Restoration **Rally Cry**
for the Big Cypress Swamp

Greater Everglades Ecosystem Restoration (GEER) Conference
Coral Springs, Florida April 21-24, 2015


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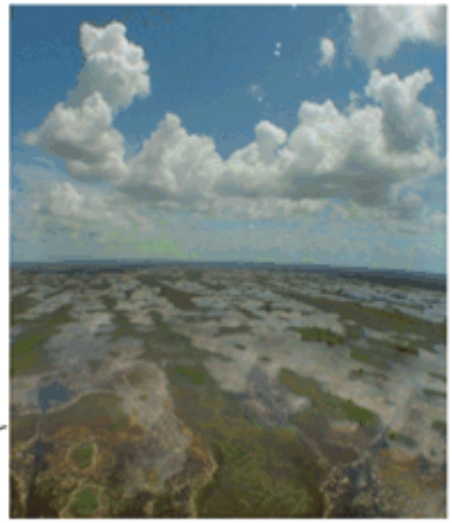
Forgotten Piece of the Puzzle



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

Upper Wagon Wheel Road

Many more like it

All in the **front** country

Birdon Road

Many more like it

All in the **front** country

All cause ecological **impacts**

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

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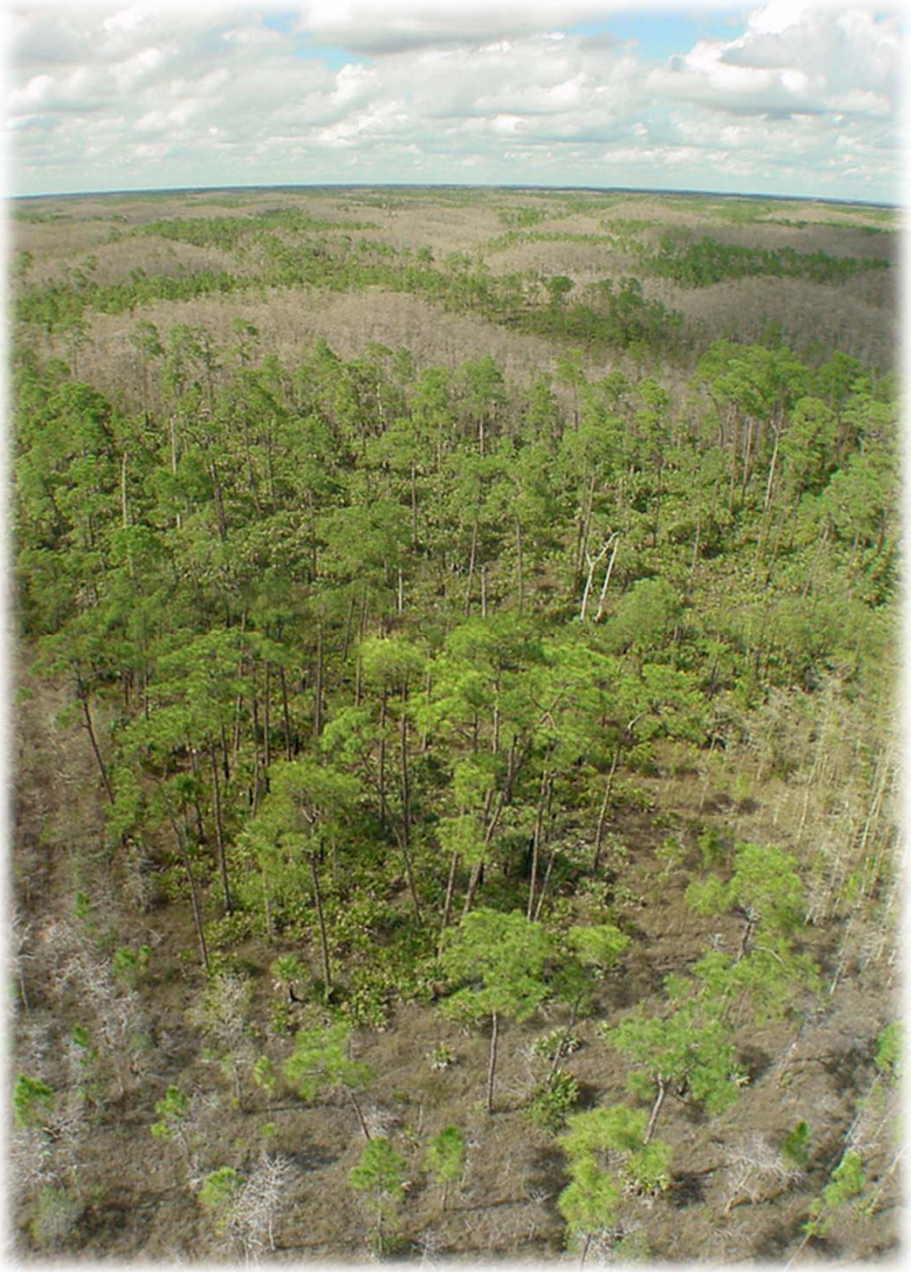
But usually by only a **few inches**

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

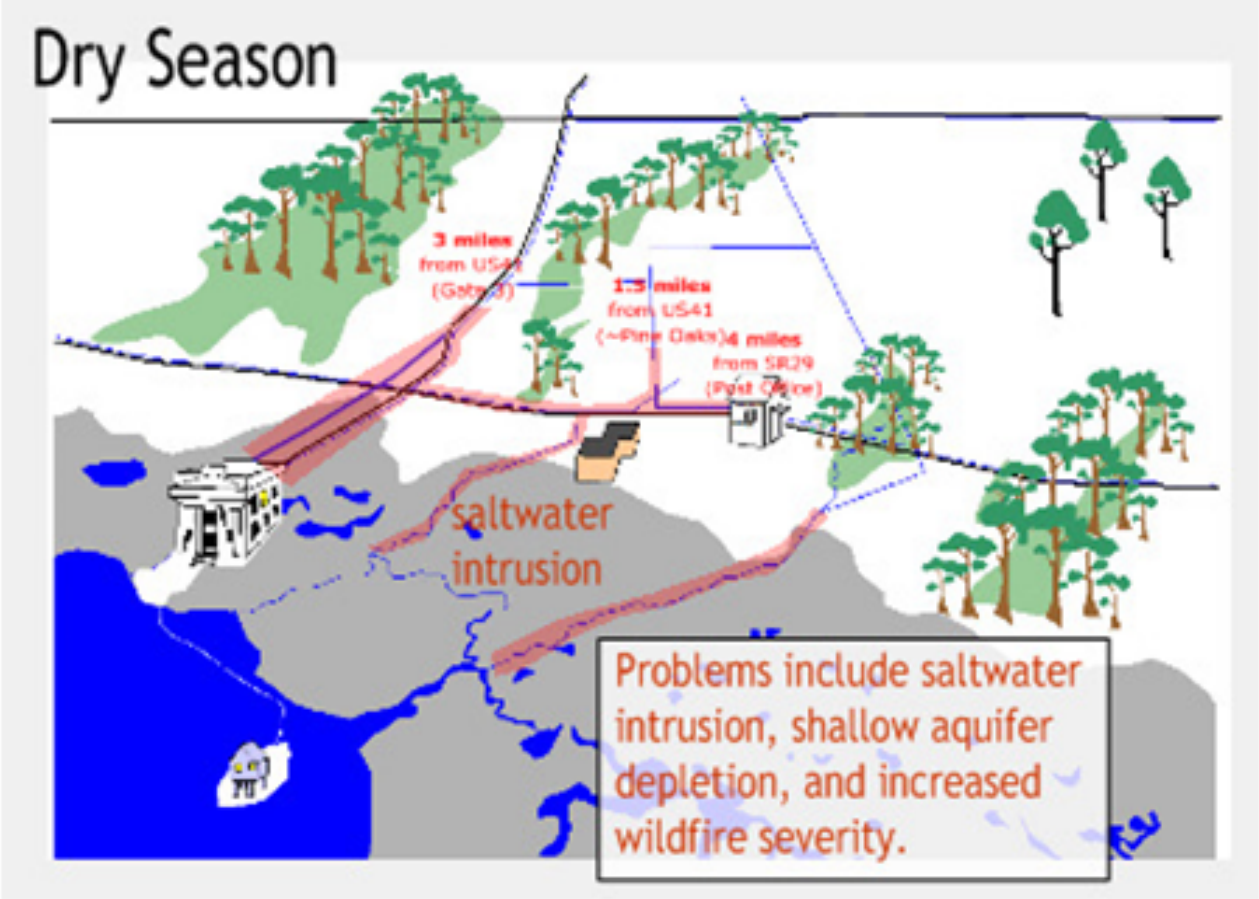
And the same channel
that allows **freshwater** to escape

Increases vulnerability to
saltwater intrusion
come spring

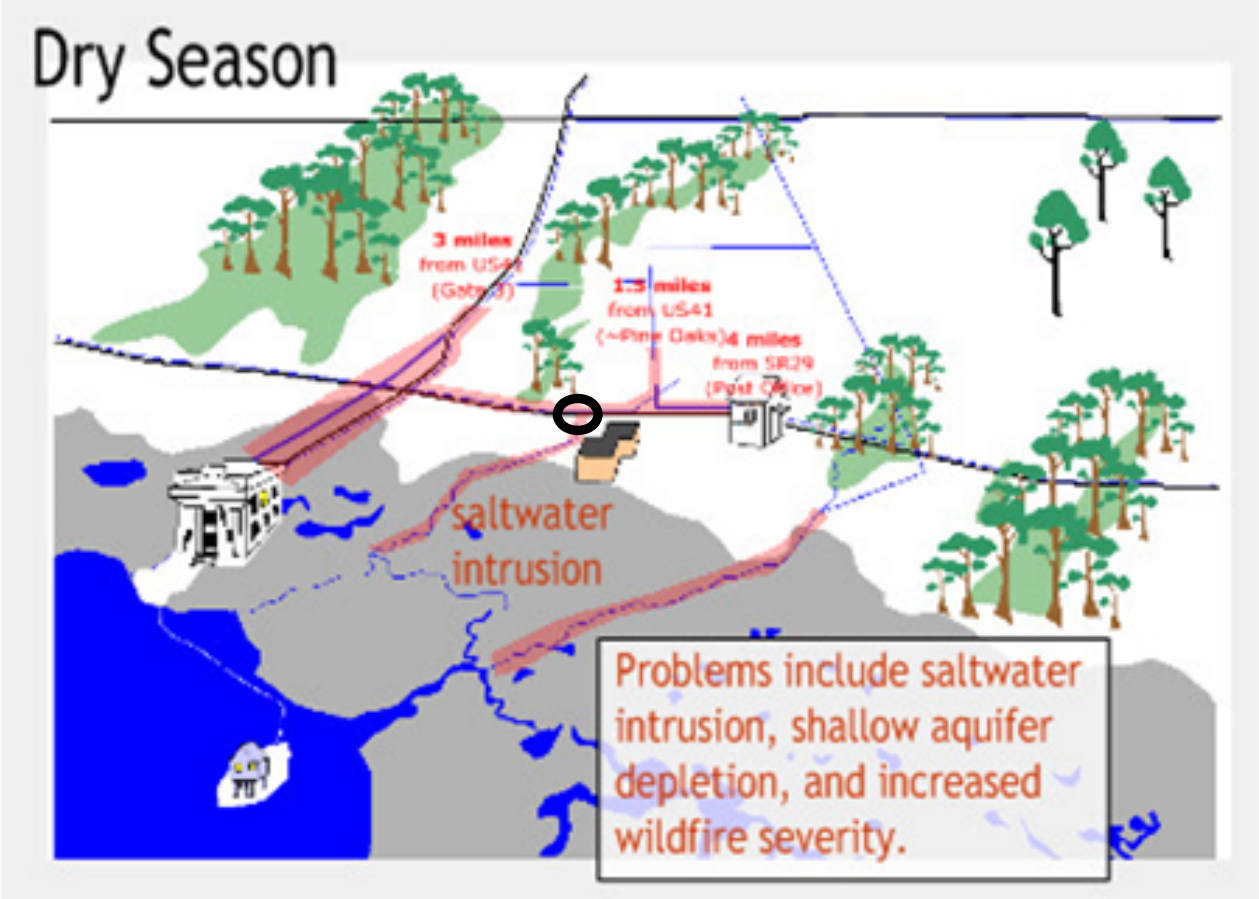
Increases vulnerability to
saltwater intrusion
come spring

How far?

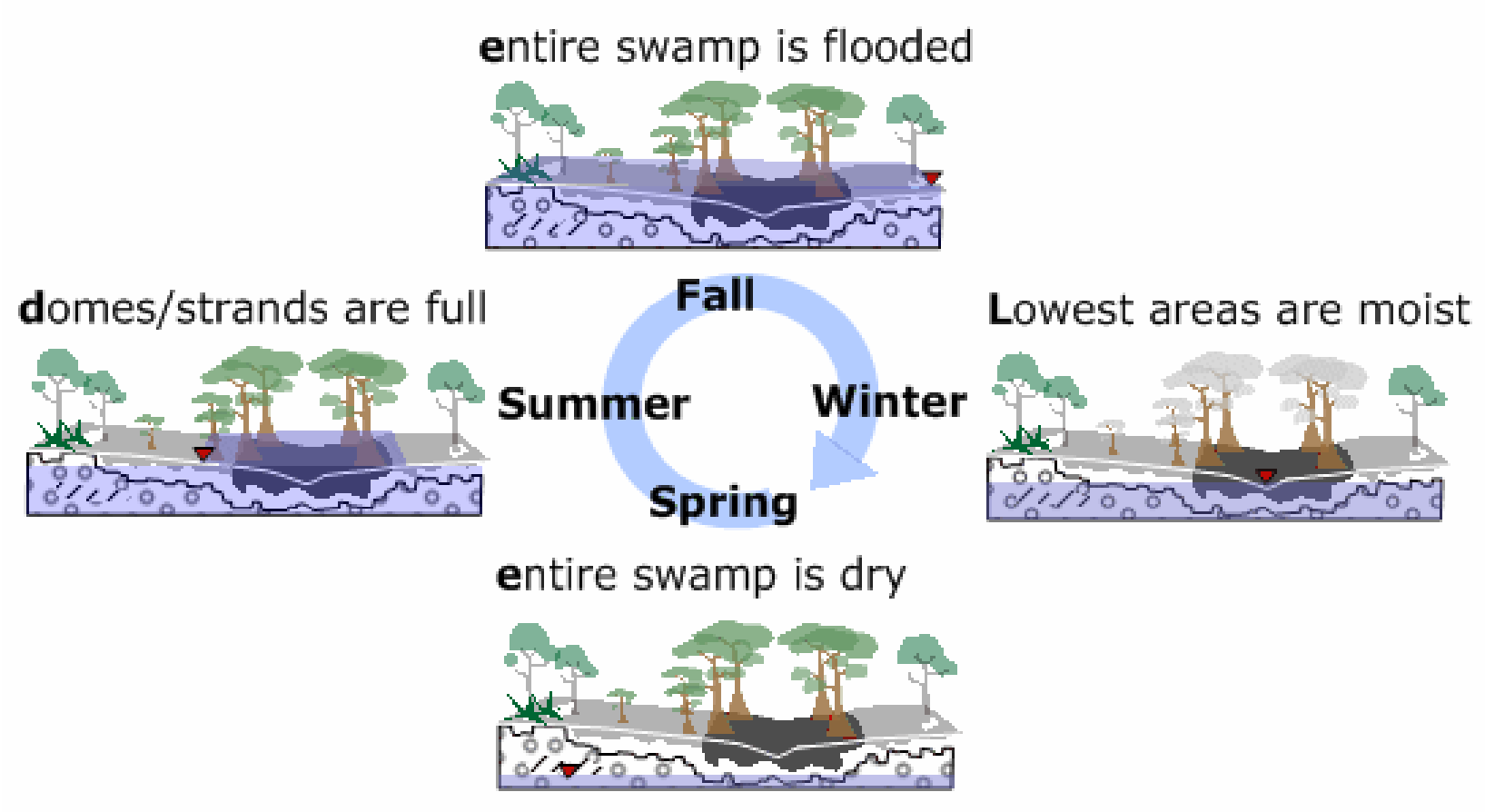
Saltwater Canals



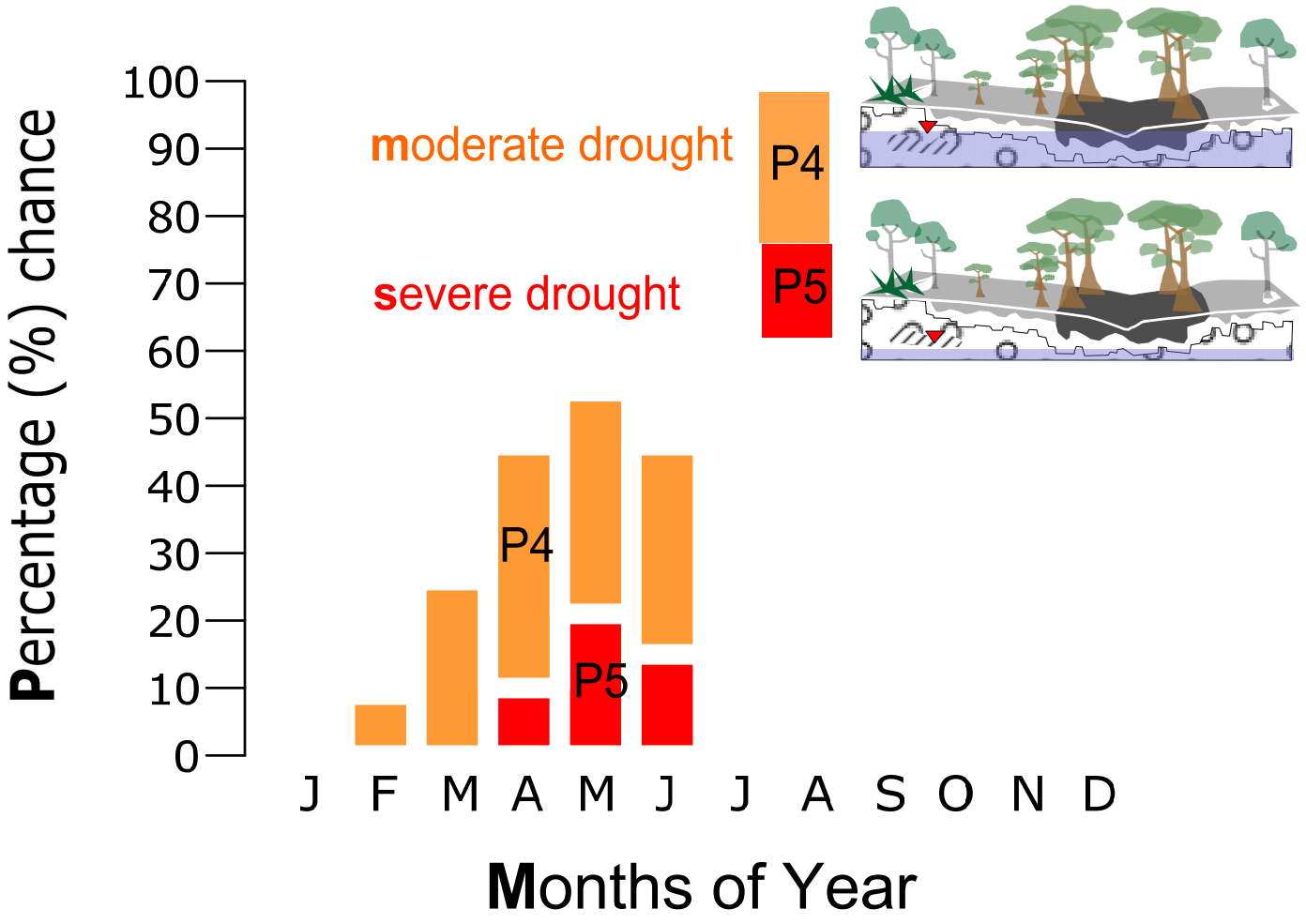
Saltwater Canals



Speaking of drought …



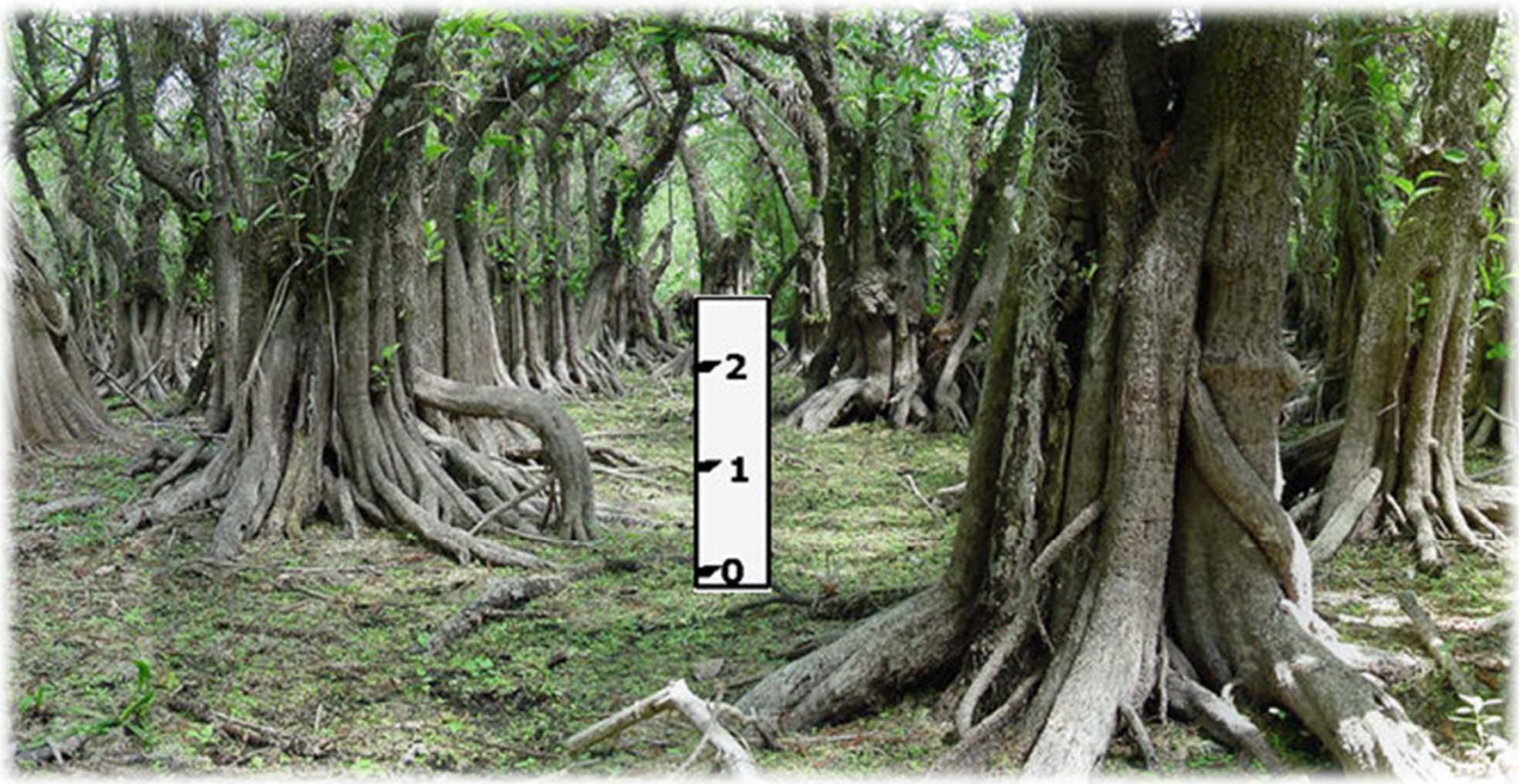
Monthly Probability of Moderate and Severe Drought

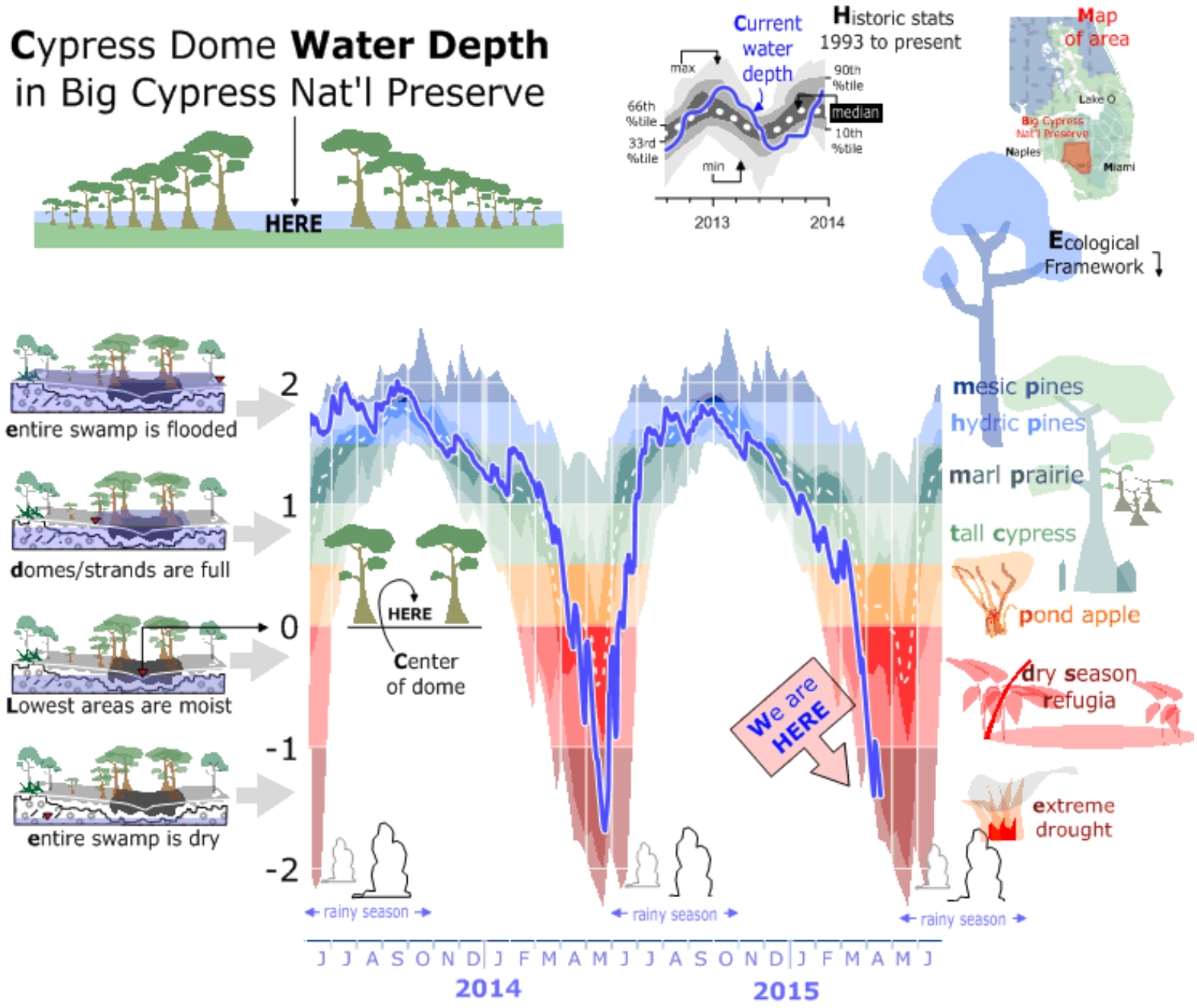


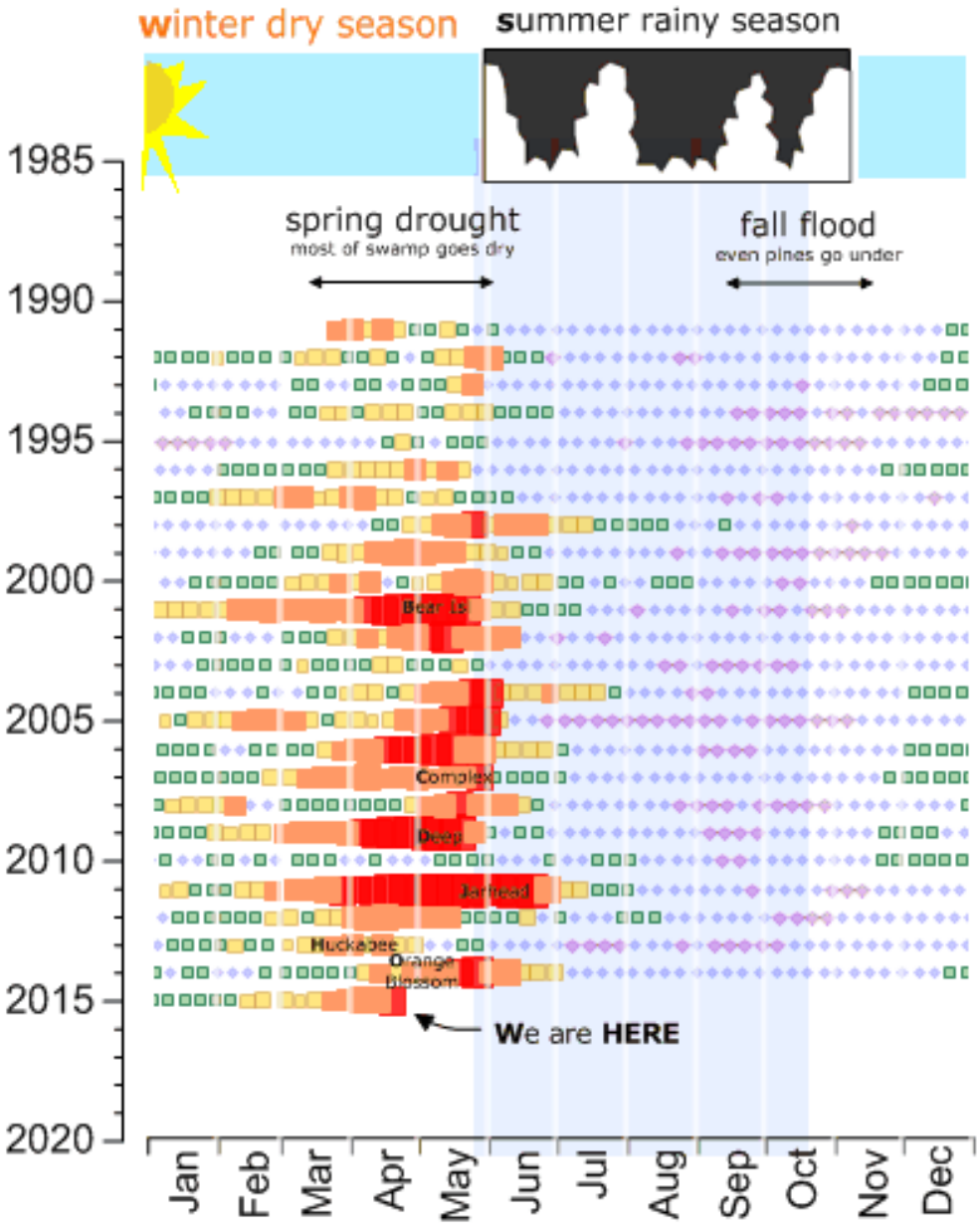
Swamp is **vulnerable** during drought

Natural **water breaks** dry up

Swamp measuring stick ...

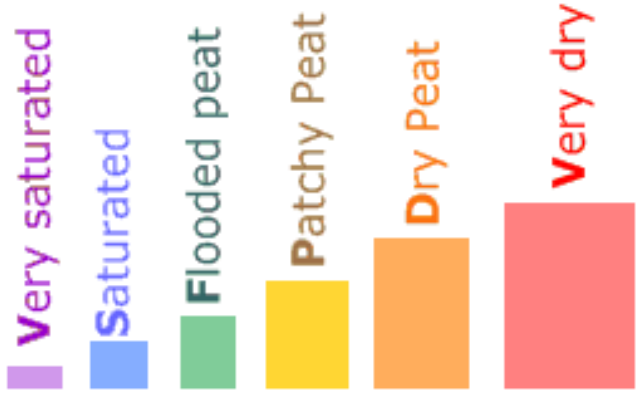



Cypress Dome Water Depth
in Big Cypress Nat'l Preserve
HERE
Current water depth
Historic stats 1993 to present
max
90th %tile
66th %tile
median
33rd %tile
10th %tile
min
2013
2014
Map of area
Lake O
Big Cypress Nat'l Preserve
Naples
Miami
Ecological Framework
entire swamp is flooded
domes/strands are full
Lowest areas are moist
entire swamp is dry
2
1
0
-1
-2
HERE
Center of dome
We are HERE
mesic pines
hydric pines
marl prairie
tall cypress
pond apple
dry season refugia
extreme drought
rainy season
rainy season
rainy season
J J A S O N D J F M A M J J A S O N D J F M A M J
2014
2015

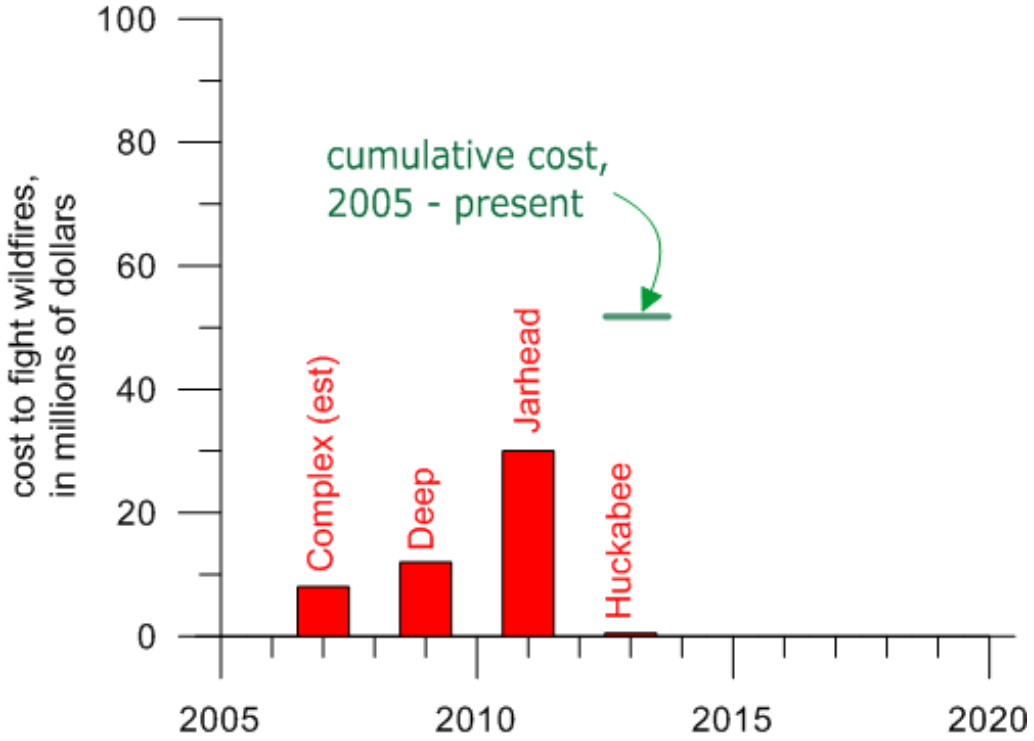


Soil Saturation Index

for Big Cypress Nat'l Preserve
1992-present



And wildfires are <u>very</u> **expensive,** too.



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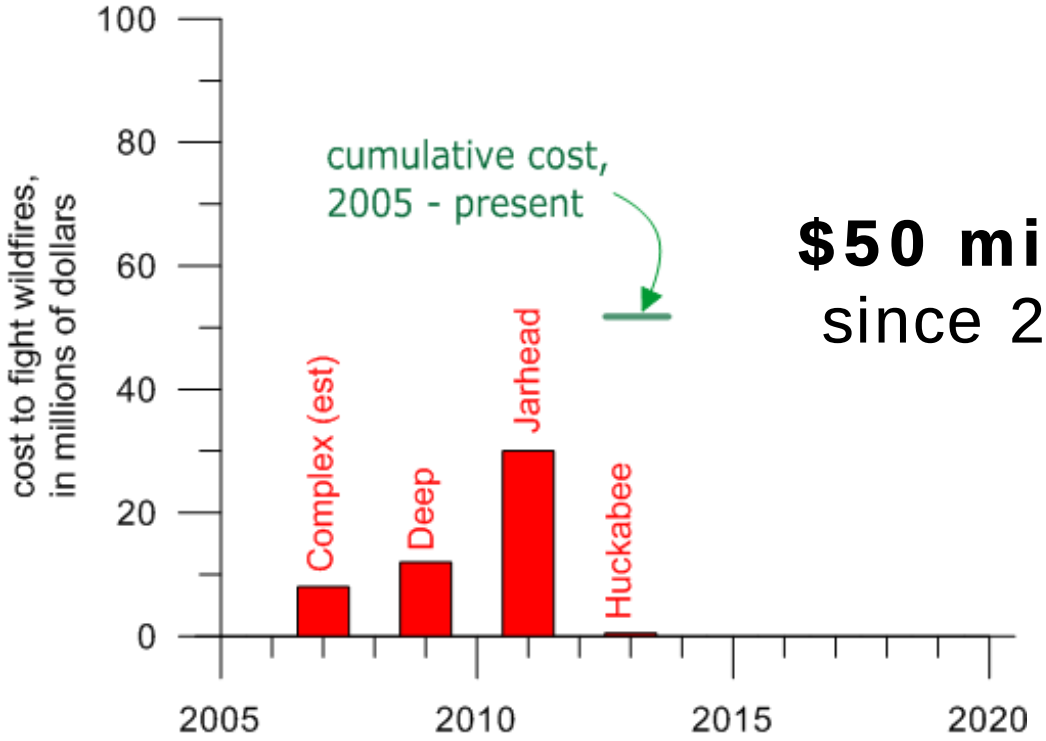

$50 million since 2007

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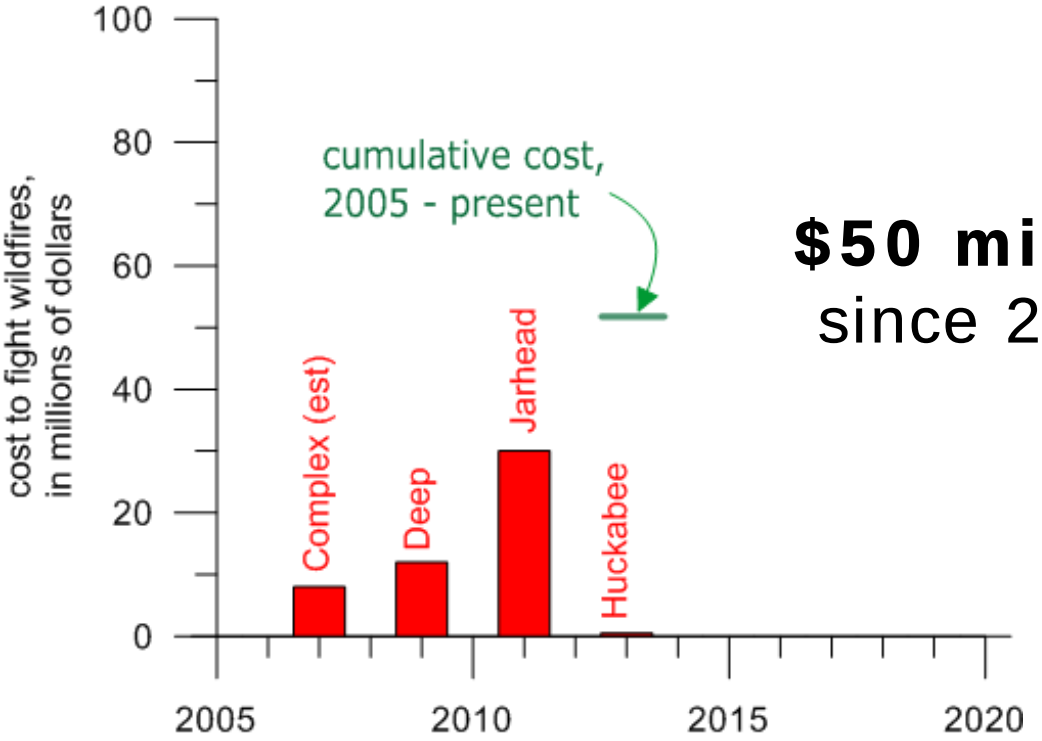
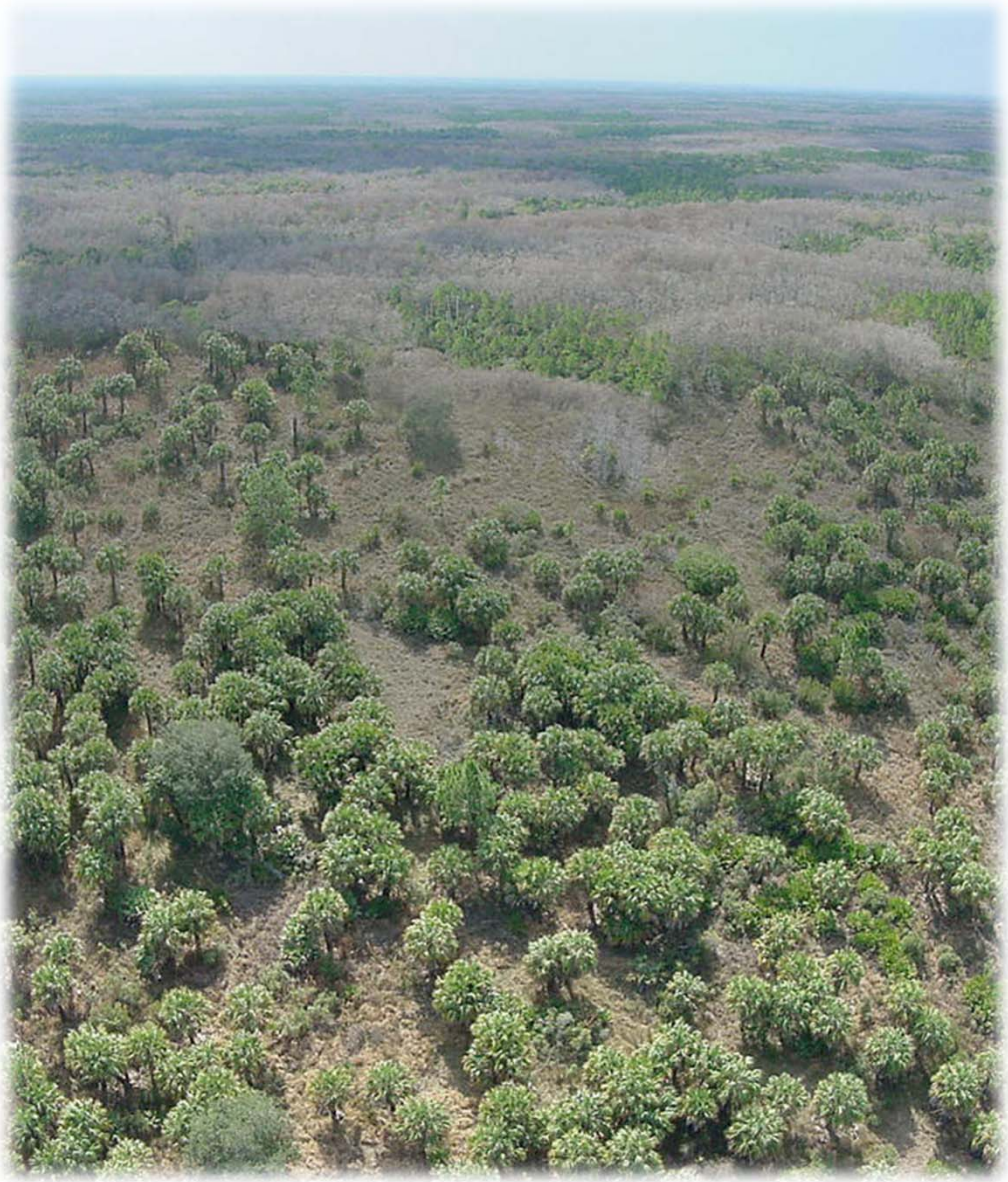


$50 million
since 2007

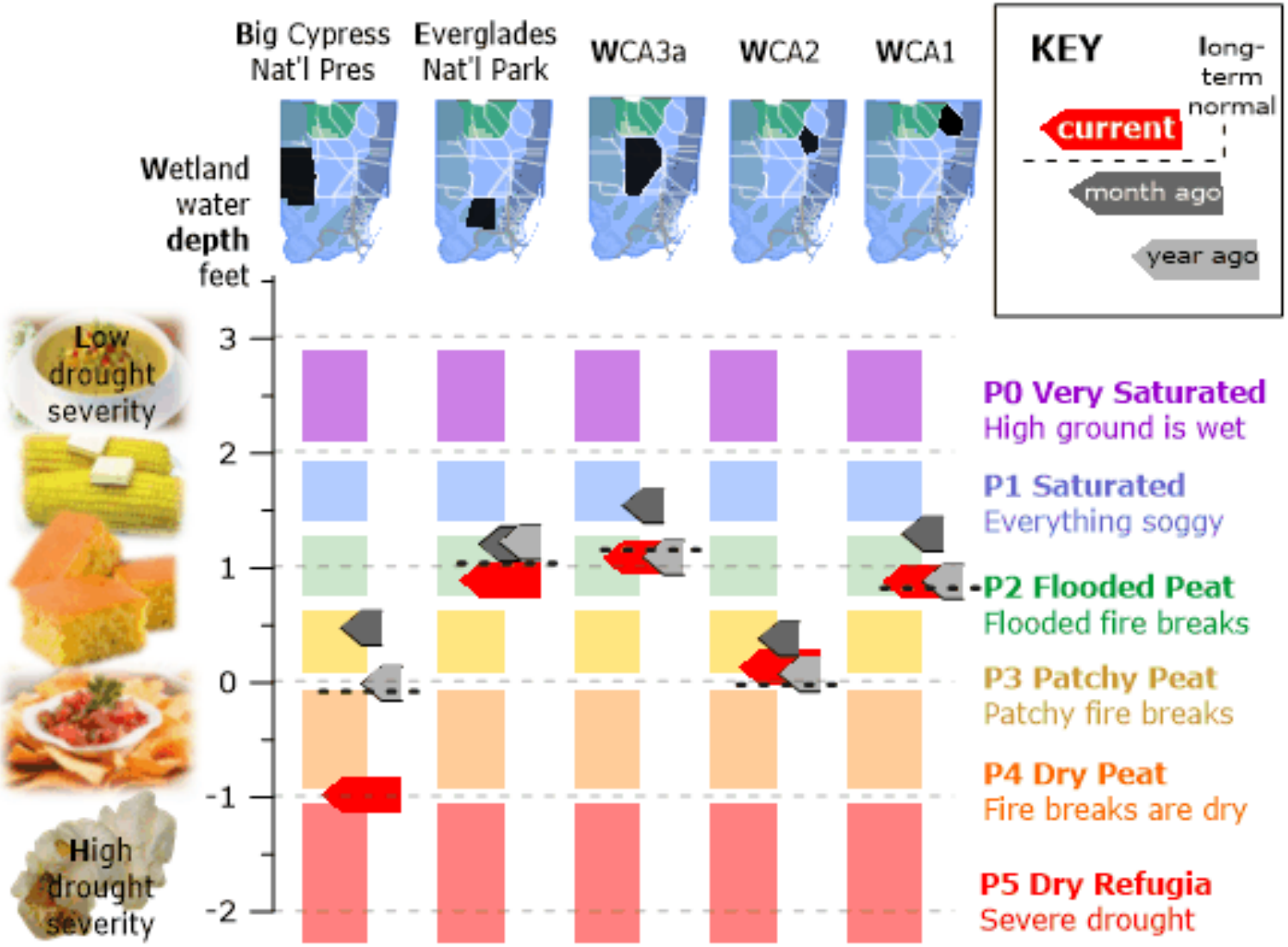
Yet translates into **$0**
for increasing swamp's
long-term <u>natural resilience</u>
to fight wildfire

Dome **Killing** Wildfires

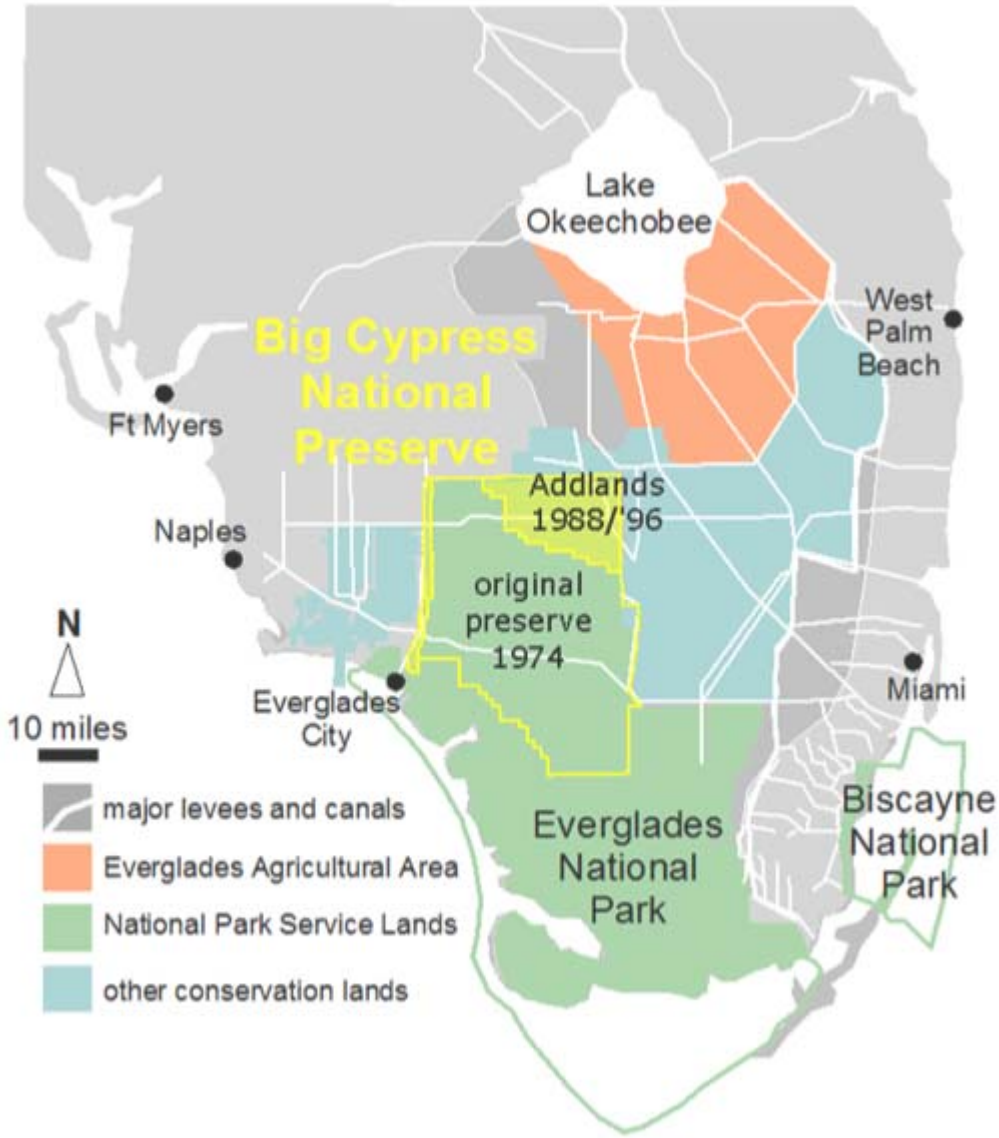
Invasion of the Sabal Palm



South Florida **Parchedness** Index for 4/16/15

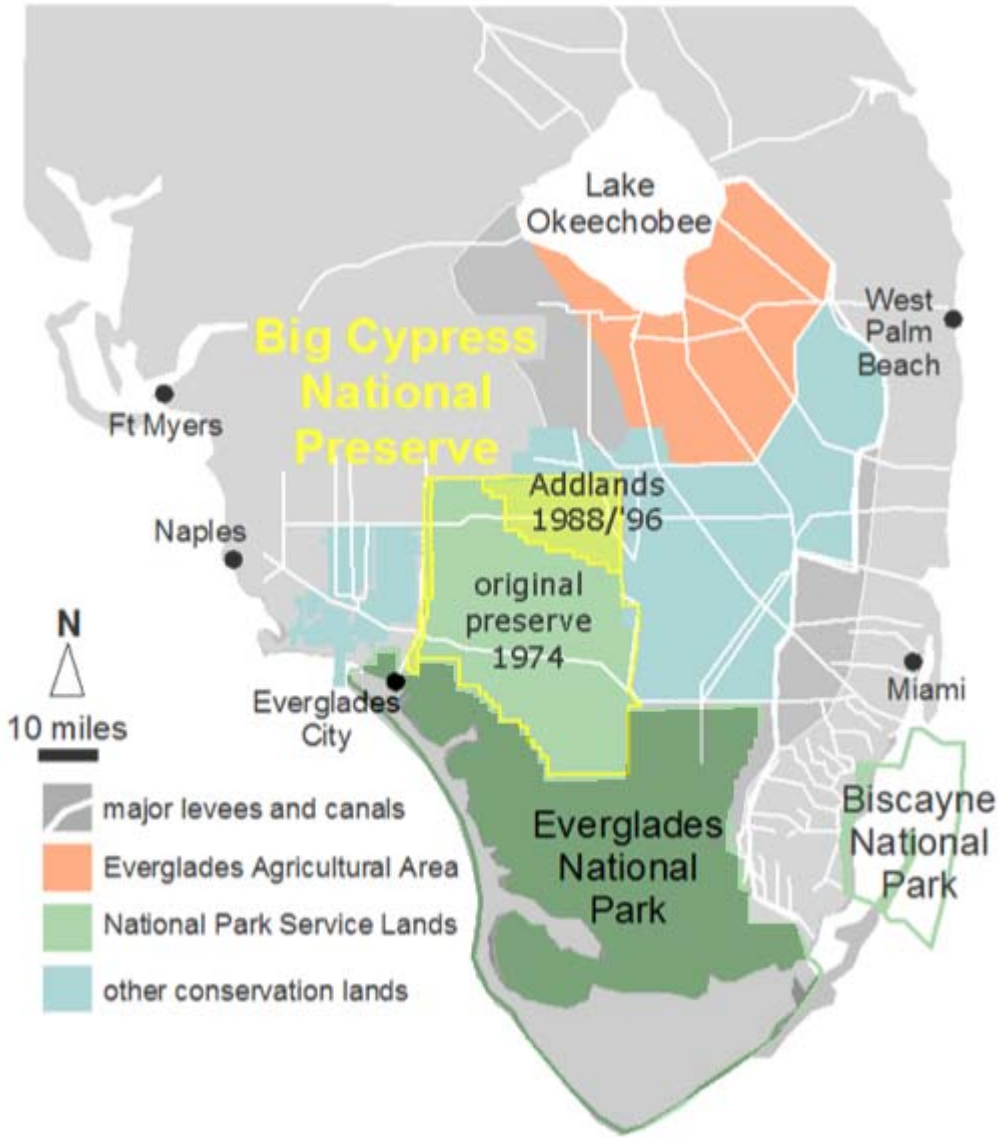


Why was The Big Cypress **Conserved?**



Why was The Big Cypress **Conserved?**

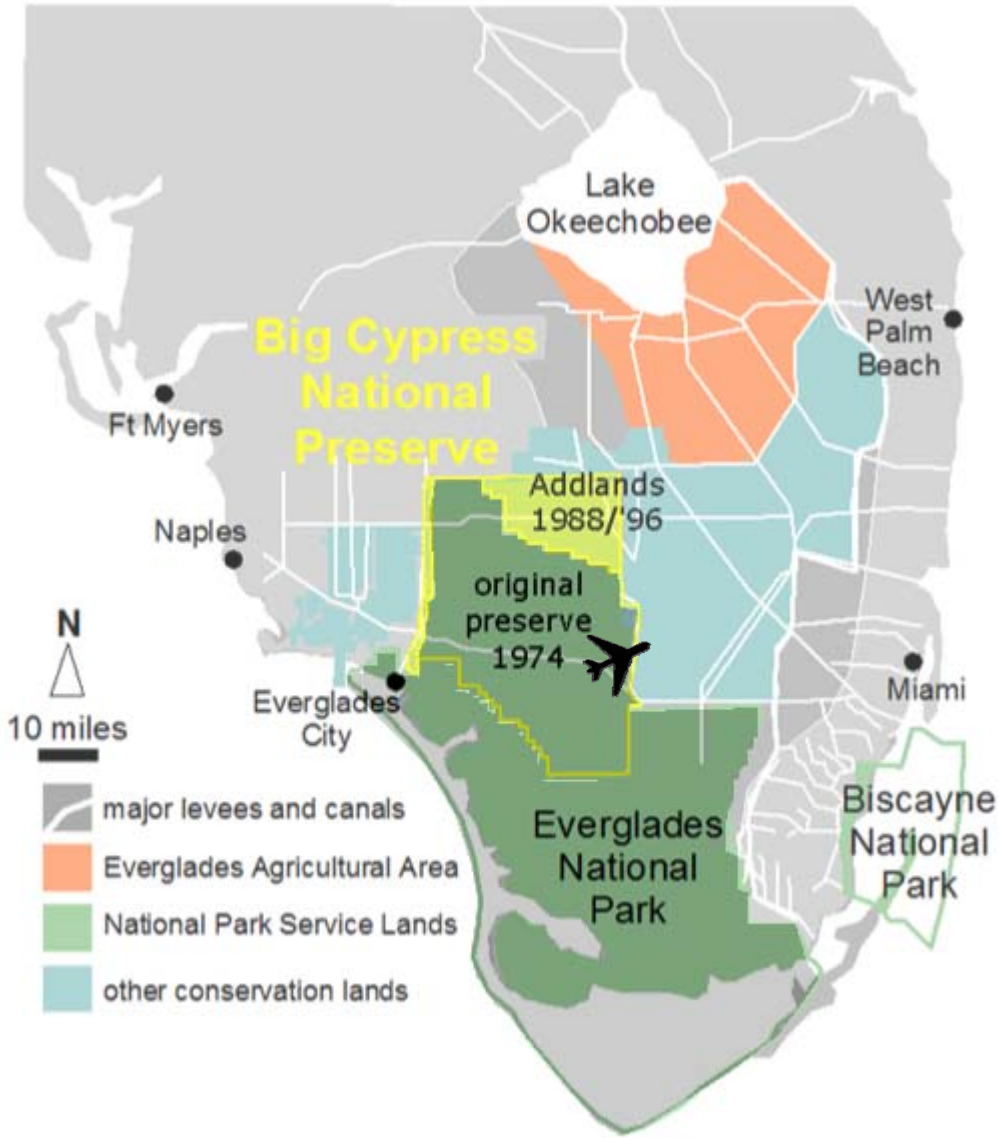
Protect freshwater flows down-stream estuaries



Why was The Big Cypress **Conserved?**

Protect freshwater flows into EVER's western **estuarine** arm …

By preserving the upstream **watershed**



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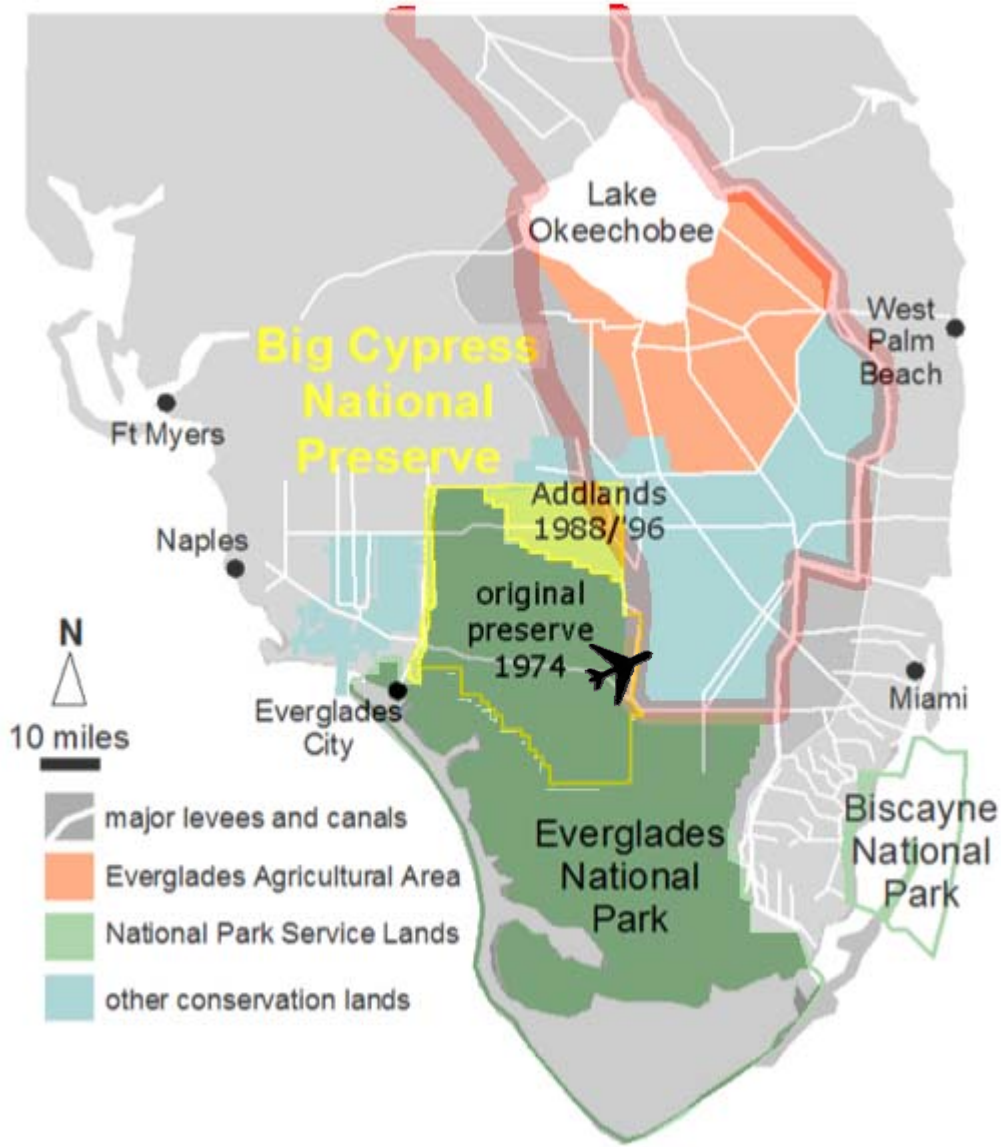

In doing so, prevent what happened on the Park's **east** side

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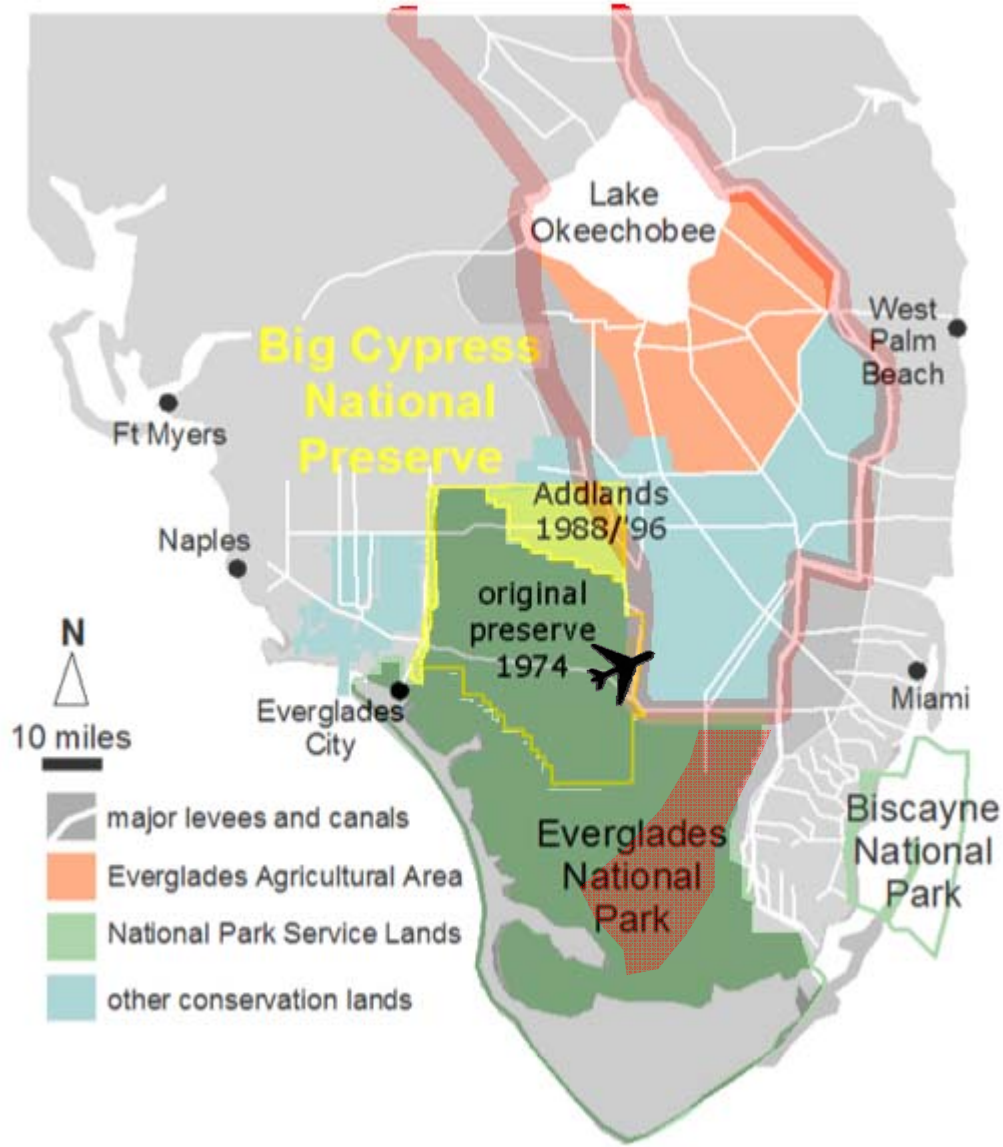

In doing so, prevent what happened on the Park's **east** side

Shark River **Slough**

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

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Called strands,

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Called strands, uncontrolled by **gates**

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Called strands, uncontrolled by **gates**

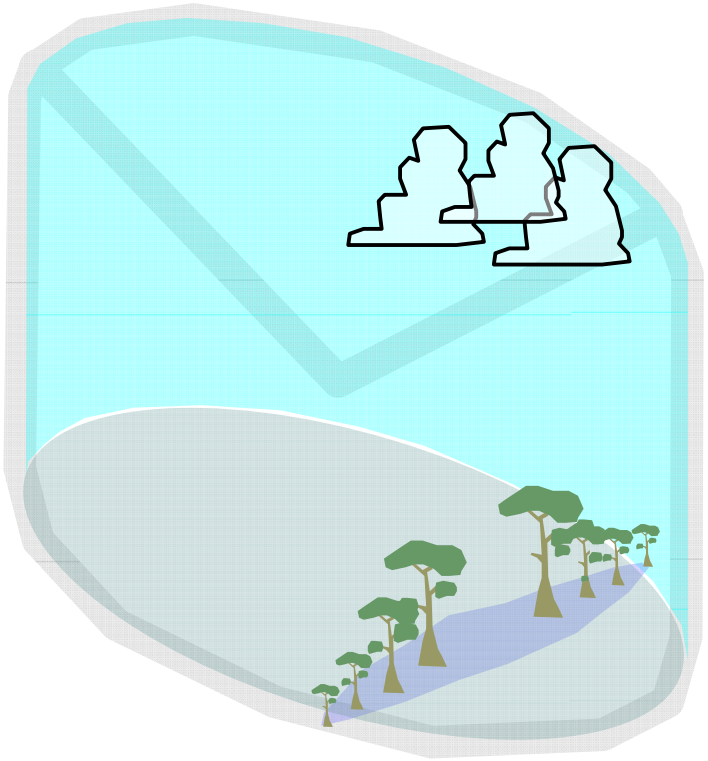
Thus started a **misconception**

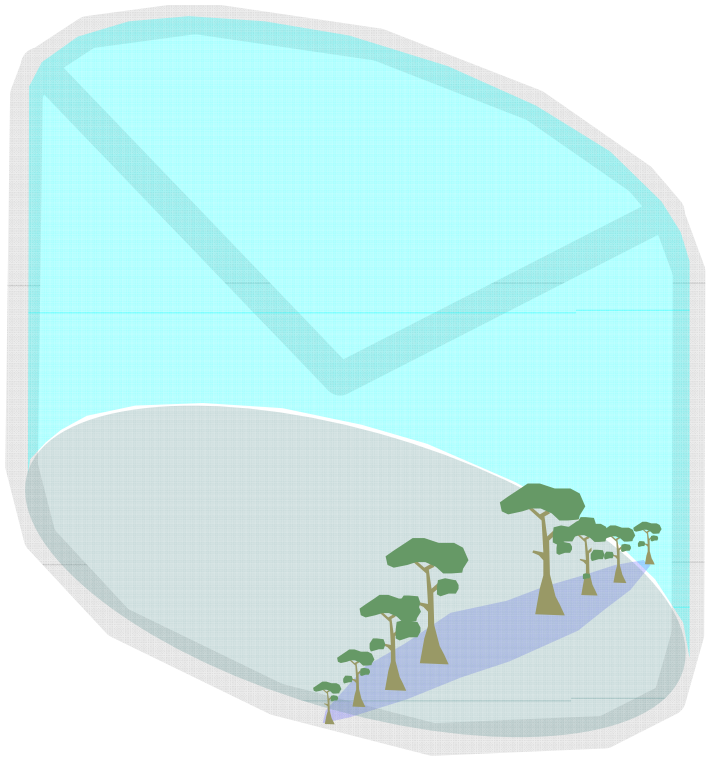
Thus started a **misconception**

Thus started a **misconception**

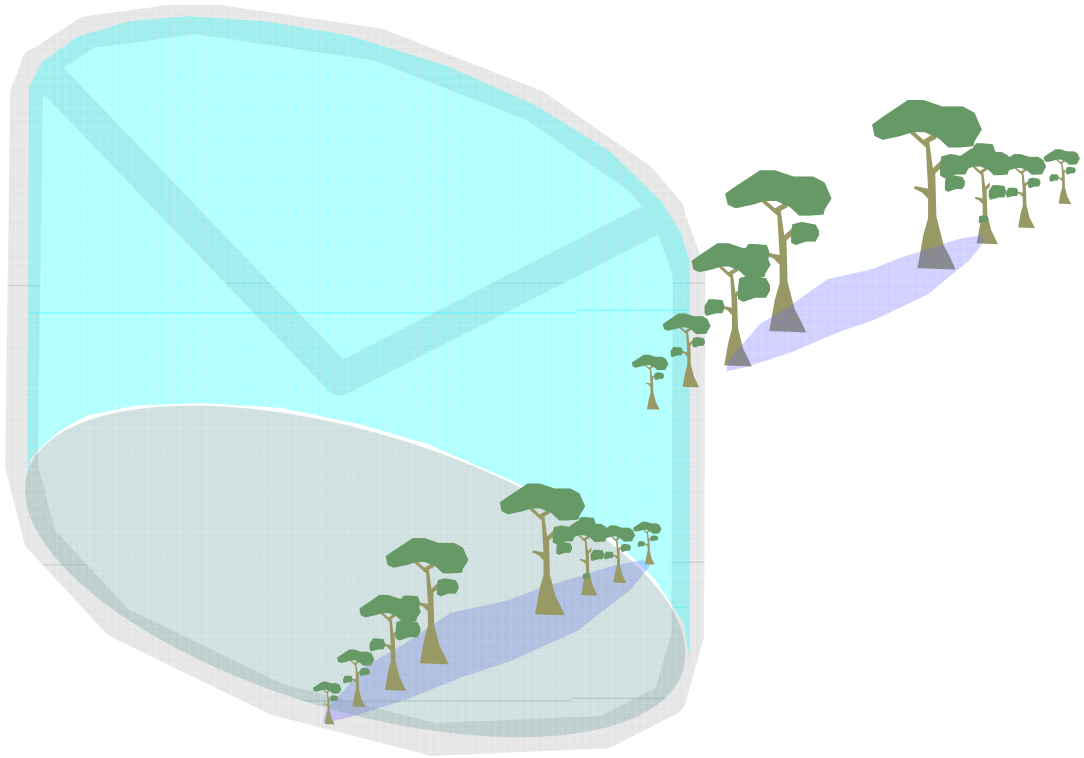
Not affected by **gates**

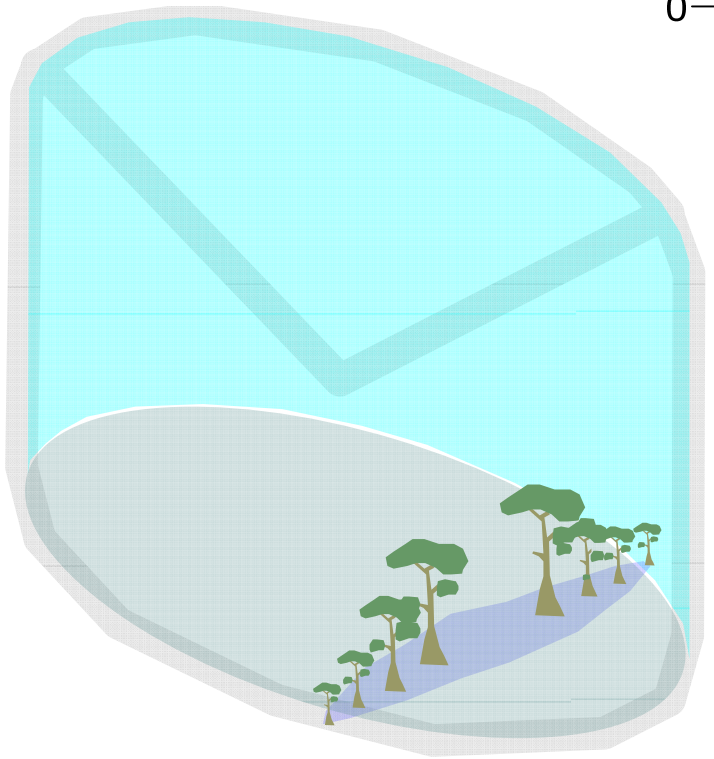
Correct Misconception with **Sophisticated** Model

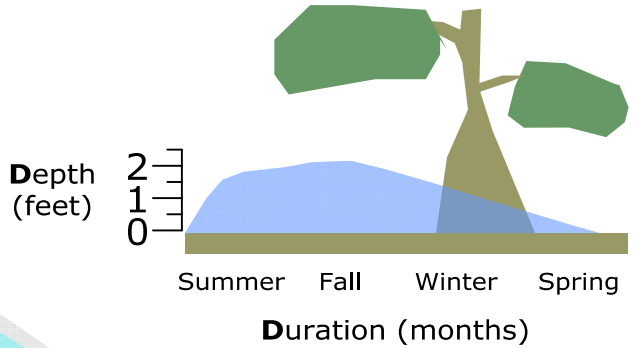


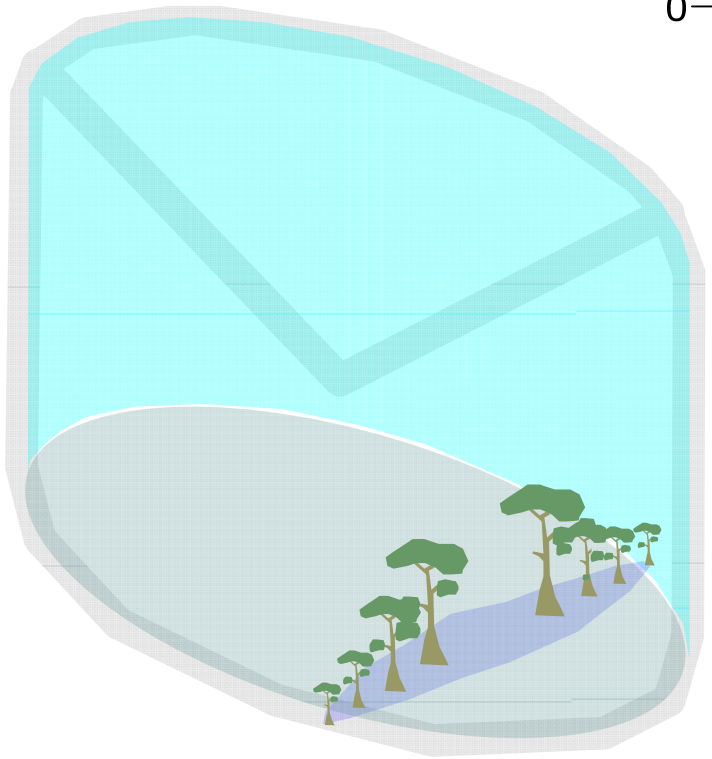


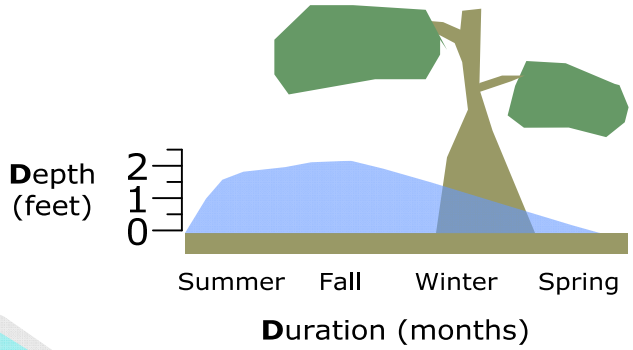
Back of **Envelope** Approach



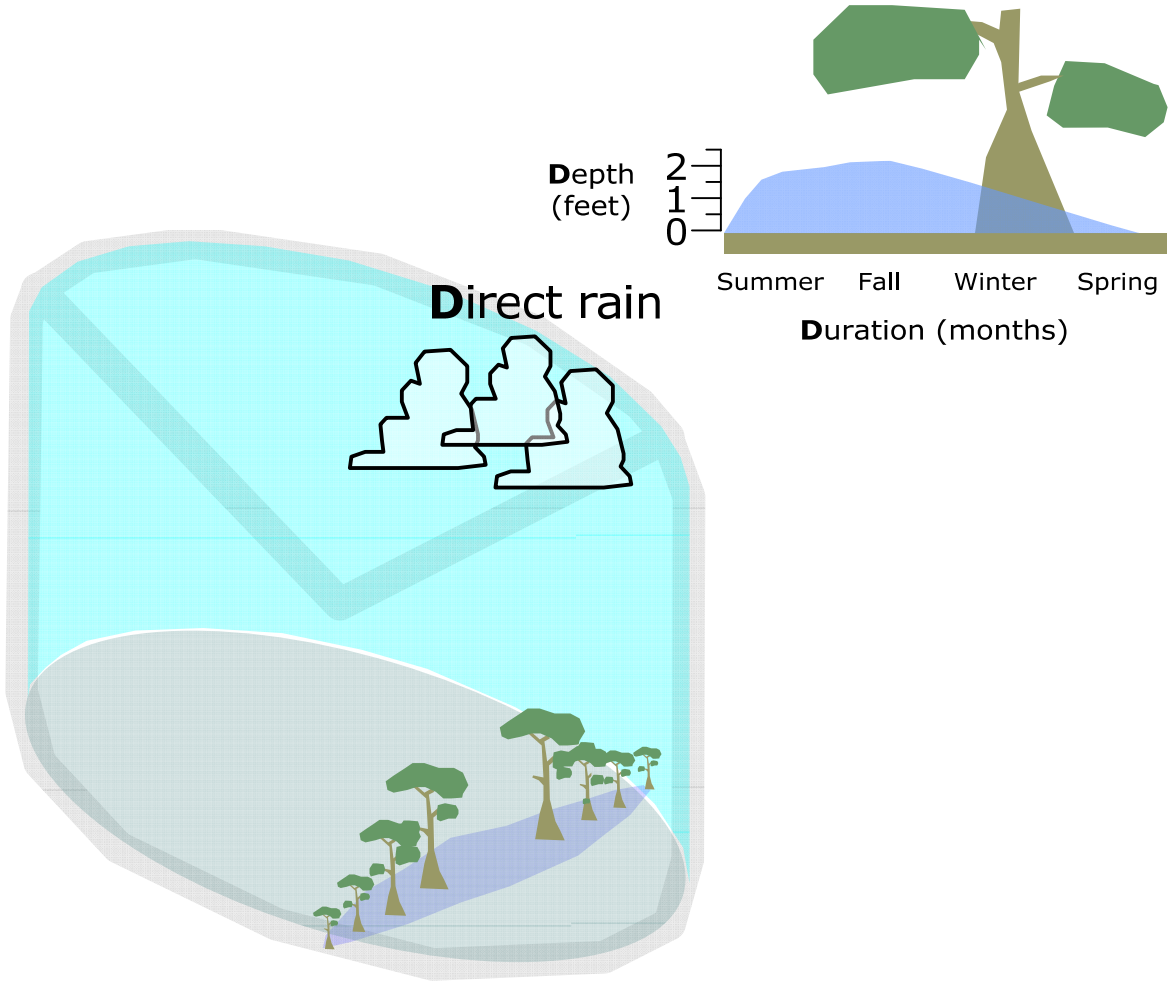



Depth
(feet)
2
1
0
Summer
Fall
Winter
Spring
Duration (months)

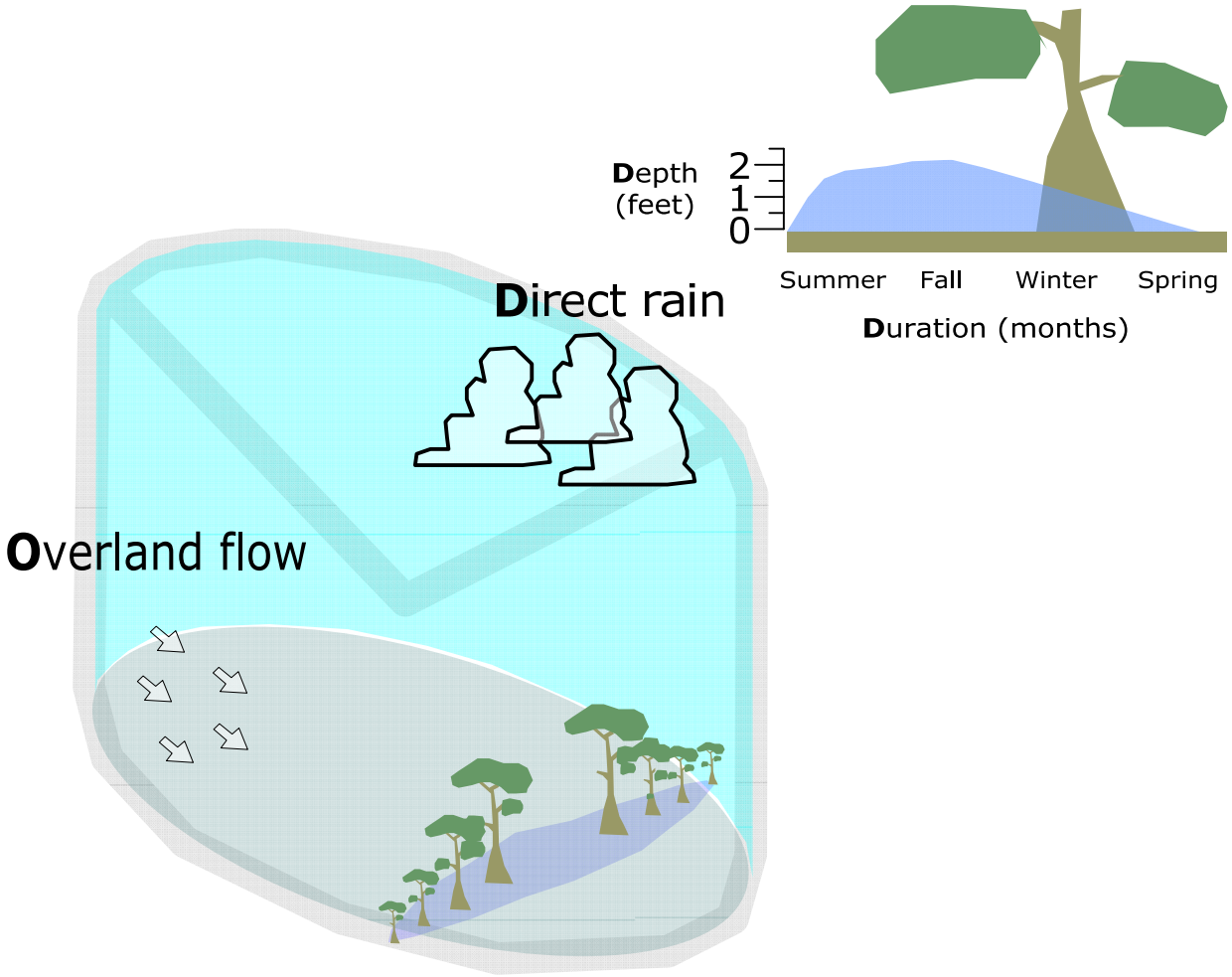




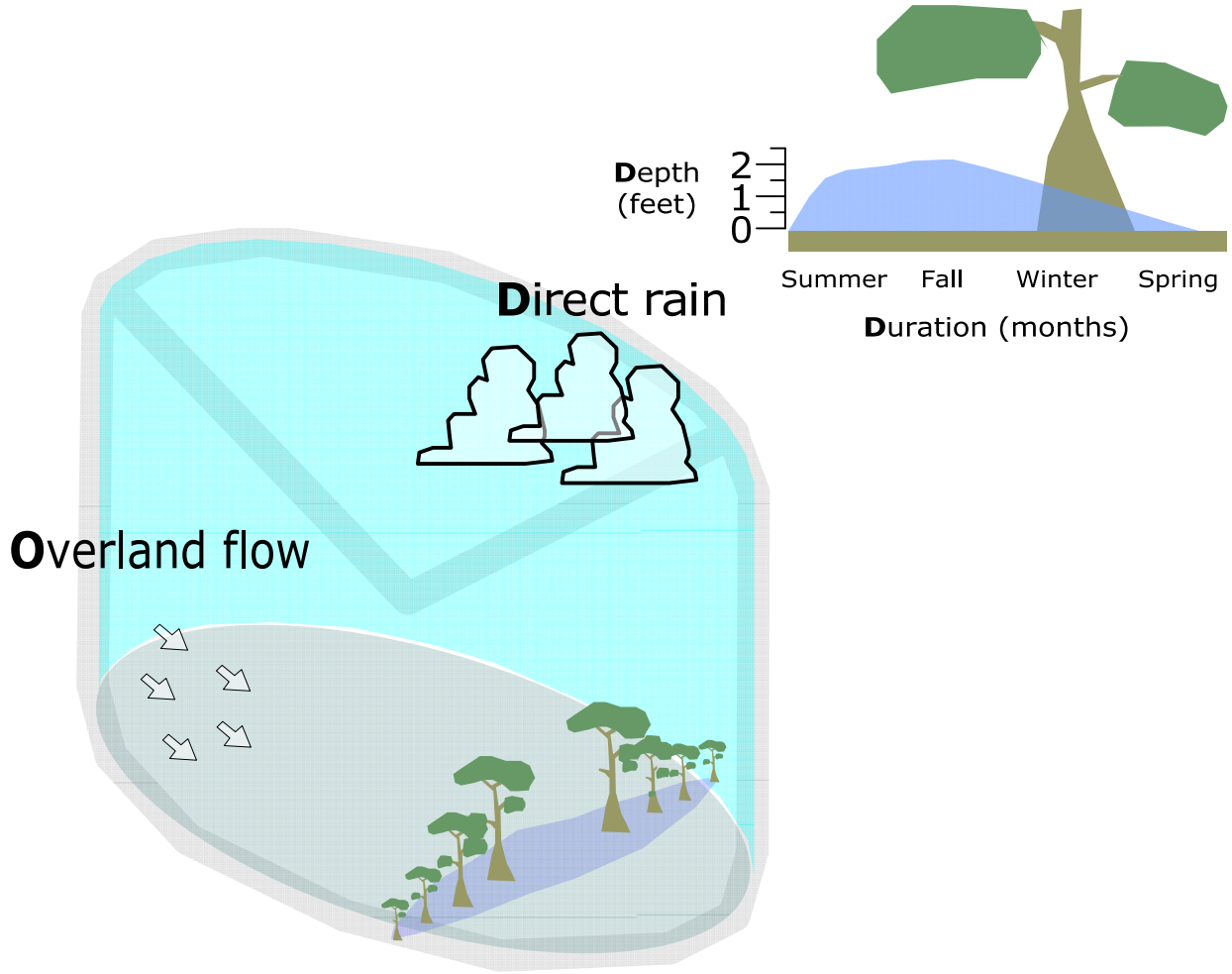
Dome depth (ft) and duration (months)



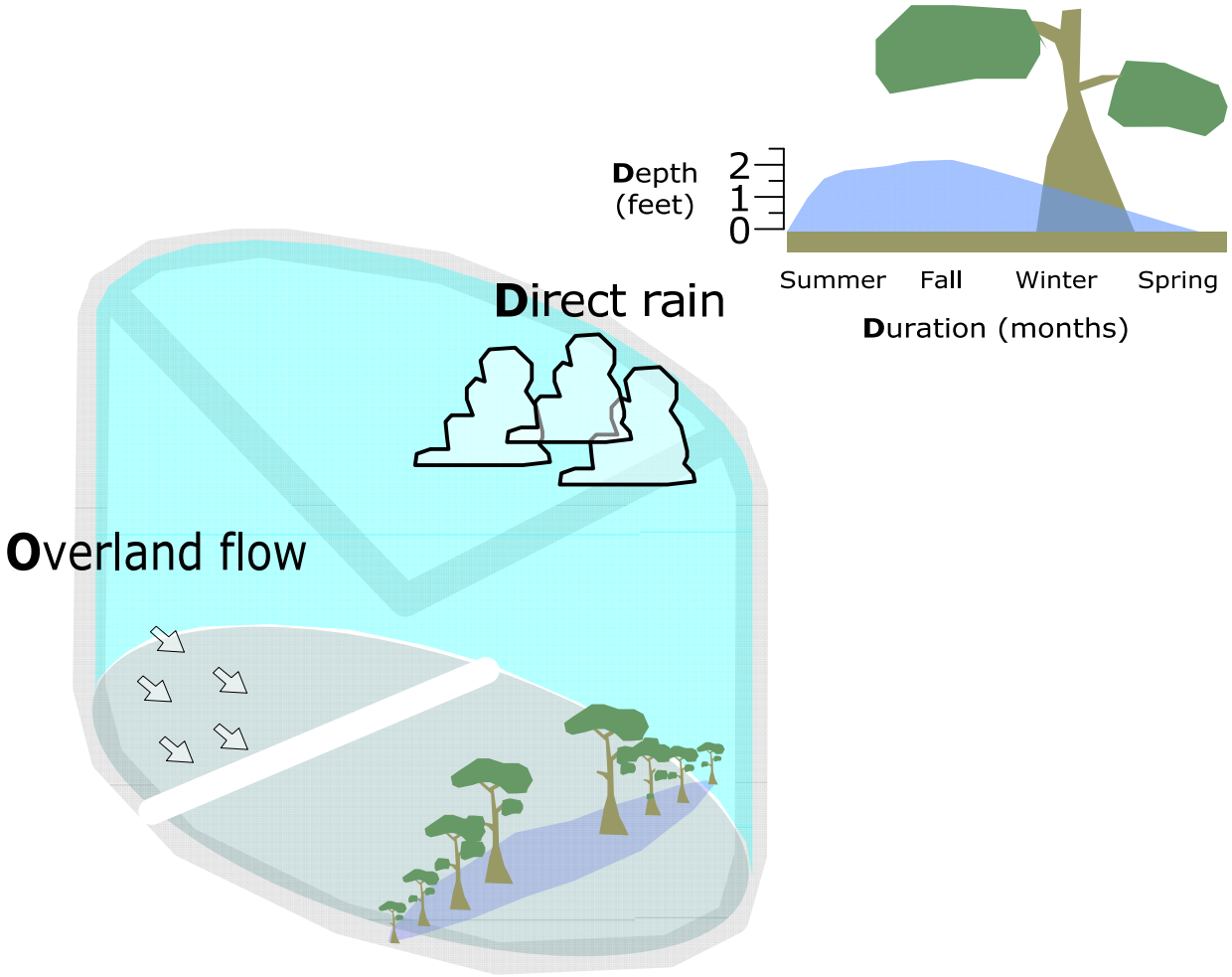
Dome $_{\text{depth (ft) and duration (months)}}$ $\propto$ Direct rainfall



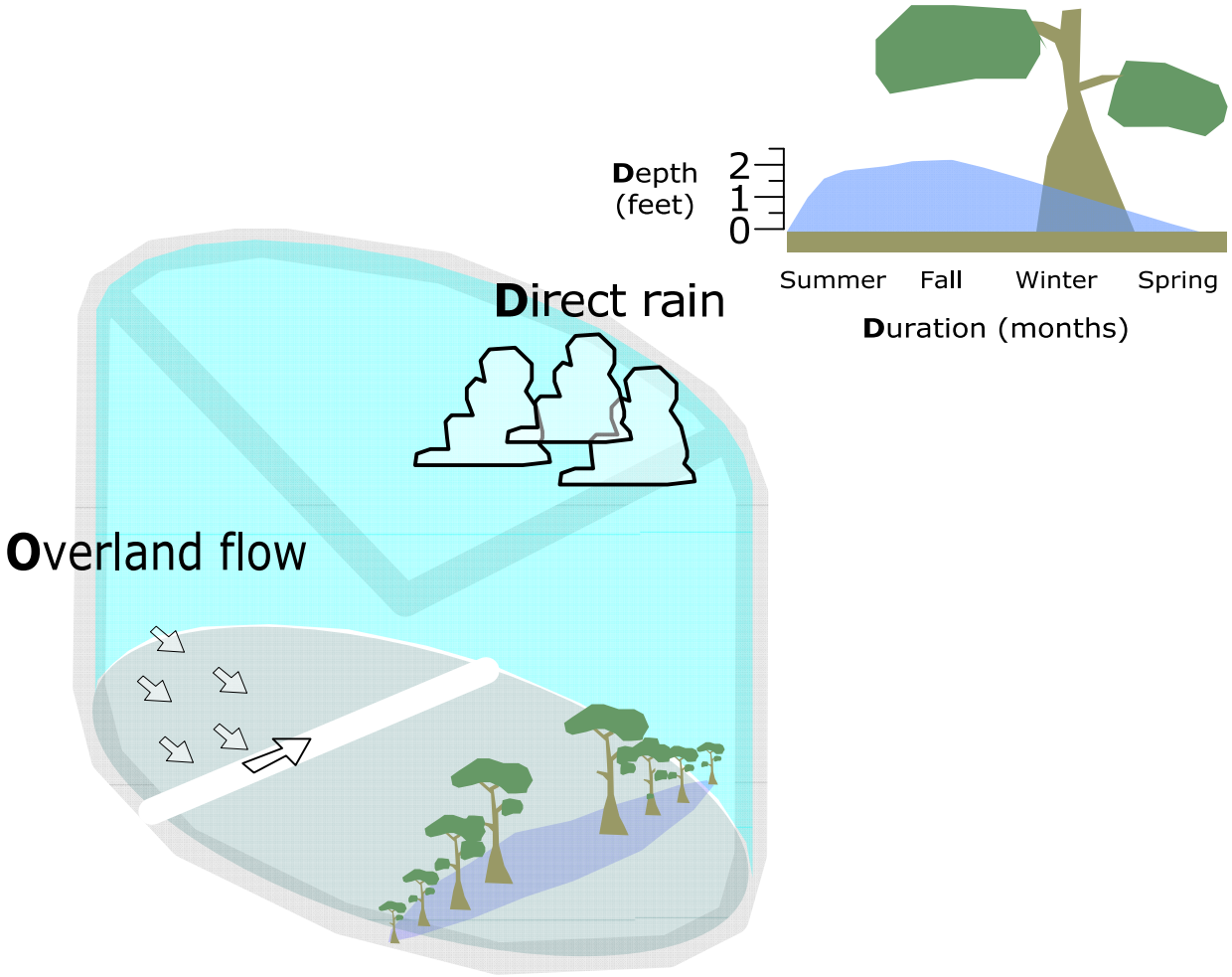
Dome $_{\text{depth (ft) and duration (months)}}$ $\propto$ Direct rainfall + Overland flow



$$\text{Dome}_{\text{depth (ft) and duration (months)}} \propto \text{Direct rainfall} + \text{Overland flow} + \text{Wetland storage}$$



Dome $_{\text{depth (ft) and duration (months)}}$ $\propto$ Direct rainfall + ~~Overland flow~~ + Wetland storage



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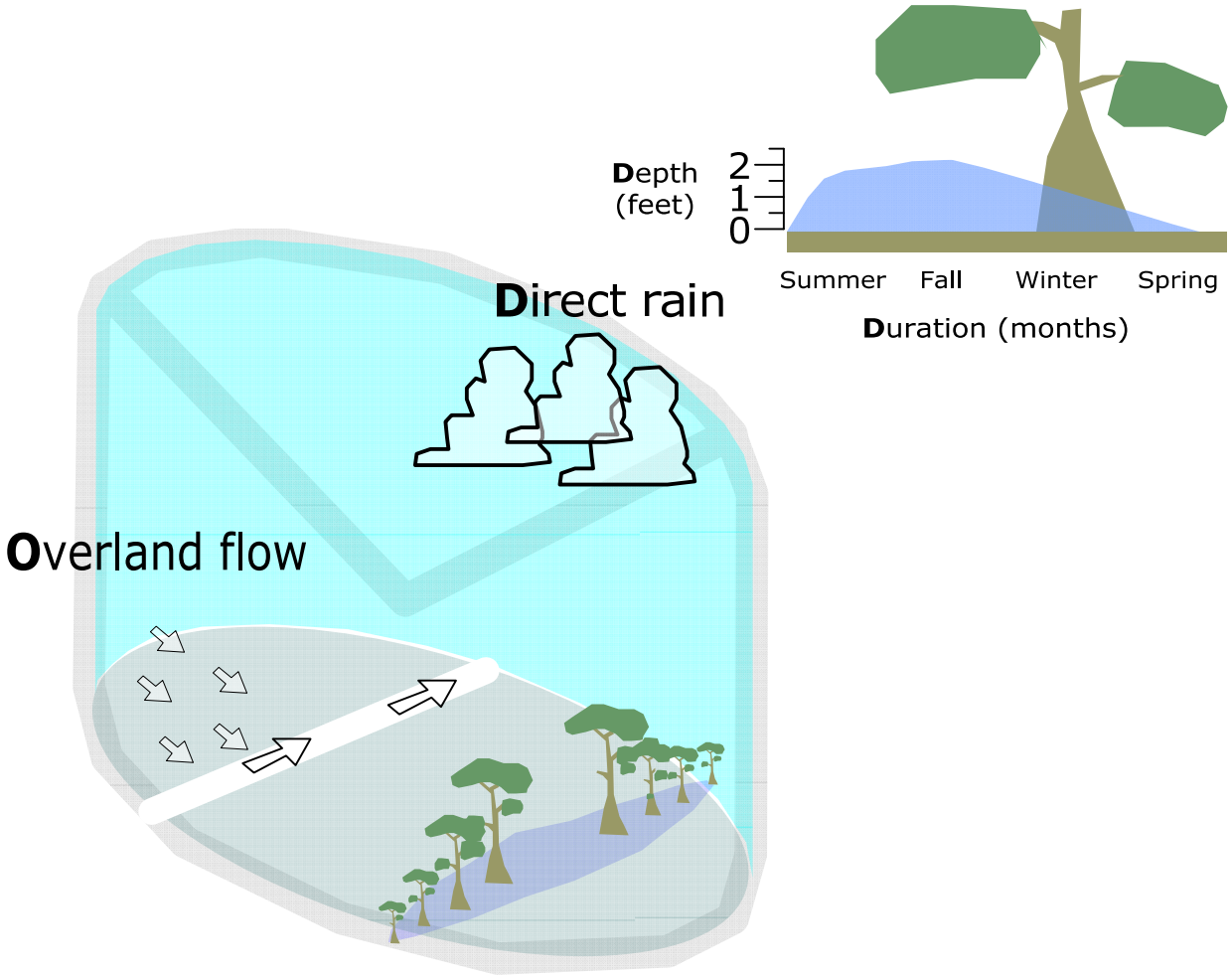

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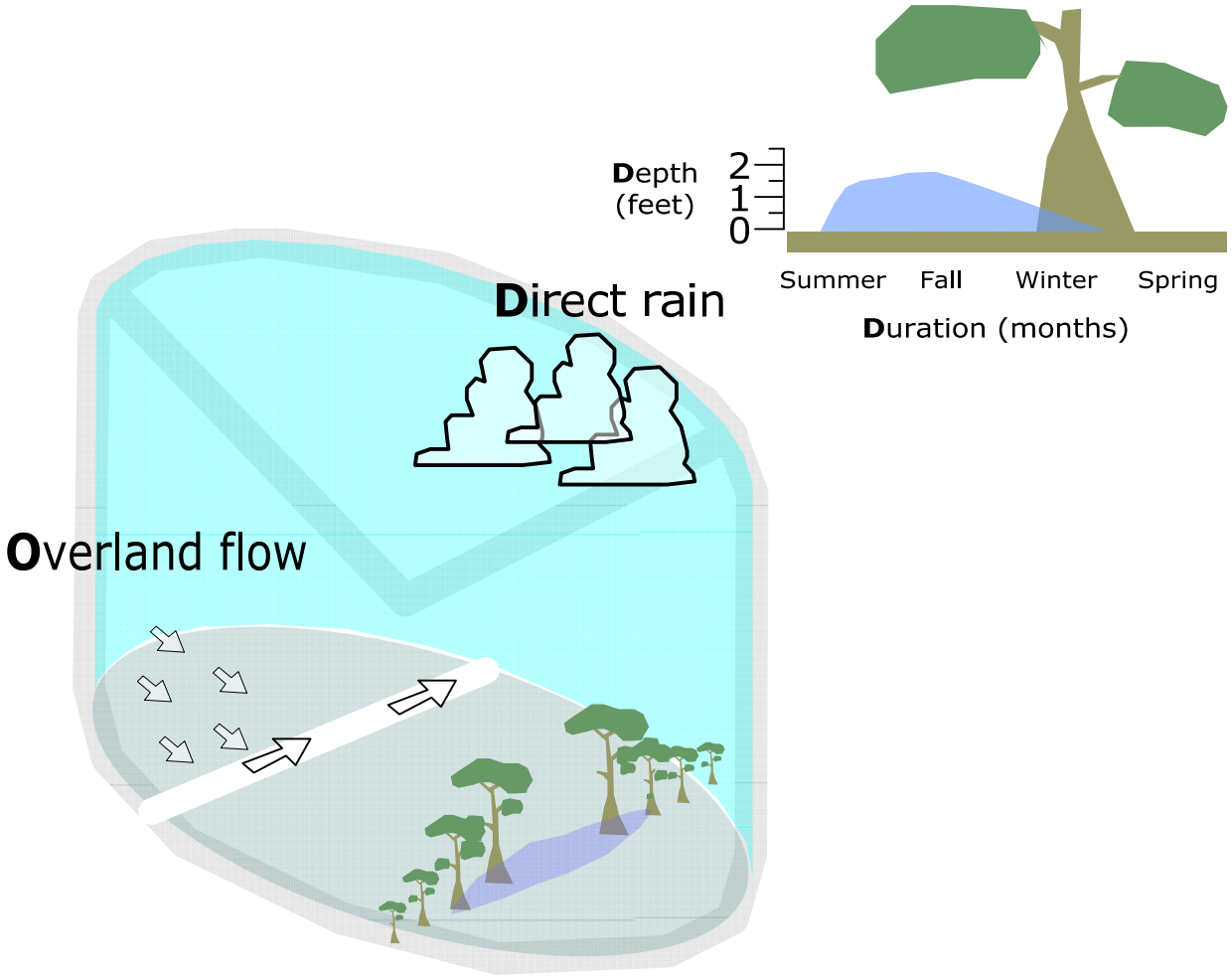

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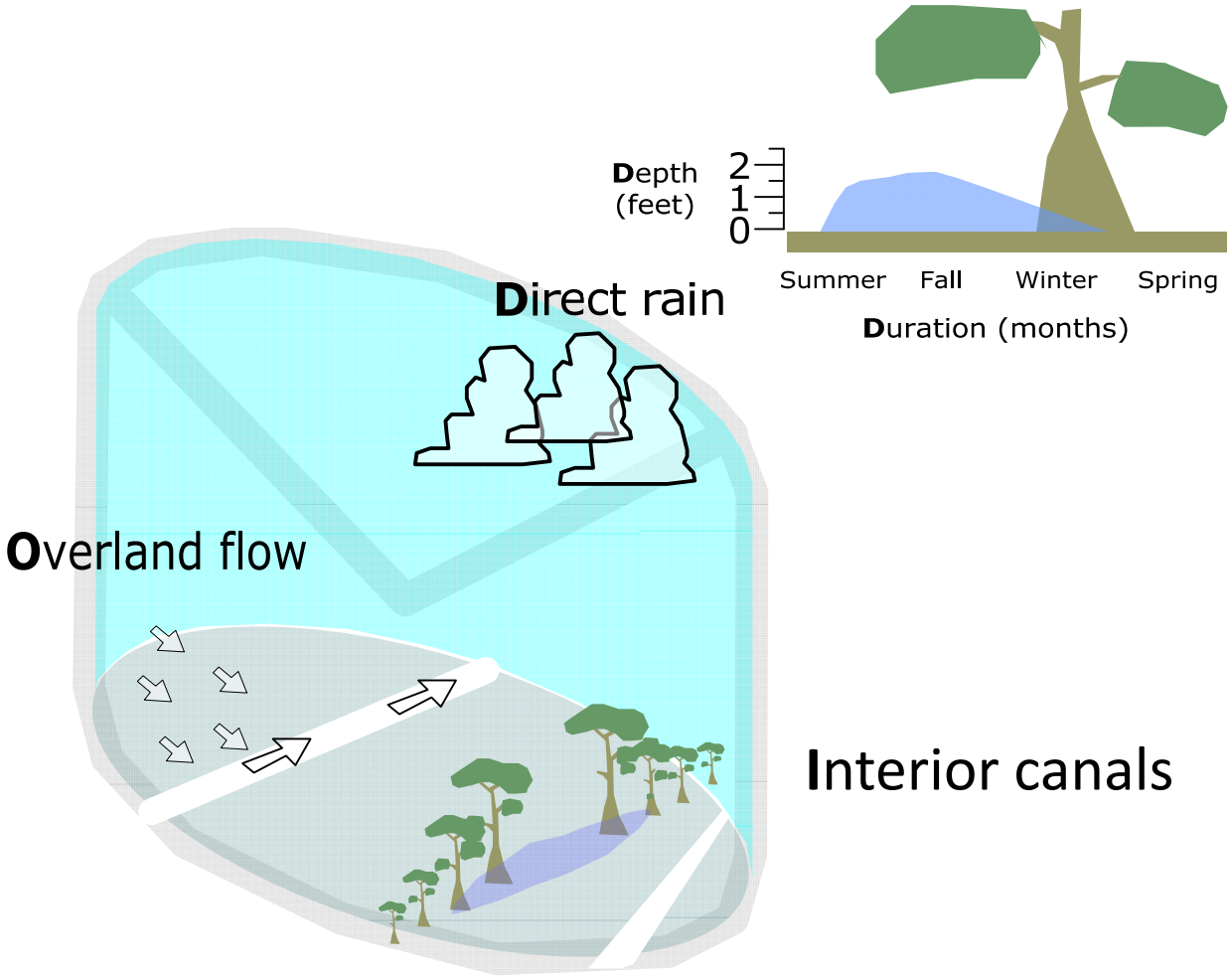

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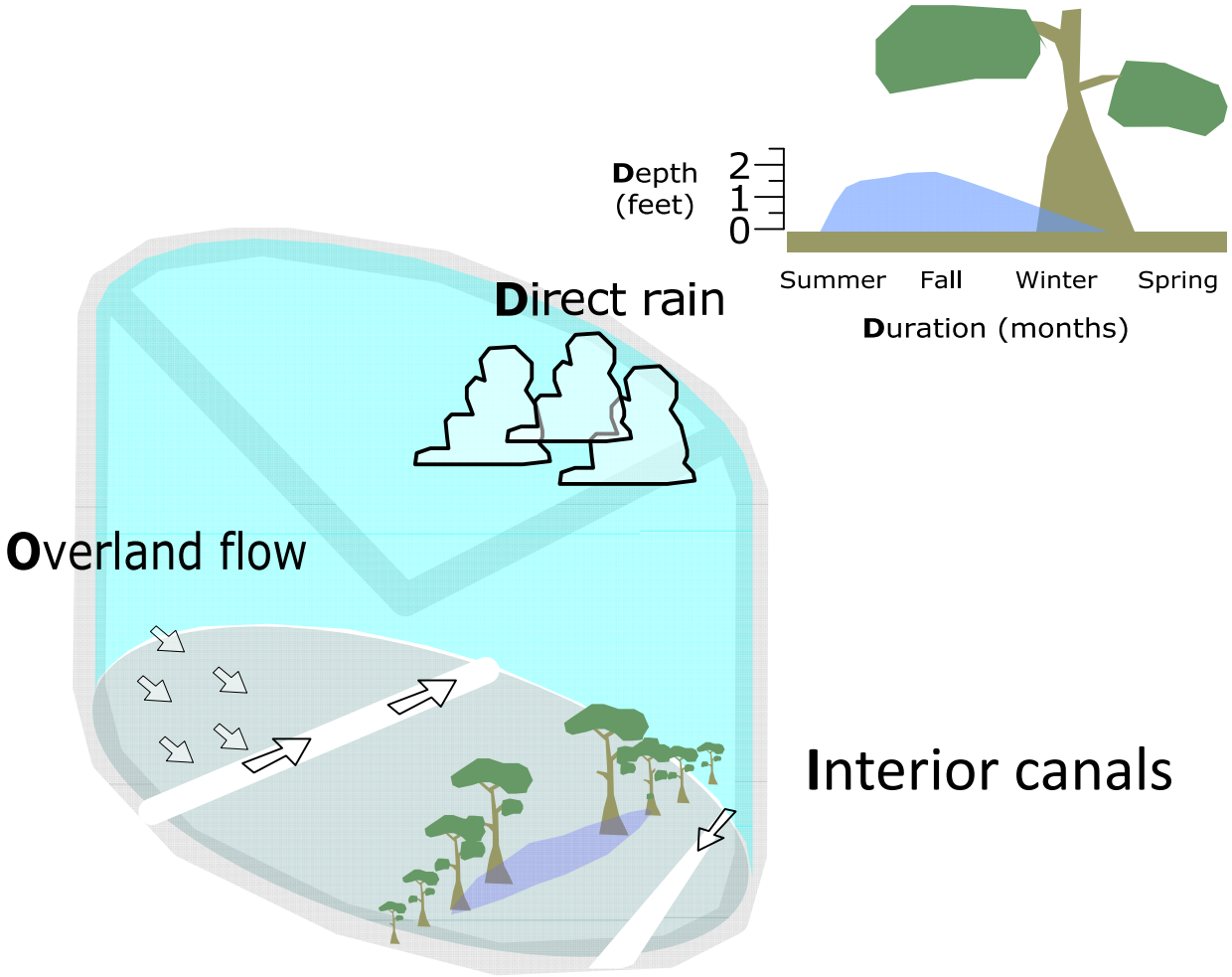

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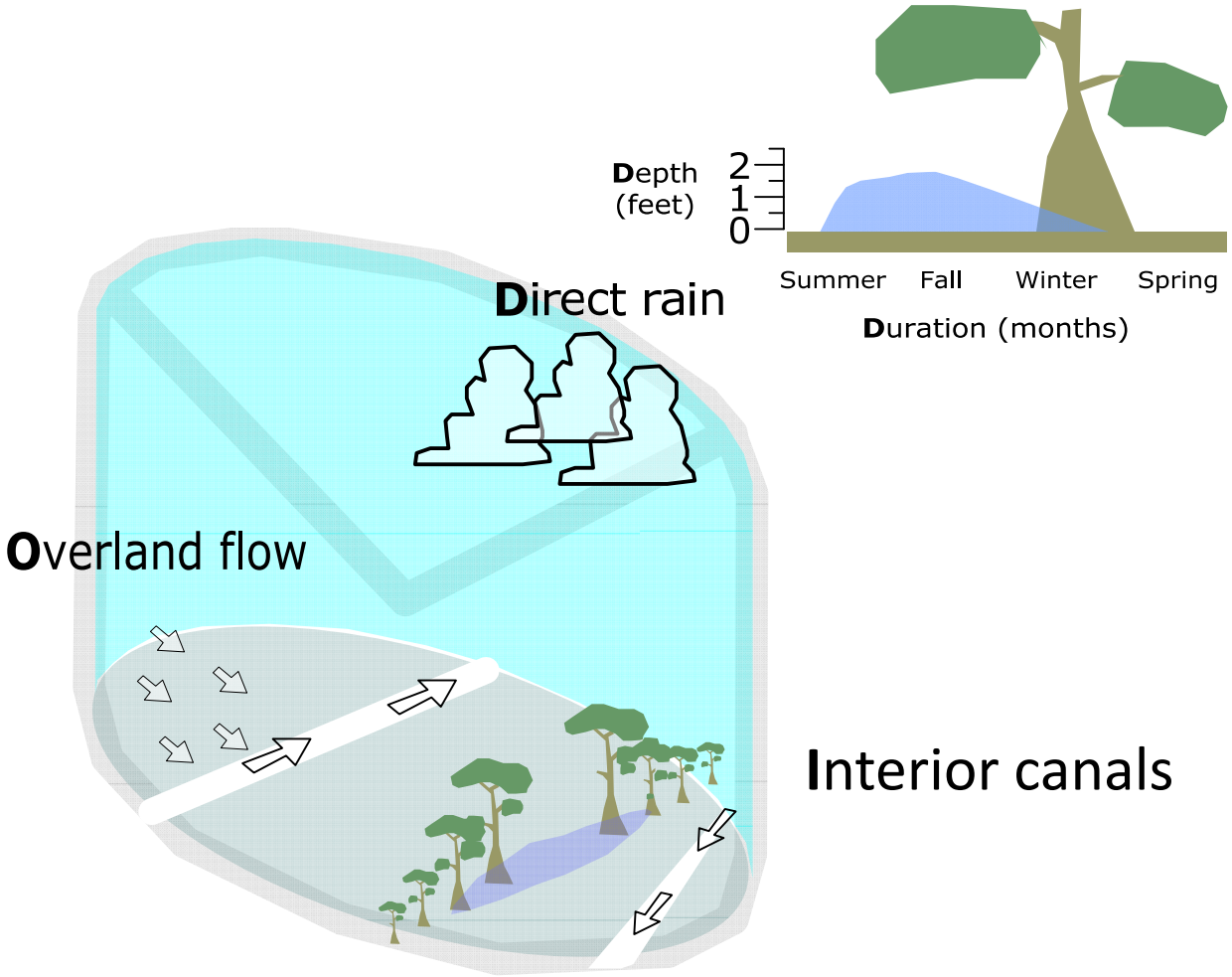

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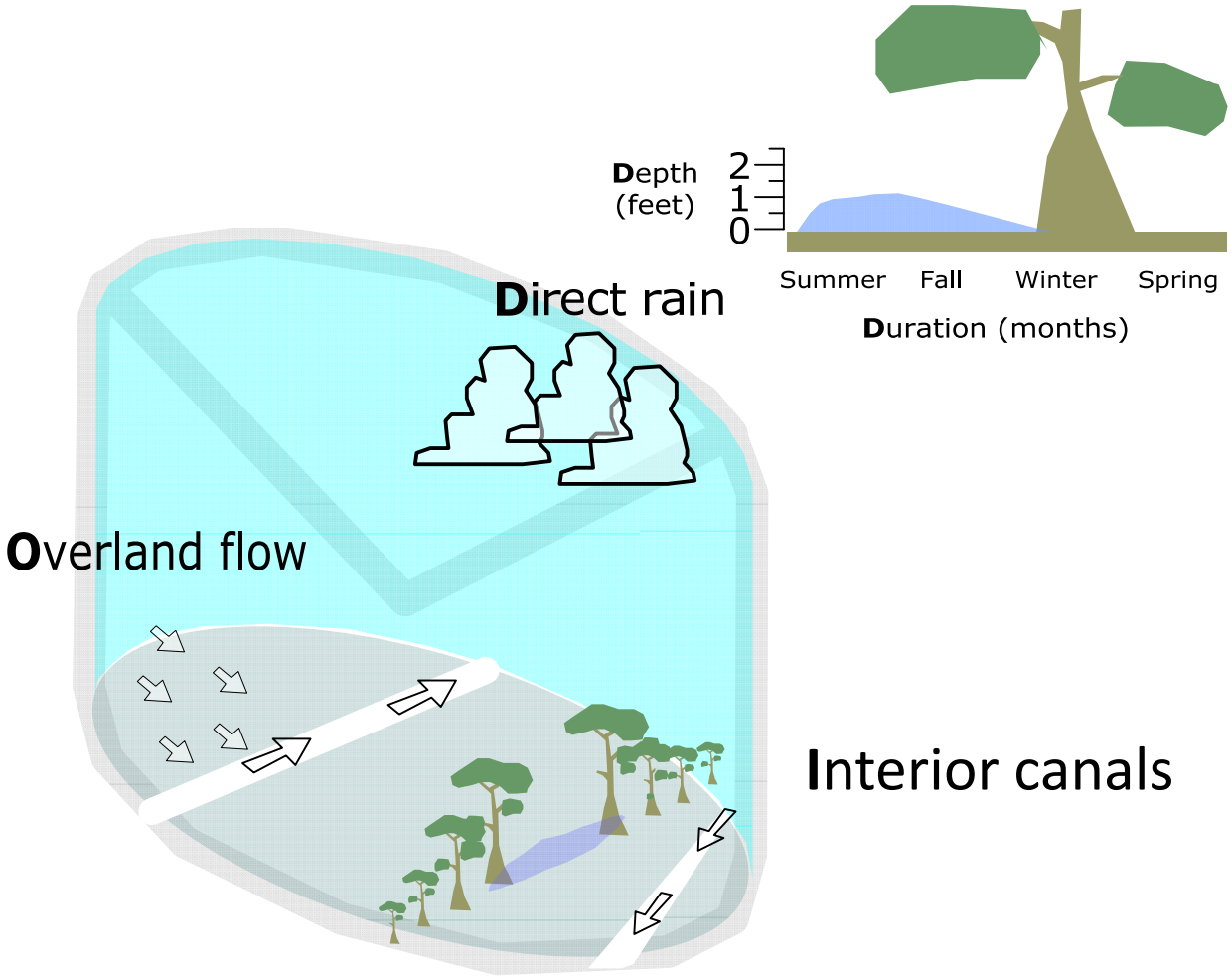

Dome $_{\text{depth (ft) and duration (months)}}$ $\propto$ Direct rainfall + ~~Overland flow~~

+ Wetland storage