

# **Welcome to the 20<sup>th</sup> Annual Wetland Assessment Procedure (WAP) Workshop!**

Southwest Florida  
*Water Management District*



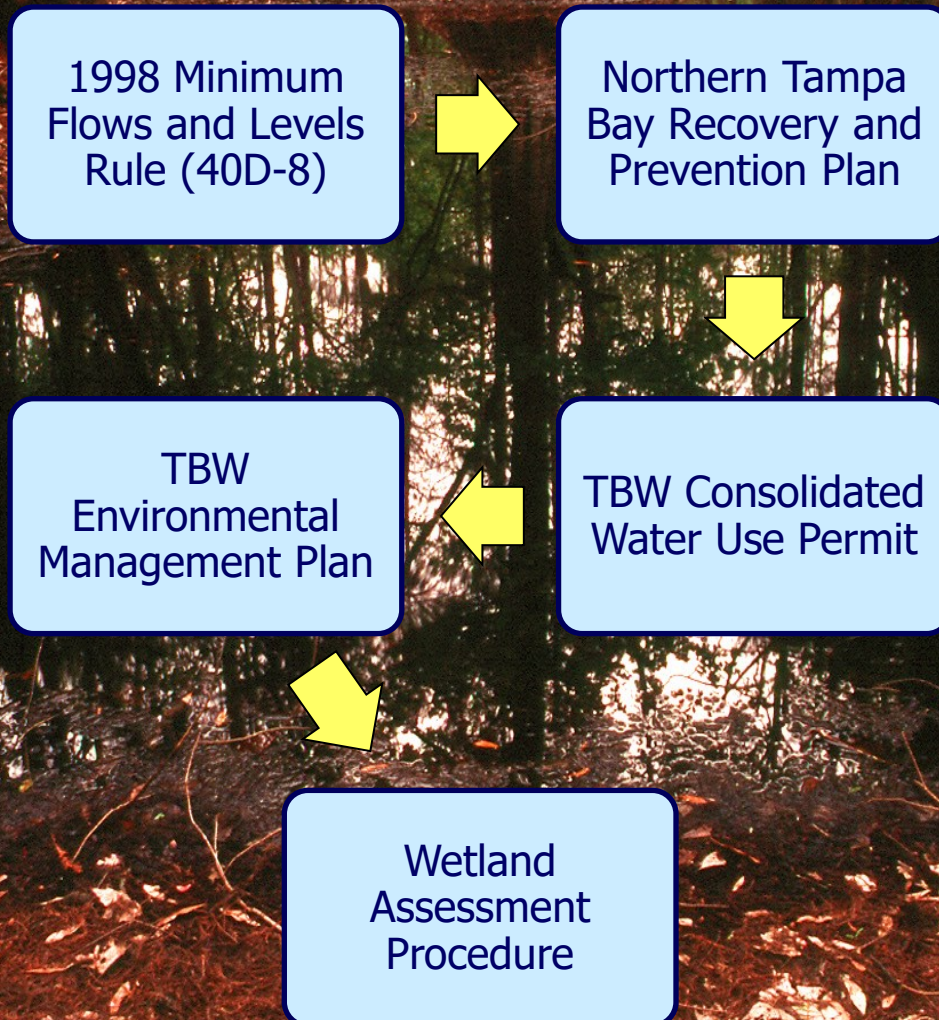


## Wetland Assessment Procedure

Objective: Collect information on vegetation, hydrology, soils, etc. in monitored wetlands to accurately characterize ongoing biological condition & health of each wetland



# Brief History: Wetland Assessment Procedure





# Original WAP Methodology (2000-2004)

- TBW evaluated 360 wetlands in Northern Tampa Bay
- District evaluated 150 wetlands
- 57 wetlands were assessed by both
- Assessments in the Spring and Fall each year



# WAP Methodology Assessment (2002)

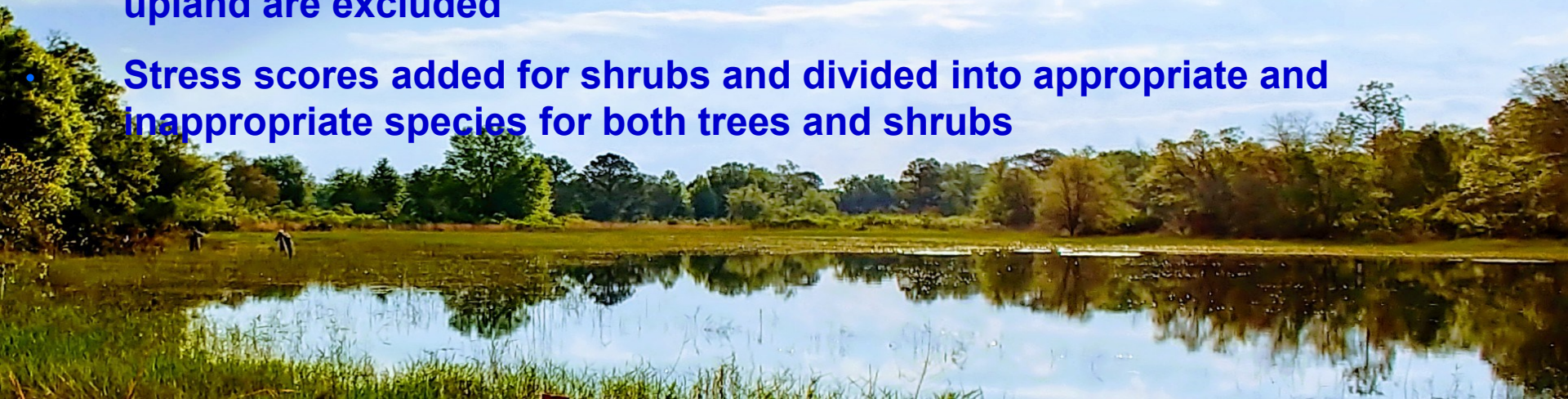
- Data collected from 2000 to 2002 was evaluated
- Results were compared from the 57 sites assessed by both TBW and the District
- Several inconsistencies were identified:
  - Variable transect set ups
  - Wetland plant zonation variable between assessors
  - Scoring system applied differently
  - Understanding of wetland history variable between assessors
  - Soil monitoring instructions interpreted differently



# Revised WAP Methodology (2004)

## Key changes included:

- Written wetland history required
- Transect set-up instructions clarified
- More simplistic soils method required every 5 years
- Emphasized importance of explanations and comments
- Zonation scores changed from a 3-point to a 5-point scale
- Scores for weedy and exotic species and vines discontinued
- Vegetation on hummocks, floating vegetation, and vegetation rooted in the upland are excluded
- Stress scores added for shrubs and divided into appropriate and inappropriate species for both trees and shrubs





# Revised WAP Methodology Assessment (May 2004)

- Field test of 10 wetlands to be assessed by TBW, District, and Consultants (21 wetland biologists in total)
- Inconsistencies persisted:
  - Plant ID issues, even among experienced biologists
  - Differences in zone scores resulted from different assessment areas around the transect
  - Stress scores were highly variable
  - Few comments included
  - Hummocks and shallow areas difficult to assess
  - Scoring difficult for narrow transition zone





# Revised WAP Methodology (October 2004)

- Replaced FDEP plant designation with one more suitable for wetland interiors
  - Plant zonation within the wetland is more useful
    - Transition (T), Outer Deep (OD), Deep (D), and Adaptive (AD) species zonation assigned to 111 plants, creating the WAP plant list
- Zonation scoring system updated to include new plant classifications
- Assessors encouraged to stay within 5 meters on either side of transect
- Percent cover and stress estimates further refined





# Revised WAP Methodology Assessment (October 2004)

- Field test of 10 wetlands to be assessed by TBW, District, and Consultants who participated in May 2004 field test (10 biologists in total)
- Variability between assessors still existed but was much less compared to May field test
  - The variability in scoring was now attributed to errors by individual assessor rather than problems with the methodology
- The participants and reviewers agreed that the updated zonation scoring methodology was now more logical, and the results seemed representative of the hydrologic/biologic health of the wetland





**Review of Original Wetland Assessment  
Procedure (WAP - March 2000)  
and  
Test Results of a Proposed Revision to the  
WAP, May 2004**



Prepared by:

Michael C. Hancock, P.E.  
Ted Rochow, Ph.D.  
Jill Hood, P.G.

December 2005



**Test Results of a Proposed Revision to the  
Wetland Assessment Procedure (WAP),  
October 2004  
and  
Development of the Final WAP Methodology  
Adopted in April 2005**



Prepared by:

Michael C. Hancock, P.E.  
Ted Rochow, Ph.D.  
Jill Hood, P.G.

December 2005





# Today's WAP Methodology

- **Completed in 2005**
- **This methodology has since been applied in 400+ wetlands**

**WETLAND ASSESSMENT PROCEDURE (WAP)  
INSTRUCTION MANUAL FOR ISOLATED WETLANDS**

**March 2005**

Prepared by:

Southwest Florida Water Management District

and

Tampa Bay Water, a Regional Water Supply Authority



# 2024 WAP Workshop Introduction





# Purpose of Wetland Assessment Procedure (WAP)

- Collect biologic data in wetlands to be used to monitor change (if any) due to hydrologic change (ground-water)
- WAP data *supplements* hydrologic data
- Uses for data include:
  - Water Use Permitting (part of EMP)
  - TBW Recovery Assessment



# Main Goal while completing the WAP

- Describe what you see on the day of your visit (snapshot)
- Data Collection
- Data Collection
- Data Collection
- Scores



# WAP Limitations

- **Tested and developed for isolated systems**
- **Most consistent in flatwoods (mesic)**
- **Not consistent in sandhill (xeric)**





# Annually

- **May through June assessments**
- **Main components:**
  - **Species documentation**
  - **Zonation scoring**
  - **Explanations**
  - **Additional Information**
    - **Stress**
    - **Comments**



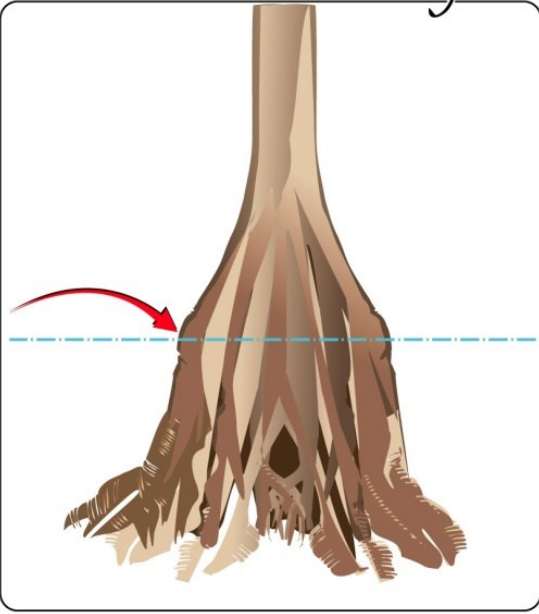
# Establishing WAP Zones

# **WAP Zones:**

## **Horizontal Distance From Normal Pool**



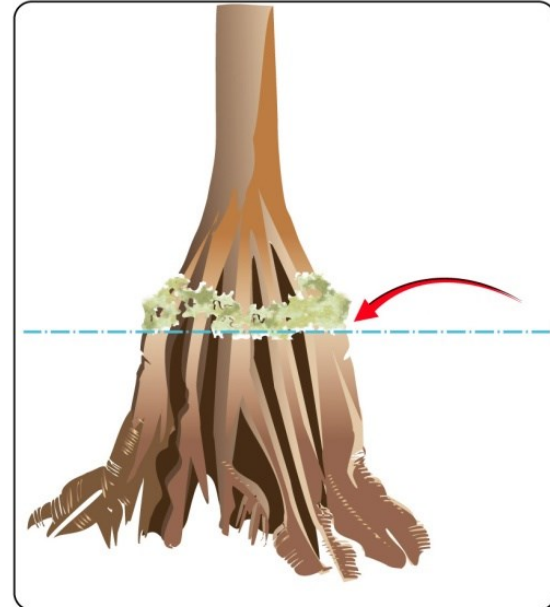
Buttress Swelling



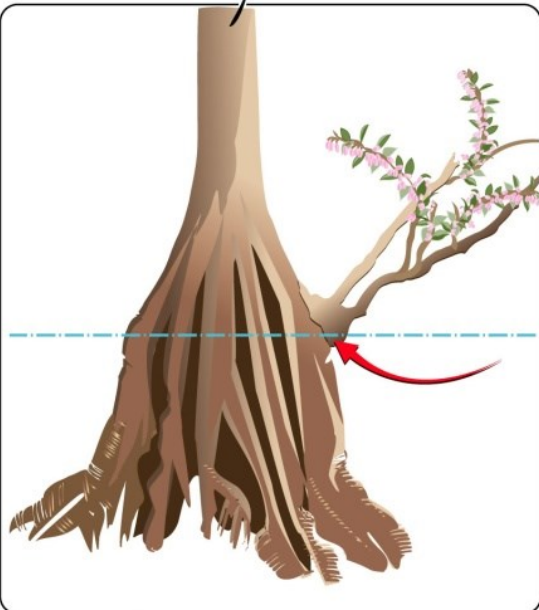
## WAP Zones:

# Horizontal Distance From Normal Pool

Moss Collar

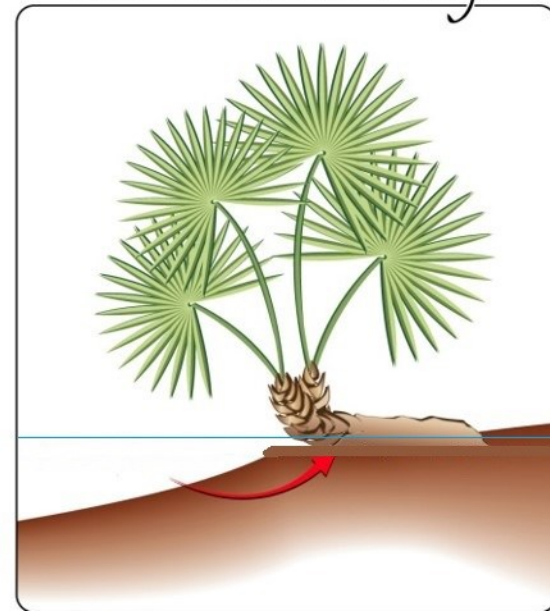


Lyonia



Diameter at base > 1 inch

Saw Palmetto Fringe





# Normal Pool Indicators





# Normal Pool Indicators

Sept 20, 2010  
Eldridge-Wilde  
wet prairie  
wetland 248  
28 10.096 N  
82 37.883 W  
large cypress in  
wetland center



Photos by Scott  
Emery

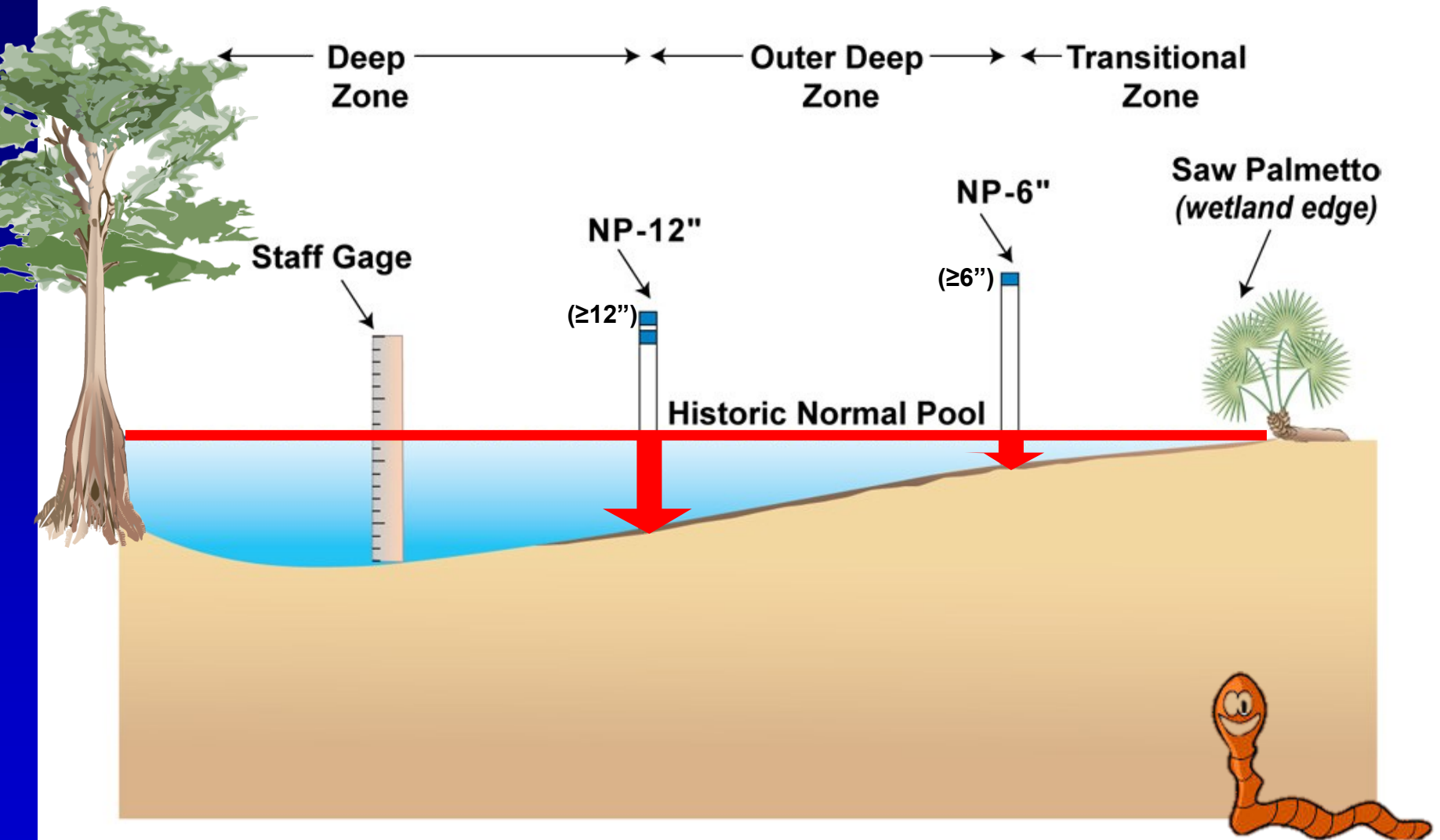


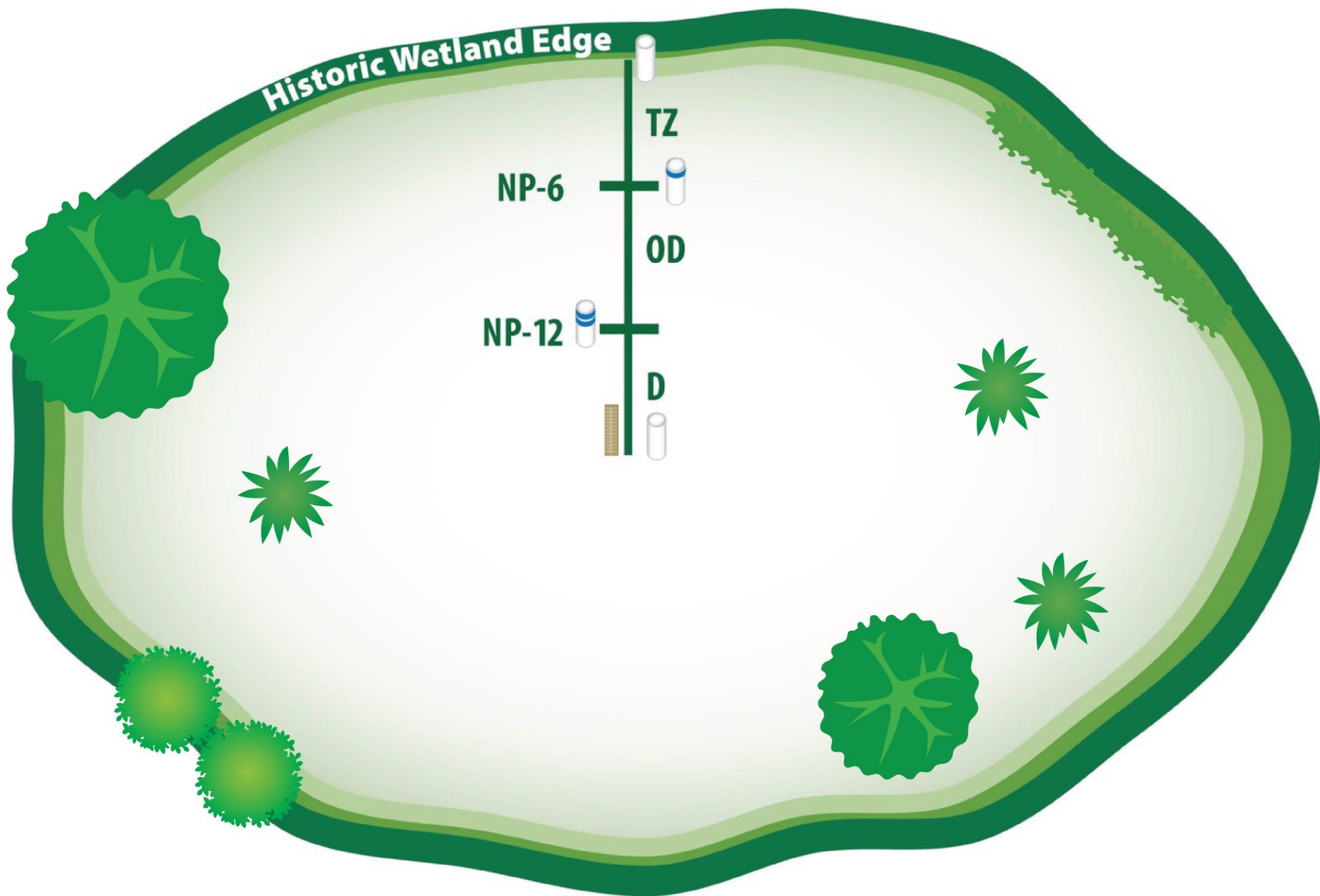


# The Transect

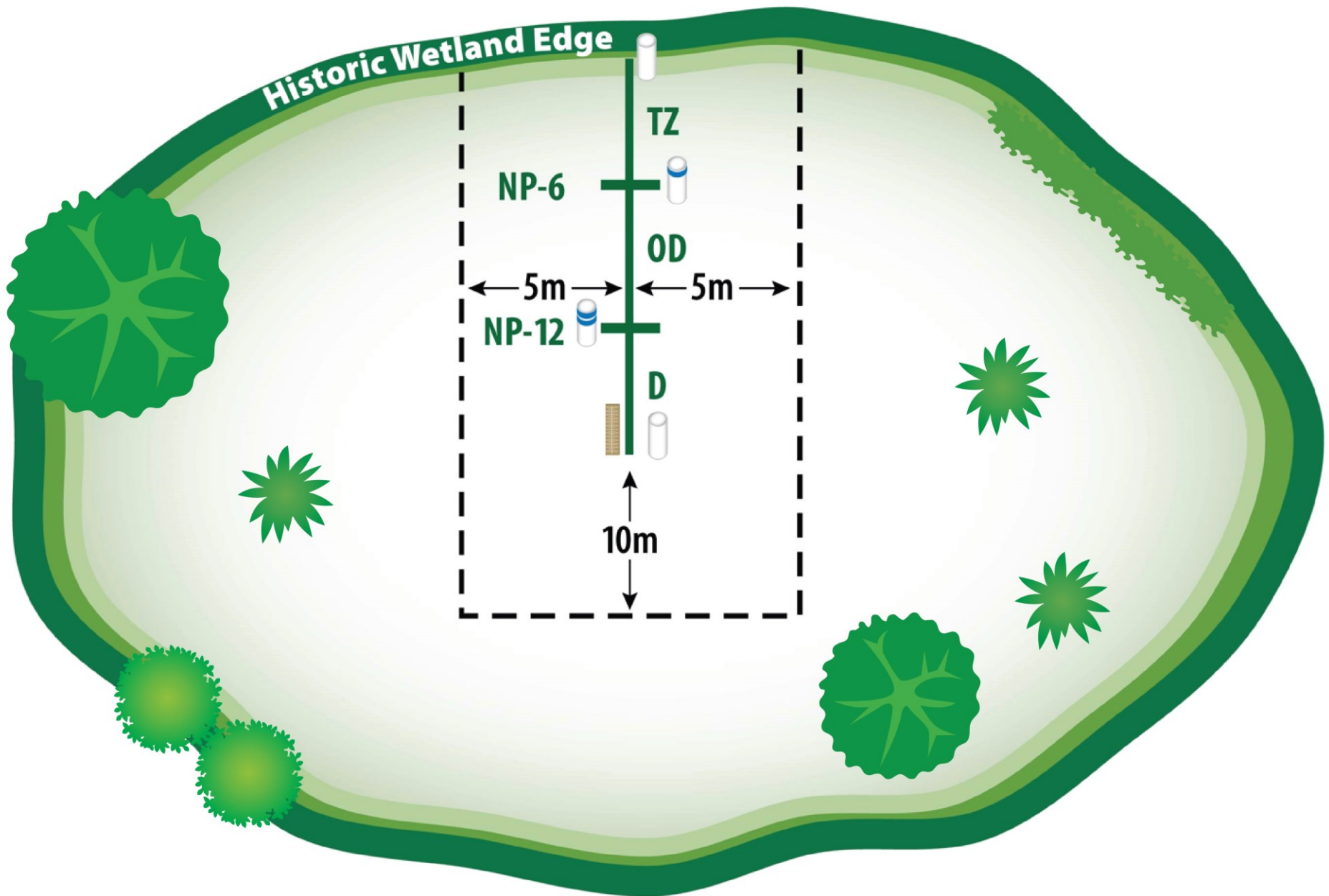


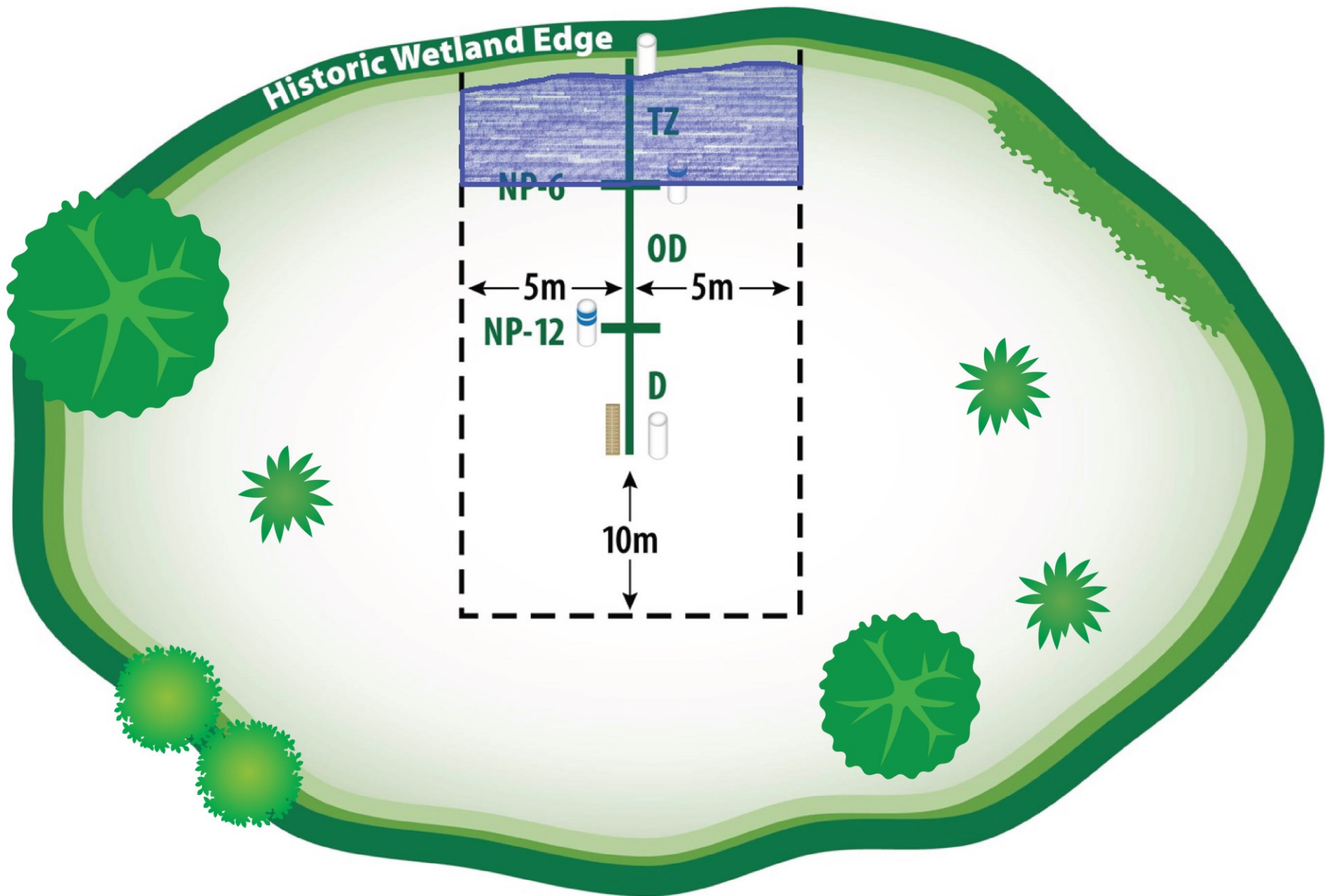
# Example of Typical WAP Transect



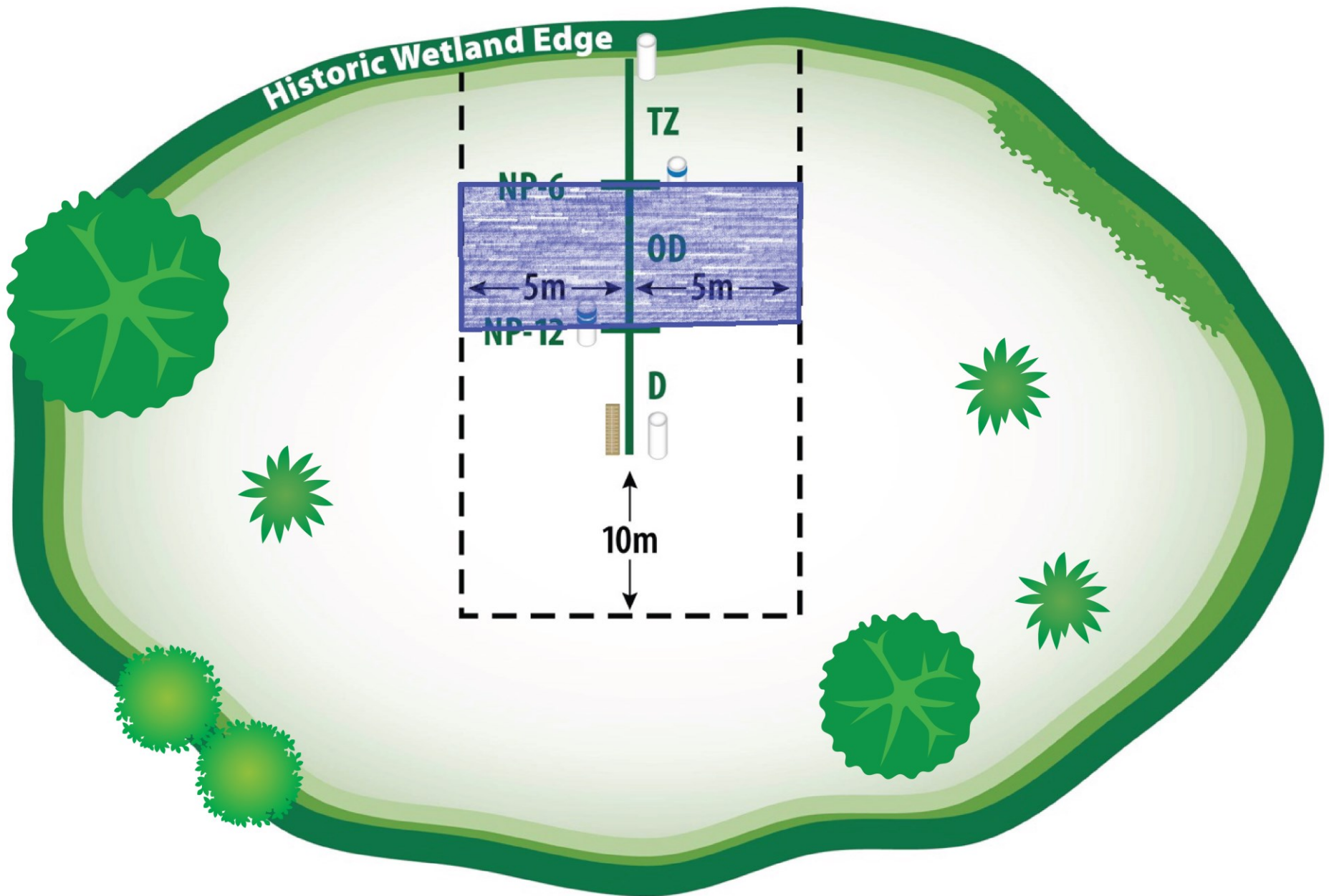


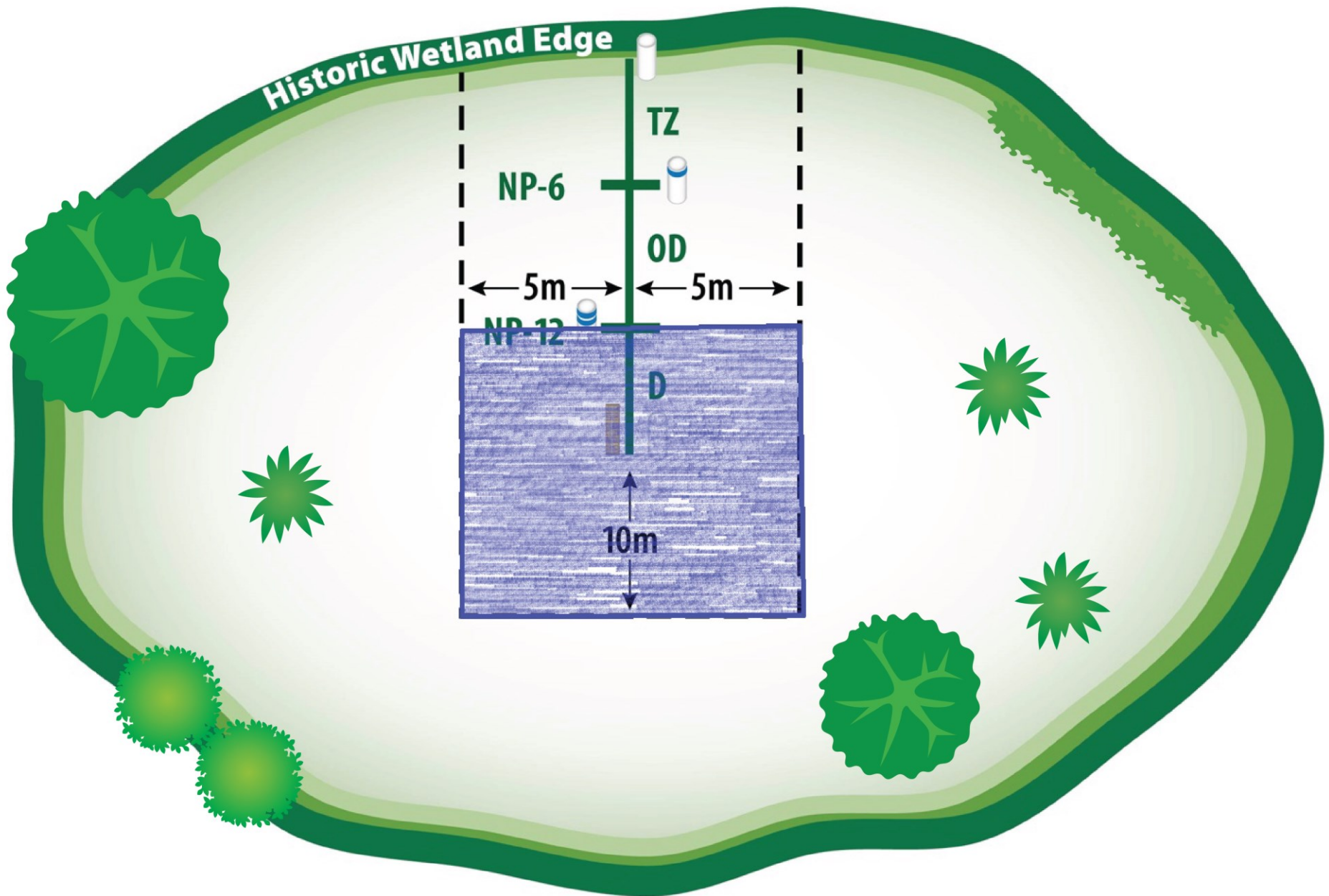






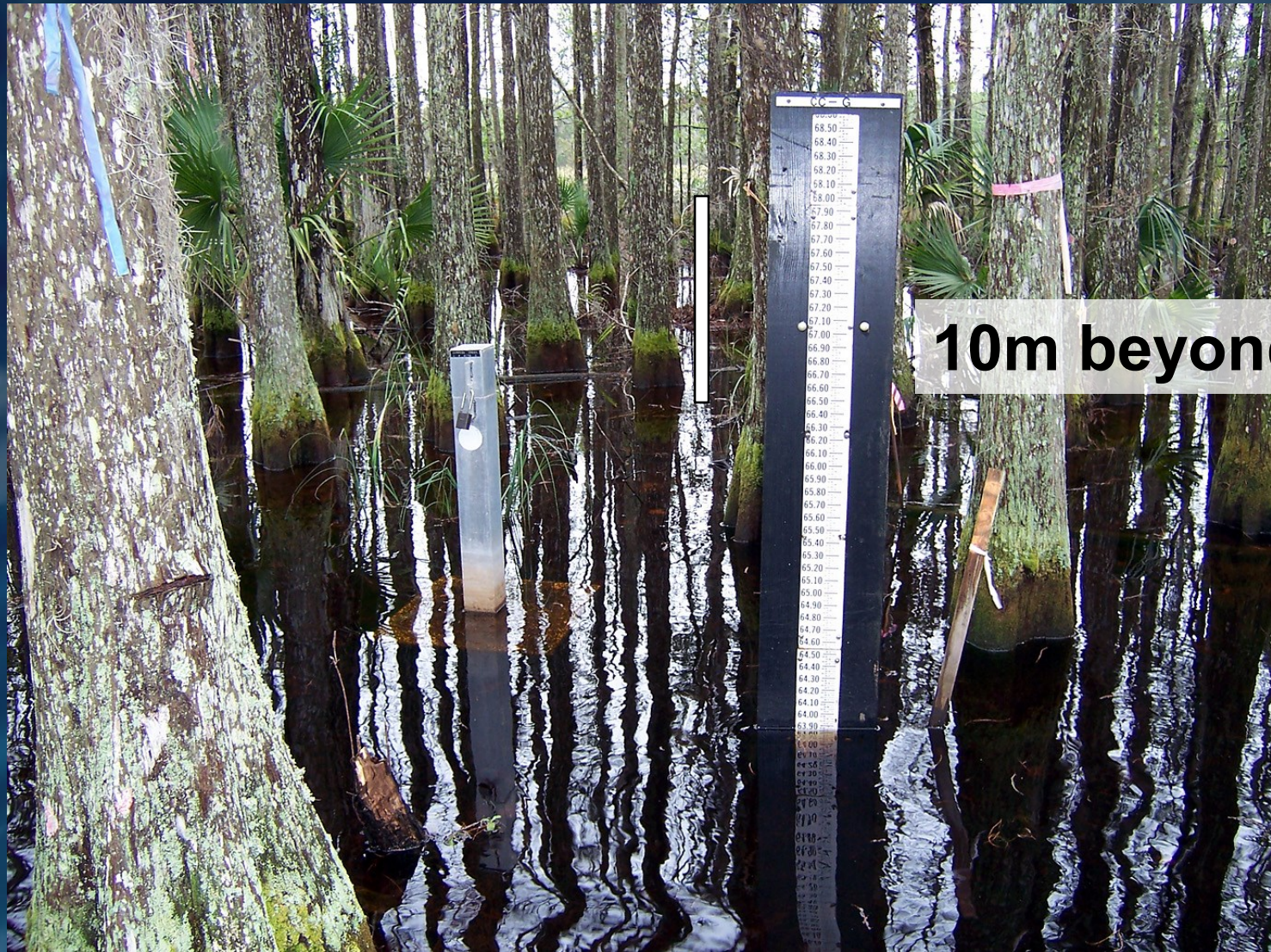








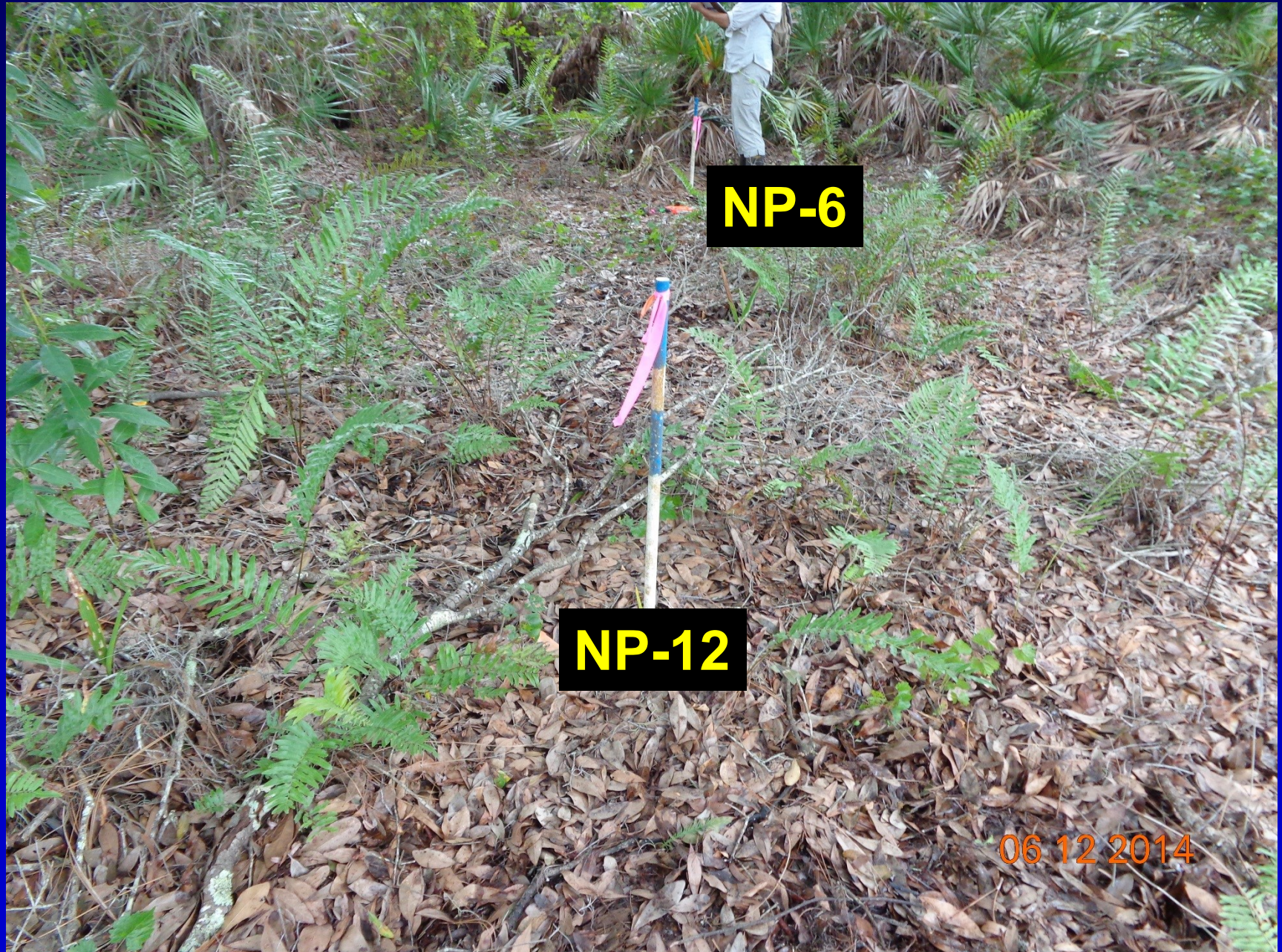
# Transect End



10m beyond



# NP-6 & NP-12 Markers



06 12 2014

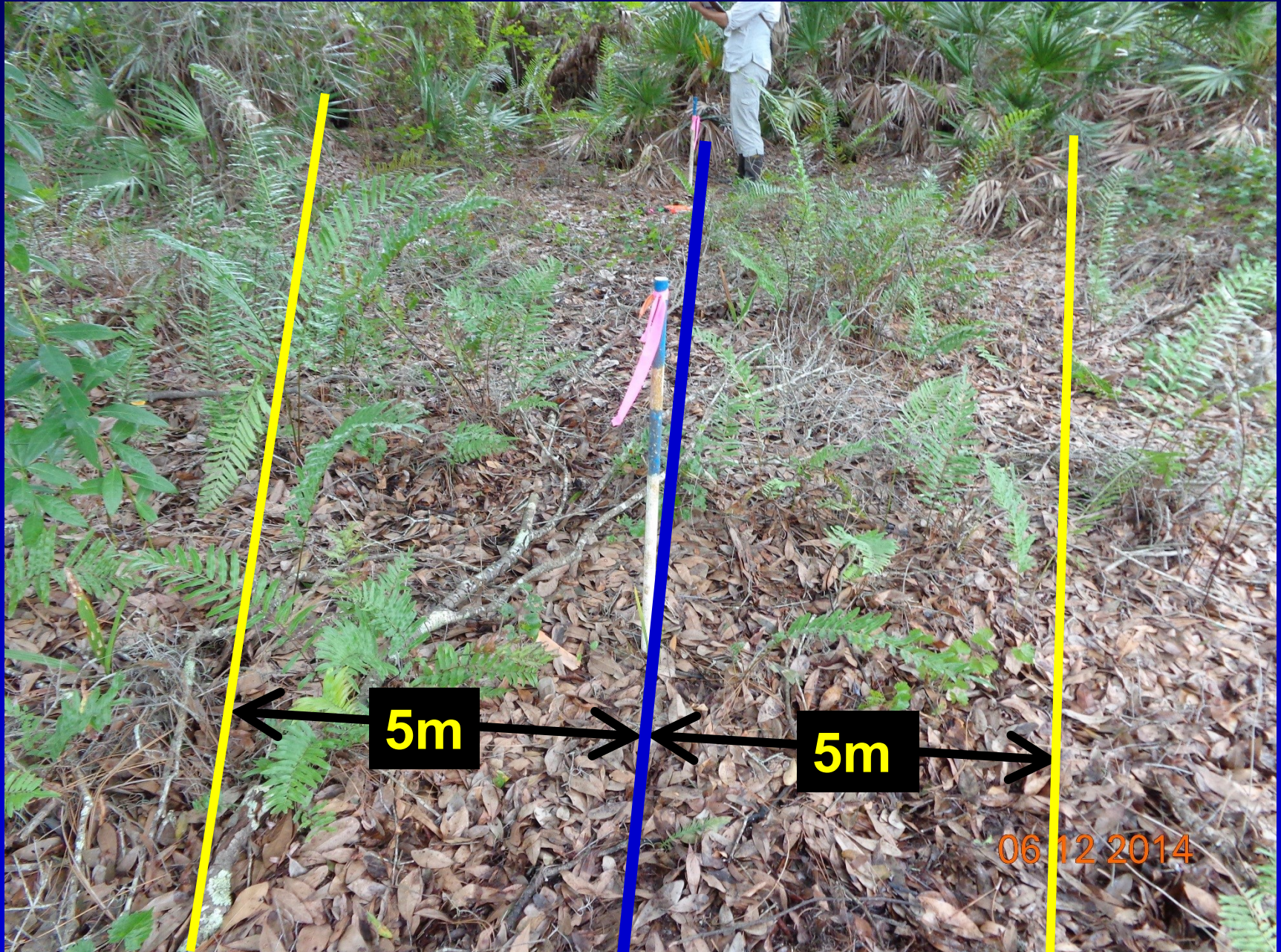


# Transect Line



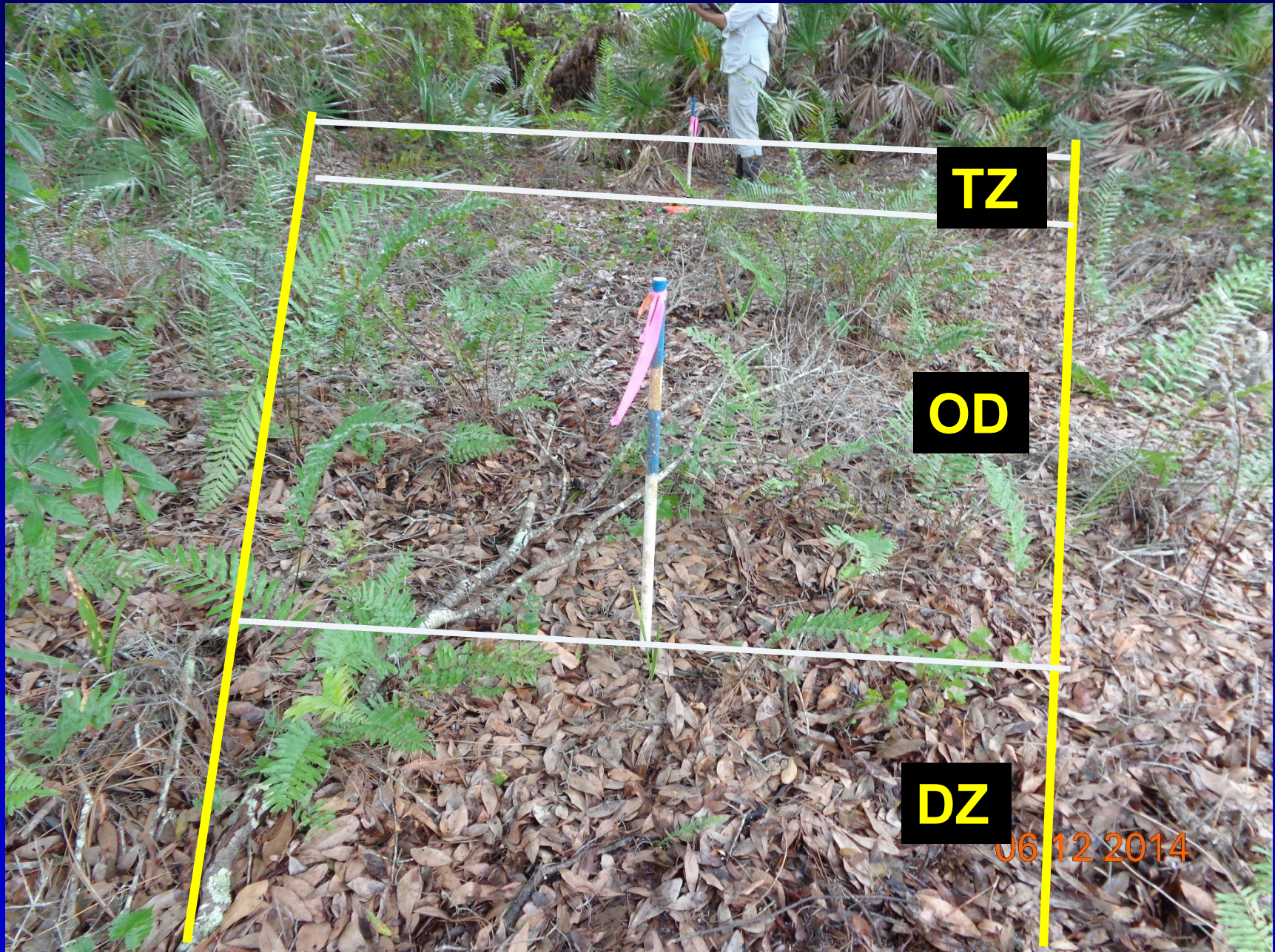


# 10m Boundary



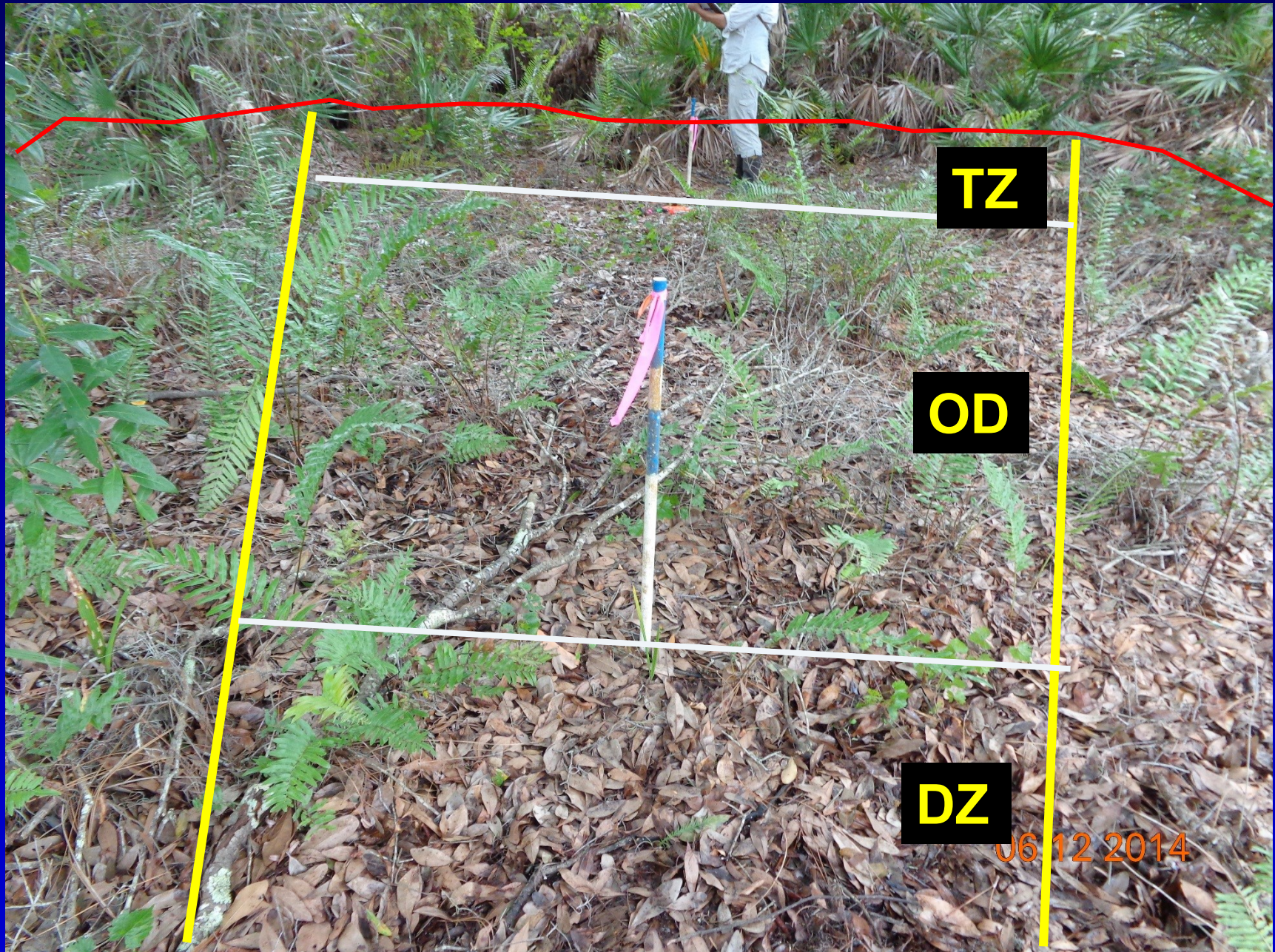


# Zones





# Edge Delineation





# Edge





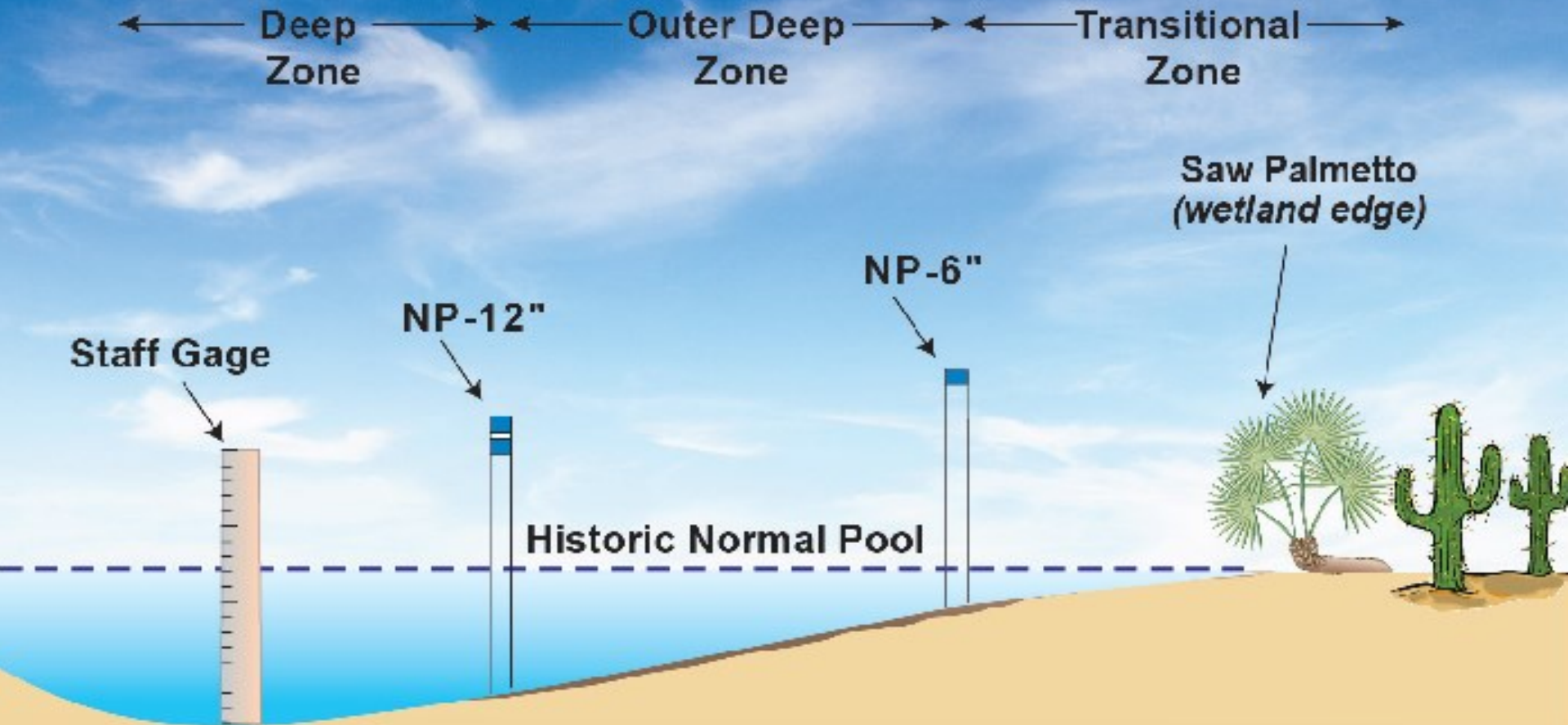






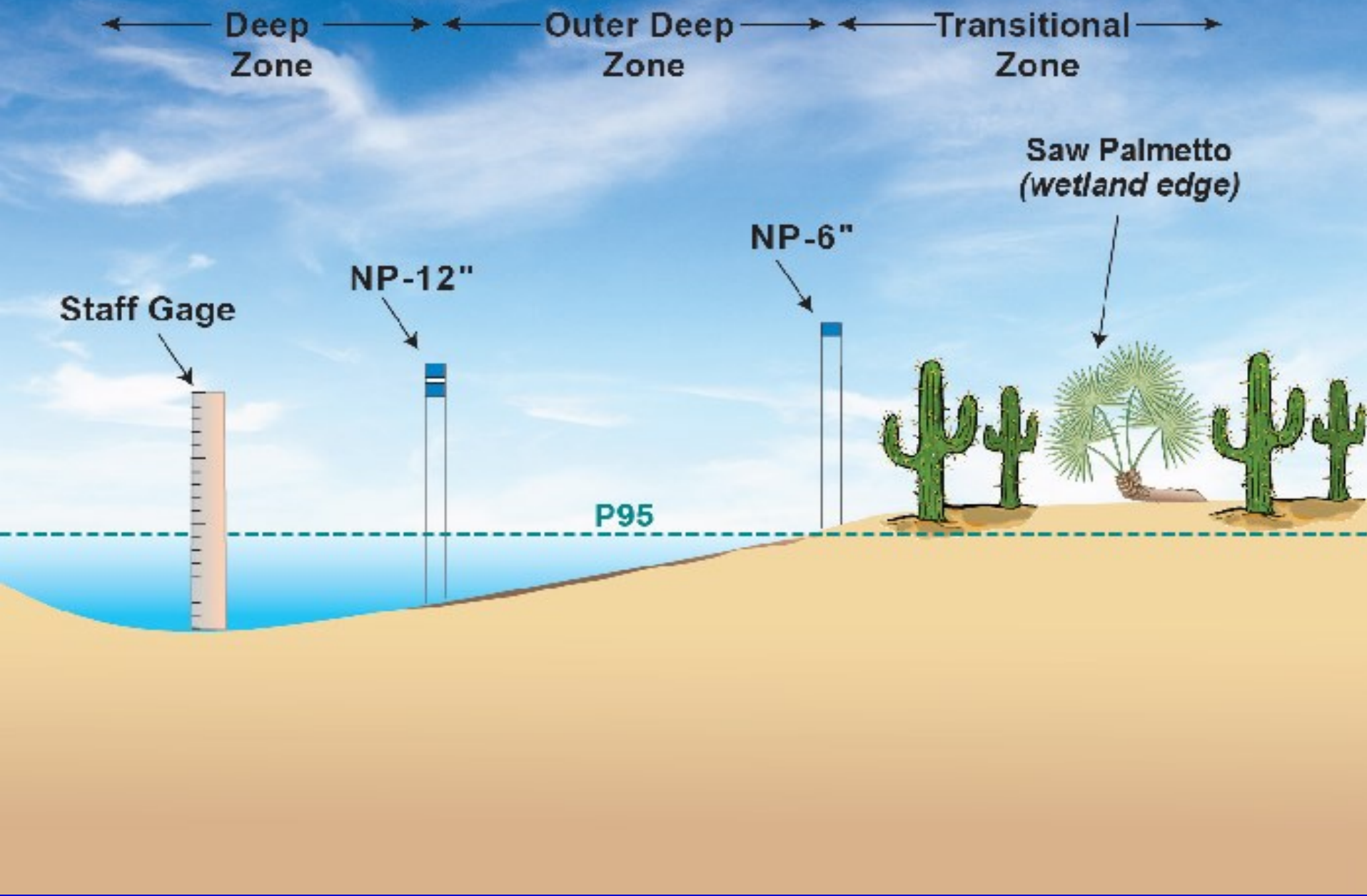


## Upland Species Moving Into Wetland



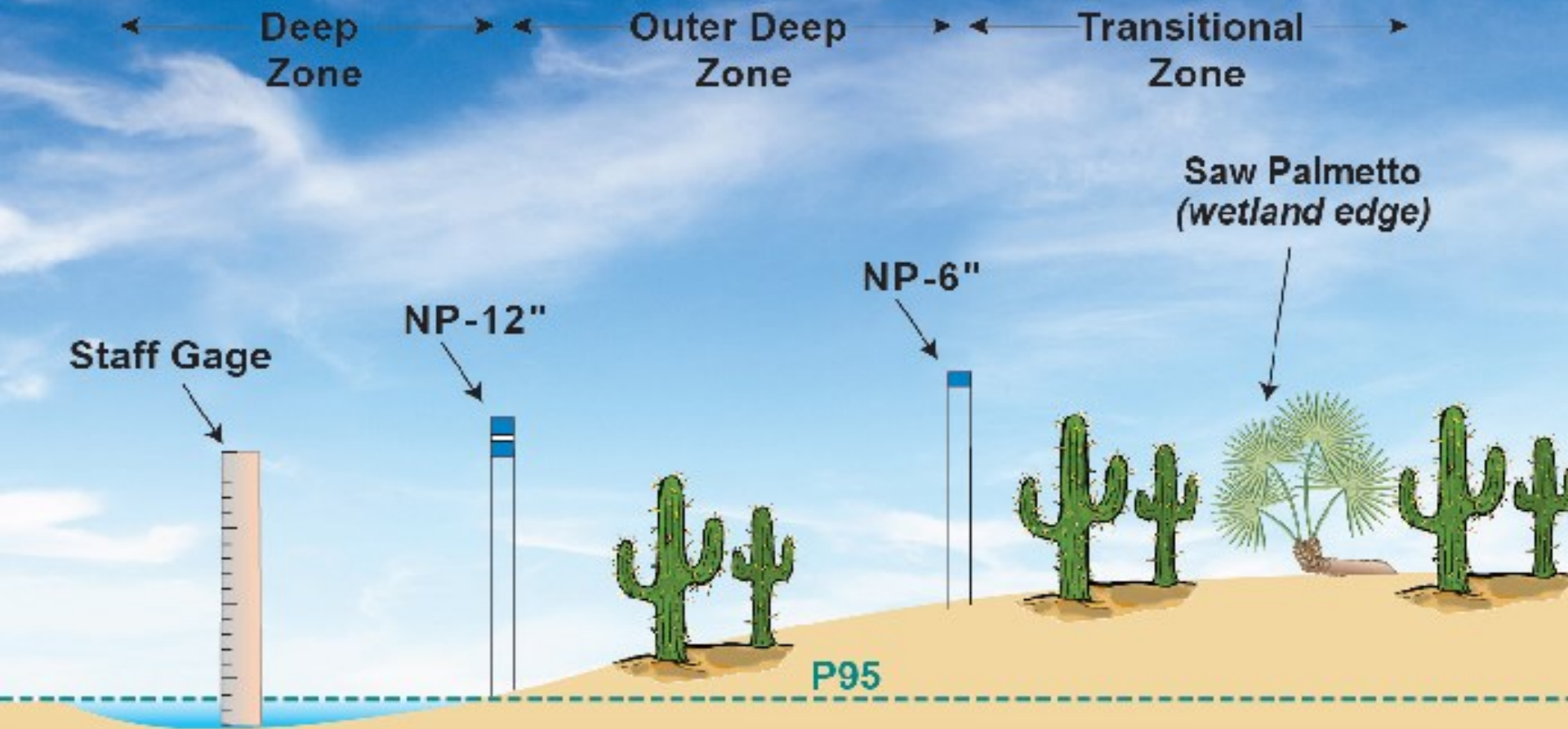


# Upland Species Moving Into Wetland



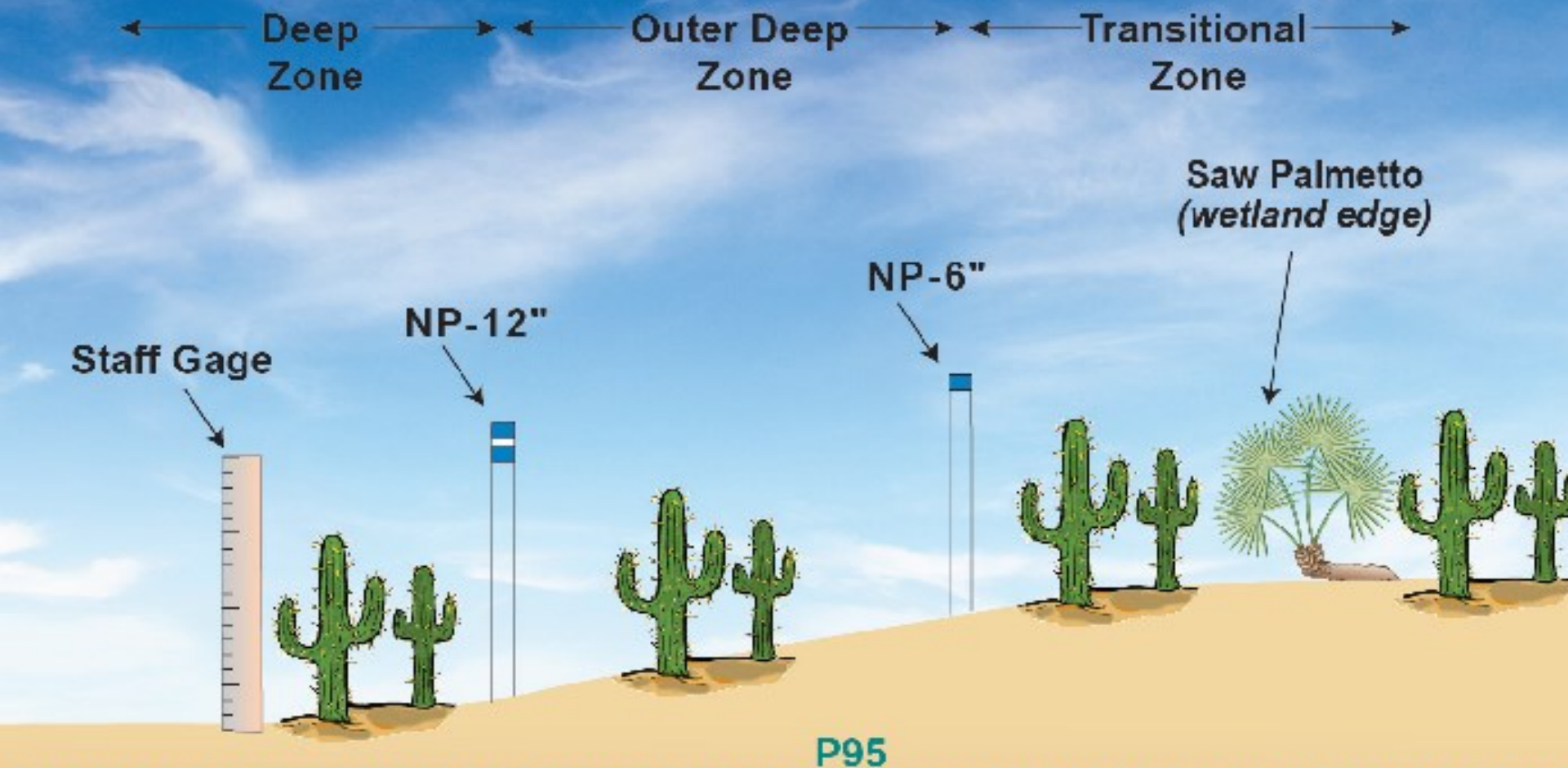


# *Upland Species Moving Into Wetland*



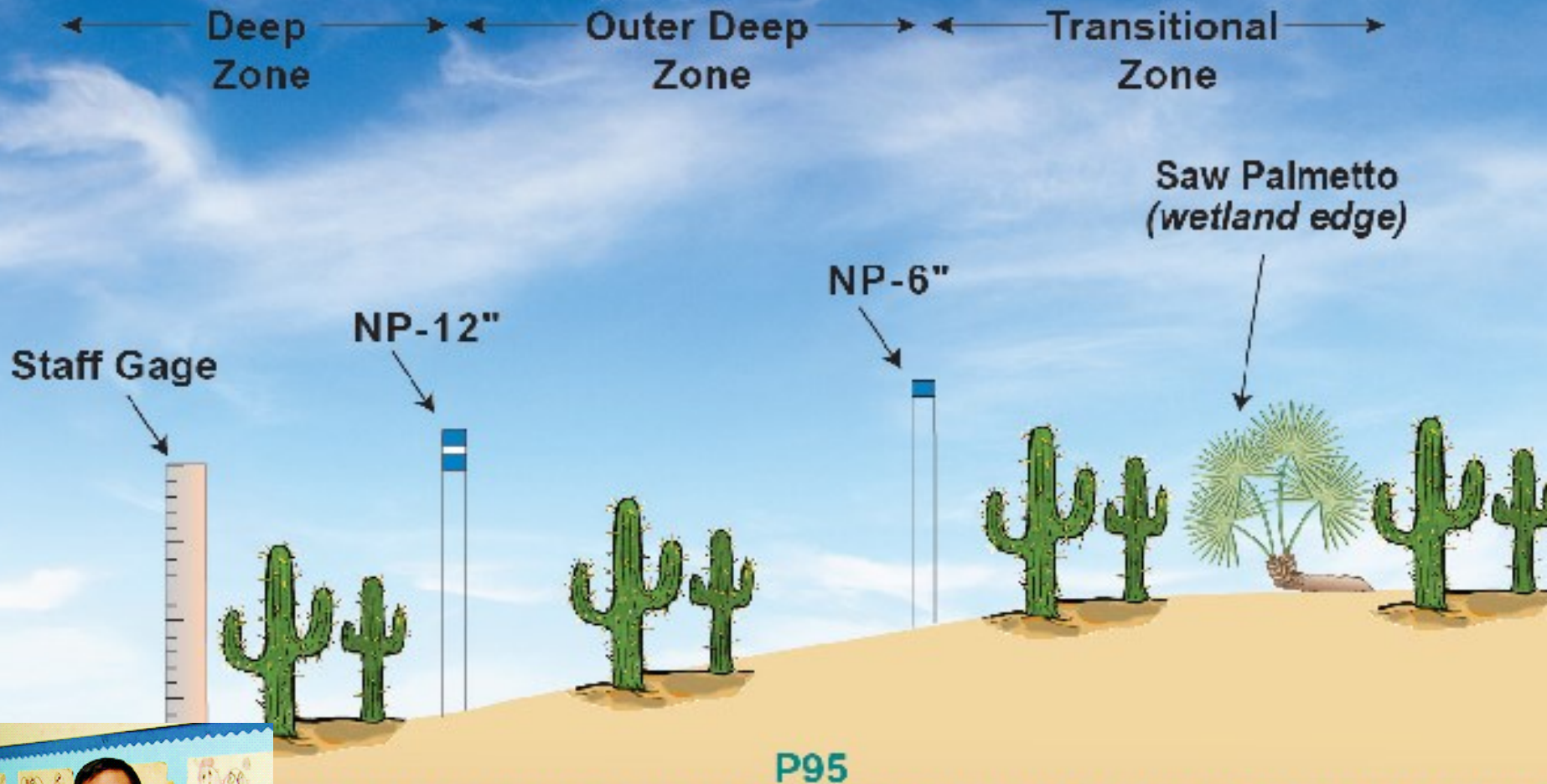


# Upland Species Moving Into Wetland



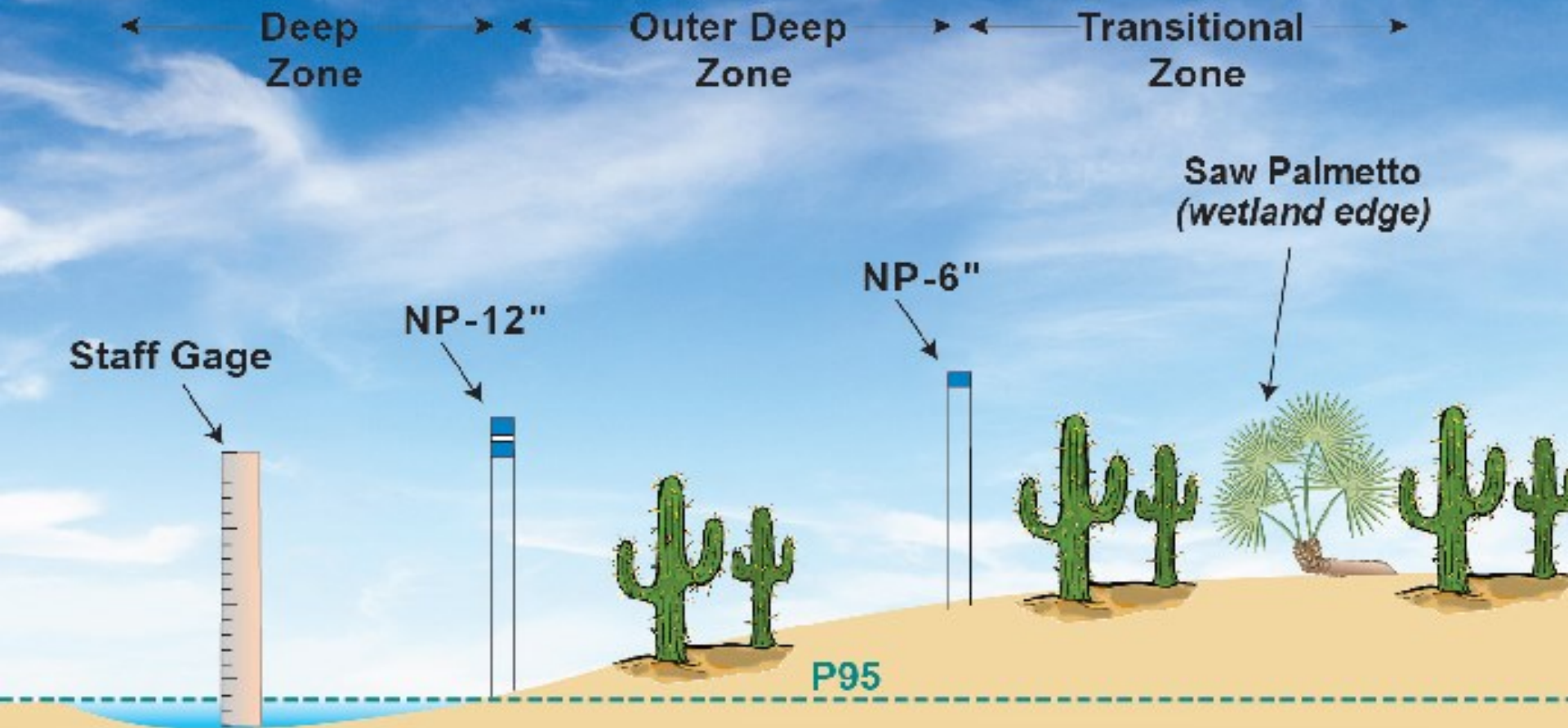


# Upland Species Moving Into Wetland



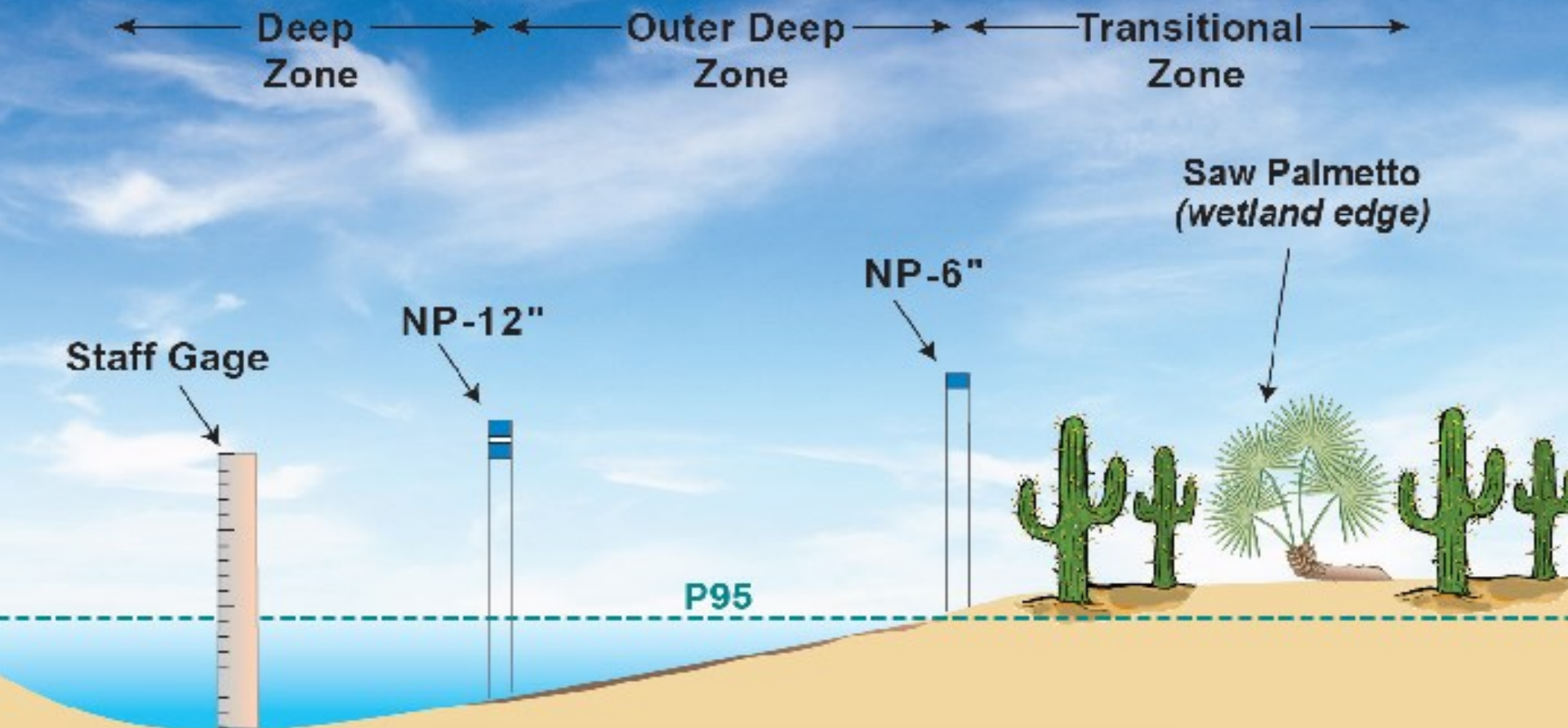


# *Upland Species Moving Into Wetland*



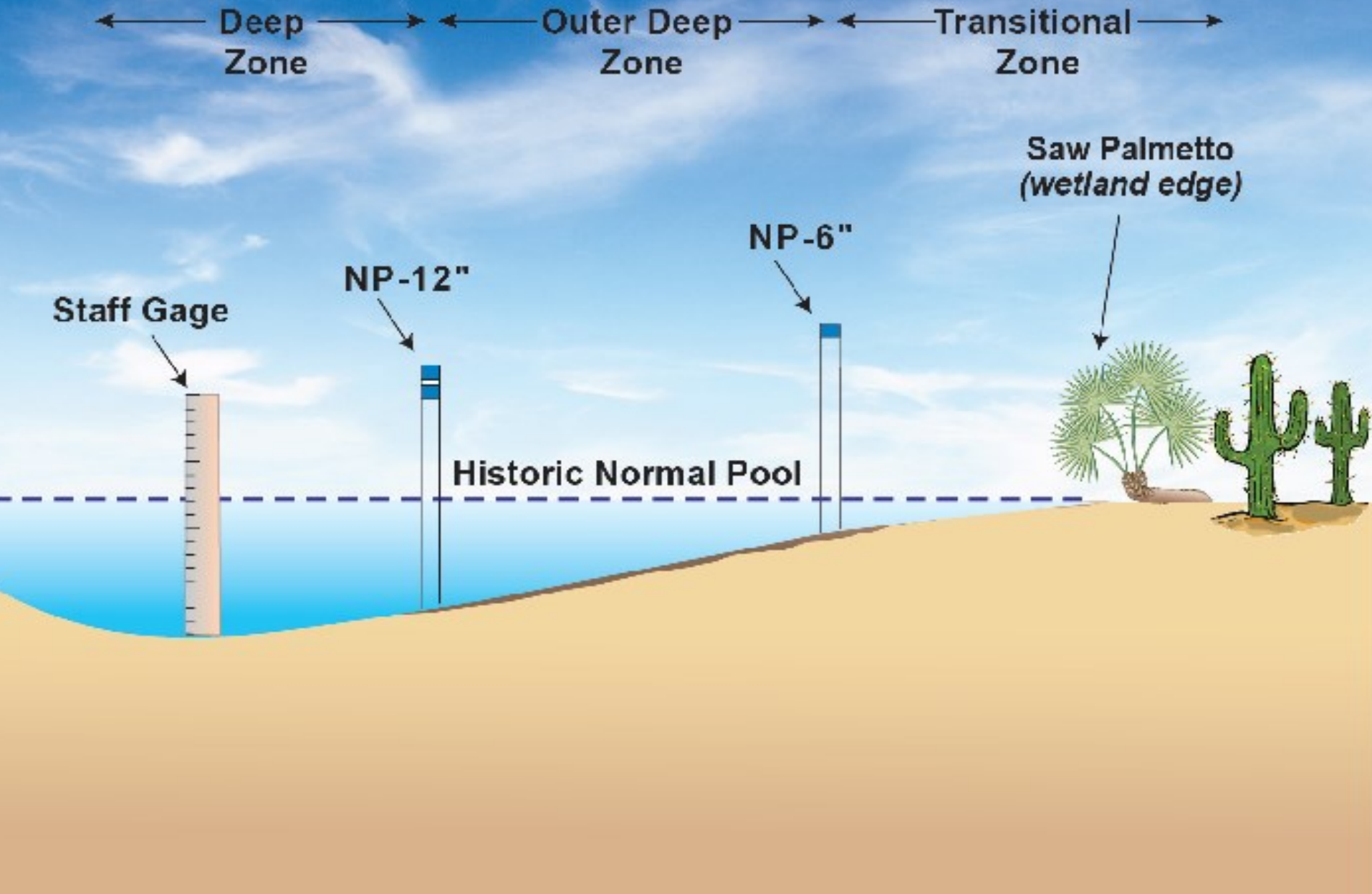


# *Upland Species Moving Into Wetland*





# *Upland Species Moving Into Wetland*





# 2024 WAP Training Part 1 – The Form





# The Form

## Our first look



Wetland Assessment Procedure										P. 1																			
DID:		Wellfield/Property: Portfolio				Wetland Name		Wetland Type																					
No DID		J.B. STARKEY				Starkey T		Cypress Isolated																					
Wetland ID:	Site ID:	Data Owner:	Personnel's Employer:		Date:	Start Time:	End Time:	Transect																					
503	776584	DIST						Starkey T A																					
WAP Assessment Personnel:																													
Photo Documentation					Water Level Information																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Frame</th> <th>Description</th> <th>Photo Point Desc</th> <th>Direction</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>					Frame	Description	Photo Point Desc	Direction																	<div style="display: flex; justify-content: space-between;"> <div>           Dry? <input type="checkbox"/>            Elevation (ft):         </div> <div>           Yes <input type="checkbox"/>            Device Type:         </div> <div>           No <input type="checkbox"/>            Well/Gauge ID:         </div> </div>				
Frame	Description	Photo Point Desc	Direction																										
Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations ( 2013 data shaded).																													
Wetland Impacts					Wetland Drainage																								
Wetland edges filled or disturbed?					Augmentation equipment in place?																								
<input type="checkbox"/> No <input type="checkbox"/>					<input type="checkbox"/> No <input type="checkbox"/>																								
Excessive dumping or trash in wetland?					Augmentation occurring at time of WAP?																								
<input type="checkbox"/> No <input type="checkbox"/>					<input type="checkbox"/> No <input type="checkbox"/>																								
Hog disturbance?					Clear evidence of direct stormwater inflow?																								
<input type="checkbox"/> Yes <input type="checkbox"/>					<input type="checkbox"/> No <input type="checkbox"/>																								
Significant impact from cattle (trampling)?					Clear evidence of direct drainage from wetland?																								
<input type="checkbox"/> No <input type="checkbox"/>					<input type="checkbox"/> No <input type="checkbox"/>																								
Vehicles through wetland (including bicycles)?					Other drainage activities in area?																								
<input type="checkbox"/> Yes <input type="checkbox"/>					<input type="checkbox"/> No <input type="checkbox"/>																								
Insect damage?					Borrow pit/retention pond in wetland vicinity?																								
<input type="checkbox"/> No <input type="checkbox"/>					<input type="checkbox"/> No <input type="checkbox"/>																								
Disease?					<input type="checkbox"/> No <input type="checkbox"/>																								
Wetland Impact Comment(s)					Wetland Drainage Comment(s)																								
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Fire					Lakes/Docks																								
Signs of Fire? <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No					<input type="checkbox"/> Docks completely out of water <input type="checkbox"/> Docks touching water or with < 50% of dock over water <input type="checkbox"/> Docks > 50% out of water <input type="checkbox"/> N/A																								
2013 Is the littoral zone stranded? <input type="checkbox"/>					Current: <input type="checkbox"/> Yes <input type="checkbox"/> No																								
Fire Comment (year, expanse, intensity)					Lakes/Docks Comments:																								
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Soil Subsidence					General Comments/Observations:																								
New signs of oxidation/subsidence? <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No																													
Soil Subsidence Comment:																													
<div style="border: 1px solid black; height: 20px; width: 100%;"></div>																													
Future users of these data may not want to analyze/compare these data with other wetlands due to the extensive level of:																													
2013      Current <input type="checkbox"/> <input type="checkbox"/> Non-grounded water withdraw related disturbance <input type="checkbox"/> <input type="checkbox"/> Soil subsidence																													
Species Count		Common Name		Evidence Description		Comment																							



# Top - Page 1

Wetland Assessment Procedure										P. 1
DID:		Wellfield/Property: Portfolio			Wetland Name			Wetland Type		
No DID		J.B. STARKEY			Starkey T			Cypress Isolated		
Wetland ID:		Site ID:		Data Owner:		Personnel's Employer:		Date:		Start Time: End Time: Transect
503		776584		DIST						Starkey T A
WAP Assessment Personnel:										
<b>Photo Documentation</b>										
Frame	Description	Photo Point Desc		Direction						
<b>Water Level Information</b>										
Dry?		Yes <input type="checkbox"/>		No <input type="checkbox"/>						
Elevation (ft):		Device Type:		Well/Gauge ID:						

Water Levels with description of inundation



**Wetland Willie**  
Delaware Wetland Restoration Project



# Impacts and Drainage

Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations

(2021 info is shaded. First column of yes/no entries)

## Wetland Impacts

Wetland edges filled or disturbed?	No	<input type="checkbox"/>
Excessive dumping or trash in wetland?	No	<input type="checkbox"/>
Hog disturbance?	Yes	<input type="checkbox"/>
Significant impact from cattle (trampling)?	No	<input type="checkbox"/>
Vehicles through wetland (including bicycles)?	Yes	<input type="checkbox"/>
Insect damage?	No	<input type="checkbox"/>
Disease?	No	<input type="checkbox"/>

Augmentation equipment in place?	No	<input type="checkbox"/>
Augmentation occurring at time of WAP?	No	<input type="checkbox"/>
Clear evidence of direct stormwater inflow?	No	<input type="checkbox"/>
Clear evidence of direct drainage from wetland?	No	<input type="checkbox"/>
Other drainage activities in area?	No	<input type="checkbox"/>
Borrow pit/retention pond in wetland vicinity?	No	<input type="checkbox"/>

## Wetland Impact Comment(s)

none

Lower 1/2 OD rooted 6" deep - fresh

## Wetland Drainage Comment(s)

none

Stormwater inflow from Publix lot







# FIRE

## Fire

Signs of Fire? ☐ No ☒ Yes ☐ No

Fire Comment (year, expanse, intensity)

none

## Lakes/Docks

- ☐ Docks completely out of water  
☐ Docks touching water or with < 50% of dock over water  
☐ Docks > 50% out of water  
☒ N/A

2014 Is the littoral zone stranded? ☐

Current: ☐ Yes ☐ No

Lakes/Docks Comments:





# Soil Subsidence

## Fire

Signs of Fire? ☒ No ☐ Yes ☐ No

Fire Comment (year, expanse, intensity)

none

## Soil Subsidence

New signs of oxidation/subsidence: ☒ No ☐ Yes ☐ No

Soil Subsidence Comment:

none

3" root exposure on several Cypress near gage

Future users of these data may not want to analyze/compare these data with other wetlands due to the extensive level of:

2014      Current

☐ ☐ Non-grounded water withdraw related disturbance

☐ ☐ Soil subsidence

## Lakes/Docks

- ☐ Docks completely out of water
- ☐ Docks touching water or with < 50% of dock over water
- ☐ Docks > 50% out of water
- ☐ N/A

2014 Is the littoral zone stranded? ☐

Current: ☐ Yes ☐ No

Lakes/Docks Comments:

General Comments/Observations:

Species Count

Common Name

Evidence Description





**Subsidence**



**Subsidence**



**Not Subsidence (adventitious roots)**



# Wildlife

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT



## Lakes/Docks

- ☐ Docks completely out of water
- ☐ Docks touching water or with < 50% of dock over water
- ☐ Docks > 50% out of water
- ☐ N/A

2014 Is the littoral zone stranded? ☐

Current: ☐ Yes ☐ No

## Lakes/Docks Comments:

## General Comm



Future users of these data may not want to analyze/compare these data with other wetlands due to the extensive level of:

2014

Current

☐

☐ Non-grounded water withdraw related disturbance

☐

☐ Soil subsidence

Species Count	Common Name	Evidence Description	



# Vegetation

(pp. 2, 3, and 4)

## Strata

- Groundcover (page 2)
- Shrubs and Small Trees (page 3)
- Trees (page 4)



**Trees**

**Shrubs and  
Small Trees**

**Groundcover**





# Groundcover

- All non-woody species
- All woody species <1 meter tall
- Rooted in the wetland
- *Always groundcover:*  
*Eupatorium*, *Typha*,  
*Rubus*, and all vines





# Shrubs and Small Trees

- Woody plants greater than 1 meter tall and less than 4 cm DBH
- Cabbage palm trunks with greater than 1 meter tall but less than 6 meters tall
- Must be rooted in wetland
- Generally have multiple stems
- Includes *Hypericum* spp., *Ilex glabra*, *Myrica* (Morella), *Lyonia*, and other woody plants with multiple stems when >trunks are greater than 1 m tall





# Trees

- All woody plants greater than 1 meter tall *and greater than 4 cm DBH*
- Includes cabbage palms greater than 6 meters tall
- Rooted in the wetland
- *Not Trees- Myrica (Morella), Lyonia spp., and other woody plants with multiple stems that are greater than one meter tall are assessed as shrubs and small trees.*





# WAP Species & Assigned Zones



## Appendix A. Plant list used for WAP methodology.

Botanical Name	Common Name	Synonymy	Wetland Zone
<i>Acer rubrum</i>	red maple		OD
<i>Amaranthus australis</i>	southern amaranth		T
<i>Ambrosia artemisiifolia</i>	common ragweed		U
<i>Amorpha fruticosa</i>	Bastard indigobush; false indigobush		T
<i>Ampelopsis arborea</i>	Peppervine		AD
<i>Amphicarpum muhlenbergianum</i>	blue maidencane		OD
<i>Andropogon glomeratus</i>	bushy bluestem		T
<i>Andropogon glomeratus var. glaucopsis</i>	purple bluestem		OD
<i>Andropogon virginicus</i>	broomsedge bluestem		AD
<i>Andropogon virginicus var. decipiens</i>	broomsedge bluestem		AD
<i>Andropogon virginicus var. glaucus</i>	chalky bluestem		U
<i>Axonopus spp.</i>	Carpetgrass		AD
<i>Baccharis spp.</i>	silverling, groundsel tree, sea myrtle		AD
<i>Bacopa caroliniana</i>	lemon bacopa; blue waterhyssop		OD
<i>Berchemia scandens</i>	alabama supplejack; rattan vine		T
<i>Callicarpa americana</i>	American beautyberry		U
<i>Campsis radicans</i>	trumpet creeper		T
<i>Carex longii</i>	long's sedge		T
<i>Celtis laevigata</i>	sugarberry; hackberry		T
<i>Centella asiatica</i>	Spadeleaf		T
<i>Cephalanthus occidentalis</i>	common buttonbush		D



For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count(#) (1-4), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]



For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count(#) (1-4), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]



# Zones

## WAP Instruction Manual

### Appendix B – Definition of Wetland Assessment Method Terms

- Upland (U) – Plant species that are not expected to be seen in wetlands. It is possible that a few of these species may be found along wetland edges, but are not expected throughout the Transition zone.



# Zones

## Appendix B – Definition of Wetland Assessment Method Terms

- Adaptive (AD) – Plant species designated as FAC or UPL by DEP, but commonly seen in the Transition zone (T) in limited numbers. *When Adaptive species are found in the Outer Deep (OD) or Deep (D) zones, they should be treated the same as Transition zone species.*



# Zones

## Appendix B – Definition of Wetland Assessment Method Terms

- Transition (T) – Plant species commonly found in the Transition zone, and designated FACW (a few OBL) by DEP.



# Zones

## Appendix B – Definition of Wetland Assessment Method Terms

- Outer Deep (OD) – Plant species commonly found in the Outer Deep zone, and designated either FACW or OBL by DEP.

# Zones

## Appendix B – Definition of Wetland Assessment Method Terms

- Deep (D) - Plant species commonly found in the Deep zone, and designated OBL by DEP.

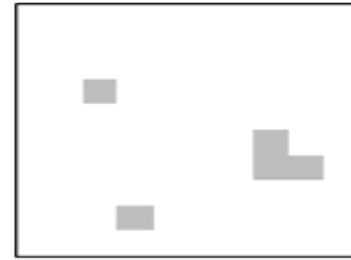
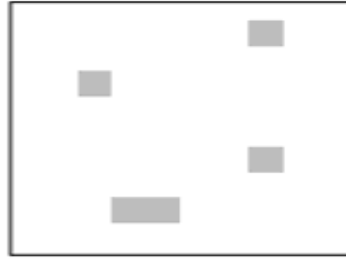
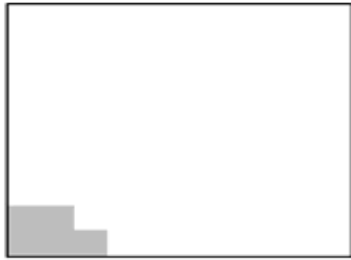


# Zones

- If a species is not a WAP plant,  
Zone designation is NA
- However, all species observed should  
be recorded

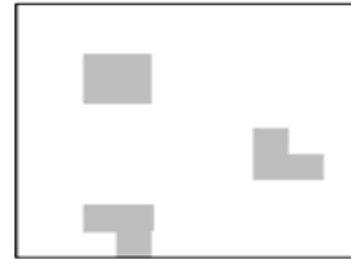
# Percent Cover

**1% to 5%: These are all 5% cover**



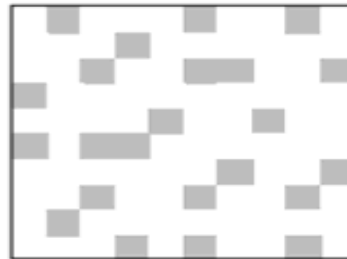
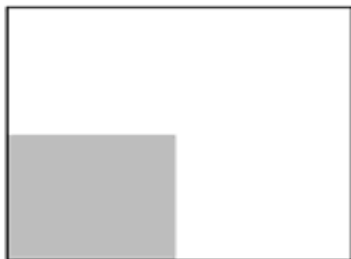
---

**6% to 10%: These are all 10% cover**



---

**11% to 25%: These are all 25% cover**





For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count(#)(1-4), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

Check if no groundcover ☐

[illegible]

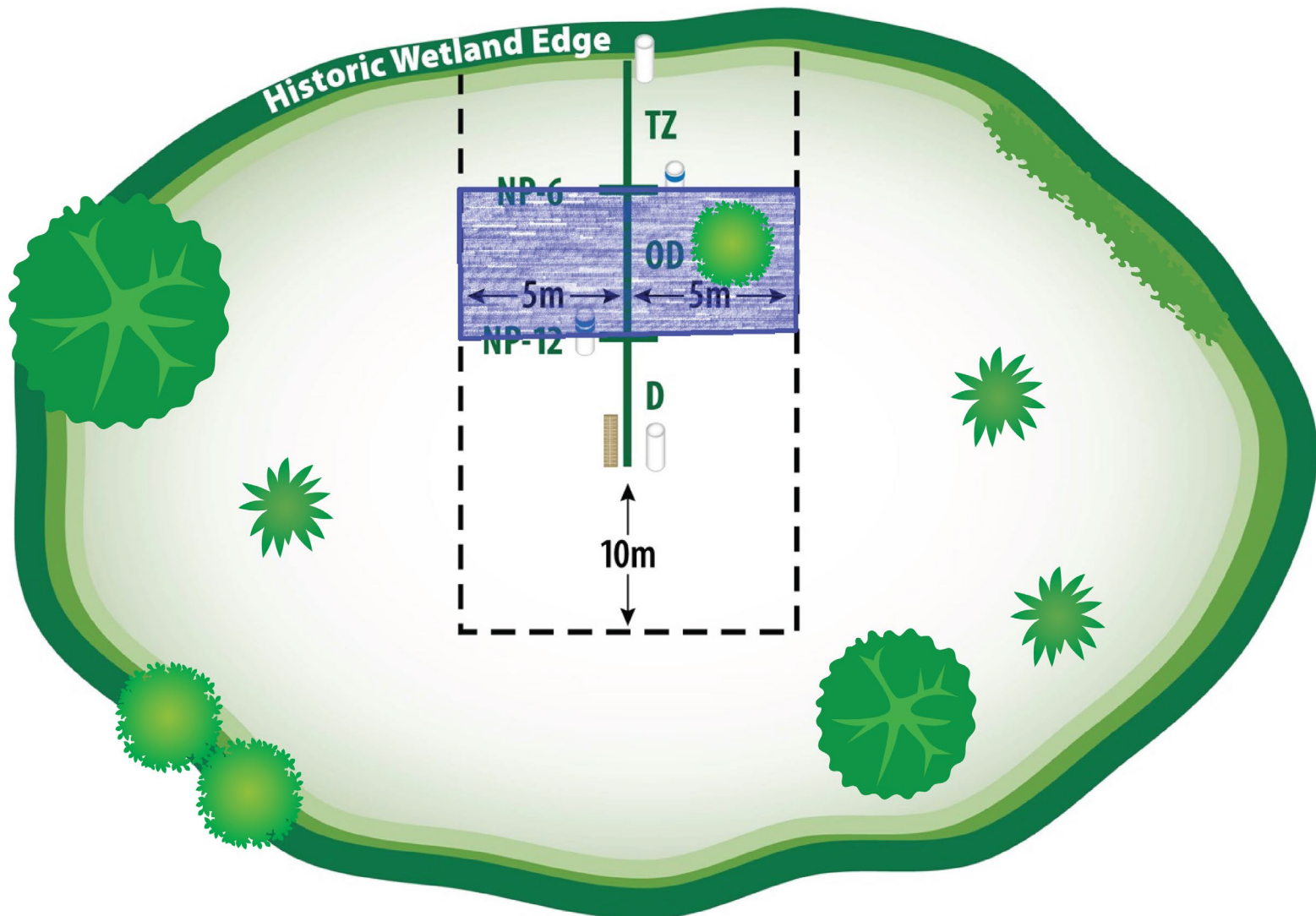
Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]

**Remember, only in 10% increments.**  
**10% < ~~15%~~ < 20%**





For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count(#)(1-4), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]

# Shrubs and Small Trees/ Trees (page 3 & 4)

## Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count (#) (1 - >50), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

### Transition Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Outer Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Shrubs/Small Trees Comments

### Zonation

Zonation Score

☐

Please assign a score of 1-5 or 0 (for N/A) and provide an explanation

Zonation Score Explanation:



# SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

## Groundcover (2014 data shaded)

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count (#) (1-4), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

### Transition Zone

Check if no groundcover 2014 ☐ Current ☐

2014      Current

Species	Z	%	#	D	%	#	D
Erioca decang	NA	10		T			
Amphic muhlen	OD	10		T			
Stilli aquati	D	5		T			
Eupato leptop	OD	5		T			
Pluche baccha	OD	5		T			
Droser capill	NA	5		T			
Dichan commut	NA	5		T			
Gratio ramosa	T	5		T			
Hyper fascic	OD	5		T			
Syngon flavid	NA		1	T			
Xyris elliot	NA		1	T			
Sagitt gramin	NA		1	T			
Juncus scirpo	NA		1	T			

### Outer Deep Zone

Check if no groundcover 2014 ☐ Current ☐

2014      Current

Species	Z	%	#	D	%	#	D
Stilli aquati	D	10		T			
Gratiola sp.	NA	5		E			
Pluche baccha	OD	5		T			
Eupato leptop	OD	5		T			
Amphic muhlen	OD	5		T			
Rhynch inunda	NA	5		T			
Erioca decang	NA		2	T			
Androp glomer glauco	OD		2	T			
Rhynch cephal	NA		2	T			
Taxodi ascend	D		1	T			
Xyris jupica	NA		1	T			
Androp glomer	T		1	T			

### Deep Zone

Check if no groundcover 2014 ☐ Current ☐

2014      Current

Species	Z	%	#	D	%	#	D
Rhynch inunda	NA	30		T			
Panicu hemito	NA	5		T			
Sagitt gramin	NA	5		T			
Carex verruc	NA	5		T			
Erioca decang	NA	5		T			
Cladiu jamaic	NA		4	T			
Pluche baccha	OD		2	B			

## Shrubs/Small Trees (2014 data shaded)

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count (#) (1 - >50), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

### Transition Zone

Check if no shrubs 2014 ☐ Current ☐

2014      Current

Species	Z	%	#	D	%	#	D
Stilli aquati	D		4	T			

### Outer Deep Zone

Check if no shrubs 2014 ☐ Current ☐

2014      Current

Species	Z	%	#	D	%	#	D
Myrica cerife	AD	20	15	T			
Taxodi ascend	D	10	10	T			
Stilli aquati	D	5	10	T			
Hyper fascic	OD	5	5	T			
Pinus elliot	AD	5	3	T			

### Deep Zone

Check if no shrubs 2014 ☐ Current ☐

2014      Current

Species	Z	%	#	D	%	#	D
Taxodi ascend	D	10	17	T			
Stilli aquati	D	5	8	T			
Myrica cerife	AD	5	6	B			

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count(#) (1-4) and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]

Check if no groundcover ☐

[illegible]



# Dead vs. Live Vegetation





# Explanations and Comments

## Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count (#) (1 - >50), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

### Transition Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Outer Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Shrubs/Small Trees Comments

### Zonation

Zonation Score ☐

Please assign a score of 1-5 or 0 (for N/A) and provide an explanation

Zonation Score Explanation:

### Stress

Signs of stress of appropriate shrubs and small trees (including dead species)



# Guidance/Reminders

- Don't include plants in pathways / trails
- The total percent cover does not have to equal 100%
- Be careful with ID and estimates of distant plants
- Add any notes to explain yourself, as needed
- Remember to include only living plants
- Edge vs. Throughout

# Guidance/Reminders

- Look at previous year's data, and try to be consistent (within reason)
- Trees shouldn't change much
- Exact width of transect is not critical
- When disagreeing with previous years, include explanation



# Guidance/Reminders

If any zone has been temporarily disturbed (pig rooting, fire, etc.):

- Check “no cover” box (top of zone species list, pp. 2,3, and 4)
- Add an explanation
- Re-evaluate next year

# When is NA an Appropriate Score?

Not enough cover in any zone to make an evaluation of a stratum

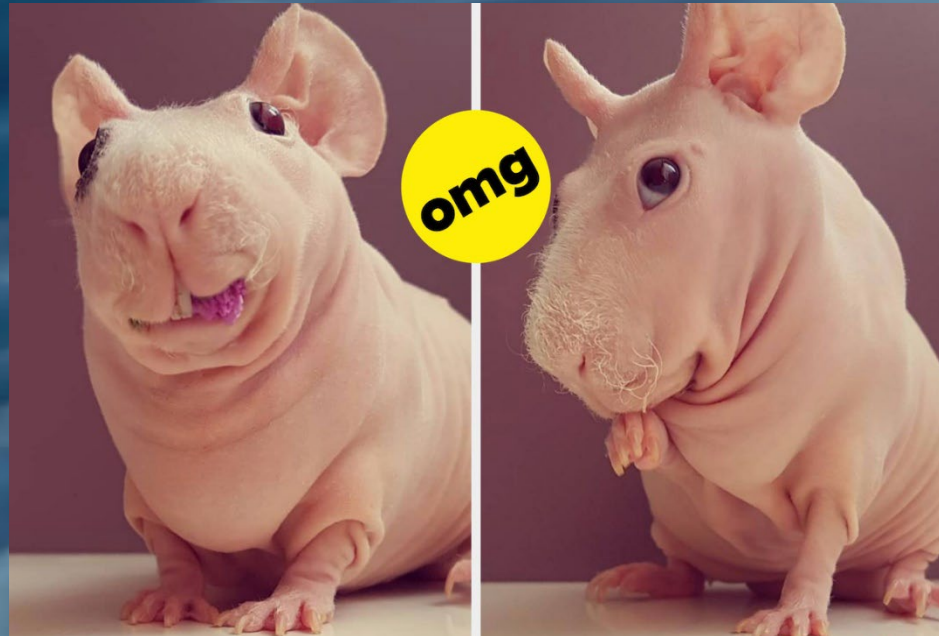
- If <5% groundcover, only one shrub or small tree, or only one tree

Guidance: If you feel there is not enough of the cover to make a meaningful score, choose NA.

- Can also be due to high water, fire, inaccessibility, or other temporary reasons
- **Explain reasons**



# Examples of not enough groundcover (NA)





# Zonation Score

- For each stratum, score each zone
  - Stick closely to the rules
  - A choice of 1-5 or NA must be made for each stratum based on the *lowest zone score in each stratum*



COVER CATEGORIES RANKING SCALE
 Wetland ID \_\_\_\_\_  
 Personnel \_\_\_\_\_  
 Date \_\_\_\_\_

Check the ONE box that applies for each Cover category. Each Cover category can have only 1 Rank Score, e.g.: Rank 2, GC; Rank 4, Tr; Rank 4, S; that best describes the most degraded condition for each cover category. Two different Rank Scores can never be assigned to a cover category. **DO NOT** accumulate percentages or numbers between zones. Copy the ranking scales derived for each Cover category to the WAP Field Form

RANK SCORE

5

No Migration or

Inward Migration 1 zone BEYOND or THROUGHOUT or Species found only along Zone EDGE (within 1 ft.)

- GC ☐ < 5% cover for all inappropriate species  
 S ☐ < 2 specimens  
 Tr ☐ < 2 specimens  
 AND/OR (Adaptive Species in the Transition Zone)  
☐ < 25% GC and/or ☐ < 5 specimens S and/or ☐ < 5 specimens Tr

4 Migration Inward 1 Zone – Species distributed BEYOND a few feet or THROUGHOUT a Zone

- GC ☐ 5% - 25% cover for all species  
 S ☐ 2 or 3 specimens  
 Tr ☐ 2 or 3 specimens  
 AND/OR (Adaptive Species located THROUGHOUT much of the Trans Zone)  
☐ > 25% GC and/or ☐ > 5 specimens S and/or ☐ > 5 specimens Tr

3 Migration Inward 1 Zone – Species distributed THROUGHOUT MUCH of the Zone

- GC ☐ > 25% cover for all species  
 S ☐ > 5 specimens  
 Tr ☐ > 5 specimens  
 AND/OR (Inward Migration 2 Zones distributed BEYOND or THROUGHOUT)  
 GC ☐ 5% - 25% cover for all species  
 S ☐ > 2 but < 5 specimens  
 Tr ☐ > 2 but < 5 specimens

2 Migration Inward 2 Zones – Species distributed THROUGHOUT the Zone

- GC ☐ > 25% cover for all species  
 S ☐ > 5 specimens  
 Tr ☐ > 5 specimens  
 AND/OR (Upland species moved into DEEP zone, distributed BEYOND or THROUGHOUT)  
 GC ☐ 5% - 25% cover for all species  
 S ☐ > 2 but < 5 specimens  
 Tr ☐ > 2 but < 5 specimens

1 Migration of Upland species distributed THROUGHOUT much of the DEEP zone

- GC ☐ > 25% cover for all species  
 S ☐ > 5 specimens  
 Tr ☐ > 5 specimens

N/A Not enough Cover to make an evaluation, &lt; 2 S or &lt; 5% GC (Please explain below)

- GC ☐ \_\_\_\_\_  
 S ☐ \_\_\_\_\_  
 Tr ☐ \_\_\_\_\_

Notes: 1. AD species are treated the same as T species when they are found in the OD and D Zones

2. If there are not enough species or #'s to justify one score, choose the higher score.

Legend

GC = Ground Cover Tr = Tree Cover T = Transitional AD = Adaptive  
 S = Shrub & Small Tree Cover D = Deep Zone OD = Outer Deep

Ranking Scale

5. Normal zonation. Some species may have migrated inward one zone, but they are not in enough numbers and/or right along the zone edge. Adaptive species in the transition zone are not considered abnormal if they are not in high numbers and distribution.

4. Species have moved in one zone in enough numbers and distribution to be of concern, and/or species with an adaptive classification are in high numbers and distribution in the transition zone.

3. Species have moved in one zone in high numbers and distribution, and/or species have moved in two zones in enough numbers and distribution to be of concern.

2. Species have moved in two zones in high numbers and distribution, and/or some species with an upland classification have moved into the deep zone in enough numbers and distribution to be of concern.

1. Species with an upland classification have moved into the deep zone in high numbers and distribution.

NA. Not enough cover to make evaluation (< 5 percent for groundcover, and < 2 individuals for "shrubs and small trees" and "trees")

Guidance:

For groundcover:

- "Enough numbers" generally means greater than 5 percent cover for all species.
- "High numbers" generally means greater than 25 percent cover.
- "Enough distribution" generally means located beyond a few feet of the appropriate zone.
- "High distribution" generally means located throughout much of the zone.

For shrubs and small trees, and trees:

- "Enough numbers" generally means 2 or 3 specimens.
- "High numbers" generally means greater than 5 specimens.
- "Enough distribution" generally means located beyond a few feet of the appropriate zone.
- "High distribution" generally means located throughout much of the zone.

If there are not enough specimens to justify one score, choose the one higher. For example, if all you have is one T shrub well into the deep zone (two zone move), a "3" is not justified (less than 2 to 3 specimens). Choose a "4".

Note: For scoring purposes, AD species are treated the same as T species when they are found in the Outer Deep and Deep zones.

### Ranking Scale

5. Normal **zonation**. Some species may have migrated inward one **zone**, but they are not in enough numbers and/or right along the **zone** edge. **Adaptive species** in the **transition zone** are not considered abnormal if they are not in high numbers and distribution.
  4. Species have moved in one **zone** in enough numbers and distribution to be of concern, and/or species with an **adaptive** classification are in high numbers and distribution in the **transition zone**.
  3. Species have moved in one **zone** in high numbers and distribution, and/or species have moved in two **zones** in enough numbers and distribution to be of concern.
  2. Species have moved in two **zones** in high numbers and distribution, and/or some species with an **upland** classification have moved into the **deep zone** in enough numbers and distribution to be of concern.
  1. Species with an **upland** classification have moved into the **deep zone** in high numbers and distribution.
- NA. Not enough **cover** to make evaluation (< 5 percent for groundcover, and < 2 individuals for "shrubs and small trees" and "trees")



# Numbers & Distribution

## Guidance:

### For **groundcover**:

- a. "Enough numbers" generally means greater than 5 percent **cover** for all species.
- b. "High numbers" generally means greater than 25 percent **cover**.
- c. "Enough distribution" generally means located beyond a few feet of the appropriate **zone**.
- d. "High distribution" generally means located throughout much of the **zone**.

### For **shrubs and small trees**, and **trees**:

- a. "Enough numbers" generally means 2 or 3 specimens.
- b. "High numbers" generally means greater than 5 specimens.
- c. "Enough distribution" generally means located beyond a few feet of the appropriate **zone**.
- d. "High distribution" generally means located throughout much of the **zone**.

*If there are not enough specimens to justify one score, choose the one higher. For example, if all you have is one T shrub well into the deep zone (two zone move), a "3" is not justified (less than 2 to 3 specimens). Choose a "4".*

*Note: For scoring purposes, AD species are treated the same as T species when they are found in the Outer Deep and Deep zones.*

# Numbers & Percentages

- Percentages are not cumulative between zones
  - 3 Adaptive (AD) plants into the Outer Deep (OD) zone, and 3 Outer Deep plants into the Deep (D) zone is not a one zone move for 6 plants
  - 15% Adaptive species into the Outer Deep zone, and 20% Outer Deep species into the Deep zone is not a 35% one zone move.



## Wetland Assessment Procedure

P. 2

Wellfield/Property: Portfolio

Wetland Name

Wetland Type

Cross Bar Ranch

CBARWF Stop #7

Cypress Isolated

Wetland ID:

Prev Yr. Assessment Area Width

Zone Assessment Notes

Transect

22

5M on each side of transect

Cross Bar Stop #7 A

## Groundcover

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count(#) (1-4), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

## Transition Zone

Check if no groundcover ☐

## Outer Deep Zone

Check if no groundcover ☐

## Deep Zone

Check if no groundcover ☐

Species	Z	%	#	D
<i>Amphicarpum muhlenbergianum</i>	OD		3	T
<i>Erechtites hieraciifolius</i>	AD	10		T
<i>Myrica cerifera</i>	AD		4	T
<i>Persea palustris</i>	OD	10		T
<i>Rubus argutus</i>	AD		3	E
<i>Smilax bona-nox</i>	AD		2	T
<i>Vitis rotundifolia</i>	AD		3	T
<i>Eupatorium leptophyllum</i>	OD		4	T
<i>Toxicodendron radicans</i>	AD	5		T
<i>Hypericum cistifolium</i>		5		T

4

Species	Z	%	#	D
<i>Amphicarpum muhlenbergianum</i>	OD	20		T
<i>Centella asiatica</i>	T	5		E
<i>Erechtites hieraciifolius</i>	AD		2	T
<i>Eupatorium leptophyllum</i>	OD	10		T
<i>Baccharis halimifolia</i>	AD		3	T
<i>Pluchea rosea</i>	OD	10		T
<i>Vitis rotundifolia</i>	AD		4	T
<i>Callicarpa americana</i>	U		2	E
<i>Rubus argutus</i>	AD		3	T
<i>Hypericum cistifolium</i>			3	T
<i>Cerastium glomeratum</i>			2	T
<i>Rhynchospora wrightiana</i>		10		T

4

Species	Z	%	#	D
<i>Stillingia aquatica</i>	D	10		T
<i>Panicum hemitomon</i>		10		T
<i>Amphicarpum muhlenbergianum</i>	OD	5		T
<i>Erechtites hieraciifolius</i>	AD		3	T
<i>Blechnum serrulatum</i>		10		T
<i>Diodia virginiana</i>	OD	5		T
<i>Pluchea rosea</i>	OD		3	T
<i>Woodwardia virginica</i>		10		T
<i>Xyris jupicai</i>		5		T
<i>Lachnanthes caroliniana</i>		5		T

4

## Groundcover Comments

## Zonation

Zonation Score:

4

Please assign a score of 1-5 or 0 (for N/A) and provide an explanation

Zonation Score Explanation:

4 in the transition zone high number of adaptive species and 4 in the outer deep zone because One zone move of transition and adaptive species in enough numbers, and 4 in deep because one zone move of outer deep species enough numbers

## Wetland Assessment Procedure

P. 3

Wellfield/Property: Portfolio

Wetland Name

Wetland Type

Cross Bar Ranch

CBARWR Stop #7

Cypress Isolated

Wetland ID: Prev Yr. Assessment Area Width

22

Zone Assessment Notes

5M on each side of transect

Transect

Cross Bar Stop #7 A

## Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count (#) (1 - >50), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

## Transition Zone

Check if no shrubs/small trees ☐

## Outer Deep Zone

Check if no shrubs/small trees ☐

## Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D
<i>Myrica cerifera</i>	AD	5	3	T
<i>Persea palustris</i>	OD	10	3	T

Species	Z	%	#	D
<i>Persea palustris</i>	OD	10	5	T
<i>Taxodium ascendens</i>	D	20	13	T

Species	Z	%	#	D
<i>Persea palustris</i>	OD	5	2	T
<i>Taxodium ascendens</i>	D	30	25	T

## Shrubs/Small Trees Comments

Some Myrica were hummocked and were not counted

## Zonation

Zonation Score

5

Please assign a score of 1-5 or 0 (for N/A) and provide an explanation

Zonation Score Explanation:

Transition zone had 3 Myrica rooted in the ground- Not in "High Numbers". In Deep Zone it was determined that the Persea was not significant enough to drop score because one was on the edge of the zone.

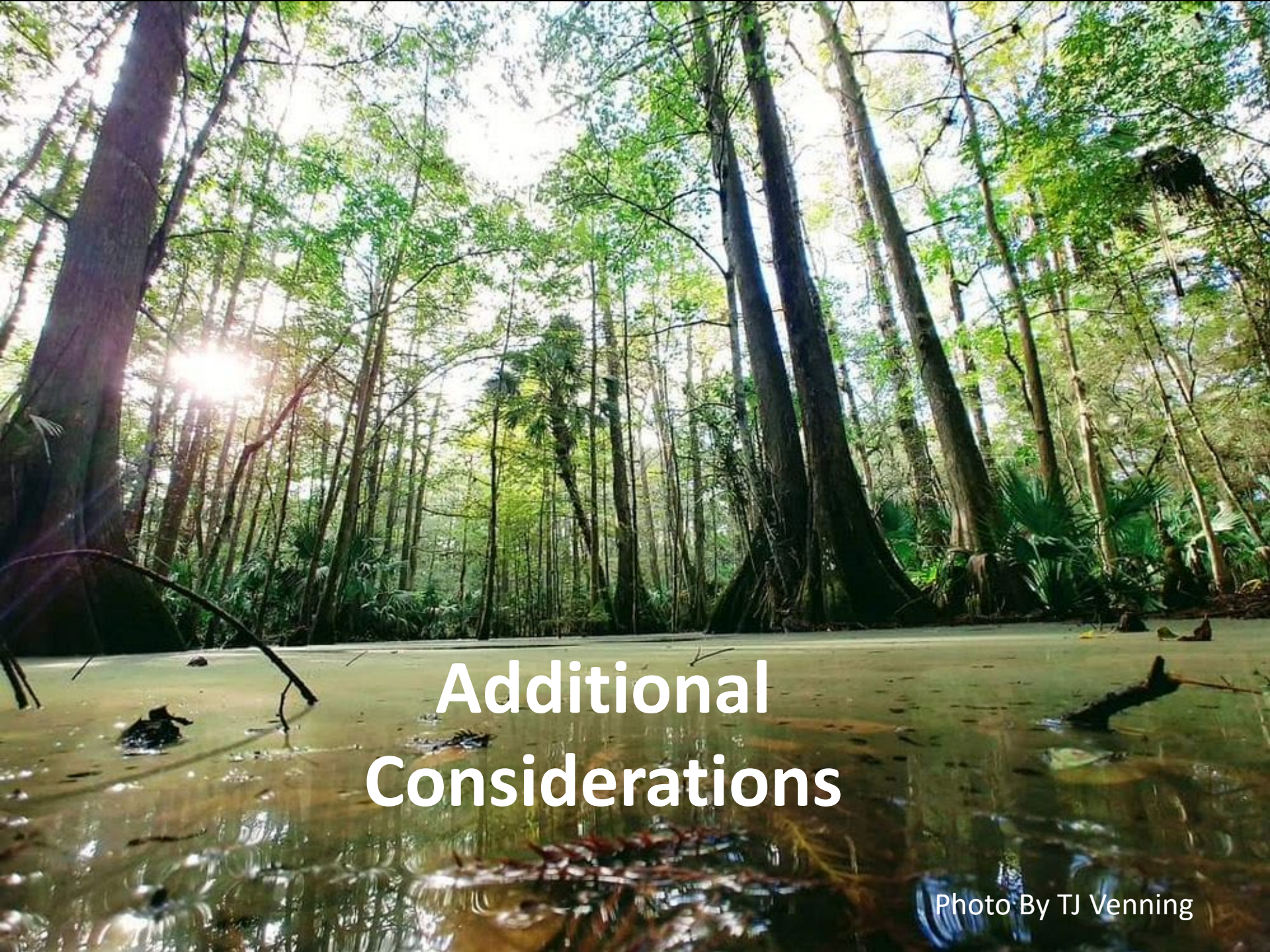


# Explanations

- Explain your score in the Zonation Score Explanation box
- Also, comments in the Comments box, if appropriate





A photograph of a swampy forest. In the foreground, there is a body of water with a greenish tint, reflecting the surrounding trees. Several large, dark tree trunks are visible, some with prominent buttresses. The background is filled with a dense canopy of green leaves, and sunlight is filtering through the trees on the left side, creating a bright spot. The overall scene is a lush, natural environment.

# Additional Considerations

Photo By TJ Venning



# Shrubs and Small Trees (page 3)

## Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (ZONE) (U, AD, T, OD, or D), percent cover (%) (5% or 10% - 100% in increments of 10%), count (#) (1 - >50), and distribution (DIST) (E=edge, B=beyond a few feet, or T=throughout).

### Transition Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Outer Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Deep Zone

Check if no shrubs/small trees ☐

Species	Z	%	#	D

### Shrubs/Small Trees Comments

### Zonation

Zonation Score ☐

Please assign a score of 1-5 or 0 (for N/A) and provide an explanation

Zonation Score Explanation:

### Stress

Signs of stress of appropriate shrubs and small trees (including dead species)

- ☐ Little or None  
☐ Noticeable  
☐ Significant  
☐ Not Applicable

Signs of stress of inappropriate shrubs and small trees (including dead species)

- ☐ Little or None  
☐ Noticeable  
☐ Significant  
☐ Not Applicable

# Stress

## (Shrubs and Small Trees)

- Appropriate species – species found in the WAP zone in which they would normally be expected (e.g., *Myrica* (*Morella*) in Transition zone)
  - Inappropriate species – species found in the WAP zone in which they would *not* normally be expected (e.g., *Myrica* in the Outer Deep or Deep zones)
- \* Include all dead shrubs and small trees (appropriate *and* inappropriate)



# Stress

- Little or None
- Noticeable
- Significant
- Not Applicable





*Ilex glabra*



# Trees (page 4)

## Stress

Signs of stress of appropriate trees (do not include dead species)

- ☐ Little or None
- ☐ Noticeable
- ☐ Significant
- ☐ Not Applicable

^

v

Signs of stress of inappropriate trees (include dead species)

- ☐ Little or None
- ☐ Noticeable
- ☐ Significant
- ☐ Not Applicable

^

v

Dead/leaning trees (include standing dead trees and dead trees on ground that are appropriate.

- ☐ Little or None
- ☐ Noticeable
- ☐ Significant
- ☐ Not Applicable

^

v

## Recovery

Signs of tree recovery

- ☐ Yes
- ☐ No
- ☐ Not Sure
- ☐ Not Applicable

^

v

Inappropriate vine death suggesting recovery

- ☐ Yes
- ☐ No
- ☐ Not Sure
- ☐ Not Applicable

^

v



*Taxodium*







**Stressed vs. Dead?**







# Dead and Leaning Trees

## Stress

Signs of stress of appropriate trees (do not include dead species)

- ☐ Little or None
- ☐ Noticeable
- ☐ Significant
- ☐ Not Applicable

Signs of stress of inappropriate trees (include dead species)

- ☐ Little or None
- ☐ Noticeable
- ☐ Significant
- ☐ Not Applicable

Dead/leaning trees (include standing dead trees and dead trees on ground that are appropriate.)

- ☐ Little or None
- ☐ Noticeable
- ☐ Significant
- ☐ Not Applicable

## Recovery

Signs of tree recovery

- ☐ Yes
- ☐ No
- ☐ Not Sure
- ☐ Not Applicable

Inappropriate vine death suggesting recovery

- ☐ Yes
- ☐ No
- ☐ Not Sure
- ☐ Not Applicable

# Dead and Leaning Trees

- Include only appropriate trees.
- Include all trees in entire wetland (viewable distance).
- Include standing and fallen dead trees.
- Do not include timbered trees or storm/wind impacts.
- Include leaning trees that are alive (leaning = 30 degrees *or more*.)

Think: Is it *hydrology* related?







# Recovery

## Recovery

Signs of tree recovery

2015 4 Data: N/A

- ☐ Yes
- ☐ No
- ☐ Not Sure
- ☐ Not Applicable

Example: Young cypress recruitment.

Inappropriate vine death suggesting recovery

2015 1 Data: N/A

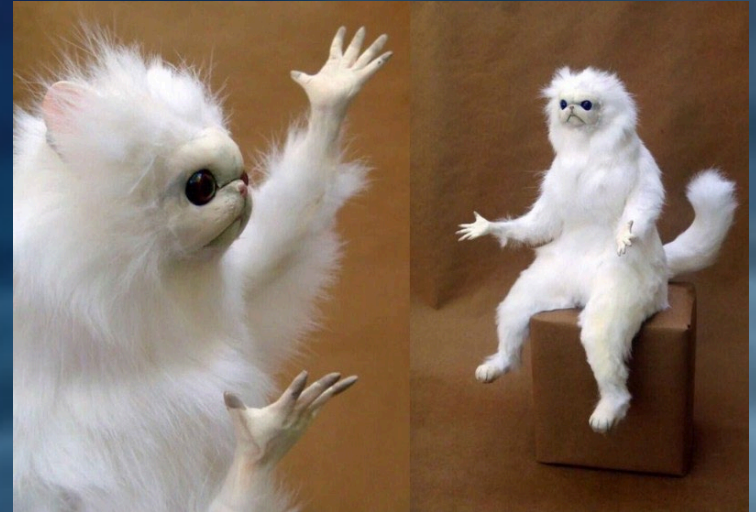
- ☐ Yes
- ☐ No
- ☐ Not Sure
- ☐ Not Applicable

Example: *Vitis* in deeper zones (not on hummock) now dying.

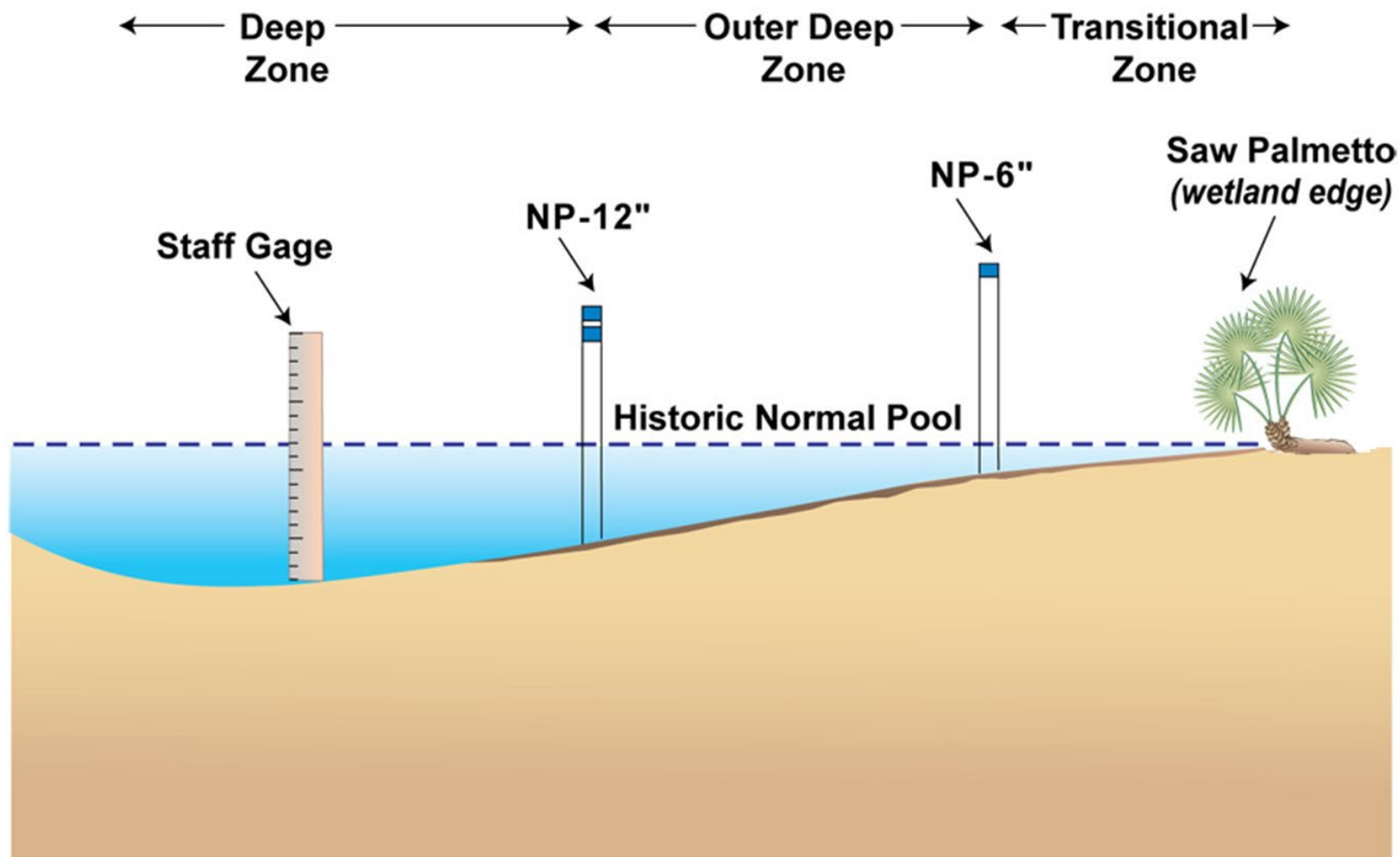


# Challenging Aspects of WAP

- Knowing the plants / WAP Field ID Guide
- Percent cover
- Topography
- Hummocks
- Writing down explanations
- Trusting your judgement

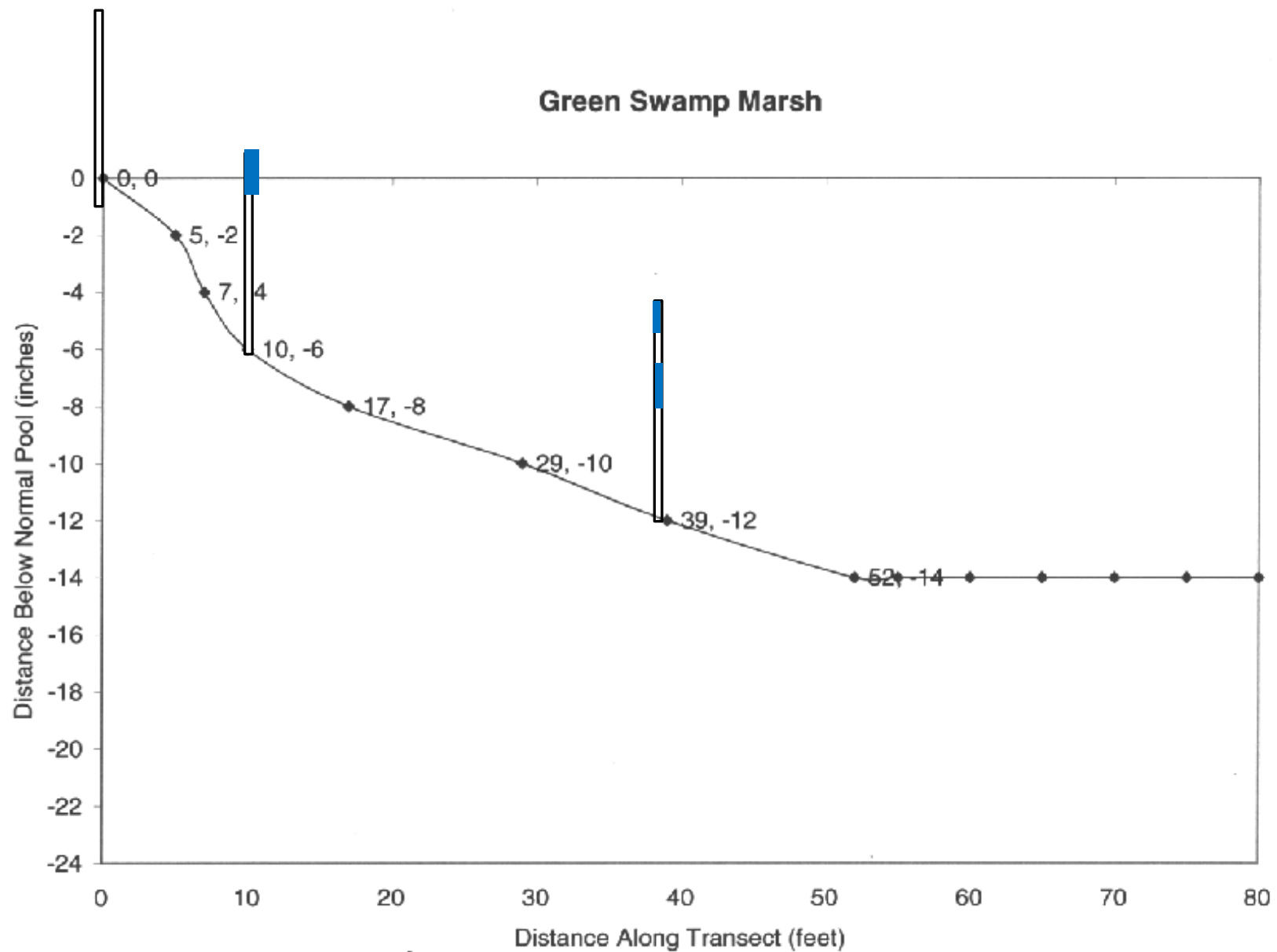


## ***Example of Typical WAP Transect***





## Green Swamp Marsh



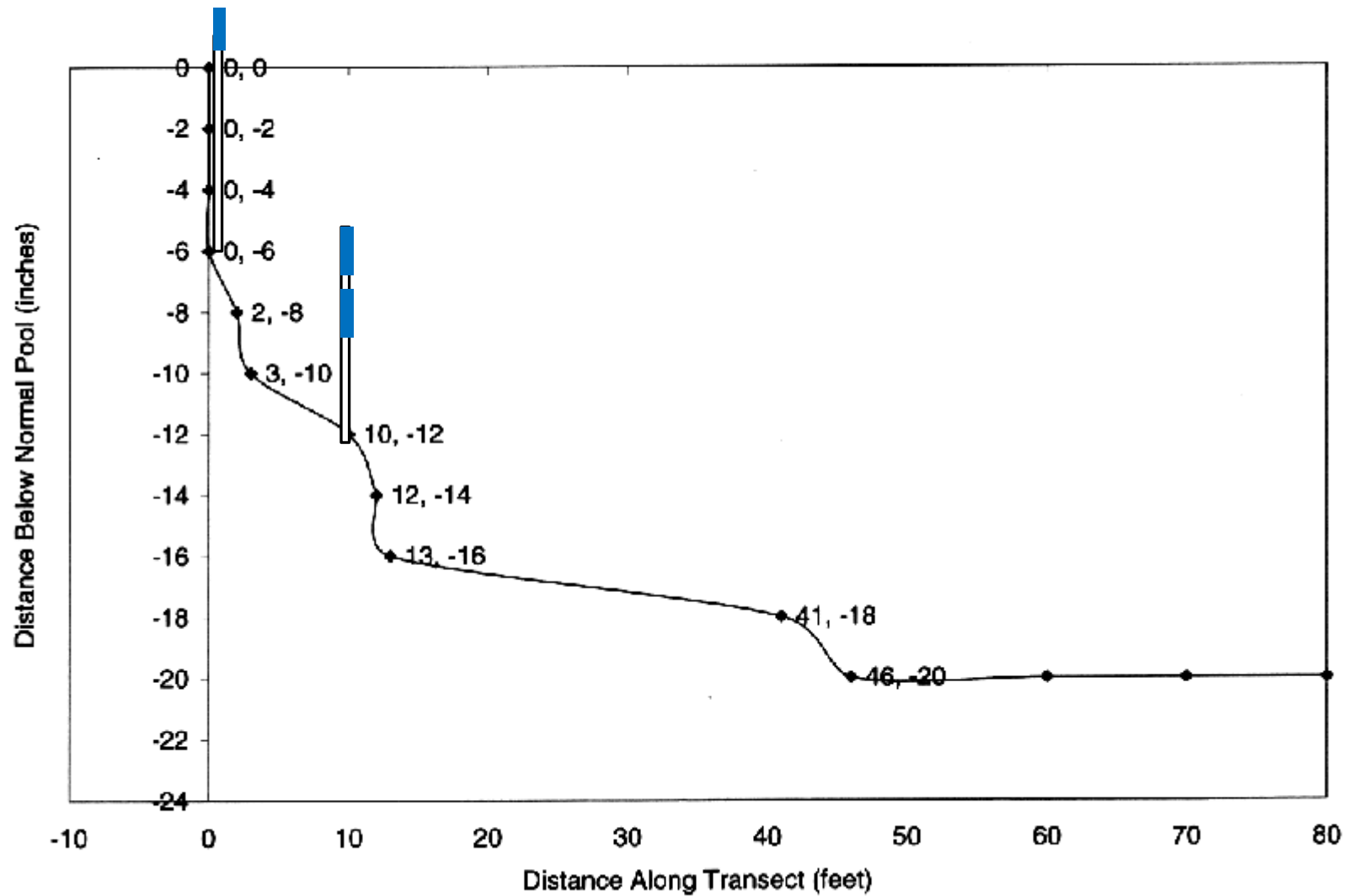
Berryman &amp; Henigar, 2005

# Missing Zones



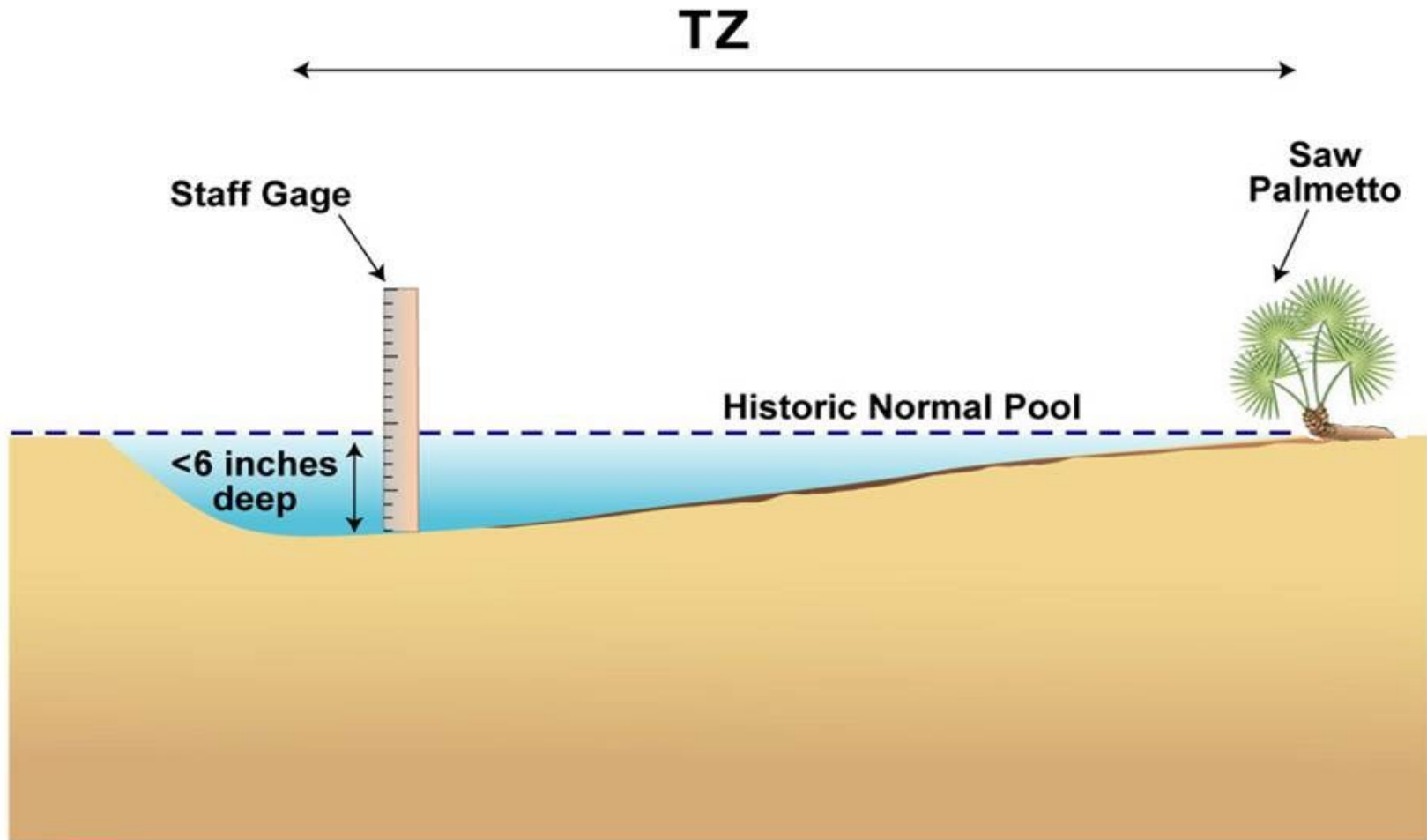


## NP-36

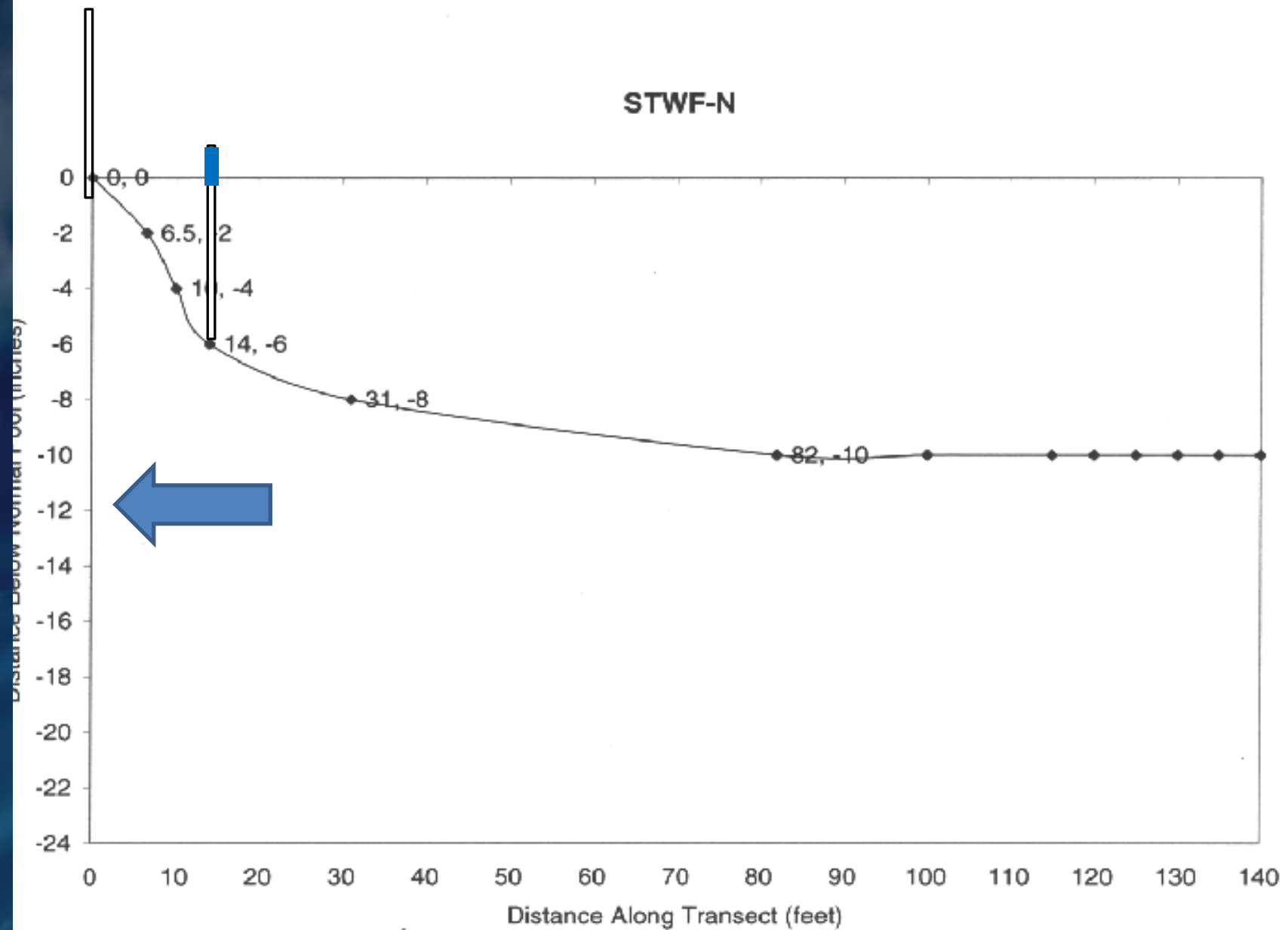


Berryman &amp; Henigar, 2005

## ***Example of WAP Transect in a Shallow Wetland***







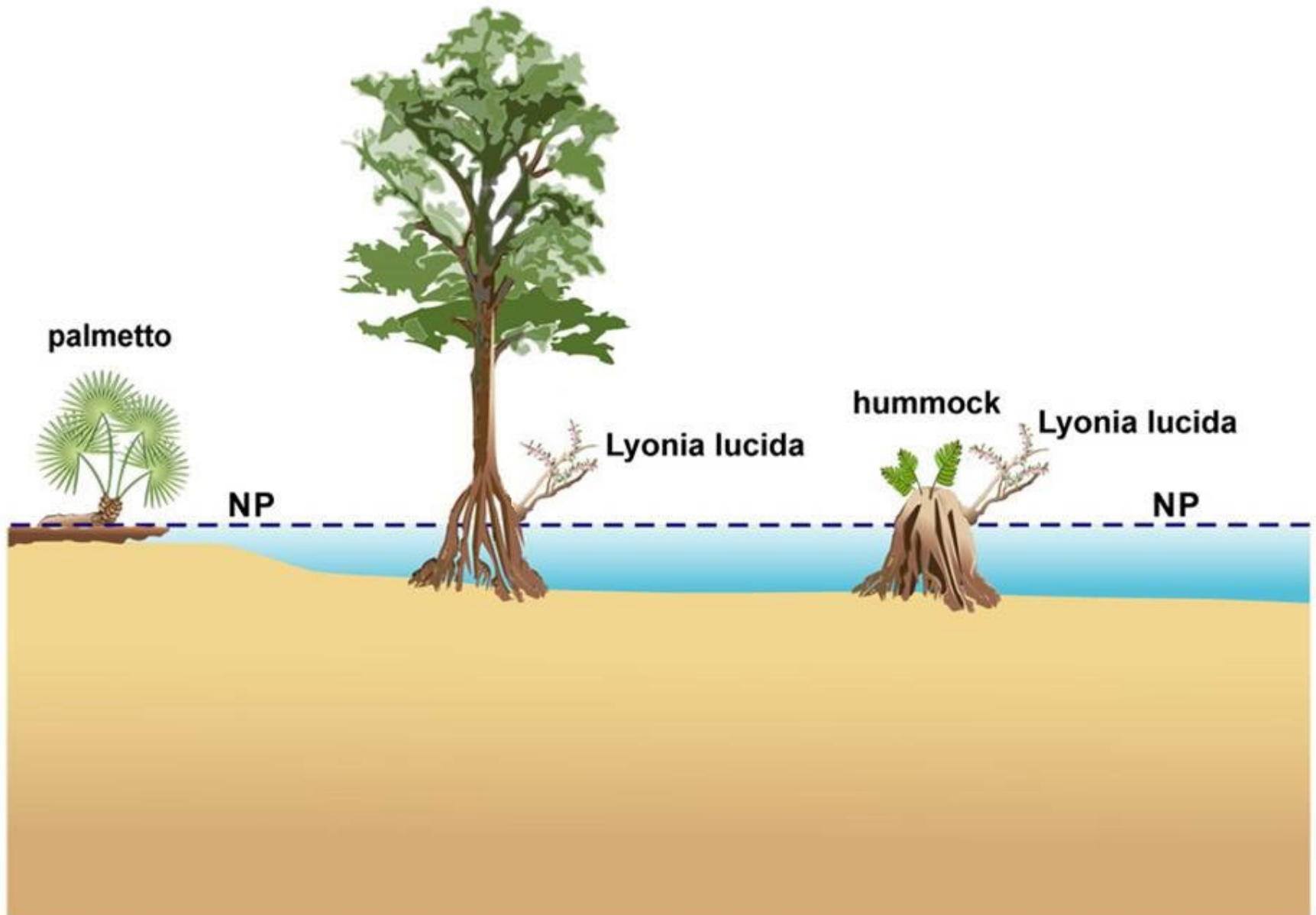


# Hummocks

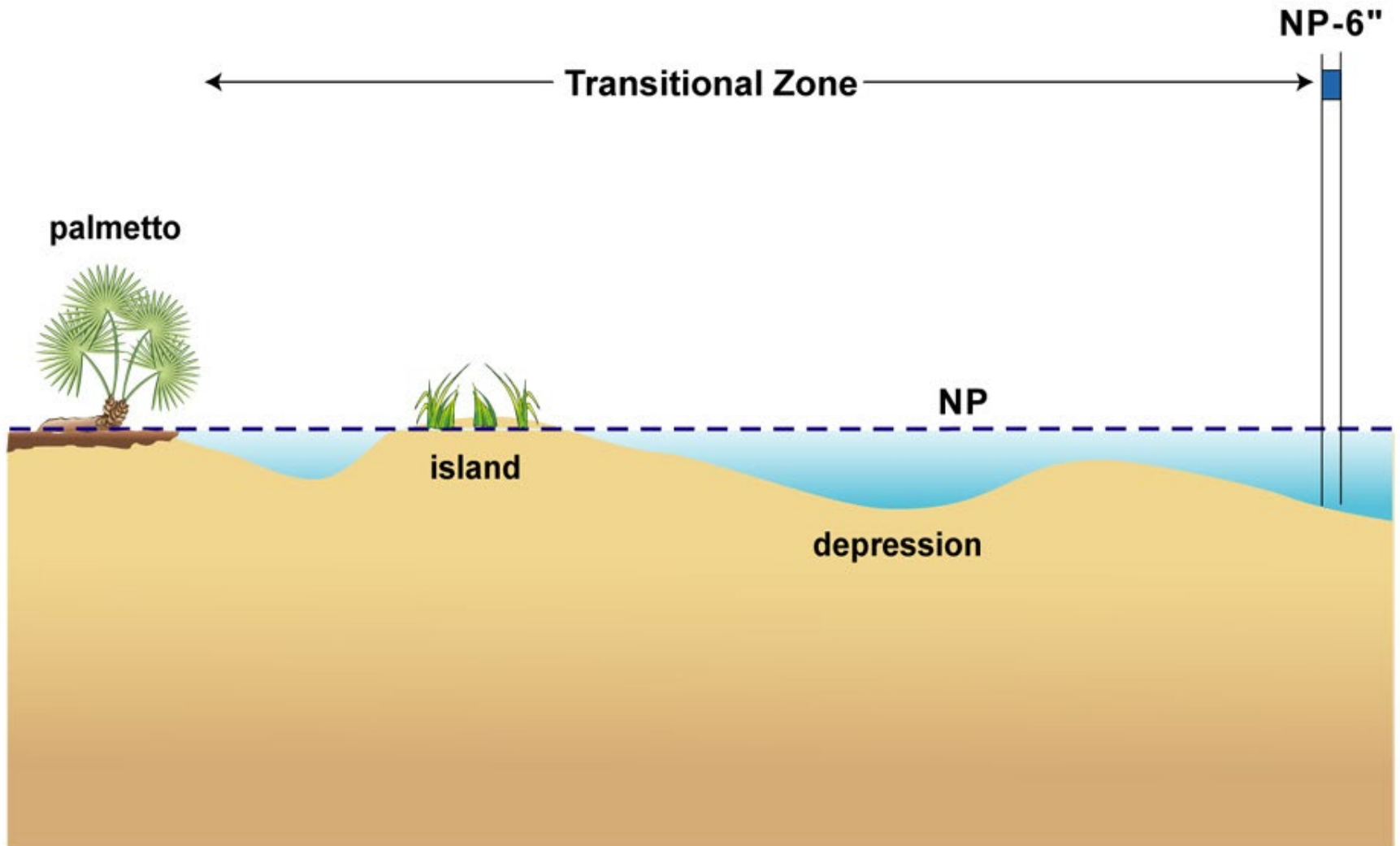




# *Tree Bases and Hummocks*

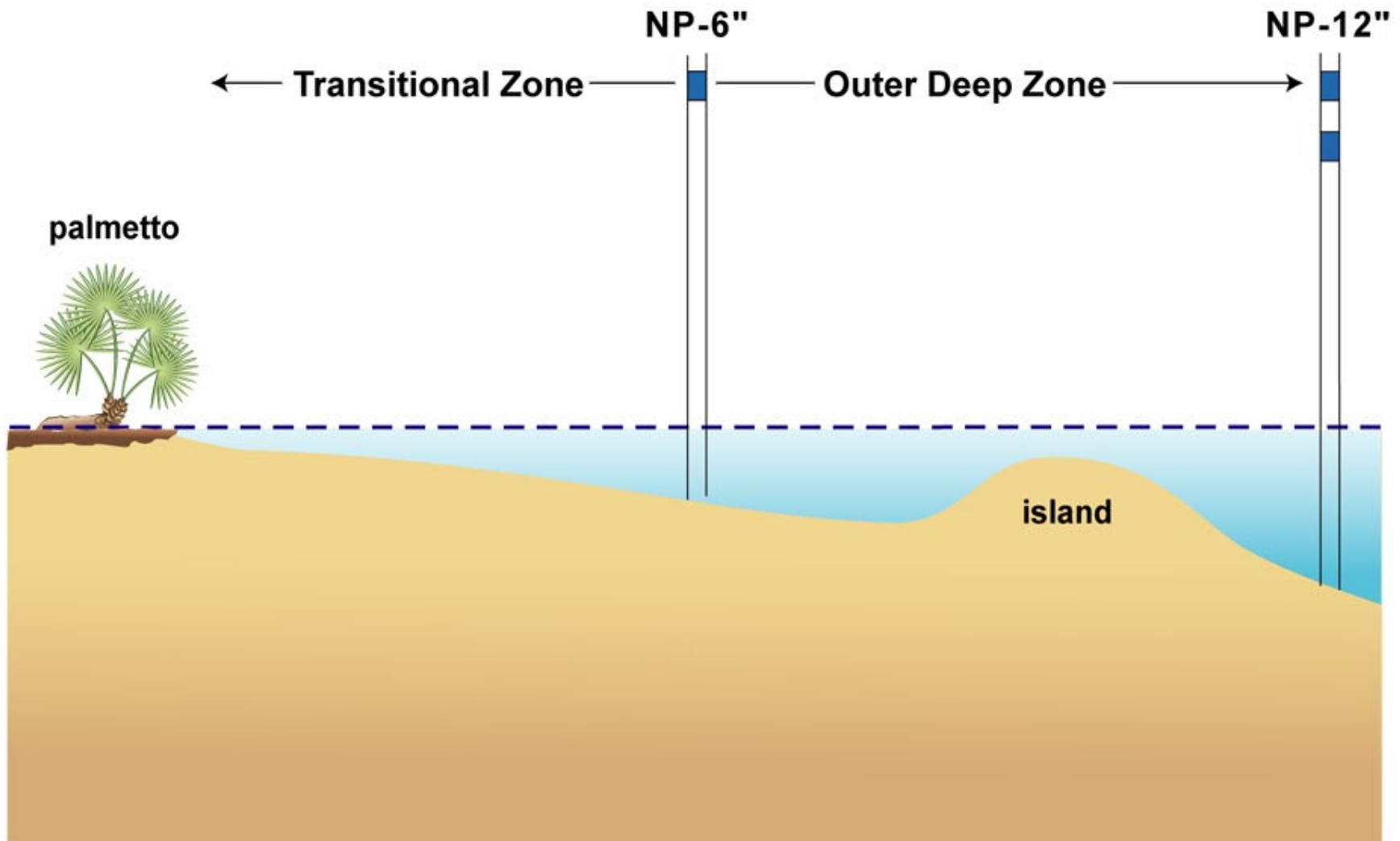


# ***Island and Depression in the Transitional Zone***

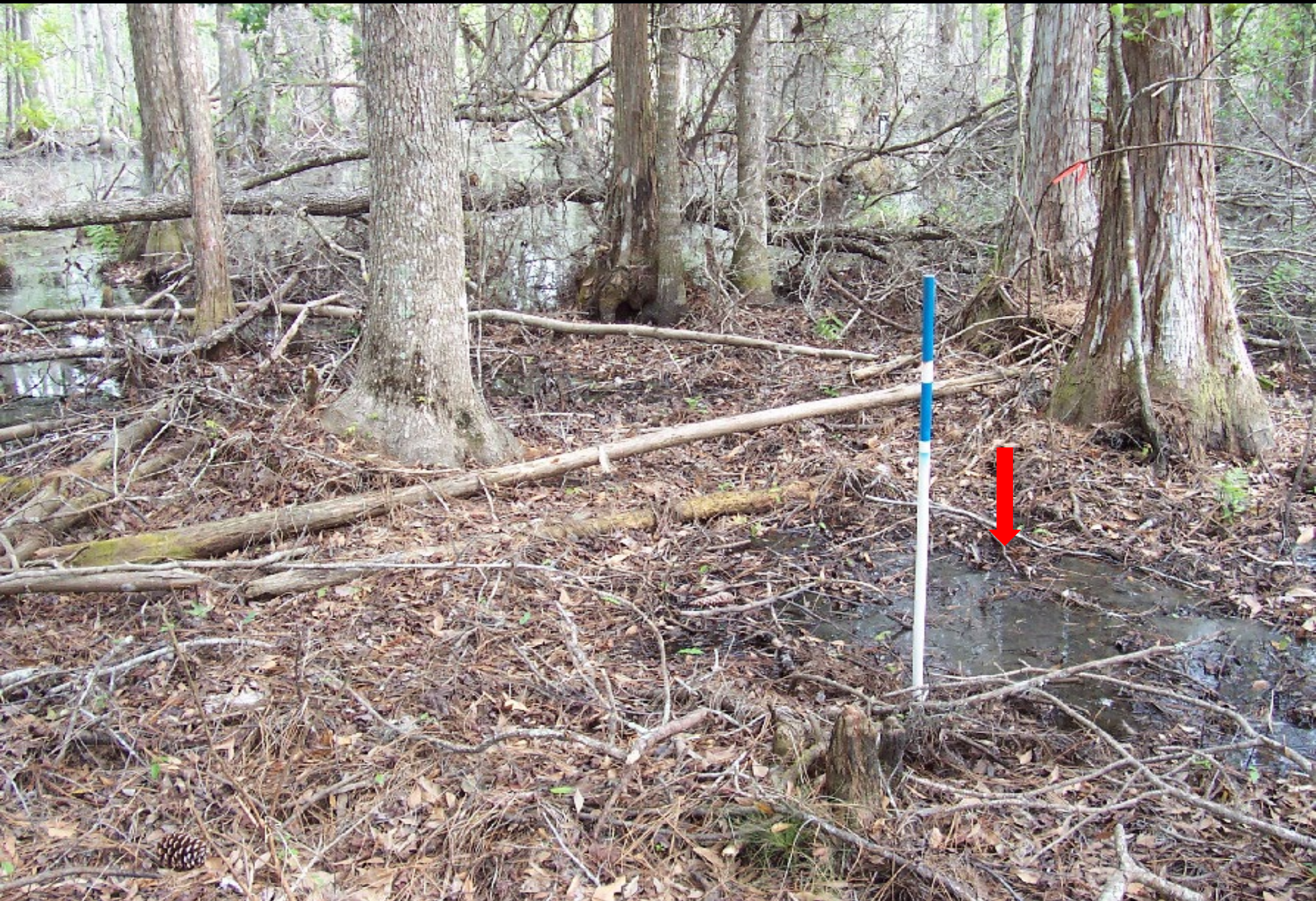




# ***“Island” in the Outer Deep Zone***













# Vehicle Impacts



Exclude?  
Include?  
Note it.



# Appendices of WAP Manual

A - Plant List

B - Definitions

C - Historic Normal Pool and Historic Wetland Edge

D - Wetland Types

E - Wetland History

F - Transect Information “Worksheet”

G - References



A photograph of a marshy landscape. In the foreground, there is a body of water reflecting the sky and the surrounding vegetation. Tall, green grasses and some brown, dried plant matter are visible in the water. In the background, a dense forest of tall, thin pine trees stands against a pale, overcast sky. The word "Questions" is written in white, bold, sans-serif font across the center of the image.

# Questions

Photo By TJ Venning



## Scoring How-To

1. Add up AD in T Zone. Are there high numbers? Are there enough U in T zone to lower score?
2. Add up AD and T in OD zone. Are there enough numbers? High numbers? Enough U plants?
3. Add up AD and T in D zone. Separately add up OD in D deep zone. Are there enough numbers of either? High numbers?