Restoration Rally Cry for the Big Cypress Swamp

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We are HERE
Forgotten Piece of the Puzzle

Big Cypress Swamp/Southwest FL Side of the Greater Everglades Ecosystem

River of Grass East Coast Side of the Greater Everglades Ecosystem
Types of threats to Big Cypress

Some dominate the discussion
Types of threats to Big Cypress

Some dominate the discussion
Back Country trails are not a hydrologic a problem
It’s the Trail under this buggy that is
Turner River Road

Many more like it
Many more like it

All in the front country

Upper Wagon Wheel Road
Many more like it

All in the front country

All cause ecological impacts

Birdon Road
What is their impact?
What is their impact?

Deepest natural flow systems are two feet deep
And often discontinuous
Canals are 5-10 feet deep
And continuous for **miles** long
Pinelands are natural high ground
Pinelands are **natural** high ground

**But usually by only a few inches**
Thus allow water to **pass through**
Levees are 3-15 feet tall
And run unculverted for **miles** on end

Birdon Road Canal
And run unculverted for **miles** on end

Birdon Road Canal
And run unculverted for **miles** on end

**Worse yet,** these canals are connected to **tide**

Birdon Road Canal
Thus **accelerating** drainage of freshwater straight to coast

Halfway Creek Canal
And the same channel that allows freshwater to escape
Increases vulnerability to 
saltwater intrusion 
come spring
Increases vulnerability to saltwater intrusion come spring

How far?
**Saltwater Canals**

*Diagram of Saltwater Canals during the Dry Season.*

Problems include saltwater intrusion, shallow aquifer depletion, and increased wildfire severity.
Saltwater Canals

Problems include saltwater intrusion, shallow aquifer depletion, and increased wildfire severity.
Speaking of drought ...
Monthly Probability of Moderate and Severe Drought

Percentage (%) chance

Months of Year

J  F  M  A  M  J  J  A  S  O  N  D

Moderate drought

Severe drought

P4

P5
Swamp is **vulnerable** during drought

Natural **water breaks** dry up
Swamp measuring stick ...
Soil Saturation Index
for Big Cypress Nat'l Preserve
1992-present

winter dry season
summer rainy season

spring drought
most of swamp goes dry

fall flood
even pines go under

We are HERE
And wildfires are very expensive, too.
And wildfires are very expensive, too.

$50 million since 2007

cumulative cost, 2005 - present

<table>
<thead>
<tr>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
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<tbody>
<tr>
<td>Complex (est)</td>
<td>Deep</td>
<td>Jarhead</td>
<td>Huckabee</td>
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And wildfires are very expensive, too.

Yet translates into $0 for increasing swamp’s long-term natural resilience to fight wildfire

Cumulative cost, 2005 - present

$50 million since 2007
Dome Killing Wildfires
Invasion of the Sabal Palm
South Florida Parchedness Index for 4/16/15

- Big Cypress Nat'l Pres
- Everglades Nat'l Park
- WCA3a
- WCA2
- WCA1

**KEY**

- **Current**
- **Month ago**
- **Year ago**

- **Wetland water depth**
- **Feet**

- **P0 Very Saturated**
  - High ground is wet
- **P1 Saturated**
  - Everything soggy
- **P2 Flooded Peat**
  - Flooded fire breaks
- **P3 Patchy Peat**
  - Patchy fire breaks
- **P4 Dry Peat**
  - Fire breaks are dry
- **P5 Dry Refugia**
  - Severe drought

- **Low drought severity**

- **High drought severity**
Why was The Big Cypress Conserved?
Why was The Big Cypress Conserved?

Protect freshwater flows downstream estuaries
Why was The Big Cypress Conserved?

Protect freshwater flows into EVER’s western estuarine arm ...

By preserving the upstream watershed
Why was The Big Cypress **Conserved**?

**Protect** freshwater flows down-stream estuaries

**By** preserving the upstream **watershed**

**In doing so**, prevent what happened on the Park’s **east** side.
Why was The Big Cypress Conservated?

Protect freshwater flows downstream estuaries

By preserving the upstream watershed

In doing so, prevent what happened on the Park’s east side

Shark River Slough
The Big Cypress would replenish downstream estuaries with *sheetflow* through the trees.
The Big Cypress would replenish downstream estuaries with **sheetflow** through the trees.

Called strands,
The Big Cypress would replenish downstream estuaries with *sheetflow* through the trees

Called strands, uncontrolled by *gates*
The Big Cypress would replenish downstream estuaries with **sheetflow** through the trees.

Called strands, uncontrolled by **gates**.
Thus started a misconception
Thus started a misconception

We’re rain driven
Thus started a misconception

Not affected by gates
Correct Misconception with **Sophisticated** Model
Back of *Envelope* Approach
Dome depth (ft) and duration (months)
Dome depth (ft) and duration (months) \( \propto \) Direct rainfall
Dome depth (ft) and duration (months) $\propto$ Direct rainfall + Overland flow
Dome depth (ft) and duration (months) $\propto$ Direct rainfall + Overland flow + Wetland storage
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+ Wetland storage