Call for Integrated Water and Transportation Management along the State Road 29 Road and Canal Corridor

Big Cypress National Preserve Draft Report

February 2019

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I.BACKGROUND AND PURPOSE

On December 19th, FDOT held a pre-meeting (i.e. in advance of upcoming public workshops) on the Project Development & Environment (PD&E) Study for widening State Road 29 (SR29) from I-75 to Oil Well Road. During this meeting, a wide range of topics were discussed regarding the tentative options for the project, the jurisdictions (i.e. stakeholders) involved and a variety of other issues in play.

In particular, FDOT felt a pre-meeting was warranted in light of:

- The presence of public lands on both sides of the southern half of the project area, i.e. Florida Panther National Wildlife Refuge (hereafter called Panther Refuge) on the west and Big Cypress National Preserve (hereafter called Big Cypress) to the east and

- Visitor access, wildlife management and water management aspects of the project relative to those public lands.

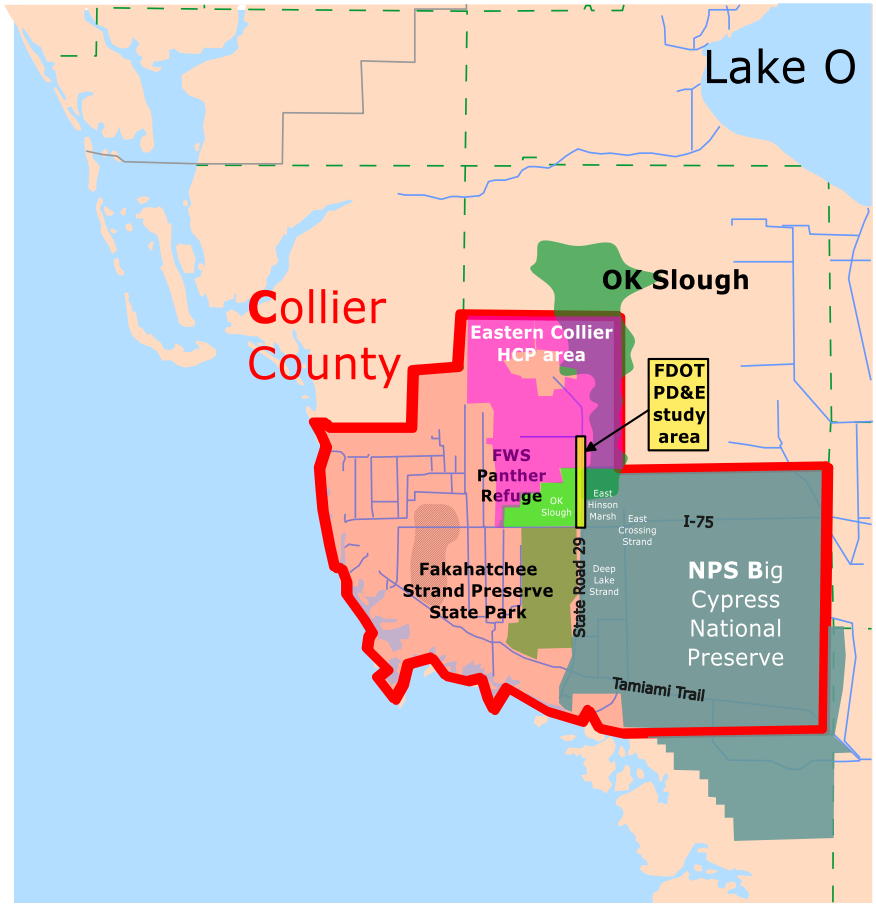

Figure 1: Overview map of FDOT's PD&E study area relative to the SR29 road and canal corridor and the Eastern Collier HCP

The purpose of this report is to help summarize and build upon what was discussed to help advance our collective understanding on the issues and solutions as we move ahead.

II. PROPOSED ROAD CHANGES

While the project is still in the PD&E phase, meaning that preliminary assumptions and features are still subject to change, indications from the pre-meeting point towards the following initial project presumptions:

Preliminary project presumptions include:

- Probable expansion of road from 2 to 4 lanes (i.e. 2 each way)
- Desire to limit road width to a 180-ft width

Primary reasons for limiting the road improvements to a 180-ft width include:

- Avoidance of any land acquisition (i.e. other than terminating the FWS easement) and

- Alleviating any need to touch the canal (i.e. keeping canal out of the project).

Figure 2: Aerial view of SR29 road and canal corridor about 1 mile north of I-75, looking north

III. NPS CONCERNS

The NPS is concerned that restricting the road to a 180-ft width (especially under the 4-lane scenario) will result in a suboptimal solution as follows.

A. Balancing "Pass Through" and "Destination" Goals

The narrower width runs the risk of favoring "pass through" over "destination" transportation goals.

- Normally 4 lanes would require at least 225 feet of width to accommodate all desired features of a fully designed travel corridor, including: driving surface, median strip, shoulders, storm water retention, pullouts and turning lanes for egress to and from public lands on both sides of the road.

- Balancing "pass through" and "destination" traffic is particularly vital for the stretch of road under consideration.

    - SR29 is a public access gateway to Panther Refuge and Big Cypress.
    - Population growth will increase both "pass through" traffic (including freight) driving by and "destination" traffic going to the Panther Refuge and Big Cypress.
    - Population growth will be driven by the Rural Lands Stewardship Area (RLSA) and the associated Eastern Collier Habitat Conservation Plan (HCP) immediately to the north and population growth in south Florida at large.

B. Balancing Transportation and Water Resources Goals

The narrower width runs the risk of jeopardizing 'water resources" components of the project over transportation (and specifically "pass through") goals, as follows.

- Decreasing storm water treatment capacity from its current condition. Instead of having a continuous swale along the east side of the road (i.e. the current situation), compensatory storm water treatment will be employed off site (to the north, and possibly to the south).

- Ignoring (or avoiding) the long-term water resources problems of the road and canal corridor

C. Missing an Opportunity

The narrower width may put the region and its stakeholders on the path of squandering a valuable opportunity to:

- Address the full range of long-standing and newly emergent issues in play along the SR29 road and canal corridor,
- Make conditions better in the future, and
- Possibly make future conditions worse than currently exists.

Figure 3: Looking North along the SR29 Road and Canal Corridor at the first bridge north of I-75

IV. ABOUT ROAD-CANAL CORRIDORS

A. History of Road Building

Historically-speaking, road building was delayed in south Florida's interior because the seasonal flooding regime of the vast wetland landscape prevented building of a maintenance-friendly driving surface at natural grade.

Thus, as is the case for almost all roads in the Everglades and Big Cypress, roadbuilding required a relatively rigorous "cut and fill" (or "dredge and fill") construction technique where in-situ rock along the travel route was blasted loose, dredged, extracted and then piled up in a long linear mound to form an elevated driving surface. The end result almost always achieved not just a road, but the dual presence of a road *and canal.*

In this way, the road and the canal are not stand-alone features, nor have they ever been managed as such. The original road builders at the time of construction (and in the decades hence) understood that the road and the canal were inextricably linked for the purposes of using:

- The road berm to serve as a "high and dry" levee for blocking overland flow to downstream areas,

- The adjacent canal to provide a local drainage solution for keeping water off the top of the levee (i.e. road), and

- The full length of the canal to serve as a regional drainage solution for lands upstream and adjacent of the road for a range of economic activities (i.e. farming and other land development schemes).

B. Road and Water Linkage

In this way, transportation, land development, and water management elements of the road and canal corridor are interlinked with one another.

- Historically, when the road was first built (and the decades that followed), the focus of the canal was on "simple drainage," i.e. getting the water off the landscape to open it to land development; or in the case that the land was already developed, to prevent flood damage thereof.

- In modern times, the "simple drainage" imperative has evolved to include a broader set of water management goals (i.e. water supply, flood control, environmental, ground water recharge, water quality).

- The emphasis and balance among the goals varies in any one spot depending on some combination of local/regional needs and meeting modern-day engineering standards.

- Sometimes these goals change: For example, in the case of SR29, the change of land ownership on the west and east sides of the road from private to public land status has placed a new imperative of managing the road and canal corridor in concert with federal and state missions and mandates.

C. Road and Canal Legacy

- Most roads have been modified over time for the purpose of maintaining the road surface, meeting modern-day transportation engineering standards, and where possible, to mitigate against certain environmental impact (i.e. such as wildlife mortality or direct runoff into waterbodies).

  Examples of these improvements for SR29 include:

  - Wider lanes and other safety features - for motorists
  - Wildlife crossings and fencing - for wildlife
  - Bridge crossings and structures - for water resources
  - Storm water retention swales – for water quality

- Despite these modifications, the SR29 road and canal corridor remains at environmental odds with the water conservation goals and ecological health of the adjacent wetland landscape.

Figure 4: Looking north at third bridge north of I-75 during the wet season. Note the abundance of vegetation under the bridge

V. CLOSER LOOK AT SR29

The SR29 road and canal corridor includes the following:

A. Road and Canal Features

- Two lanes (i.e. one lane each way)
- Wide shoulders on each side.
- A storm-water swale on the east side, between the canal and road.
- Three (3) bridge spans
- Water control gate in canal at Sunniland Grade
- Four (4) wildlife crossings, and partial fencing.
- One (1) entry point into Big Cypress Preserve and four (4) into Florida Panther Refuge

B. Transportation Goals

- "Pass through" traffic (including Freight) to and from I75
- "Destination" traffic to the FWS Panther Refuge and NPS Big Cypress National Preserve
- Mitigation of the road's environmental impacts
    - Wildlife crossings
    - Storm water swale

C. Property Jurisdictions:

Entity	Primary canal interest	Adjacent land interest
FDOT	Keeping the road surface dry	
State of Florida	The fresh surface waters of Big Cypress National Preserve are designated as **Outstanding Florida Water**. This is a state designation intended to protect existing high quality waters	The Big Cypress Swamp is designated as an **Area of Critical State Concern** by Florida by Florida state statute (Chapter 380.05)
SFWMD	Comprehensive water management	
USACE	*SR29 Flowway project in Southwest Florida Comprehensive Watershed Plan*	
Collier County	-Appropriate drainage easements for maintaining a clear channel -SR29 Flowway project in county's watershed management plan	
NPS	-Primary canal owner (Sunniland-I75) -Environmental and water quality impacts	Yes (owner to east)
USFWS	Potential recipient of canal water	Yes (owner to west)
Private Property	-Primary owner of canal north of Sunniland -Drainage capacity	Yes (owner to north)

D. Water Management Goals

Ranked from 1 (worst) to 10 (best)

- Keeping water off the road (10)
- Maintaining upstream drainage (7)
- Environmental inflows into wetlands (1)
- Sustaining dry-season water table levels (3)
- Meeting water quality standards (1)

E. Chronic Issues along the Corridor

(1= still a problem, 5= partially corrected, 10= fully solved)

- Lack of inflows under bridges into Panther Refuge (1)
- Undesired wet-season drainage of water out of Big Cypress (1)
- Undesired dry-season loss of water from shallow aquifer (4)
- Water quality pollution in the canal (1)
- An odd piecemeal ownership nature of the canal (1)
- Upstream property owner concerns with inadequate drainage capacity of canal, i.e. keeping the canal free of vegetation (5)
- Wildlife porosity of the road with respect to aquatic and terrestrial crossing, including the long-term species recovery area for the Florida Panther (6)

Figure 5: Wildlife crossing at Bear Island Grade

VI. CLOSER LOOK AT OKALOACOOCHEE (OK) SLOUGH

A. Importance of OK Slough

The State Road 29 canal and road bisect the main channel of Okaloacoochee (OK) Slough.

- OK Slough is among the largest and most regionally-interconnected natural flow ways in the Big Cypress Basin.

- OK Slough forms the natural headwaters for a series of wetland flow ways and natural areas to the south, including

    - To the west, Florida Panther Refuge and Fakahatchee Strand and
    - To the east, Big Cypress National Preserve's East Hinson Marsh, East Crossing Strand and Deep Lake Strand

- OK Slough is the vital linchpin for achieving a range of water resources goals in the Big Cypress Basin, including

    - Environmental deliveries to natural areas
    - Meeting and maintaining water quality standards
    - Water supply and recharge to the underlying aquifer
    - Maintaining continuity of conservation footprint and flow ways

B. Problems with OK Slough

- Because much of OK Slough and the downstream wetlands are contiguous, undeveloped and in public ownership (as often looked at from bird's eye view on a map), there is a misconception that the ecosystem (or flow way) has been adequately protected and is relatively intact "as is" without additional, or only minor, restoration measures.

- A more accurate assessment reveals OK Slough to be impacted by SR29 as follows:

    Ecological

    - Water overwhelming flows down the canal instead of under the bridges into the Panther Refuge or into Big Cypress National Preserve's East Hinson Marsh

Water Supply

- The loss of water down the canal increases the region's susceptibility to drought and wildfire during the dry season. Over the past decade, over $150 million has been spent to pay firefighters to combat wildfires on federal and state lands adjacent to SR29.

Flood Control

- Contrary to these environmental concerns, upstream property owners feel the conveyance of the canal is undersized relative to their flood control needs.

Water Quality

- The canal has become polluted over time by runoff from upstream agricultural lands. As a result, the canal is in violation of water quality standards afforded the Big Cypress and Panther Refuge as Outstanding Florida Waters (OFWs).

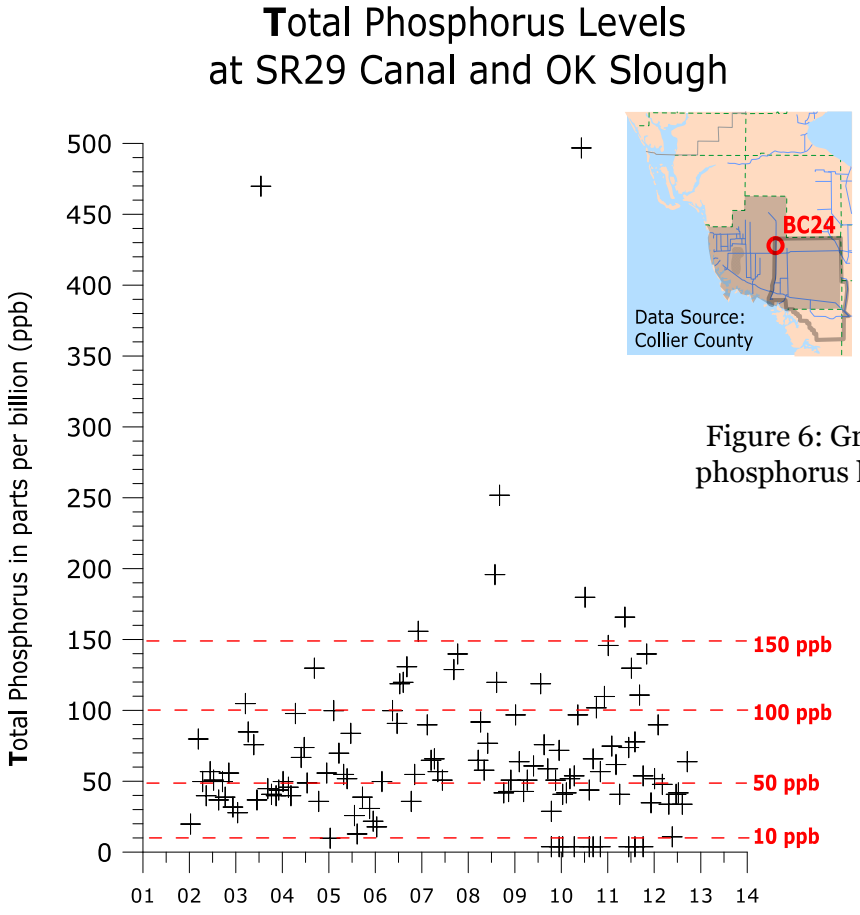

Figure 6: Graph showing high total phosphorus levels in the SR29 Canal

VII. CLOSER LOOK AT THE STATUS QUO

A. Current Status Quo

The management scheme for SR29 is relatively simple.

- During the summer, control structures are fully opened to maximize the canal's drainage capacity.

- During the winter, control structures are closed (or inserted crane) to prevent over-drainage of the shallow aquifer.

Performance of the SR29 corridor can be characterized as some combination of being serviceable, underperforming and unprepared for the future, as described below.

Status	Example
Serviceable	-Current traffic levels -Flood control of road surface -Storm water run off -Access for biking, fishing -Wildlife Crossing
Under performing	-Environmental delivery of water to public lands -Canal weir integrity -Impact on exacerbating drought -Drainage to upstream property owners -Water quality of canal
Unprepared for future	-Increased traffic flow of upstream development -Drainage implications of upstream development -A narrow road design could defer improvement or worsen the performance of the features described above

This status quo runs the risk of being perpetuated into the future if we:

- Allow individual transportation, natural area, land development or water management projects to proceed on separate tracks,
- Allow projects to proceed without factoring in the bigger picture (cumulative effects), and
- Do not identify the comprehensive water resources fix.

B. Prolonged Persistence of Status Quo

Unlike other areas of the Everglades and Big Cypress conservation footprint, comprehensive water management has eluded the SR29 corridor.

On the one hand, this is a bit of surprise given:

- The age of the canal, it is one of the oldest and longest inland roads in the Big Cypress Swamp;

- The canal's centrality in the matrix of publically-managed "natural lands" that lie to both its east and west at its southern half (i.e. an approximate thirty mile reach from Sunniland to Everglades City), thus making a seemingly ready-made receiving ground for steering water from the canal; and

- Identification of the canal as a major hydrologic disturbance in the many foundational studies and documents in the 1970s that led to the designation of the Big Cypress, Fakahatchee Strand and Florida Panther as conservation lands.

On the other hand, the inertia makes perfect sense given the following two Catch-22's in play:

- The same canal water that the public land managers want (to better hydrate wetland and sustain a higher winter water table), they can't use because of its degraded water quality (i.e. runoff from upstream agriculture to the north makes the water quality unsuitable for environmental releases into wetlands to the south); and

- The desire to decrease the drainage capacity of the canal for environmental and drought-prevention purposes is in contradiction to the desire of upstream property owners to increase the drainage capacity of the canal.

C. Reasons for the Persistence of Status Quo

The persistence of the status quo can be explained as some combination of the following.

1. The severity and solutions for diverting canal water into the Panther Refuge are misunderstood.

    - *Clearing out vegetation theory:*

      Some have asserted that the solution to routing canal flow into the Panther Refuge is as simple as clearing out the vegetation underneath the bridges (and as far as the tree line). So the theory goes — once clear of the thicket of plants, canal water will free flow west into the Panther Refuge.

      Visual observation by NPS/FWS staff suggest that vegetation growth is not the culprit in blocking the water, rather the reverse: vegetation is an artifact of no flow. Even during stands of high water, the flow under the bridges is negligible compared to the gush of water down the canal. Clearing out vegetation will only nominally improve flow, if at all.

- *Adding more culverts theory:*

  Strategic addition of box culverts in new locations (i.e. in the main thalweg of the slough) has also been suggested as a way to better divert water into the Panther Refuge. However, as judged by the current situation with the bridges, there is no guarantee these culverts will convey water west, even if their invert (i.e. base elevation) is lowered.

- *Adding a weir theory:*

  A suggested fix to the above problem has been the concept of installing a weir (or canal plug) downstream of one or multiple bridges, thereby helping to raise the hydraulic head on the upstream side and force more water out of the canal into the Panther Refuge.

  While in theory this action may work to some degree, it has also never gained traction for the two important reasons:

  (1) A canal weir would potentially increase flooding on upstream private property land and

  (2) The water in the canal is water-quality impaired with respect to total phosphorus, and thus unsuitable for release into the Panther Refuge.

2. Goals for northern and southern half of SR29 are in conflict

   - *Wetland rehydration and flood control conflicts*

     Sending water into the Florida Panther and Big Cypress wetland water ways would involve slowing down canal flows and raising the water table (i.e. through infilling of the canals or structural control weirs), actions which are in contradiction to the flood control the canal provides to upstream private property owners.

   - *Land use and water quality conflicts*.

     The water quality question has gone underappreciated and unaddressed for too long. While some have held the notion that "any water is better than no water," from a statutory and scientific perspective, such a diversion of untreated water would be unacceptable in terms of both being harmful to the ecosystem and in violation of OFW water quality standards. That being said, it should not be ignored that, under the status quo, polluted water from the canal is already entering adjacent wetlands to some degree on both sides of the road,

and discharges entirely into Everglades National Park to the south.

- *Over drainage and wildfire link*

  Over-drainage and loss of freshwater down the SR29 canal has contributed to a deeper and more prolonged drop in the regional water table during the winter and spring periods.

  As a result, the severity of drought and occurrence of wildfires in the adjacent Big Cypress and Florida Panther Refuge have been increased. Over the past decade, fighting wildfires in the Big Cypress and Florida Panther Refuge have cost the federal government over $150 million. Meanwhile, the entirety of these wildfire suppression dollars goes to the short-term investment of paying fire fighter salary and equipment instead of the long-term capital improvements to better sustain water on the landscape (instead of draining it off).

3. Jurisdictions along SR29 are not on the same page, as exemplified by the:

   - *Patchwork ownership of the canal*

     The odd ownership of the canal makes it everyone's local-scale problem but outside the purview of any one stakeholder to correct.

   - *The canal's low priority among stakeholders*

     Until recently, State Road 29 has been not been a primary management priority of the many stakeholders who play a role in managing it. This can be partly explained as a coastal bias where the water management issues more proximate to the coastal population centers get the majority of the attention and funds.

As a result of the above reasons, routine problems and issues along the SR29 corridor have tended to go unresolved.

- Regular maintenance or replacement cycles for structures has generally been deferred in interest of not wanting to waste money on a temporary fix,

- Meanwhile, on a local-scale, structures have become derelict (i.e. eroded away) and regionally, the canal has become severely outdated per basic engineering, environmental and water management standards that local or "reach specific" solutions cannot fix.

D. Emerging issues that Threaten Status Quo

Once a remote and lightly traveled corridor, SR29 increasingly finds itself in the "center of the universe" of its dual transportation and water resources management roles.

After decades of inertia, there seems to be growing awareness among stakeholders that the water resources problems that come to the fore along SR29 (and in particular the critical reach between I-75 and Oil Well Road) cannot be individually addressed; nor can projects proceed without understanding and giving design consideration for the larger water resources problems and solutions in play.

This urgency is on the verge of reaching a tipping point as:

- Population expands inland to the north,
  - Rural Lands Stewardship Area
  - Eastern Collier HCP to the north
  - SR29 Road widening from I-75 to Immokalee

- Two major water management projects unfold to the west and east, and
  - Picayune Strand Restoration Project to the west
  - Western Everglades Restoration Project to the east

- Problems continue to remain unresolved along its length.

Figure 7: Even during the peak water season, water from the canal does not flow under the bridges into the Florida Panther Refuge, looking south

VIII. COMPHREHENSIVE WATER SOLUTION

What would the comprehensive water resources plan look like?

A. Review of Historic Literature

To date, there has never been a detailed, stand-alone study on water resources management for the SR29 corridor, neither for its entire length (i.e. Immokalee to Everglades City), nor for the 10-mile stretch (Oil Well Road to I-75) – although the need for such has been discussed by a variety of stakeholders over the years.

Conceptual-level descriptions of water management projects that endorse filling in portions of the SR29 canal are contained in two reports as follows:

- USACE/SFWMD's The *Southwest Florida Comprehensive Watershed Plan*, 2015, which includes the following project:

    - SR29 Barron River Flowway Restoration

    Reduce SR29 drainage impacts with a mix of weirs and canal plugs that will restore hydrologic and fire regimes in adjacent portions of Big Cypress National Preserve, Florida Panther National Wildlife Refuge, Fakahatchee Strand Preserve State Park, and Everglades National Park.

- Collier County's *Collier County Watershed Management Plan*, 2011. Under the heading of "Identification of Potential Structural Projects," both the Okaloacoochee Slough Flowway Restoration and SR-29 Flowway Restoration are listed, as follows

    - Okaloacoochee Flowway Restoration

    This project provides little detail in the SWFFS documentation. The concept is to improve the wetland system by improving the flowway by removing man-made impediments. Specific projects to support this concept have been proposed.

    - SR-29 Flowway Restoration

    This project calls for the SR-29 Canal to be plugged with ditch blocks at regular intervals. Culverts underneath SR-29 will be used to divert water to the west into Fakahatchee Strand. Other components include the construction of spreader canal and pump stations to divert water into wetland systems north of I-75.

Interestingly, neither the SFWMD's *Lower West Coast Water Supply Plan (2017)* or the NPS's *General Management Plan for the Addition*

Lands of Big Cypress National Preserve (2010) make mention of water management along the SR29 corridor, but this is likely reflective of the scope of those reports, not endorsement of a particular view. The FWS is in the process of a *Comprehensive Conservation Plan for the Florida Panther National Wildlife Refuge*, within which the desire for clean inflows from the SR29 canal will likely be discussed.

B. What Plan Might Look Like

A comprehensive water resources plan for the SR29 corridor would need to be as its name suggests: big, detailed and multi-disciplinary in nature (i.e. featuring and integrating water supply, flood control, environmental and water quality components).

It would involve maintaining adequate flood control for upstream property owners, cleaning the water, and spreading water across the target conservation areas. It would be similar to the solution at Picayune Strand Restoration with the caveat that it would also require surface water treatment.

The big fix would potentially consist of the following components:

North of I-75

- Filling in entire 5-mile length of canal
- Replacing Sunniland Gate with a pump station
- Building flood equalization basins (FEBs) and storm treatment areas (STAs) north of the pump station
- Building a tieback levee to prevent water from backflowing north
- Building a spreader canal to distribute water into the Panther Refuge and Big Cypress
- Adding new conveyance under SR29 (box culverts and bridges)

South of I-75

- Filling in the canal
- Adding conveyance under the road

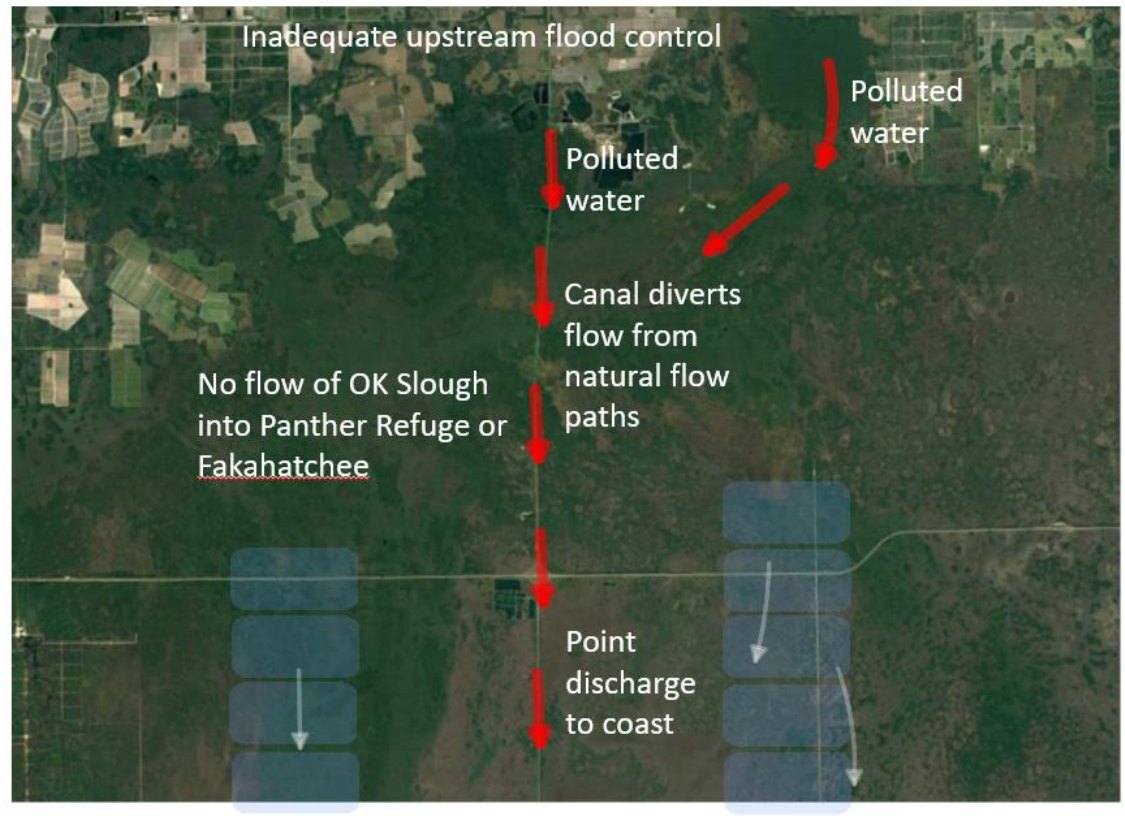

Figure 8: Conceptual maps showing "before and after" views of the problems and solutions for an integrated water resources fix

C. Pros and Cons a Comprehensive Plan

Effective water resources management along the SR29 corridor comes with bad and good news. The bad news is that "the only solution is the big solution." The good news is that the solution works for everyone.

Pros and cons include the following:

Pros:

- It fixes a long-dormant regional water resources issue. The current canal situation is bad for all stakeholders. Upstream water interests, adjacent land interests, and downstream estuary interests.

- Transportation elements of the project would be improved by lifting the width restriction.

- It would provide a beautified restoration corridor into the Refuge and Preserve thereby increasing ecological, ecotourism, and economic benefits of the corridor and upstream property values.

- It is consistent with on-going ecosystem goals (of cleaning and spreading the water out for the benefit of the ecosystem, recharging the underlying aquifer) and ongoing restoration projects, including
  - Picayune Strand Restoration
  - Comprehensive Southwest Florida Watershed Plan
  - Western Everglades Restoration Plan
  - Tamiami Trail Bridges

- It is consistent with other infrastructure projects in peninsula Florida where transportation and water resources needs were handled jointly include:

  - *I-75 southern extension across Alligator Alley* for the purpose of making the road invisible to the regional sheet flow regime
  - *Tamiami Trail New Bridges* for the purpose of shifting more water into Northeast Shark River Slough and downstream Florida Bay
  - Wekiva and State Road 40 as identified in the pre-meeting.

Cons:

- It is expensive
- It will require a higher level of planning and participation by all stakeholders
- It will require land acquisition

D. Case against Doing Nothing

- The water resources problem is unavoidable.
- Not touching the canal pushes the water problem off in the future, and potentially puts the road improvement project on a path that will produce a sub-optimal solution from both a transportation and water resources perspective.
- The timing is right, now: Many best water management solutions occur hand and hand with transportation projects. If we don't plan for it now, when will we? There will never be a bigger cost share project or a better nexus of stakeholders.

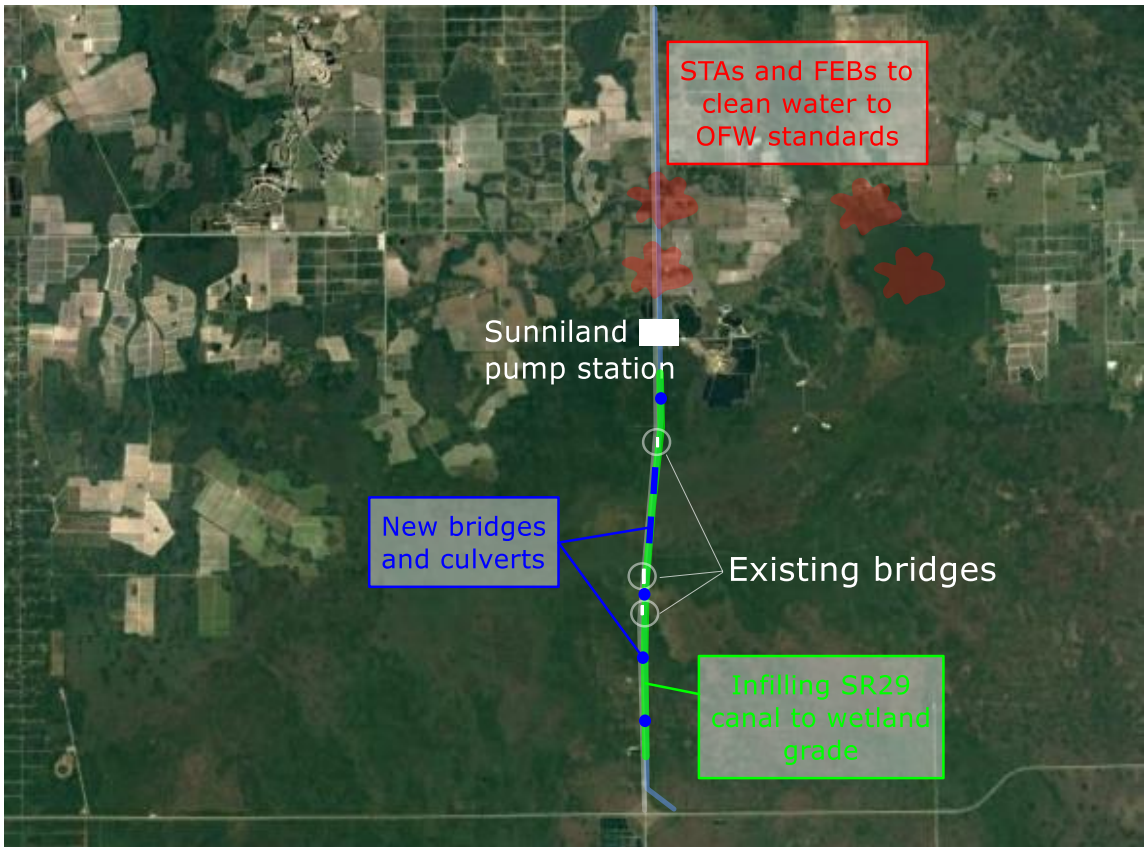

Figure 9: Some of the major components of the water resources fix.

IX. OUR SUGGESTION

The PD&E study bisects an area where transportation, water resources and land management issues are intimately linked with one another.

A. Multi-Jurisdictional Umbrella

While FDOT may not have the jurisdiction or authority to independently address the full scope of the water resources issue at play along this stretch of the SR29 corridor, the PD&E study will not be successful without appropriate planning among all stakeholders on the range of interrelated water resources, land management, and transportation issues in play along the corridor, and in particular for the 5-mile stretch between I-75 and Sunniland.

At a minimum, comprehensive planning should:

- Help bring stakeholders together on the range of issues;

- Increase recognition among stakeholders that the dual design of the SR29 corridor necessitates looking at the canal and road jointly, not *isolating* them as separate entities;

- Embrace the idea that transportation, land management and water resource management are *inextricably linked* with one other along the road and canal corridor, and best planned for in unison,

- Identify solutions that offer an improvement from the current situation in *all categories*, and does not favor one aspect (i.e. pass through traffic goals) of the SR29 corridor at the expense of short changing or worsening other aspects (i.e. destination traffic, environmental, water quality, and water resource management goals) relative to current day and future needs.

- Recognize the project traverses lands and waters that are afforded *state and federal protection*, including:

    - The fresh waters of Big Cypress National Preserve are designated as **Outstanding Florida Waters**. This is a state designation, delegated by the U.S. EPA under the Clean Water Act, and is intended to protect existing, high-quality waters.

    - The Big Cypress Swamp is also designation as an **Area of Critical State Concern** by Florida state statute (Chapter 380.05). This designation provides the state's Division of Community Planning with oversight on local development projects and comprehensive planning within the designated area (Collier County).

B. Questions to Address

1. What is the best overall design for accommodating:

    - Pass through traffic
    - Destination traffic (i.e. gateway into public lands)
    - Compatibility of corridor with wildlife
    - Water quality and storm-water management
    - Comprehensive water resources management

2. Does 180 feet provide enough width for all aspects of the road and canal corridor?

3. Does the PD&E Study need to be expanded in scope or time frame to allow full consideration of all aspects of the road and canal corridor?

4. What additional information or studies are needed to improve our understanding and integration of water resources into the project?

5. What are the roles and responsibilities of the various stakeholders for developing a comprehensive water management plan for the SR29 canal and road corridor?

Figure 10: An integrated vision of water and transportation management along the State Road 29 Road and Canal Corridor will transform it into a beautified, economically vibrant, and resource sustainable gateway.

X. CONCLUSION

A. Overview of the problem

Under current conditions, water resources are poorly managed along the SR29 corridor for the number of factors described in this paper.

The result is a status quo that doesn't work for any of the stakeholders and which is out of tune with the basic principles of water resources management along the corridor's entire length, and in particularly at the approximate 5-mile stretch between I-75 and Sunniland where the corridor crosses OK Slough.

The water resources problems are unsolvable both at a local scale and as addressed separately by any individual stakeholder or project.

For example, as stands:

- The same SR29 canal water that the public land managers want (to better hydrate wetlands and regional flow ways) cannot be used because of its degraded water quality; and

- The desire to decrease the drainage capacity of the SR29 canal for wetland-rehydration and drought-prevention purposes is also in contradiction to the desire of upstream property owners to increase the drainage capacity of the canal.

Left unaddressed, the water resources problems along the SR29 corridor can be expected to fester indefinitely and potentially worsen in the future without action.

B. Overview of the Solution

The SR29 road and canal are inextricably linked, both with one another and with the range of land, water resources and transportation management issues and needs along its length. This is true both historically (as traced back to the corridor's original construction in the late 1920s) and today as we plan to re-engineer the corridor to meet modern-day standards and future needs.

These plans are now staring us in the face.

They include:

- FDOT PD&E Study for expanding SR29
- Rural Land Stewardship Area (RSLA)
- Eastern Collier Habitat Conservation Plan (ECHCP)

Collectively, we will miss a valuable opportunity if we allow any of these studies (or infrastructure projects that they spawn) to proceed on

separate tracks and without addressing the overarching regional water resources issue at stake in all three.

Critical to the success of all three studies – separately and together – and most of all meeting the multi-disciplinary needs of the stakeholders involved (and the future of the region at large) all necessitates the development, integration and implementation of a comprehensive water resources plan for the SR29 corridor.

C. Embracing the Big Picture Solution

Indeed, the only water resources solution for SR29 is the big solution, but the good news is that the big solution works for everyone. In this respect it is vital that everyone pitches in – all the stakeholders and all studies.

The alternative (i.e. the status quo) of doing nothing and allowing projects (and stakeholders) to proceed on separate tracks will perpetuate – and possibly worsen – a "tragedy of the commons" with respect to water resources management along the SR29 in which everyone is unhappy with the situation but nobody is willing (or capable) of resolving alone.

Embracing the big picture solution starts now.

Figure 11: SR29 Canal looking south from Sunniland. The canal will remain a drainage, water quality and environmental problem, and will worsen in the future without action.

Appendix 1

Southwest Florida Comprehensive Watershed Plan

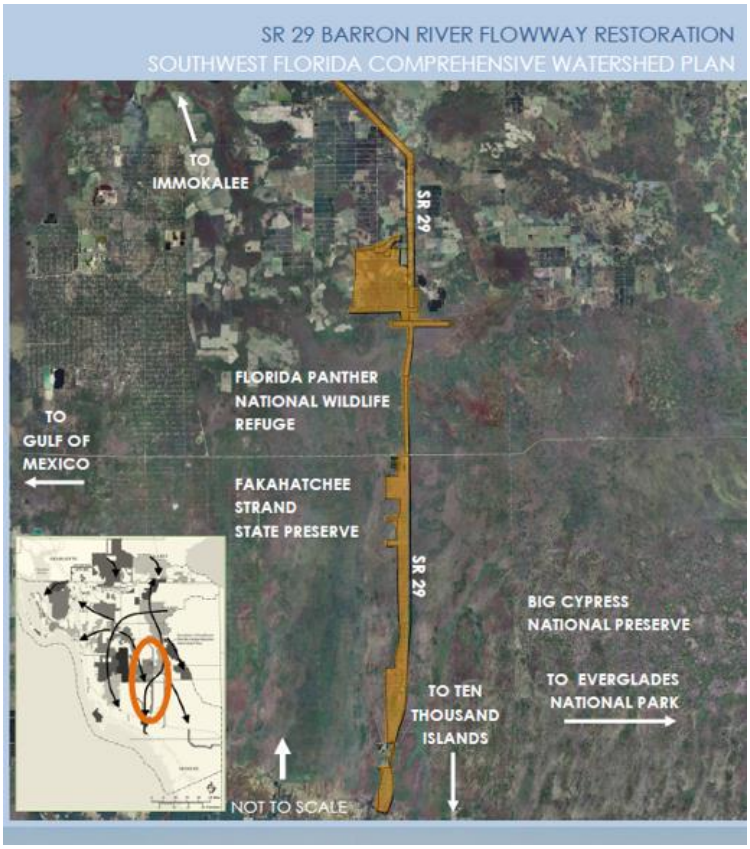

Figure 12: View of one of three new bridges being along the Tamiami Trail to help shift more water into Northeast Shark River Slough and downstream Florida Bay. Could a similar approach be championed along the SR29 road and canal corridor?

Figure 13: Let's clean the water and help spread it out into the Big Cypress, Panther Refuge, and Fakahatchee Strand where it can help revitalize the ecosystem, recharge underlying aquifers and keep costly wildfires in check.