ECOLOGICAL ILLS IN ESTERO BAY WATERSHED AND BEYOND: THE SOUTH LEE COUNTY WATERSHED RESTORATION INITIATIVE TO THE RESCUE

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Audubon of the Western Everglades
and Audubon Florida

Estero Bay Agency on Bay
Management – Cela Tega 2020

Saturday, January 25, 2020
Plagues Upon Us…

- Bonita flooding
- Corkscrew Swamp water level impacts
- Water quality decline and HAB’s
- Lack of Fire and vulnerability to catastrophe
- Wading bird losses, esp. wood storks
- Loss of regional habitats/connections
- Exotics and invasives (habitat/hydrology)
- Climate destabilization: drought, coastal impacts, storms – all increasing
Why?

- Overdrainage for flood protection
- Wetland destruction (& other habitats)
- Invasive, woody vegetation increase
- Development in floodplains
- Regional barriers to water/wildlife
- Inefficient land use
- Human overpopulation
- Poor mgmt. of nutrients (fertilizer, biosolids)
- Too many lakes and ponds
Corkscrew’s Wood Stork colony has declined severely—is further stressed by hydrologic changes
Wood storks are canary in the coal mine

Hydrologic change also has implications for
- Other aquatic-dependent wildlife
- Plant communities
- Dry season severe fire risk
- Winter temperature buffering & microclimate
- Downstream water quality and flooding
- Area economy – agriculture and tourism
- Possible human health issues
CFA:
Loss of 70% of historic shallow wetlands
Loss of 82% of wet prairie
Hydrologic impact causes: drainage and pumping for irrigation and water supply
Intense Fire in Picayune Strand Last Year
Flooding in floodplains (who would have thought?!)

Photo: NBC2
Algae: Blue/Green and Red Tide
Nutrient Pollution from Urban and Farms
Downstream Consequences – all the way to the Beach!
Red Tide Impacts to Coastal Birds & Wildlife
340,000 dry tons per year – 2/3 “beneficially” applied as fertilizer and 1/3 landfilled.
Fixes, perhaps?

- Wetland rules fixed (WOTUS!, mitigation)
- Wise land use (no floodplain building)
- Hydrologic modeling (causes/fixes)
- Science: monitor, research
- Human wastes: septic, sewer, biosolids
- Land acquisition
- Water conservation (Ag and urban)
- Alternative water supply (get off surfacial)
- Nutrient pollution rules fixed and enforced
More fixes…

• Rx fire; brush clearing; hold more water into dry season
• Lower the flood protection Level of Service
• Restore wetlands (regulatory, Everglades)
• SW Fla Comprehensive Watershed Restoration Plan (fka, SWFFS)
• S. Lee Watershed Restoration Initiative
RESTORATION: EVERGLADES, HABITAT, WETLANDS
RELEVANT RESTORATION EFFORTS

• SW FLORIDA FEASIBILITY STUDY, NOW THE SW FLORIDA COMPREHENSIVE WATERSHED MANAGEMENT PLAN
• SOUTH LEE COUNTY WATERSHED PLAN UPDATE 2009
• BONITA SPRINGS FLOOD REDUCTION PLAN
• LEE COUNTY FLOOD MITIGATION PLAN (DUE 2020)
• CORKSCREW REGIONAL HYDROLOGIC MODEL (DUE 2020)
• LEE CONSERVATION 2020 MANAGEMENT, ESPECIALLY KIKER PRESERVE
• VILLAGE OF ESTERO STORMWATER PLAN
• SOUTH LEE WATERSHED RESTORATION INITIATIVE
• LOWER WEST COAST WATER SUPPLY PLAN
ONE PERSON’S RESTORATION IS ANOTHER’S IMPACT, OR MIXED BAG

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RESTORATION EFFORTS FOCUS

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S. LEE WATERSHED RESTORATION INITIATIVE: REGIONAL WATER RESOURCE MODELING AND PLANNING FOR SOUTH LEE COUNTY
THE OBJECTIVE IS TO “GET THE WATER RIGHT” – IDENTIFYING WHAT NEEDS TO HAPPEN TO RESTORE AND MAINTAIN OUR WATER SUPPLY, FLOOD PROTECTION, WATER QUALITY AND WATER-DEPENDENT RESOURCES IN THE FACE OF EXISTING DEGRADATION AND DEPLETION, SEA LEVEL RISE AND CONTINUED REGIONAL GROWTH.
Southwest Florida Comprehensive Watershed Master Plan

Breakdown by Types of Projects

- Water Quality (17)
- Water Storage (10)
- Flood Control (1)
- Hydrological Restoration (45)
- Habitat Restoration (30)

Total: 103 Projects

Protecting and restoring water resources from Venice to Bonita Springs to Winter Haven
<table>
<thead>
<tr>
<th>Water Quality (17)</th>
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<tbody>
<tr>
<td>Cocohatchee Slough</td>
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<tr>
<td>Corkscrew Swamp Sanctuary MAPS</td>
</tr>
<tr>
<td>Southwest Unacquired Yucca Pens</td>
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<tr>
<td>Manuals Branch Shoreline</td>
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<tr>
<td>Otter Creek Corridor</td>
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<tr>
<td>Harnes Marsh Expansion</td>
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<tr>
<td>Orange River Canal/Weir Improvements</td>
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<tr>
<td>Cape Coral Spreader</td>
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<tr>
<td>Cape Coral Canal</td>
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<tr>
<td>East Branch Daughtreys Creek MAPS</td>
</tr>
<tr>
<td>North Fort Myers Centralized</td>
</tr>
<tr>
<td>Lehigh Acres Country Club</td>
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<tr>
<td>Lehigh Centralized Wastewater</td>
</tr>
<tr>
<td>Alico Road MAPS</td>
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<tr>
<td>Ten Mile Canal MAPS</td>
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<tr>
<td>W19San Carlos Estates Centralized</td>
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<tr>
<td>San Carlos Park Centralized Wastewater</td>
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</tbody>
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### Water Storage (10)
- Corkscrew Watershed Ag Water Containment Area
- Kehl Canal Storage Reservoir
- Gator Slough Storage Seepage Barrier along Gator Slough
- Orange River Storage Reservoir
- Bell West Storage Reservoir
- Six-mile Cypress Upper Storage Reservoir
- Six-mile Cypress Lower Storage Reservoir
- Freeman Storage Reservoir
- Alico Road Storage Reservoir
- Alico Flow-ways West Storage Reservoir

### Flood Control (1)
- Lehigh Stormwater
<table>
<thead>
<tr>
<th>Hydrologic Restoration (45)</th>
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<tr>
<td>Corkscrew Regional Ecosystem Watershed Acquisition &amp; Management</td>
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<tr>
<td>Corkscrew Swamp Sanctuary Hydrologic Restoration</td>
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<tr>
<td>Bird Rookery Swamp Hydrologic Improvement</td>
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<tr>
<td>Northern Golden Gate Estates Unit 53 Restoration &amp; Acquisition</td>
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<tr>
<td>Yucca Pens Buffer</td>
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<tr>
<td>Hog Branch Headwaters</td>
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<tr>
<td>Yucca Pen Inholdings</td>
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<tr>
<td>Yucca Pen Inholding East</td>
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<tr>
<td>Hancock Creek Riverine Corridor</td>
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<tr>
<td>Old Bridge Point</td>
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<tr>
<td>Lower Powell Creek Marshes</td>
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<tr>
<td>Royal Palm Estates</td>
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<tr>
<td>Reinke Property</td>
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<tr>
<td>Alliance of Casa La Linda</td>
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<tr>
<td>West Branch Daughtreys Creek</td>
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<tr>
<td>Stroud Creek</td>
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<tr>
<td>Northwest Thompson Cutoff</td>
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<tr>
<td>J. Naumann Property</td>
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<tr>
<td>Thompson Cutoff Northeast</td>
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<tr>
<td>Palm Creek</td>
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<tr>
<td>Bayshore Conservation Easement</td>
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<td>Owl Creek</td>
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<td>Telegraph Creek Corridor</td>
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<tr>
<td>Able Canal</td>
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<td>Project Name</td>
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<tr>
<td>Yellow Fever Creek Headwaters</td>
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<td>North Palm Creek Headwaters</td>
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<tr>
<td>Powell Creek Restoration</td>
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<tr>
<td>Spring Creek Hydrologic Improvement</td>
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<tr>
<td>Bonita Springs Utilities</td>
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<tr>
<td>Benson Property</td>
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<tr>
<td>Leitner Creek Connector</td>
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<tr>
<td>Imperial River Corridor Flow-way</td>
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<tr>
<td>Lakes Park/Hendry Creek</td>
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<tr>
<td>Island Park Road/Hendry Creek Filter Marsh</td>
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<tr>
<td>Bluejack Oak Parcel</td>
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<tr>
<td>Freeman</td>
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<tr>
<td>Alico Flow-ways West</td>
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<tr>
<td>Alico Flow-ways East on Ginn Proposal</td>
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<tr>
<td>Airport Expansion Flow-way</td>
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<tr>
<td>Airport Mitigation Connector</td>
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<tr>
<td>Stairstep Connection</td>
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<tr>
<td>Estero River North</td>
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<tr>
<td>Six-Mile Cypress Headwaters West</td>
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<tr>
<td>Addition to Six-Mile Cypress</td>
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<tr>
<td>Habitat Restoration (30)</td>
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<tr>
<td>Corkscrew Woodstork Flow-ways</td>
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<tr>
<td>East Bird Rookery Swamp Upland Habitat Restoration</td>
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<td>Palm Tree Farm Restoration</td>
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<td>CREW Center Restoration</td>
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<tr>
<td>Yucca Pens (Charlotte Harbor Flatwoods)</td>
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<td>Yucca Pen Mines</td>
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<tr>
<td>Yucca Pen Creek West</td>
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<tr>
<td>Zemel Grade/Powell Creek</td>
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<tr>
<td>Gatorland Vistas (Addition to Prairie Pine)</td>
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<td>Stolle Property</td>
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<tr>
<td>Caloosahatchee Creeks</td>
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<tr>
<td>Popash Creek Corridor</td>
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<td>Popash Creek Headwaters/Lee</td>
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<tr>
<td>FPL North Transmission Line Filter</td>
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<tr>
<td>Mouth of Orange River</td>
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<tr>
<td>Trout Creek/Strickler Gulley Corridor</td>
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<tr>
<td>Riverine</td>
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<tr>
<td>Daughtrey Branch Headwaters</td>
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<tr>
<td>Tidal Caloosahatchee Oxbow #1</td>
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<tr>
<td>Agripartners Properties</td>
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<tr>
<td>Halfway Creek Flow-ways</td>
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<tr>
<td>North side of Section 25 in 4725</td>
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<tr>
<td>Flow-way north of Alico Road (Alico Mine Flow-way) (Tam-Alico)</td>
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<tr>
<td>Florida Rock Industries Flow-way Buffers</td>
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<tr>
<td>Six-mile Cypress Connection under SR 82</td>
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<tr>
<td>East Estero Bay Buffer</td>
</tr>
<tr>
<td>Mullock Creek Preserve</td>
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<td>North Estero Bay Buffer</td>
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<tr>
<td>Imperial River Preserve</td>
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<tr>
<td>Green Meadows</td>
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**TABLE D-9: FUNCTIONAL GROUP 34 - ESTERO CREEKS AND HEADWATERS FLOW-WAYS DETAILED COMPONENT DESCRIPTIONS**

<table>
<thead>
<tr>
<th>BAT ID Number</th>
<th>Component Title</th>
<th>Component Justification</th>
<th>Component Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Original Components and Associated Management Measures in Functional Group 34 (Table D-9)</td>
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</tbody>
</table>

1. Conservation easements or acquisition would avoid the possibility of the eventual loss of lands in FG 34 to residential development. Restoration of developed lands to their pre-development habitats could help to eliminate nutrients problems. (1, 2, 3, 6, 7, 10, 11, 16, 22, 24, 25, 26, 27, 29, 30, 31, 36, 90, SLL02)
2. Reduce impediments to sheetflow through conveyance structures (1, 2, 11, 90, 236, SLL02)
3. Provide improved habitat through the creation of littoral zones in borrow pits (1, 7)
4. Backfill canals to restore sheetflow (7)
5. Reduce impediments to sheetflow by eliminating mosquito ditches (32, 33, 34, 39)
6. Eliminate exotic vegetation (1, 7, 9, 10, 11, 14, 16, 22, 24, 25, 30, 31, 32, 33, 34, 38, 39, 90)
7. Improve downstream hydrologic regimes by constructing weirs at 1 ft contour intervals in canals (8, 10, 11, 22, 38)
8. Remove portions or all of spoil berms in wetlands next to dredged channels (11, 34)
9. Improve the quality of water in inland canals and flow-ways through the construction of filter marshes (5, 8, 10/W1, 14/W21, 36)
10. Reduce impediments to sheetflow by regrading vehicle trails (34)
11. Construct Managed Aquatic Plant Systems to improve quality of water flowing through canals and coastal lagoon tributaries (W156/16, W15/38, W185)
12. Improve groundwater and surface water quality through conversion of septic to central sewer systems and construction of a storm water retrofit (9, W19, W28)
13. Construct above-ground reservoirs to reduce point discharges to coastal waters (SW24, SW26, SW27, SW28, SW29)
1. Conservation easements or acquisition would avoid the possibility of the eventual loss of lands in FG 5 to residential development. Restoration of developed lands to their pre-development habitats could help to eliminate nutrients problems. (28, BC23, BC25, BC28, BC32, BC34, BC54, BC62)

2. Reduce impediments to sheetflow with improved conveyance through or around structures (BC23, BC25, BC26)


4. Improve downstream hydrologic regimes by increasing storage on agricultural lands and associated detention ponds (SW07)

5. Improve downstream hydrologic regimes by constructing weirs at 1 ft contour intervals in canals and ditches (28, BC23, BC25, BC54)

6. Construct an above-ground reservoir along a major canal to store wet period excess flows and to provide supplemental dry period flows to downstream flowways (SW30)

7. Construct a Water Quality Treatment Area to improve quality of water flowing through the Corkscrew Watershed (W113)

8. Construct an Algal Turf Scrubber to improve quality of water flowing through the Corkscrew Watershed (W114)

9. Institute urban BMPs in watershed (W110)
BEFORE MOST OF THESE PROJECTS MOVE FORWARD, A REGIONAL HYDROLOGIC MODEL IS NEEDED

• CORKSCREW SWAMP SANCTUARY/AUDUBON FLORIDA IS PARTNERING WITH SFWMD/BIG CYPRESS BASIN TO REFINE A REGIONAL HYDROLOGIC MODEL FOR CORKSCREW WATERSHED TO FIND CAUSES AND SOLUTIONS TO WATER LEVEL IMPACTS

• A LARGER SOUTH LEE REGIONAL HYDROLOGIC MODEL IS ALSO NEEDED TO IDENTIFY FEASIBLE RESTORATION PROJECTS AND LOOK AT CLIMATE DESTABILIZATION AND SEA LEVEL RISE.