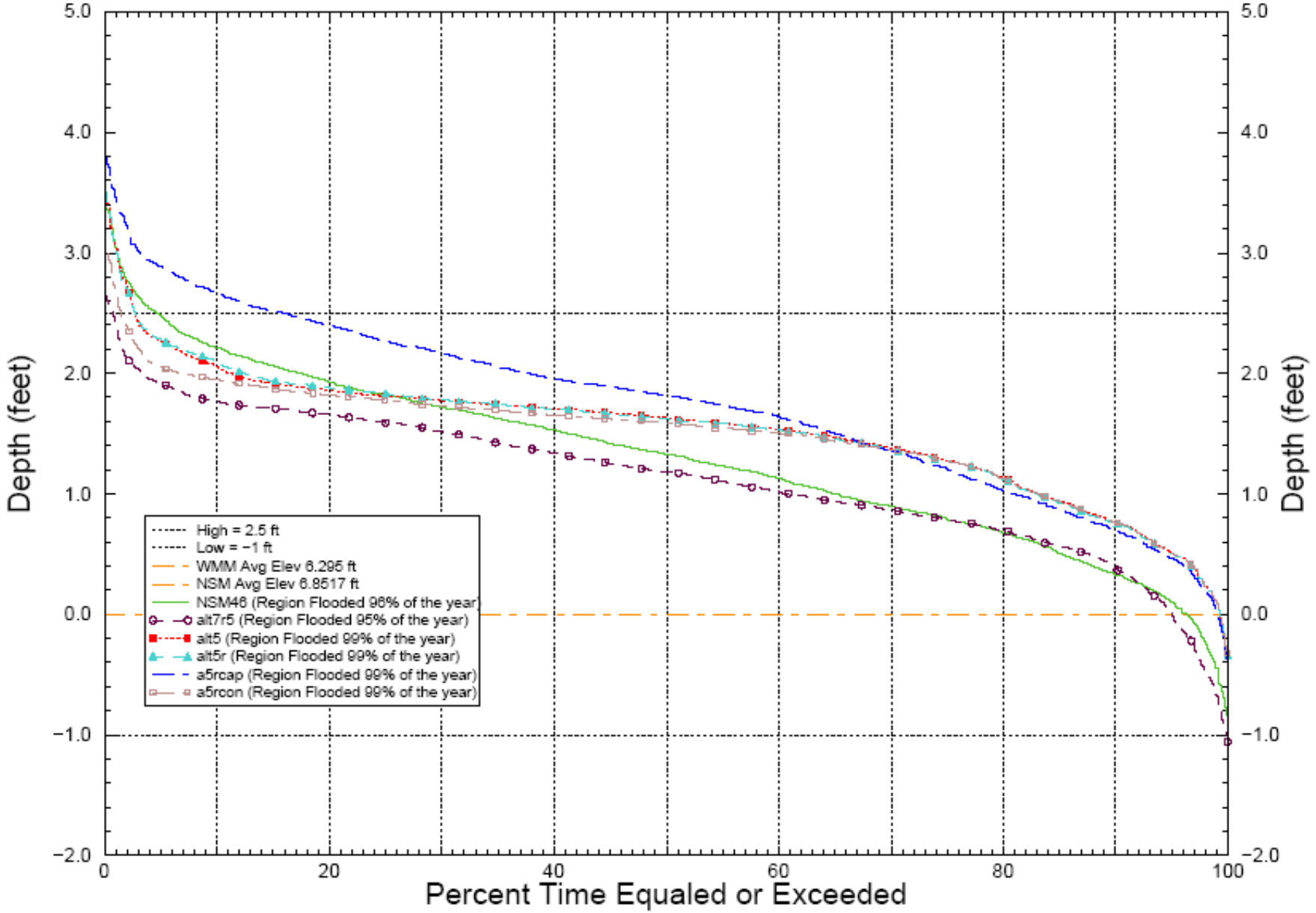
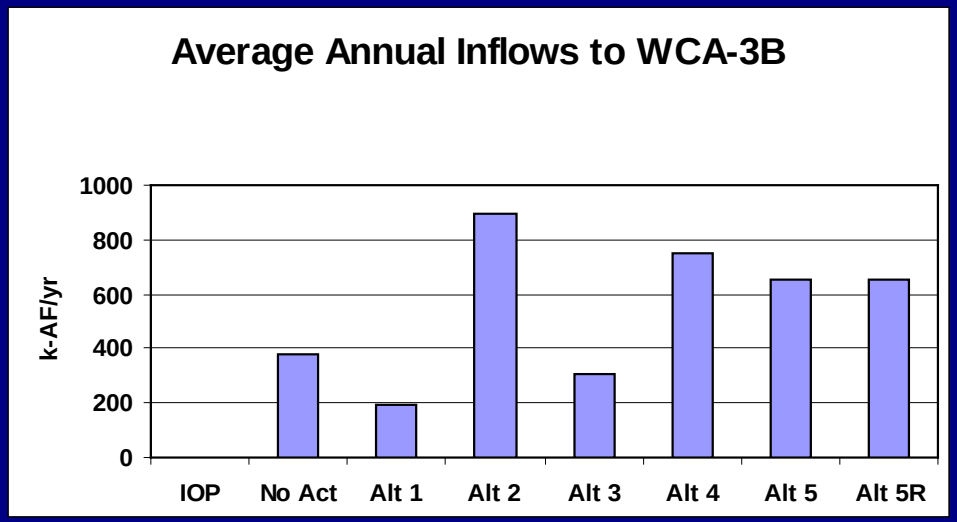
Water Conservation Area 3B

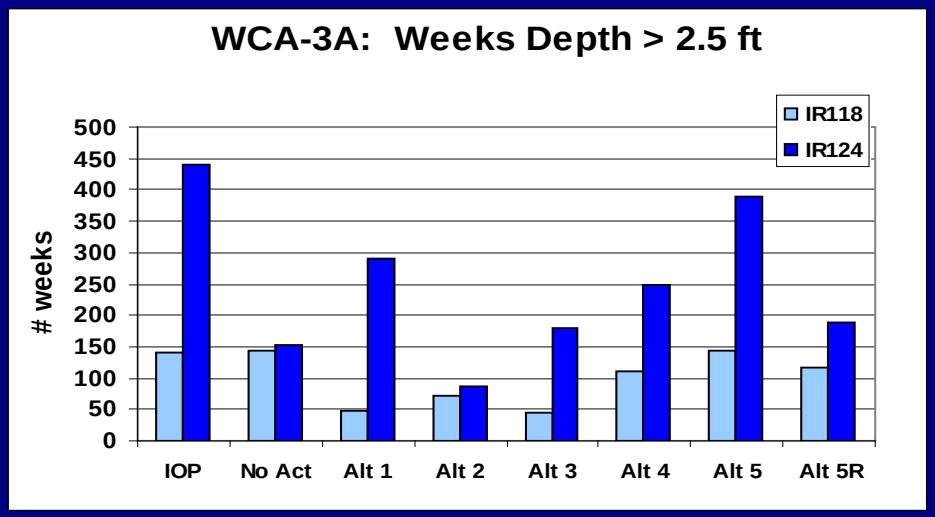
Normalized Weekly Stage Duration Curves for WCA−3B West

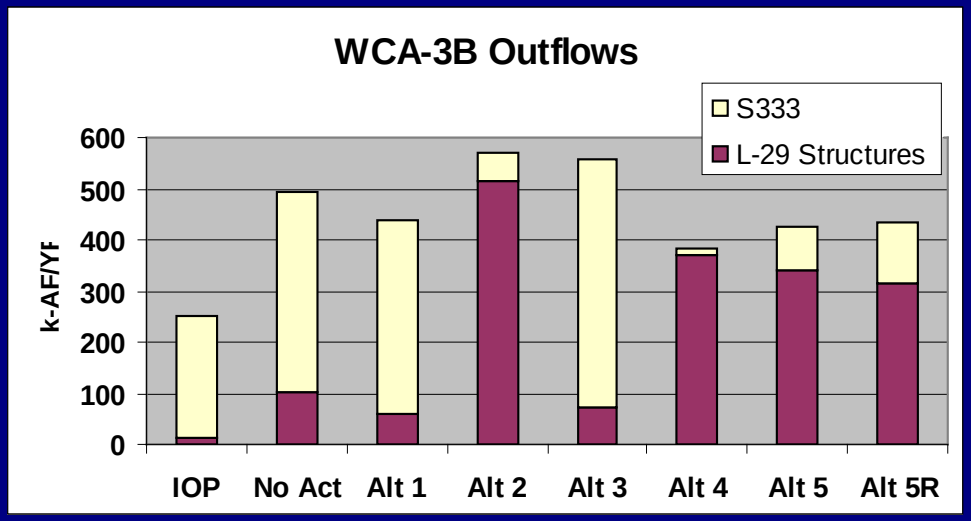
Indicator Region 126 (R23C23−23 R24C23−24 R25C24−25 R26C25−25)

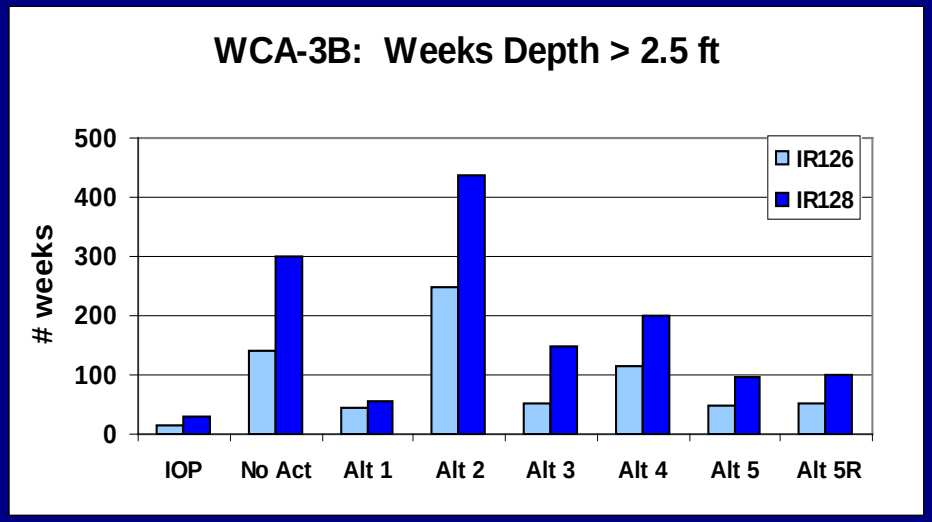


Restoration of WCA-3B as functioning component of hydrologic system…

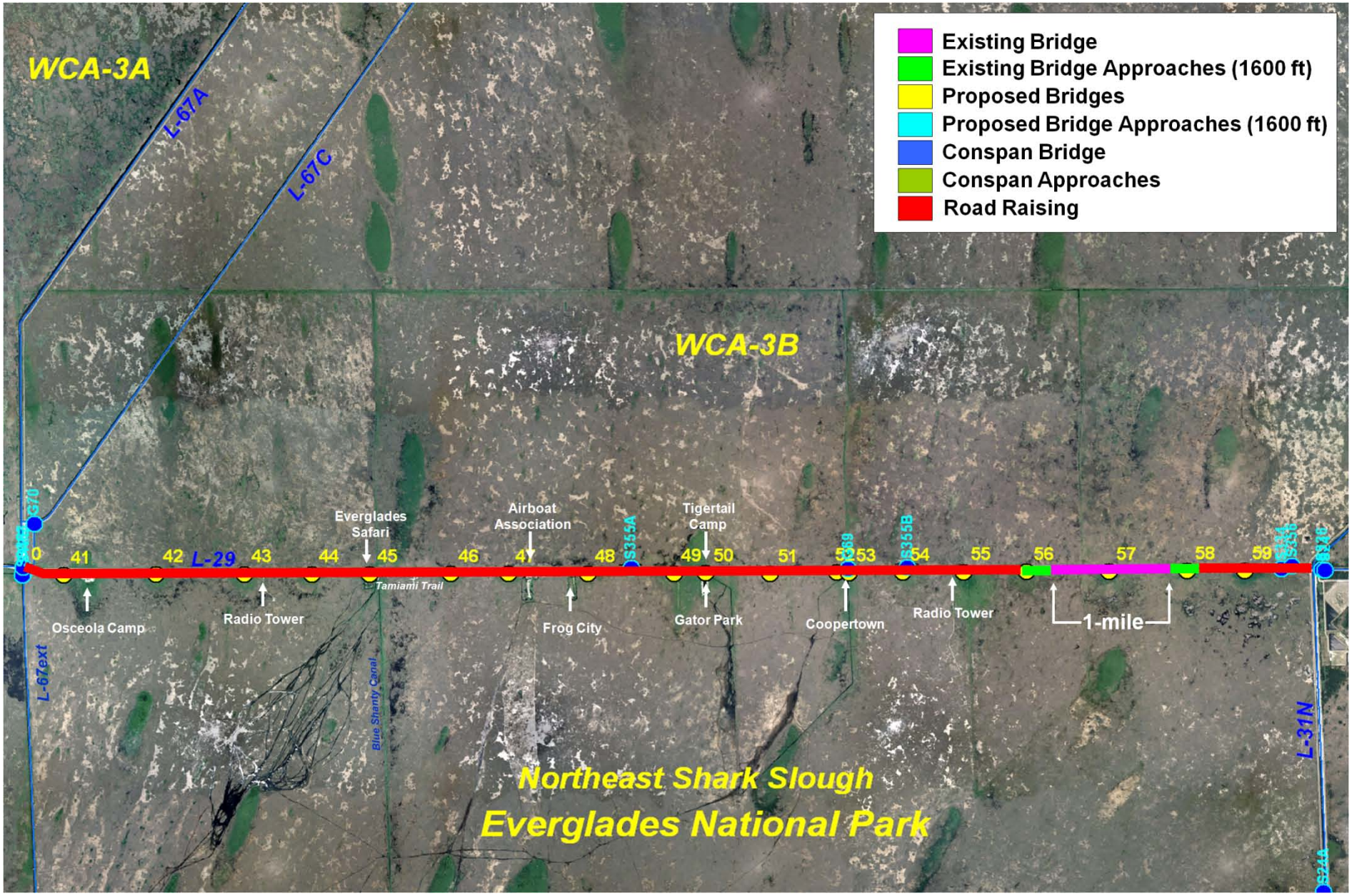




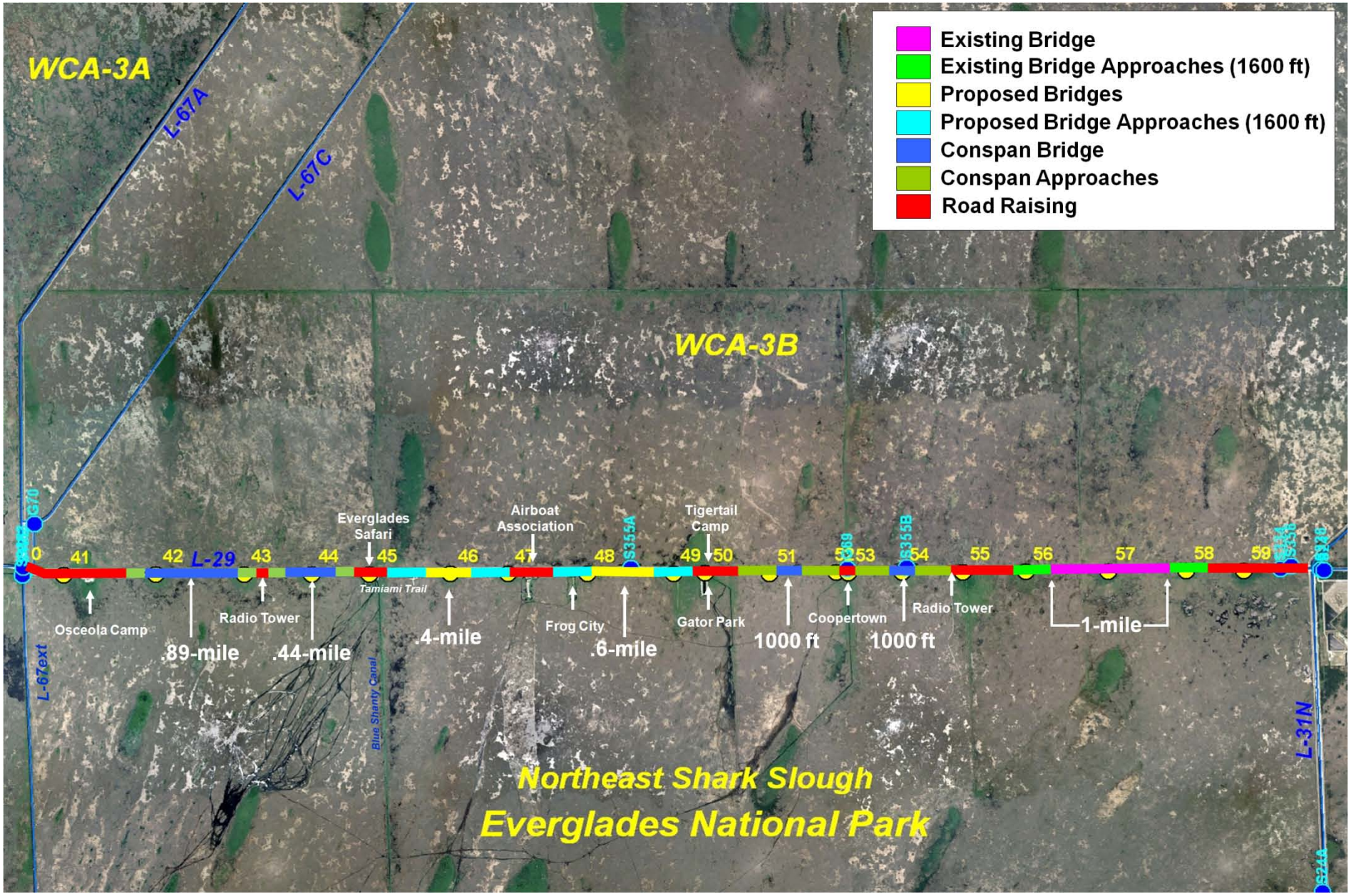




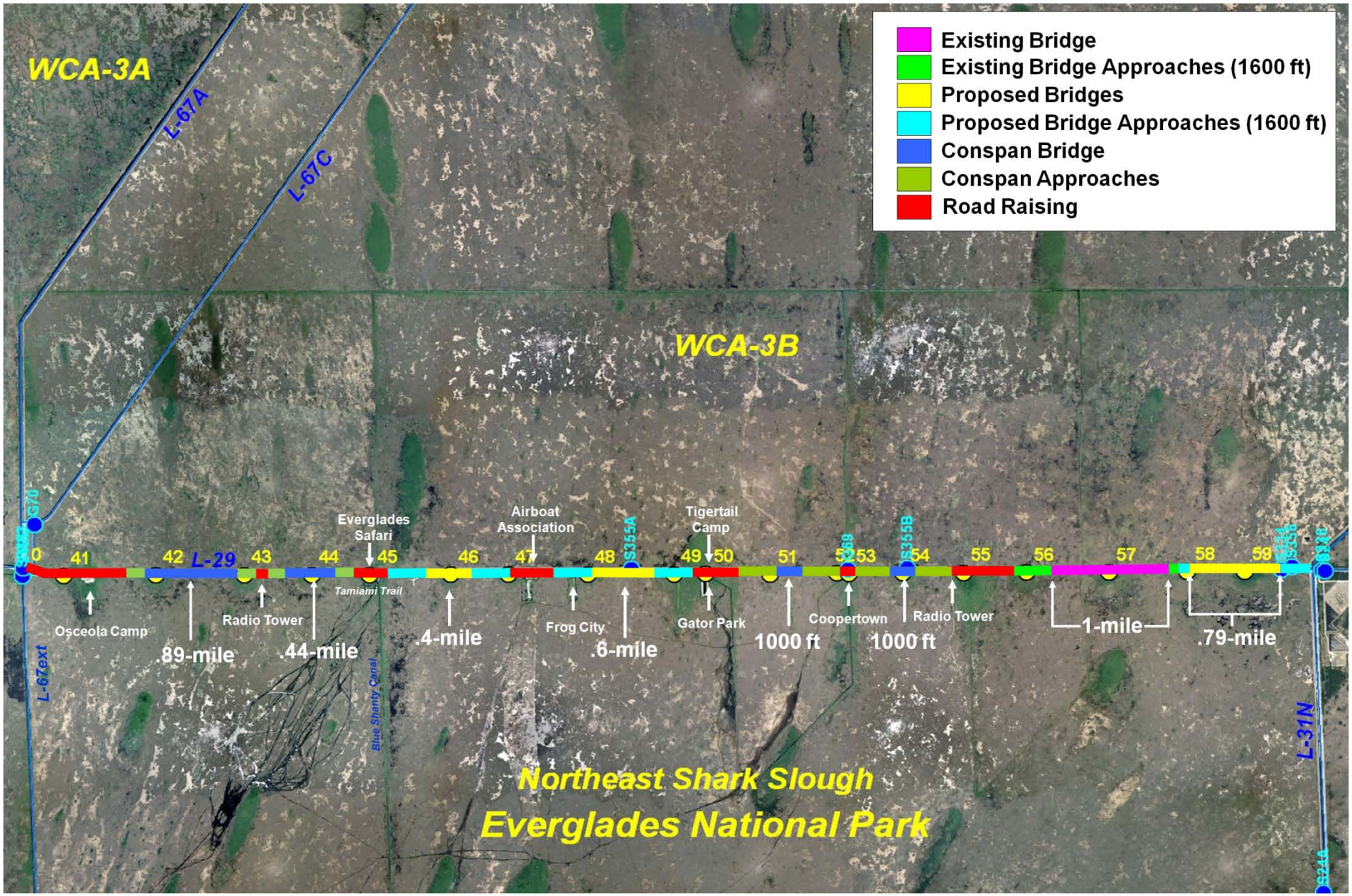
No Action Alternative: LRR 1-mile Bridge and Road Surface Raised



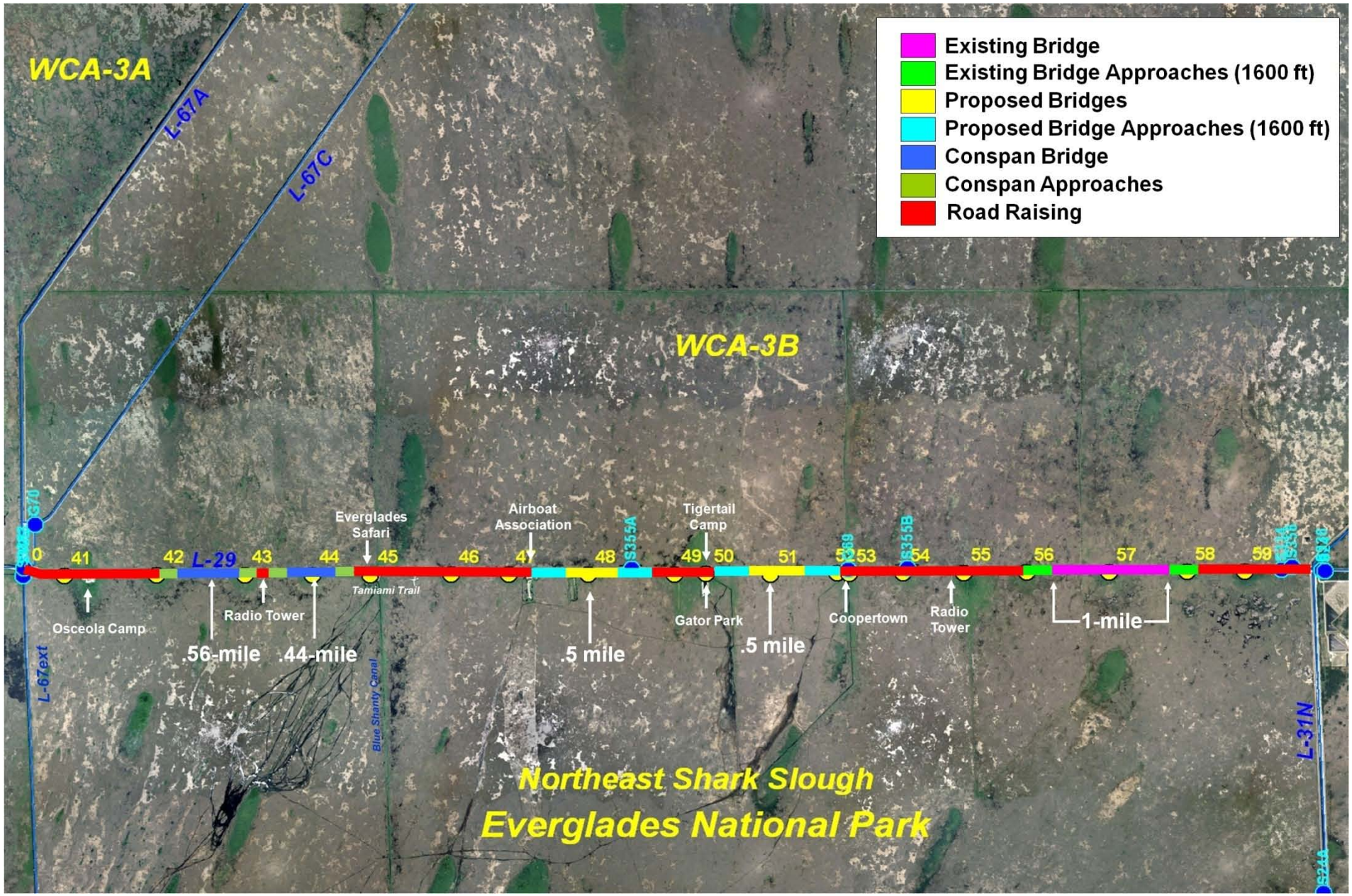
Alternative 1: 2.7-miles of bridges/conspans and remaining roadway elevated



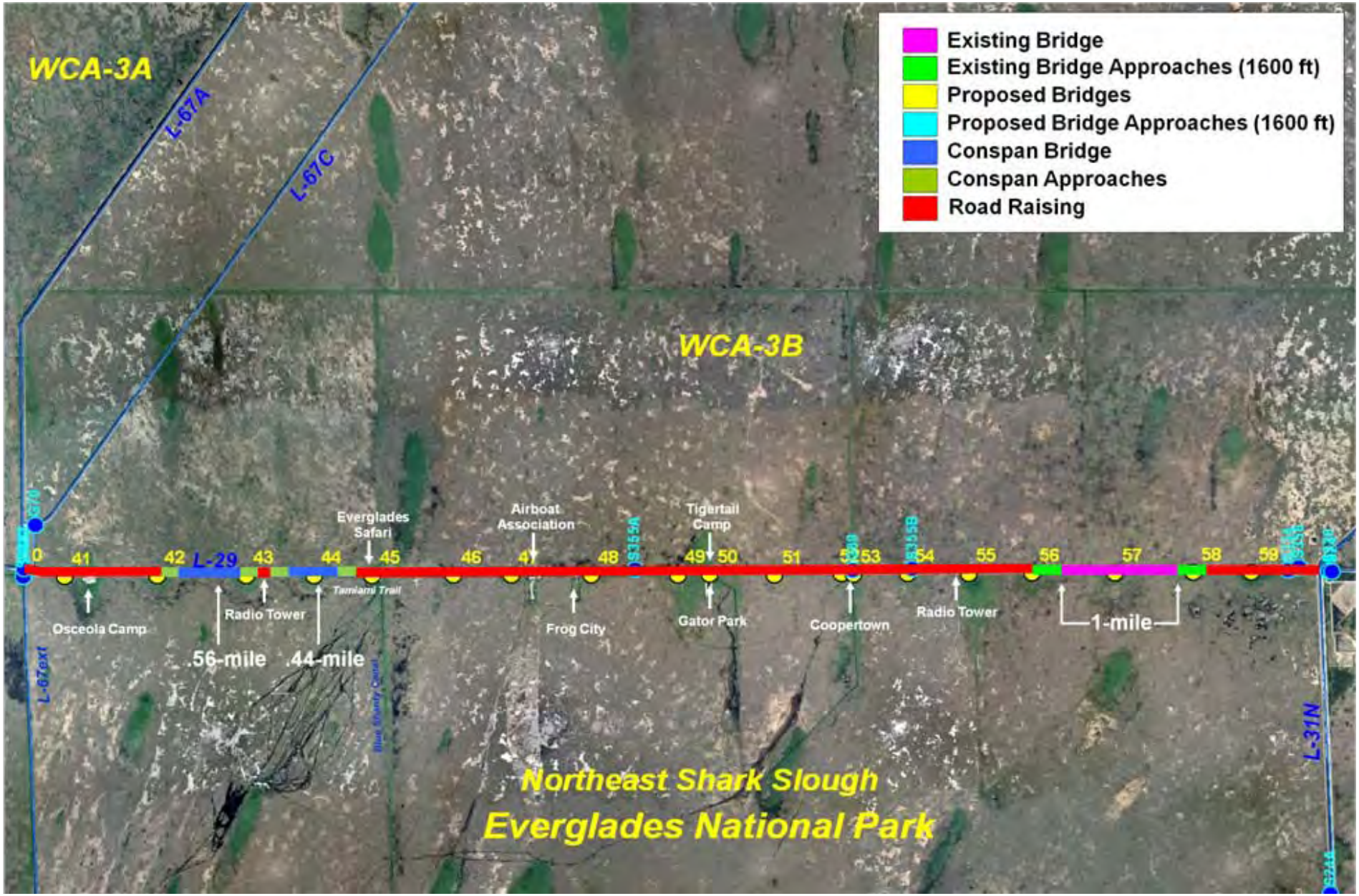
Alternative 2: 3.5-miles of bridges and remaining roadway elevated



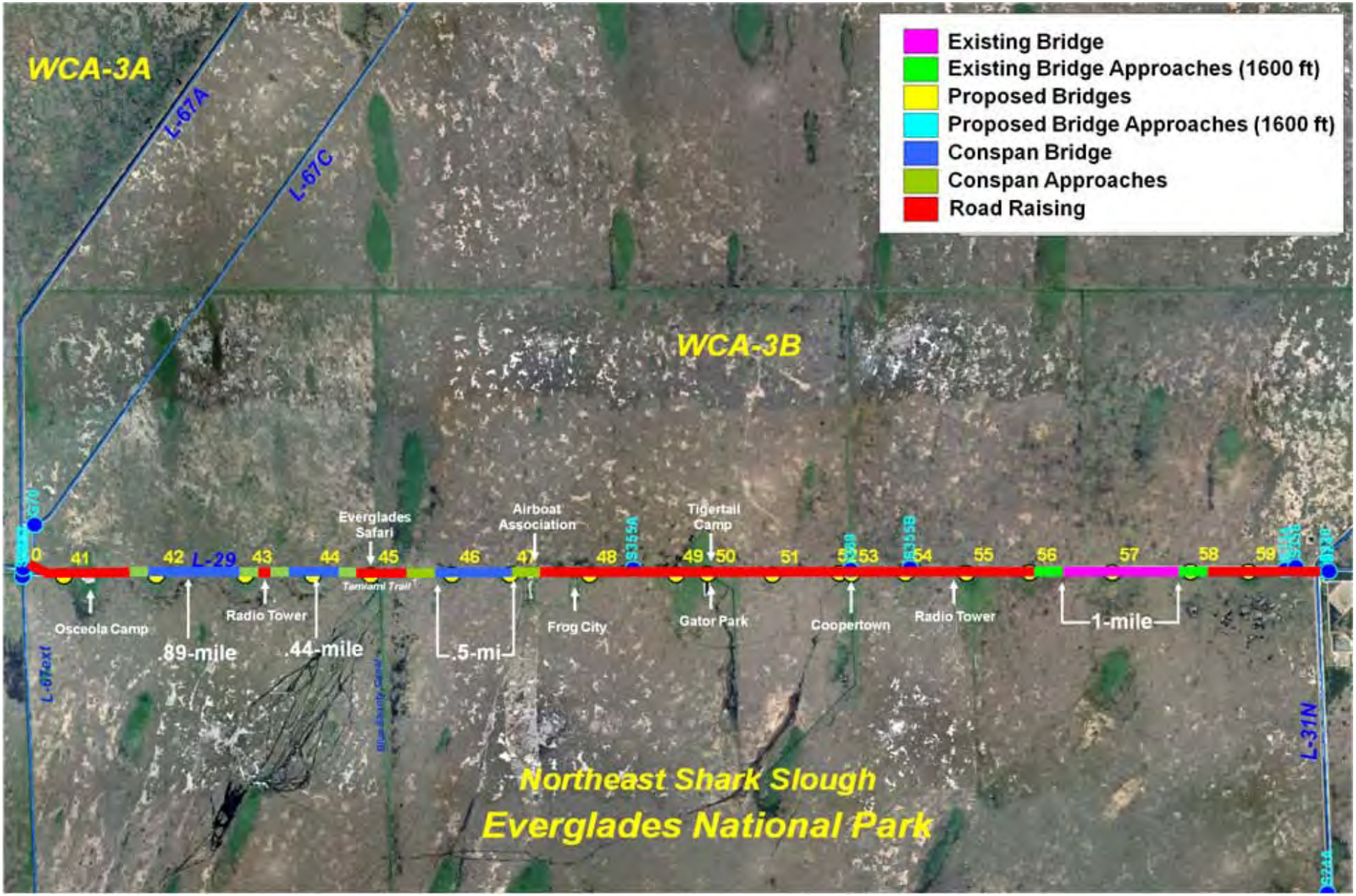
Alternative 3: 2-miles of bridges and remaining roadway elevated



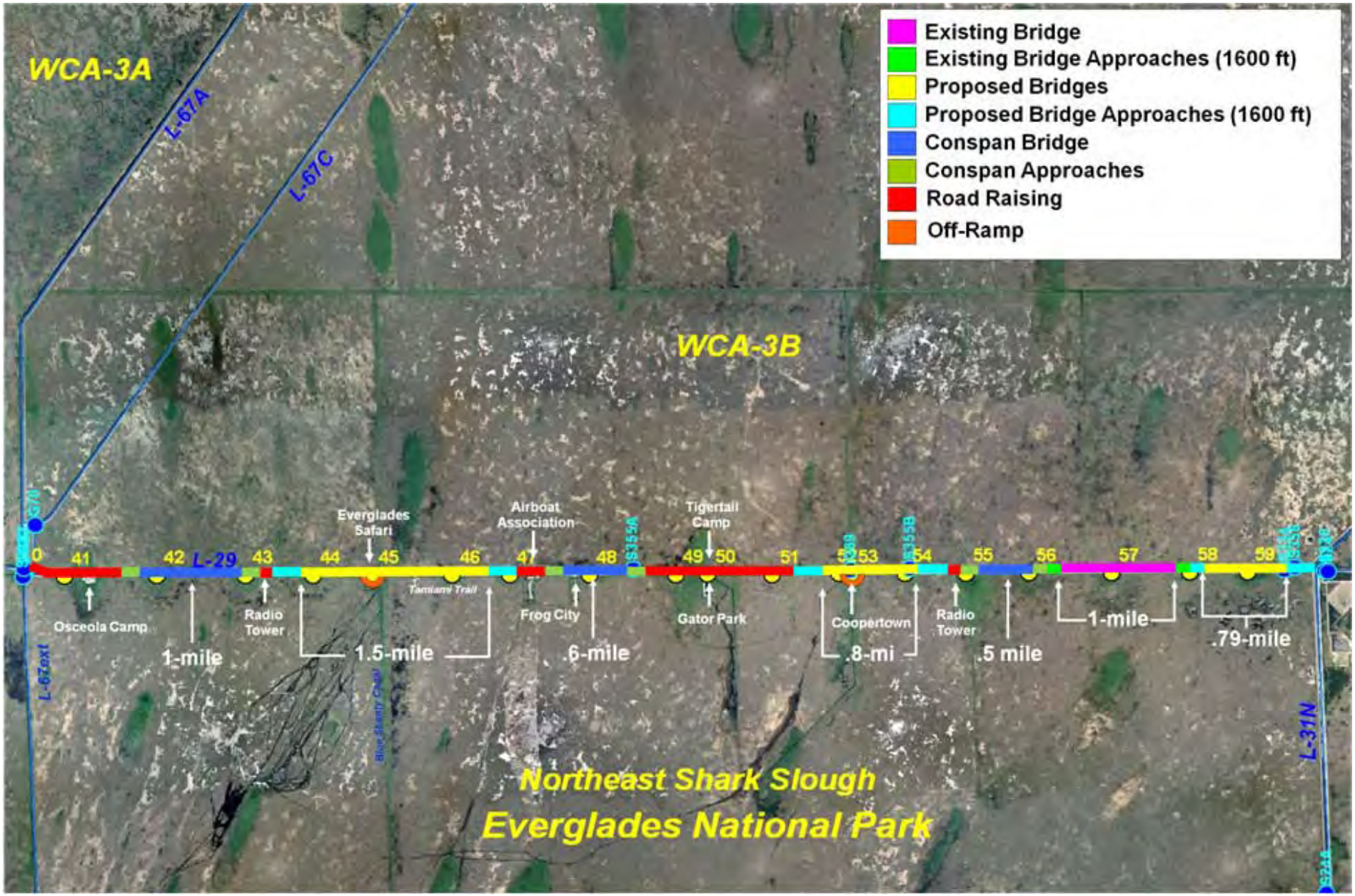
Alternative 4: 1-mile western bridge and remaining roadway elevated



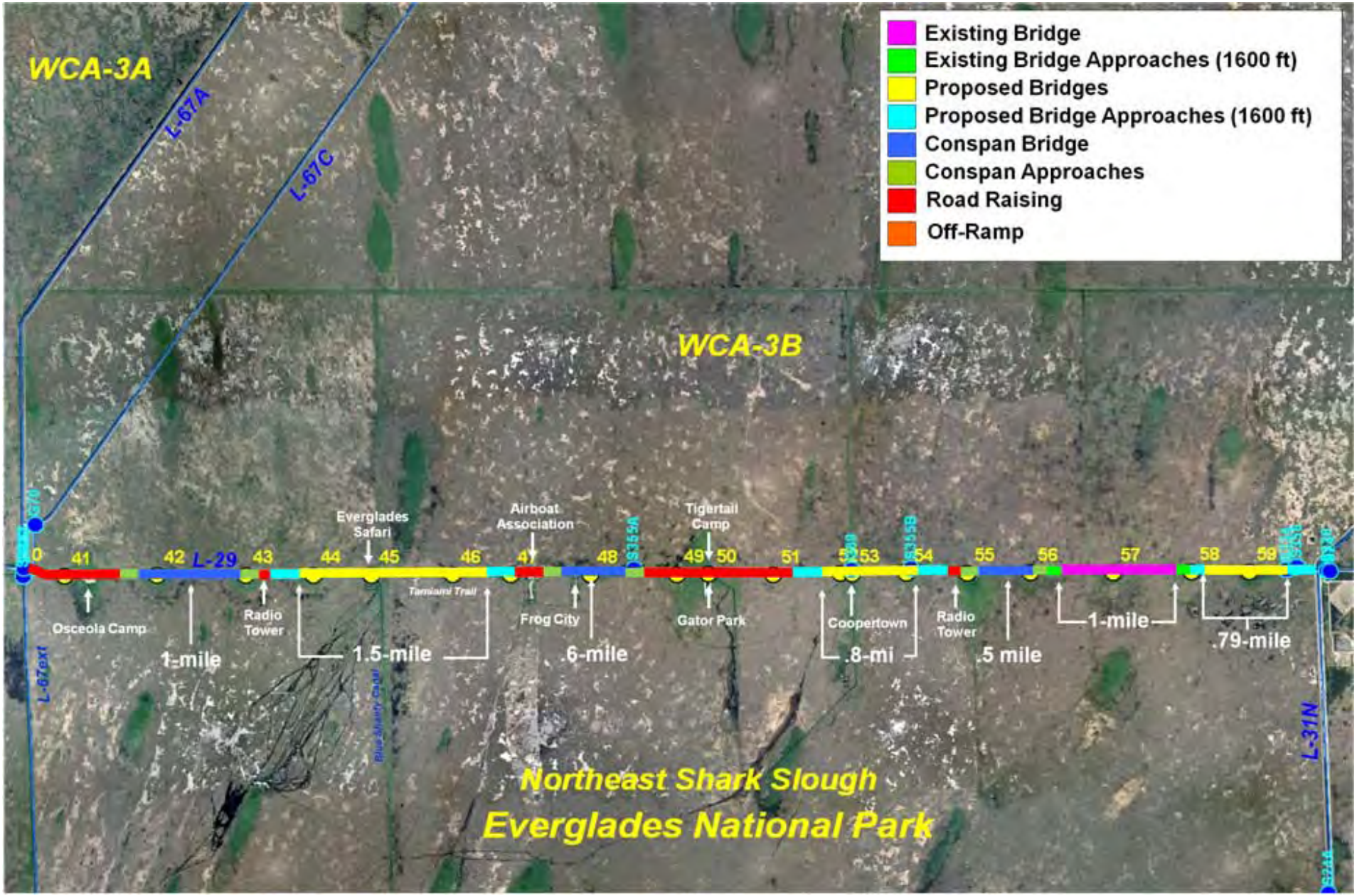
Alternative 5: 1.8-miles of bridging and remaining roadway elevated



Alternative 6A: 5.2-miles of bridges and remaining roadway elevated



Alternative 6B: 5.2-miles of bridges and remaining roadway elevated



Tamiami Trail Modifications: Next Steps

Potential Benefits Analysis

Goal of the Benefits Analysis

Utilize quantifiable performance measures to forecast potential hydrologic and ecological effects to compare project alternatives in the Tamiami Trail Modifications: Next Steps Feasibility Study.

Referenced Studies

- 2003 General Reevaluation Report (GRR) for TTM
- 2003 FWS Coordination Act Report (CAR)
- 2005 Revised General Reevaluation Report (RGRR) for Tamiami Trail Modification (TTM)
- 2008 TTM Limited Reevaluation Report (LRR)

Process

- Screen performance measures used in the 2005 RGRR and the 2008 TTM LRR
- Develop a velocity performance measure
- Calculate qualitative raw values
- Normalize raw values
- Subtract future-without-project condition from each alternative to calculate potential benefits and compare project alternatives

Screen Performance Measures

All of the PMs used in 2005 RGRR and the 2008 LRR were evaluated but the following are not recommended for the feasibility study:

- Average Annual Flow Volumes – No hydrologic data available
- Proportion of area with low flow velocity (<0.1 f/s) discharges within one mile of the Tamiami Trail–no new RMA modeling available.
- Distribution of flows, east to west - no RMA modeling output available.
- Difference between average velocity in marsh and average velocity at road – replaced with new HEC-RAS modeling effort

Screen PMs continued

- Shift to open water, spikerush marsh and slough communities in NESRS–no hydrologic modeling output available to review this PM
- Risk of ridge and tree island peat burning in NESRS– no hydrologic modeling output available to review this PM
- Invasion of exotic woody plant species- no hydrologic modeling output available to review this PM
- Total abundance of fishes in ENP marshes–no hydrologic modeling output available to review this PM
- Conditions for wading bird foraging and nesting–no hydrologic modeling output available to review this PM

Revised Performance Measures

Two performance measures were revised:

- "Reverse filling in of sloughs" changed to "Number of sloughs crossed by each alternative" (modified calculation)
- "Flows from L-29 Canal into deep sloughs of NESRS" changed to "Flows into NESS provided via bridge" (different description, same calculation)

New Velocity Performance Measure

One new performance measures was developed:

- Velocity – HECRAS modeling was used to calculate this PM (detailed information later in presentation)

Final Array of PMs

- **PM-1: Potential Connectivity of WCA-3B Marsh and NESRS as Percent of Total Project Length**
- **PM-2: Number of Sloughs Crossed by Bridge(s)**
- **PM–3: Flows into Northeast Shark River Slough Provided via Bridge**
- **PM-4: Velocity**
- **PM-5: Reduction in Wildlife Mortality**

Operational Intent

An operational plan was not developed for this project. Full realization of project effects is dependent upon an operational plan that utilizes the full range of structural capacities of the alternatives.

PM-1: Potential Connectivity of WCA-3B Marsh and NESRS as Percent of Total Project Length

This performance measure describes the potential connection between WCA-3B and NESRS if the L-29 Levee is removed under a future project. This performance measure is calculated by dividing the length of bridge opening in miles by 10.7 miles, the length of the longest possible bridge that could be constructed in the project area.

PM-1: RESULTS

Alt reference	DRAFT ALTERNATIVES	miles bridging	A. Potential connectivity of WCA-3B Marsh and NESS, % of total project length
No Action	2008 LRR 1-mile bridge, roadway elevation	1	9%
1	2.9 miles of bridges and remaining roadway elevated	3.9	36%
2	4.0 miles bridges/conspans and remaining roadway elevated	5	47%
3	2 miles bridges and remaining roadway elevated	3	28%
4	1-mile western bridge and remaining roadway elevated	2	19%
5	2 miles of bridges and remaining roadway elevated	3	28%
6	6.05 miles of briges/conspans and remaining roadway elevated	7.05	66%

PM-2: Number of Sloughs Crossed by Bridge(s)

This performance measure is related to the alignment of the bridge with existing degraded sloughs south of Tamiami Trail as revealed by the U.S. Geological Survey (USGS) High Accuracy Elevation Data (HAED). Situating a bridge directly upstream of a degraded slough would maximize the potential for storm flow velocities to maintain sloughs by removing excess organic sediment that has accumulated in the sloughs since Tamiami Trail was constructed. The performance measure is evaluated by counting the number of major sloughs that each bridge alternative crosses. The target for this performance measure is 28, the total number of sloughs crossed by Tamiami Trail.

PM–3: Flows into Northeast Shark River Slough Provided via Bridge

While the existing culverts provide a hydraulic connection to the deeper sloughs existing within NESRS, the capacity is not commensurate with amount of flow expected in these deeper sloughs during both high and low flow conditions. Preferential flow through these deeper sloughs is even more pronounced during drier times.

The increased connection provided by the bridge aligned with deeper portions of northeast Shark Slough facilitates increased flow where it should occur preferentially. When the water level is less than 0.5 foot above the ridges, most of the flow occurs in the deeper sloughs. It is important for water to be rapidly delivered to these deeper sloughs, commensurate with this capacity, during wet periods, to produce higher velocities desirable for the redevelopment and maintenance of open water vegetation in these sloughs. This assessment assumes that sheet flow is based on the following equations:

- Manning Equation; $Q = (u/n)\ A\ Rh^{(2/3)}\ (hf / L)^{(1/2)}$
- A depth dependent Manning n ($n = \sim d^{0.77}$)

PM-3: RESULTS

Alternative #	Miles of Bridging	PM-3: Flows into NESS provided via bridge (%)
No Action	1	10%
1	3.9	36%
2	5	48%
3	3	32%
4	2	27%
5	3	36%
6	7.05	69%

PM–4: Velocity PM Based on HEC-RAS modeling

PM-5: Reduction in Wildlife Mortality

- This performance measure is based on average mortality data from FWS for Tamiami Trail.
- The data describe an average of 261 deaths per mile of road per year and assumes that this rate applies to the entire 10.7 mile long project area.
- The performance measure presents the numbers of deaths that would be avoided because of the presence of the bridge(s).
- It is calculated by multiplying 261 deaths per mile per year by the total length of the bridge(s) in miles.

PM-5: RESULTS

Alt reference	DRAFT ALTERNATIVES	miles bridging	A. Reduction in wildlife mortality (# average annual deaths avoided)	A. Reduction in wildlife mortality (# average annual deaths avoided)
No Action	2008 LRR 1-mile bridge, roadway elevation	1	261	9%
1	2.9 miles of bridges and remaining roadway elevated	3.9	1018	36%
2	4.0 miles bridges/conspans and remaining roadway elevated	5	1305	47%
3	2 miles bridges and remaining roadway elevated	3	783	28%
4	1-mile western bridge and remaining roadway elevated	2	522	19%
5	2 miles of bridges and remaining roadway elevated	3	783	28%
6	6.05 miles of briges/conspans and remaining roadway elevated	7.05	1840	66%

Benefit Lift for Each Alternative

Alt #	Miles New Bridging	PM-1: Potential connectivity of WCA-3B Marsh and NESS, % of total project length	PM-2: Number of sloughs crossed by bridges	PM-3: Flows into NESS provided via bridge (%)	PM-4: Velocity	PM-5: . Reduction in wildlife mortality (# average annual deaths avoided)	Average of 5 PMs
1	2.9	27%		26%		27%	
2	4	38%		38%		38%	
3	2	19%		22%		19%	
4	1	10%		17%		10%	
5	2	19%		26%		19%	
6	6.05	57%		59%		57%	

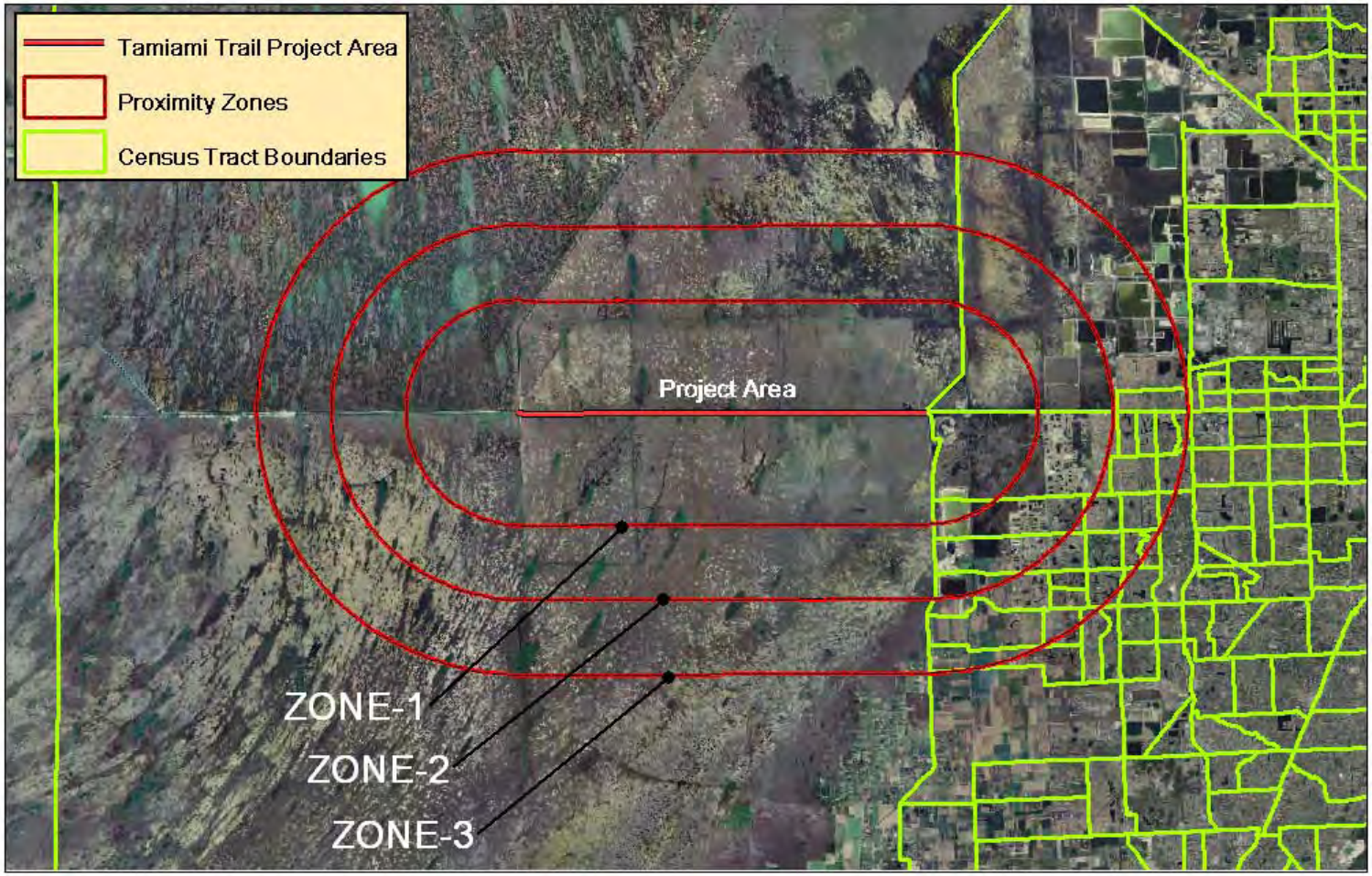
Other Considerations

- Potential befits and impacts within the affected area will be described in this EIS but the scope of the evaluation will be limited since any future operations will be evaluated in a separate NEPA document.
- Wetlands impacts and benefits will be estimated by a UMAM (Uniform Mitigation Assessment Method) within the affected project area.
- ESA consultation between DOI and FWS will occur for this feasibility study and will also be initiated between the lead agency and FWS for any future operational plans.

Socio-Economic Impacts

Socio-Economic Profile
Transportation
Flooding Level of Service
Recreation
Other Social Effects

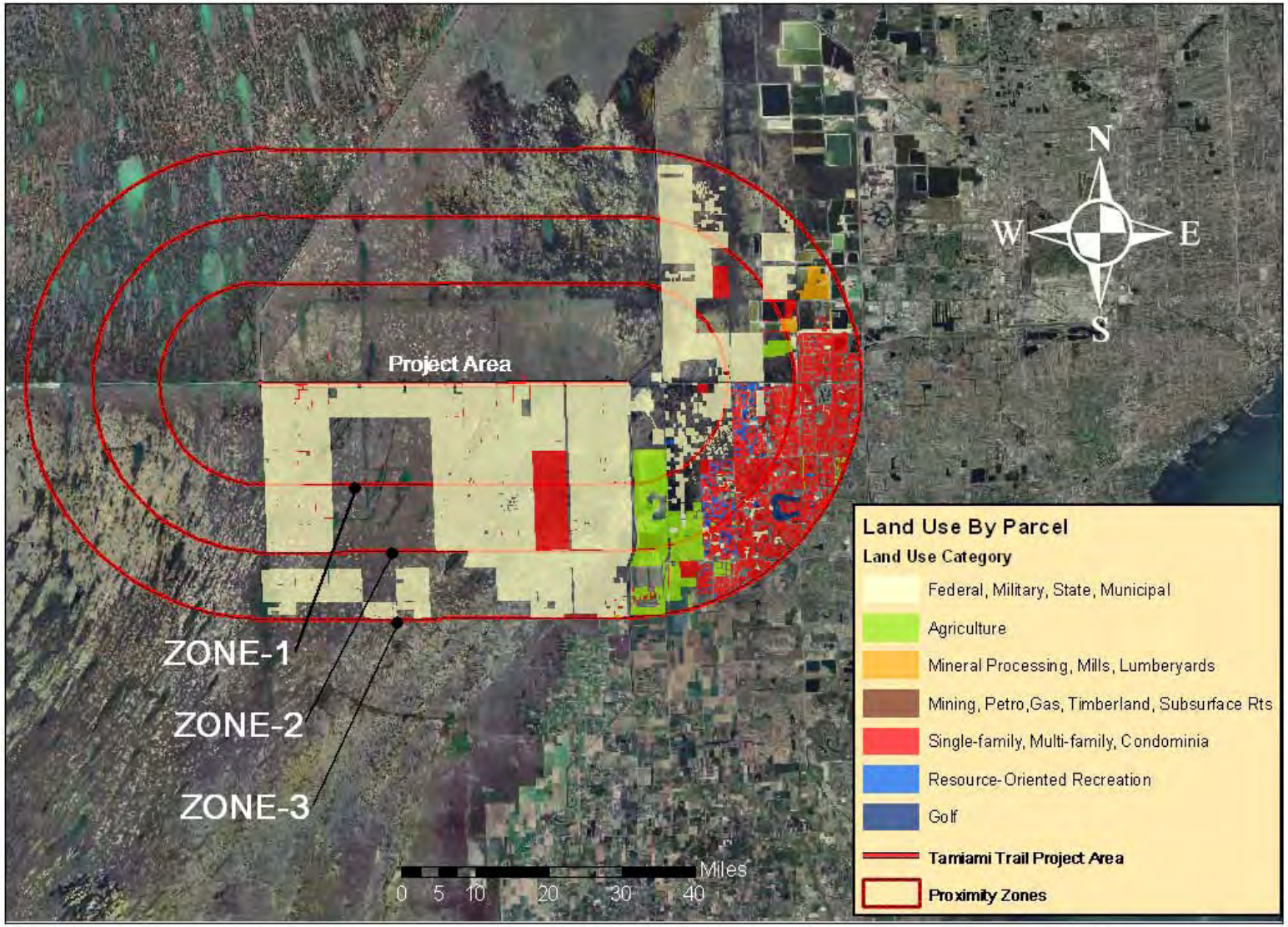
Socio-Economic Profile: Population



Proximity Zone	2007 Population	Description	Area (sqmi)
ZONE-1	30,504	Area within 3 miles of project	94
ZONE-2	61,049	Area within 5 miles of project	188
ZONE-3	215,214	Area within 7 miles of project	307

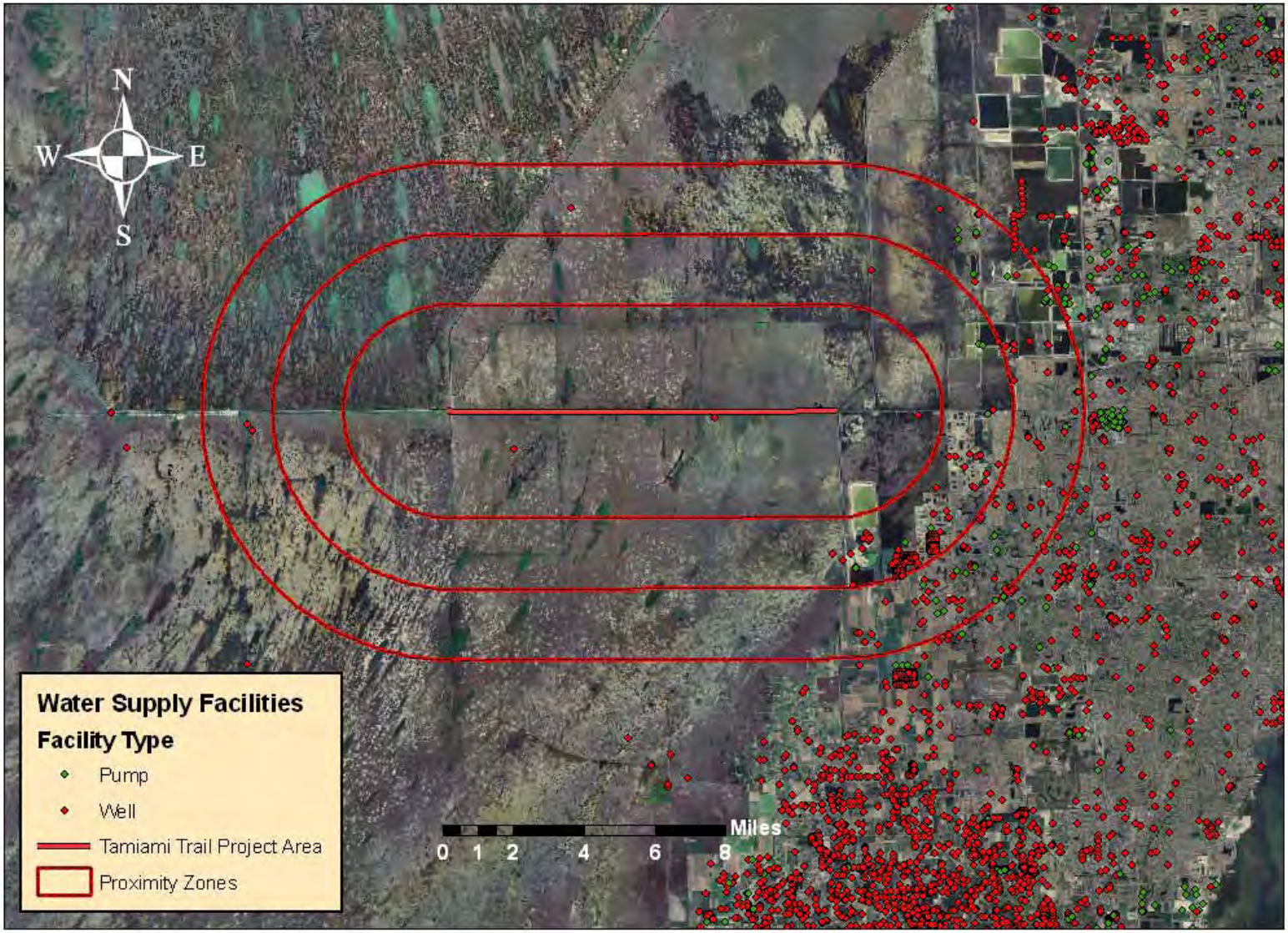
Based on 2007 Census Data

Socio-Economic Profile: Landuse



Based on 2007 FDOR Parcel Data

Socio-Economic Profile: Water Supply Facilities



Transportation

- Average Annual Daily Traffic
  - 5200 vehicles per day
  - 600 trucks per day
- Through design, major impacts to transportation will be avoided. There may be limited delays to transportation, but closing the roadways down for long periods of times is not envisioned.
- Through design, the current speed limit will be preserved.

Flooding Level of Service

- Alternatives are being designed to maintain level of service for flood protection east of the project footprint.
- Real Estate is determining the value of private lands that will need acquisition.
- With the exception of Camp Osceola and the airboat concessions, there are no private residences west, north, or south, of the project footprint.

Recreation

- Three airboat concessions located within the study area. Preliminary estimates are that as many as 500,000 visitors utilize the concessions annually. (A request has been made for visitor estimates from each airboat concession)
- The airboat concessions are the primary means a member of the public can experience the Everglades.
- Maintaining/providing access for the Airboat Association, bank fishermen and other recreationists is a concern. (Examine potential of leaving segments of the Tamiami Trail road where the bridges will be constructed for parking and boat access to the L-29 canal.)
- Examine the benefits and costs of a multi-use trail in conjunction with the road and bridging.

Other Social Effects

- Through design, maintain airboat access for the South-Florida Gladesmen to preserve their cultural, economic and historic usages.
- Through design, maintain and preserve access, level of service for flood protection, and cultural aspects of the Native American lands

Airboat Association of Florida

Clubhouse (1954) - exterior

Clubhouse - interior

Airboat Association of Florida

Kitchen (circa 1954)

Caretaker's Cottage (1962)

AAF Clubhouse
Historic View Circa 1954

Coopertown Restaurant and Airboat Rides

Restaurant (1947)

Residence (1947)

“Cooper’s Thrill Rides” – circa 1960

Miccosukee-Osceola Camp

circa 1930 with later additions

Mixture of historic and non-historic building types

Modern suburban style housing

Tamiami Trail NRHP Evaluation

Property Name	Date	Location	NRHP Evaluation
Airboat Association of Florida	1954, 1962	25400 Tamiami Trail	Eligible under Criterion A with Significance in Recreation and Conservation
Coopertown Restaurant and Airboat Rides	1947	22702 SW 8th St	Eligible under Criterion A with Significance in Recreation (SHPO previously concurred)
Miccosukee-Osceola Camp	Circa 1930	Tamiami Trail	Not Evaluated

Value Analysis & CBA

Tamiami Trail Modifications: Next Steps

Thom Rounds, AICP, LEED AP

09/03/09

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Authority – Why do Value Analysis?

OMB Circular A-131 requires all f0ederal departments and agencies to use value engineering as a management tool

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Authority – Why do Value Analysis?

- NPS Director's Order #90 explains the requirement for VA/VE within NPS
- All construction related projects over $500,000 subject to Value Analysis
- NPS and USACE Value Analysis methodology very similar

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Authority – Why do Value Analysis?

All NPS programs, projects, and activities use VA as a management and decision making tool in:

- Planning, design, construction, repair & rehabilitation of facilities,
- Programs to improve operations, manage operating costs, and improve and maintain optimum quality of program and acquisition functions

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Description – What is VA?

VA in General (OMB A-131) analyzes the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential function at the lowest life cycle costs consistent with the required performance, reliability, quality, and safety

Description – What is VA?

Choosing By Advantages

- Decisions must be based on the importance of the *advantages*

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Process – How CBA is performed

Terms in CBA vocabulary are not used interchangeably.

- A *factor* is an element, or component of a decision to be measured. A *factor* is never weighted
- An *attribute* is a characteristic, quality, or consequence of one alternative
- An *advantage* is a difference between *attributes* of two alternatives

Process – How CBA is performed

1. Summarize the *attributes* of each alternative
2. Decide the *advantages* of each alternative
3. Decide the importance of each *advantage*
4. Weigh costs with total importance of the *advantages*
5. Summarize the decision

Process – How CBA is performed

Factors

COMPONENT					ALTERNATIVES			
FACTOR								
	No Action		Alternative C		Alternative D		Alternative G	
1. PROTECT CULTURAL AND NATURAL RESOURCES								
FACTOR 1a – Prevent Loss of Natural Resources and improve fish and wildlife habitat to enhance long-term sustainability								
Attributes: (ability to restrict salt water inflow and fresh water outflow)	No ability to restrict flows		minor ability to restrict flows		moderate ability to restrict flows		major ability to restrict flows	
Advantages	No advantage in ability to restrict flows	0	Moderate difference in ability to restrict flows	65	Large difference in ability to restrict flows	90	Very large difference in ability to restrict flows	95
FACTOR 1b – Prevent Loss of Cultural Resources								
Attributes: (ability to prevent erosion of the canal banks)	no ability to prevent erosion		minor ability to prevent erosion		moderate to major ability to prevent erosion		major ability to prevent erosion (due to length of plug)	
Advantages	No advantage in ability to prevent loss of cultural resources	0	Small difference in ability to prevent loss of cultural resources	20	Moderate difference in ability to prevent loss of cultural resources	28	Large difference in ability to prevent loss of cultural resources	35
FACTOR 1c – Prevent illegal motor-boat access in designated wilderness area								
Attributes: (ability to prevent illegal	No ability to prevent illegal motor-boat access in designated wilderness area		Minor ability to restrict		Moderate ability to restrict		Major ability to restrict	
Advantages	No advantage in ability to prevent illegal access to designated wilderness	0	Small difference in ability to prevent illegal access to designated wilderness	25	Moderate difference in ability to prevent illegal access to designated wilderness	50	Large difference in ability to prevent illegal access to designated wilderness	60
FACTOR 1d – Impacts during construction								
Attributes: (size of the construction footprint – worksite)	No worksite footprint		Minor Worksite footprint		Moderate Worksite footprint		Major Worksite footprint	
Advantages	Large difference in impacts from construction	30	Moderate difference in impacts from construction	8	Small difference in impacts from construction	5	No advantage in impacts from construction	0
2. PROVIDE FOR VISITOR ENJOYMENT								
FACTOR 2a – Provide non-motorized boat access into the designated wilderness area for recreational opportunities								
Attributes: (provide safe access for non-motorized boats)	No safe access (currents, cables, and buoys)		Provides safe access		Provides safe access		Provides safe access	
Advantages	No advantage in ability to provide non-motorized boat access to designated wilderness	0	Small difference in ability to provide non-motorized boat access to designated wilderness	30	Large difference in ability to provide non-motorized boat access to designated wilderness	50	Moderate difference in ability to provide non-motorized boat access to designated wilderness	40

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Process – How CBA is performed

Alternatives

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Process – How CBA is performed

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Attributes

Shortcut to

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Process – How CBA is performed

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Advantages

Shortcut to

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Process – How CBA is performed

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Advantages

Highest is Circled

Lowest is underlined

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Purpose

- How CBA will be used for this project:
  - Comparison of alternatives to select the preferred alternative
  - Performed according to OMB A-131 & DO-90
- What answers will be developed?
  - Importance of the differences between the alternatives – including project costs
- What information is required?
  - Information from the EIS

Factors

- NPS mission statements
- Functional Requirements
- Congressional direction
- other

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Functional Requirements of the project

- Restore water deliveries to ENP
- Restore ridge and slough processes
- Restore vegetative communities
- Restore fish and wildlife resources
- Other considerations

Alternatives Description

- No Action: authorized by the 2008 LRR as 1 mile eastern bridge and elevation of the remaining roadway to allow for 8.5 feet stages in the L-29 Canal
- Alternative 1: 3 miles of bridges and remaining roadway elevated
- Alternative 2: 4 miles of bridges and remaining roadway elevated
- Alternative 3: 2 miles of bridges and remaining roadway elevated

Alternatives Description

- Alternative 4: 1 mile western bridge and remaining roadway elevated
- Alternative 5: 2 miles of bridges and remaining roadway elevated
- Alternative 6: 6.05 miles of bridges with down ramps and remaining roadway elevated
- Alternative 7: Alternative 6 without down ramps

Attributes

- Attributes are characteristics, qualities, or consequences of one of the alternatives
- The descriptions are written during the CBA Workshop

Advantages

- Advantages are the differences between attributes of two alternatives
- The advantages are identified, discussed, and agreed upon during the CBA Workshop
- The paramount advantage is selected and all other advantages are scored related to it

Preferred Alternative

The Preferred Alternative is the one that the NPS believes best fulfills its mission and responsibilities

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Preferred Alternative

The Preferred Alternative is based on:

- What and how large are the advantages of the differences between alternatives proposed for consideration?
- How important are the advantages of the differences between the alternatives?
- Are those advantages worth their associated costs?

Preferred Alternative

- The Preferred Alternative could be one of the original alternatives, a combination of elements from several alternatives, or an entirely new alternative
- It is a draft preference until it is approved according to the NPS responsibility matrix

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