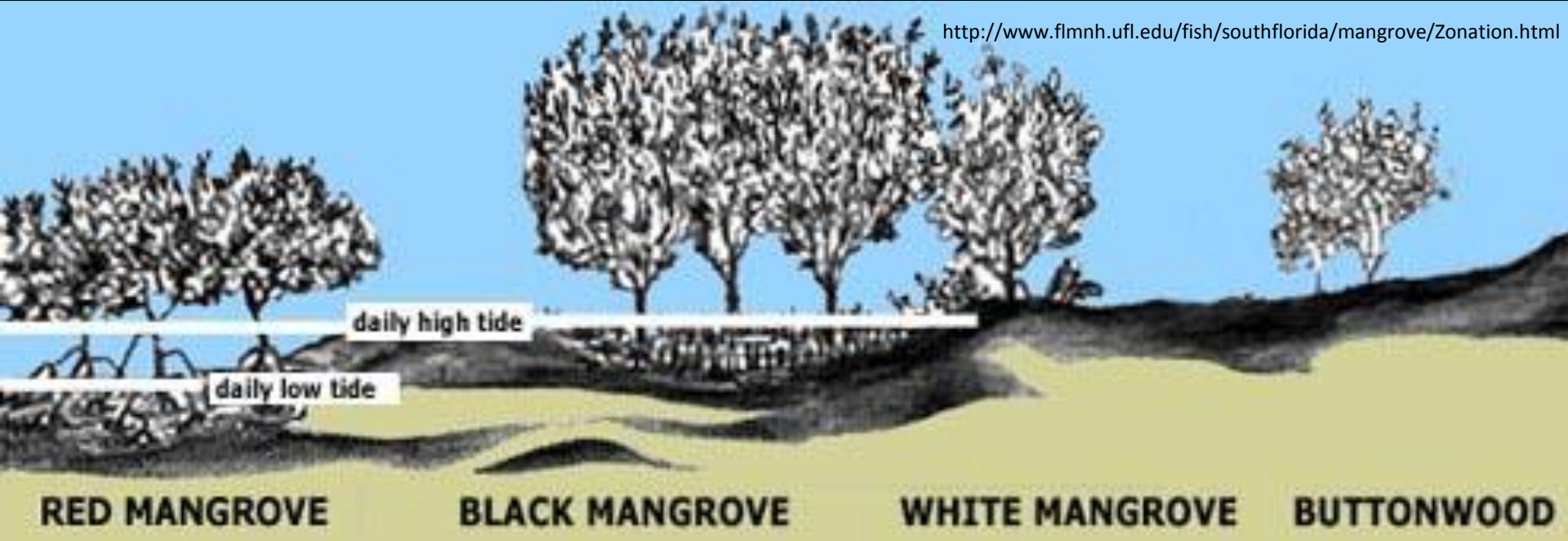


# **Habitat Mapping and Trend Analyses: Rookery Bay Watershed Discharge Locations**



**Craig van der Heiden and Mike Barry  
The Institute for Regional  
Conservation**

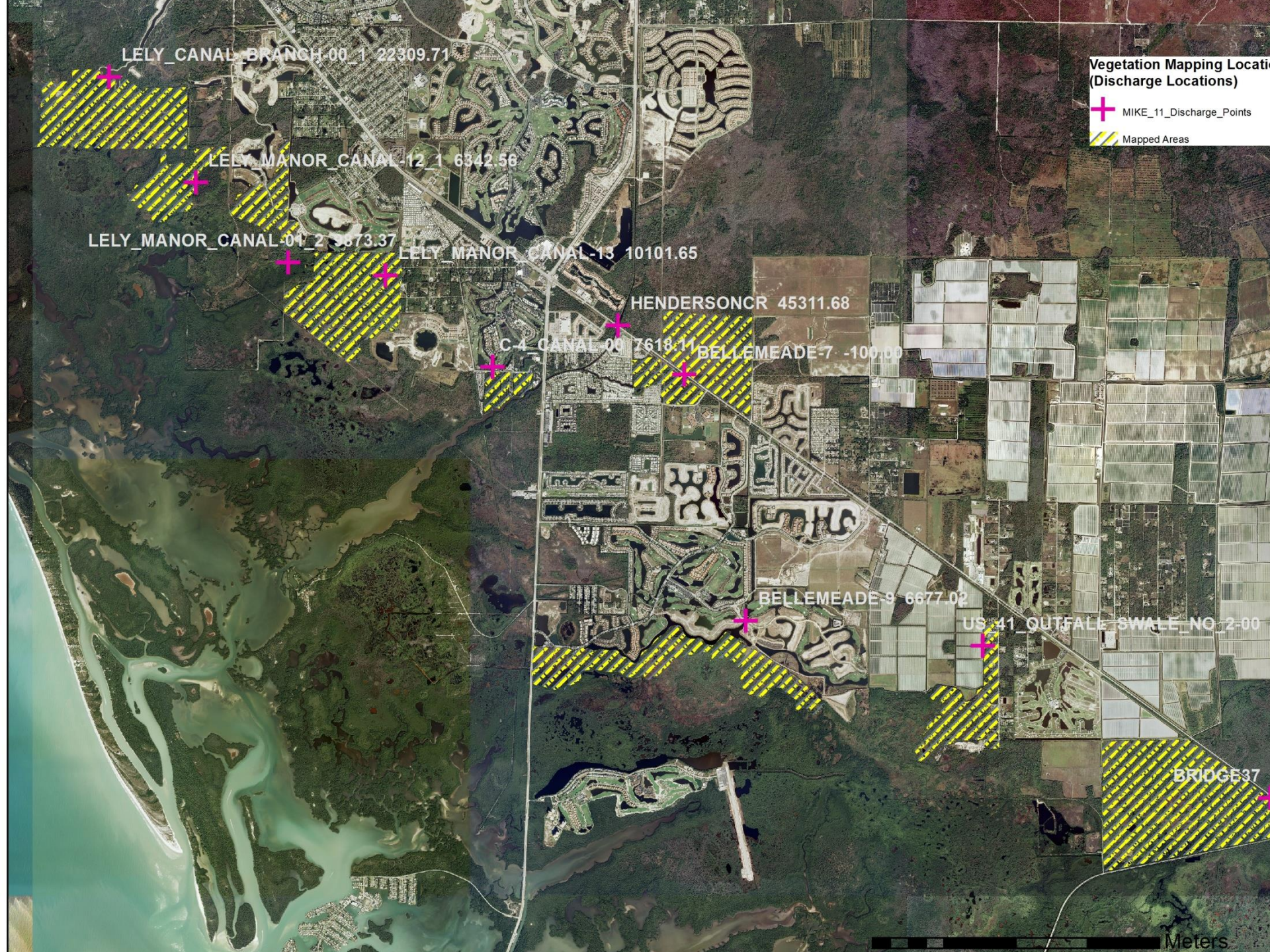




# OBJECTIVES

1. MAP EXTENT OF VEGETATION TYPES  
NEAR FRESH WATER DISCHARGE SITES
2. MAPPING VEGETATION 1940 AND 2015
3. DETERMINE DIRECTION OF SHIFTS
4. PROVIDE DETAILED GROUND-TRUTHED  
2015 LAYER FOR FUTURE COMPARISON





LELY CANAL BRANCH 00\_1 22309.71

LELY MANOR CANAL 12\_1 6342.56

LELY MANOR CANAL 01\_2 3873.37

LELY MANOR CANAL 13 10101.65

HENDERSONCR 45311.68

C-4 CANAL 00 7618.11

BELLEMEADE-7 -100.00

BELLEMEADE-9 6677.02

US 41 OUTFALL SWALE NO 2-00

BRIDGE37

**Vegetation Mapping Location  
(Discharge Locations)**

 MIKE\_11\_Discharge\_Points

 Mapped Areas

Meters



# Methods

- Image interpretation
- Ground truthing (with GPS)
- Hand Digitizing polygons using field data



# Vegetation Classification System for South Florida (Rutchey et al. 2006)

- CERP RECOVER Vegetation Mapping
- Hierarchical
- **Authors:** Rutchey, K.,\*, T.N. Schall1, R.F. Doren, A. Atkinson, M.S. Ross, D.T. Jones, M. Madden, L. Vilchek, K.A. Bradley, J.R. Snyder, J.N. Burch, T. Pernas, B. Witcher, M. Pyne, R. White, T.J. Smith III, J. Sadle, C.S. Smith, M.E. Patterson, and G.D. Gann

# “CERP” Vegetation Classification System

- Level 1    **M    Marsh**
- Level 2       MS    Salt marsh
- Level 2       MF    Freshwater marsh
- Level 3               MFB   Broadleaf emergent marsh
- Level 3               MFG   Graminoid emergent marsh
- Level 4                       MFGc   Sawgrass
- Level 5                       MFGcS   Sawgrass-Short
- Level 5                       MFGcT   Sawgrass-Tall



# Polyline Data

MFGc WSpX WUpSs  
WSpX WSpS WSpX

WMcBa

dead pinuelli standing snag, no regeneration; in WMcBa;

FMXar  
WMI FMX

CMcGI

WUpSs

WMcBa



# Polyline Data

MF Gc  
WSpX  
WUpSs  
WSpX  
WSpS  
WSpX

WMcBa

dead pinuelli standing snag, no regeneration; in WMcBa;

WSpX

WMI FMX

CMcGt

WUpSs

WMcBa



# GROUND- TRUTHING THE PAST...

Slash Pine Stumps





*Serenoa repens*





Dead  
Conocarpus  
under Avicenia  
canopy...  
things you  
wont see from  
the air





## A changing ridge

**Live Conocarpus on higher  
part of ridge in background  
with upland hardwoods  
further back**

**Recent Conocarpus  
Die-off on edge  
of slightly higher area**

**advancing  
Avicennia  
on edge of ridge**

**Older Conocarpus  
Die-off in foreground**

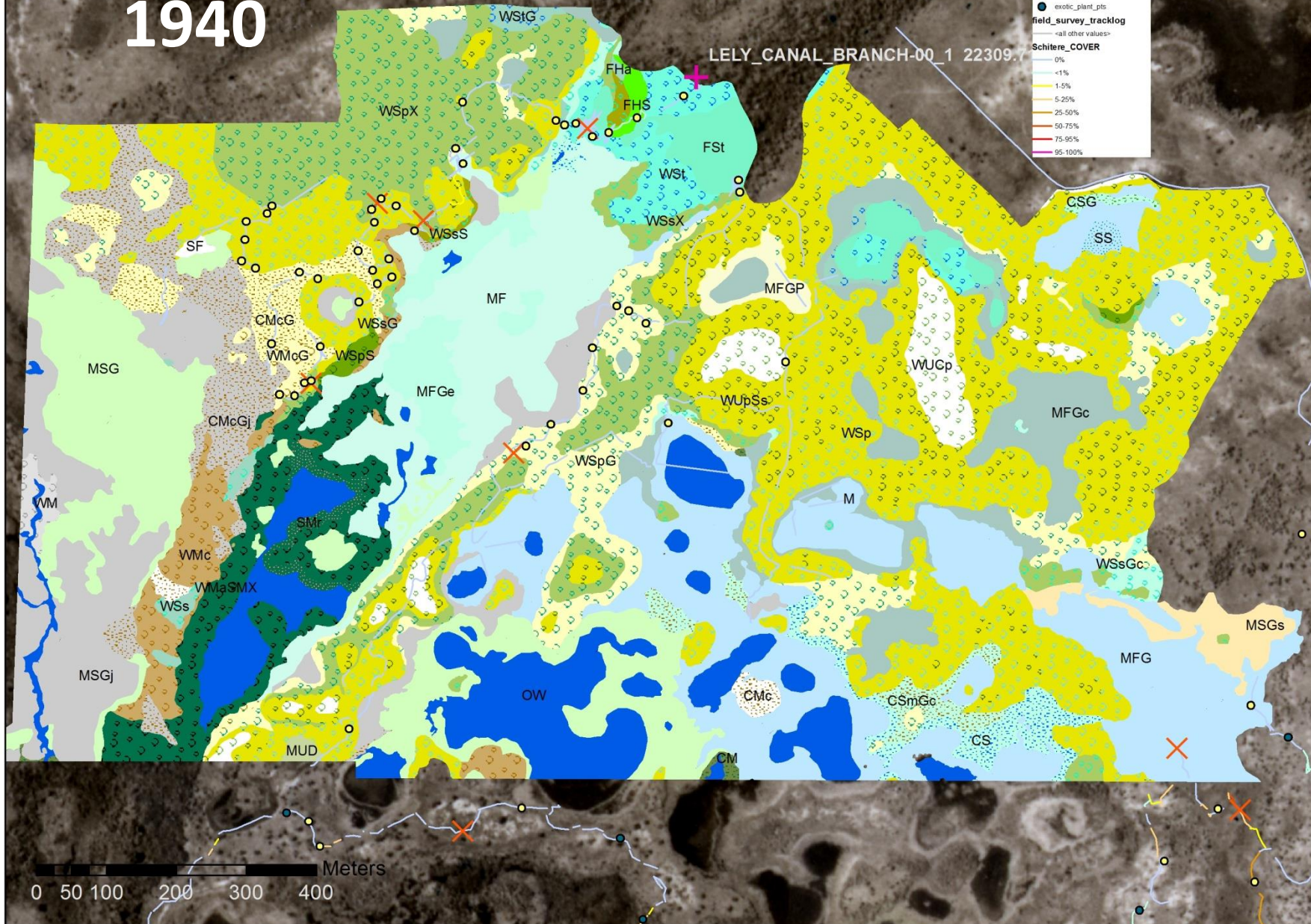








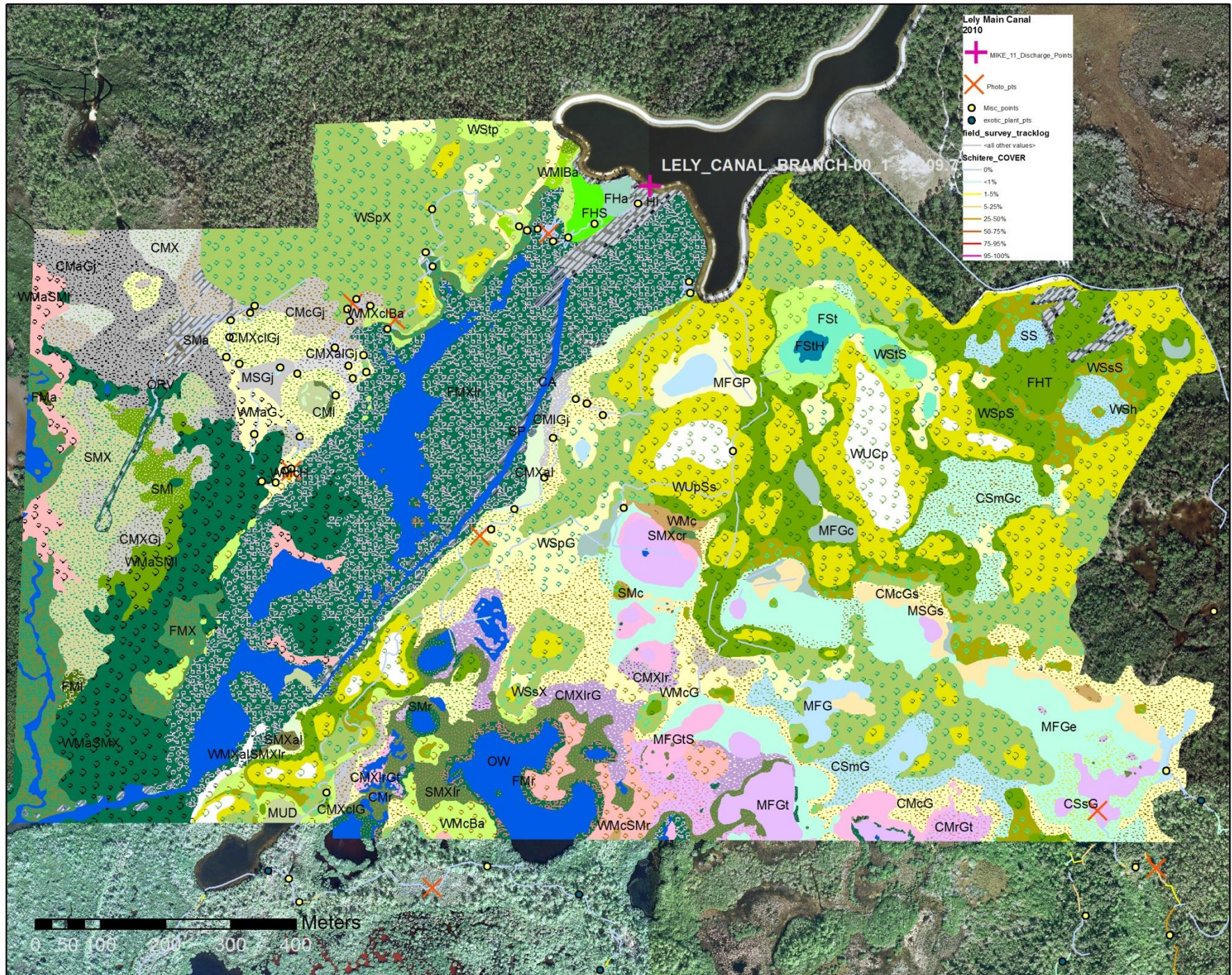
# 1940



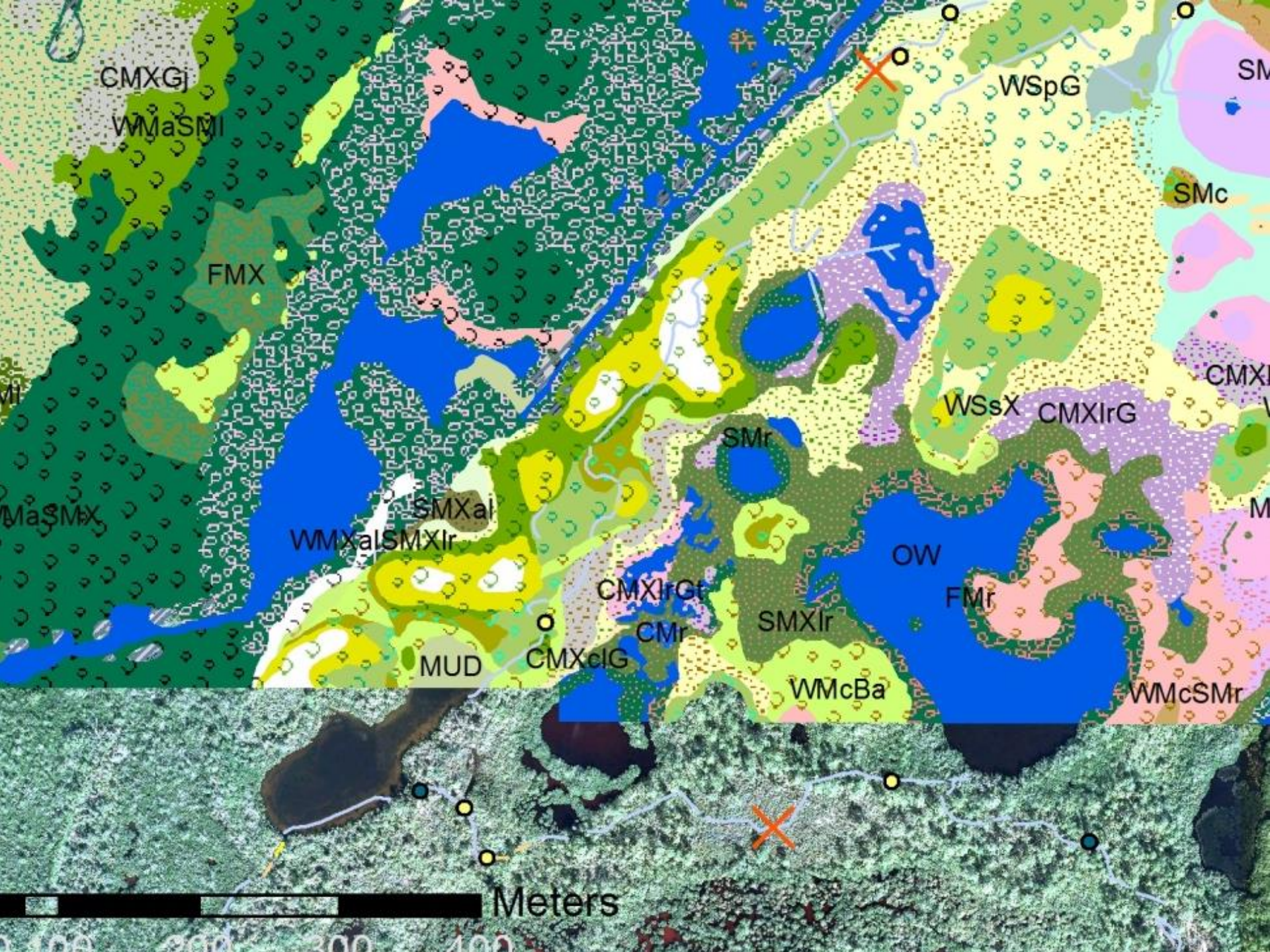














# Vegetation trend



# Results

Mapping Area	Vegetation Trends from 1940 to 2010	Suspected Causes
Lely Main Canal (405 acres)	<p><b>93 Acres</b> freshwater and brackish marshes changed to mangrove and buttonwood dominated wetlands.</p> <p><b>6.5 Acres</b> of cypress strand changed to mangrove forest.</p> <p><b>27 acres</b> of slash pine were replaced by buttonwood.</p>	Sea level rise, increased inland access by tides from downstream ditches, and shortened freshwater hydroperiods upstream with less sheet flow.









# Lely Main Canal 2010

MIKE\_11\_Discharge\_Points

Photo\_pts

## SWFL\_VEG\_TYPES\_mangrovelegend

<all other values>

### Scrub Mangroves

CM=Buttonwood Scrub

CMX=Oak/Buttonwood-Mangrove Scrub

CM=Mangrove Scrub

### Mangrove Shrubland

SM=Buttonwood Shrubland

SMX=Oak/Buttonwood-Mangrove Shrubland

SM=Mangrove Shrubland

### Mangrove Woodland

WM=Buttonwood Woodland

WMX=Oak/Mixed Buttonwood and Mangrove Woodland

WM=Mangrove Woodland

WM=Oak/Buttonwood Woodland w/shrub mangrove

WM=Oak/SM=Oak/Mangrove Woodland/Shrub Mangrove

### Mangrove Forest

FM=Mangrove Forest

### Human Impacted

QU=Quarry

HI=Human Impacted

RD=Road

ORV=ORV Trail

SP=Spill

CA=Canal

### Open Water

SF=Saline Salt Flat

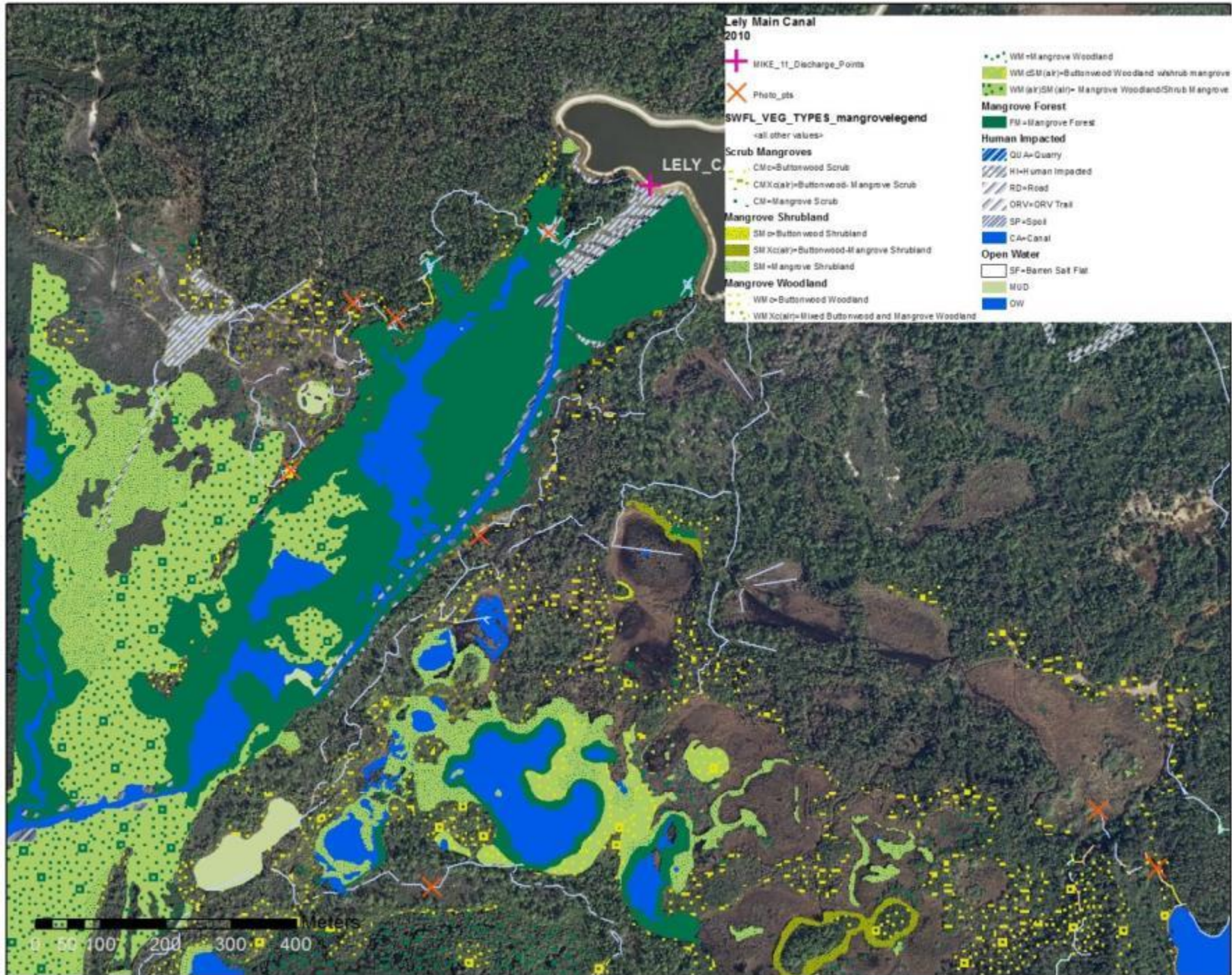
MUD

OW

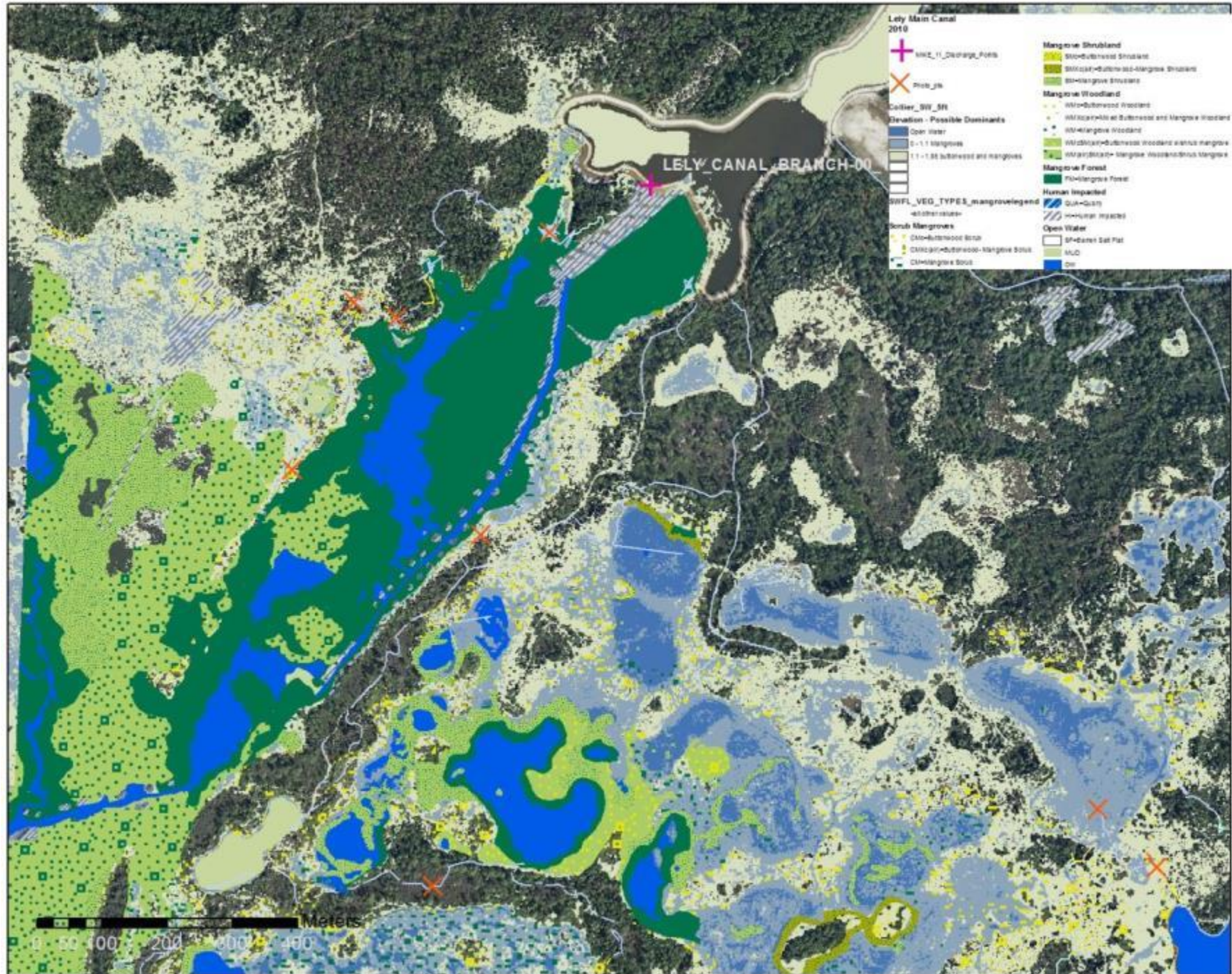
LELY\_C

0 50 100 200 300 400 Meters

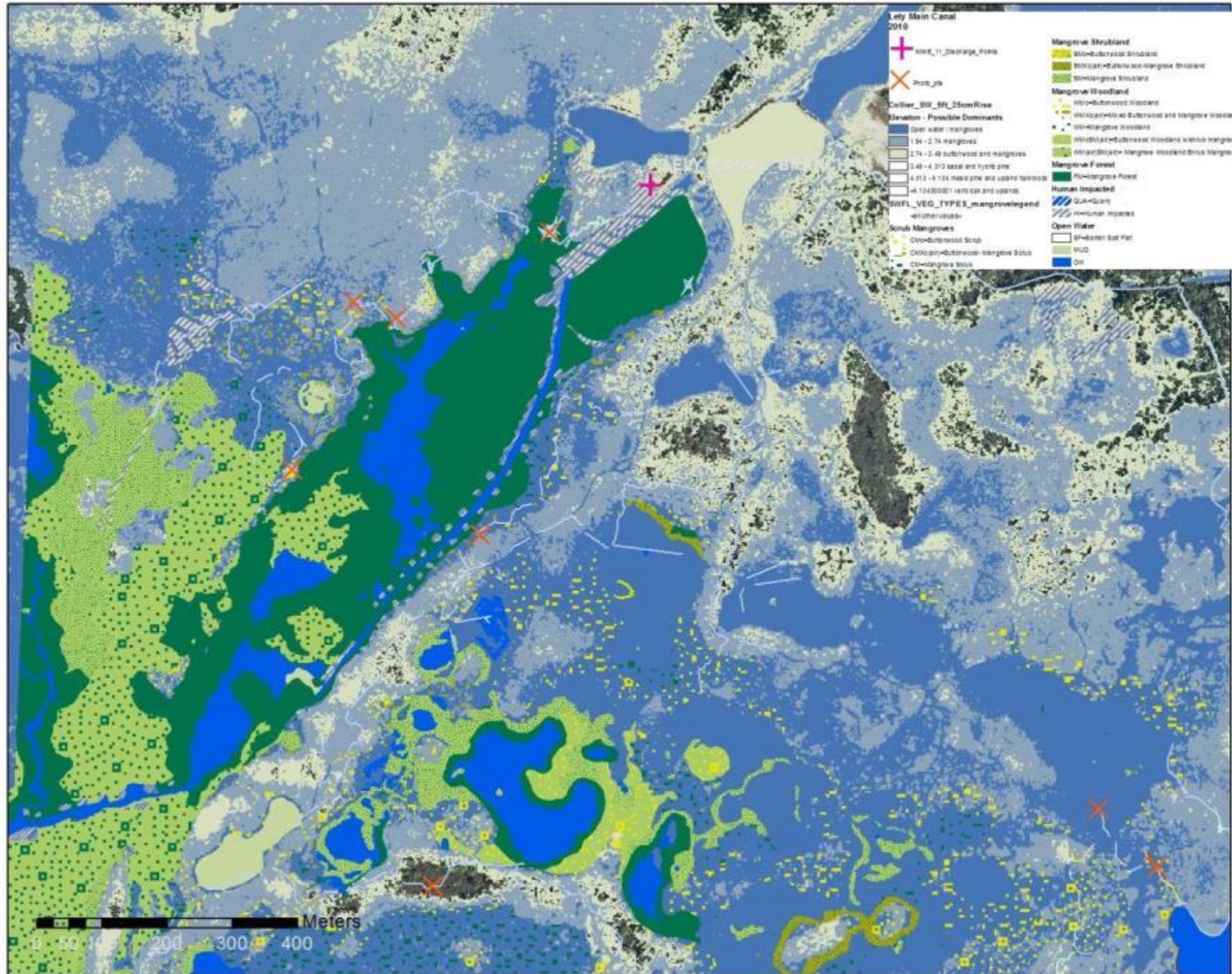




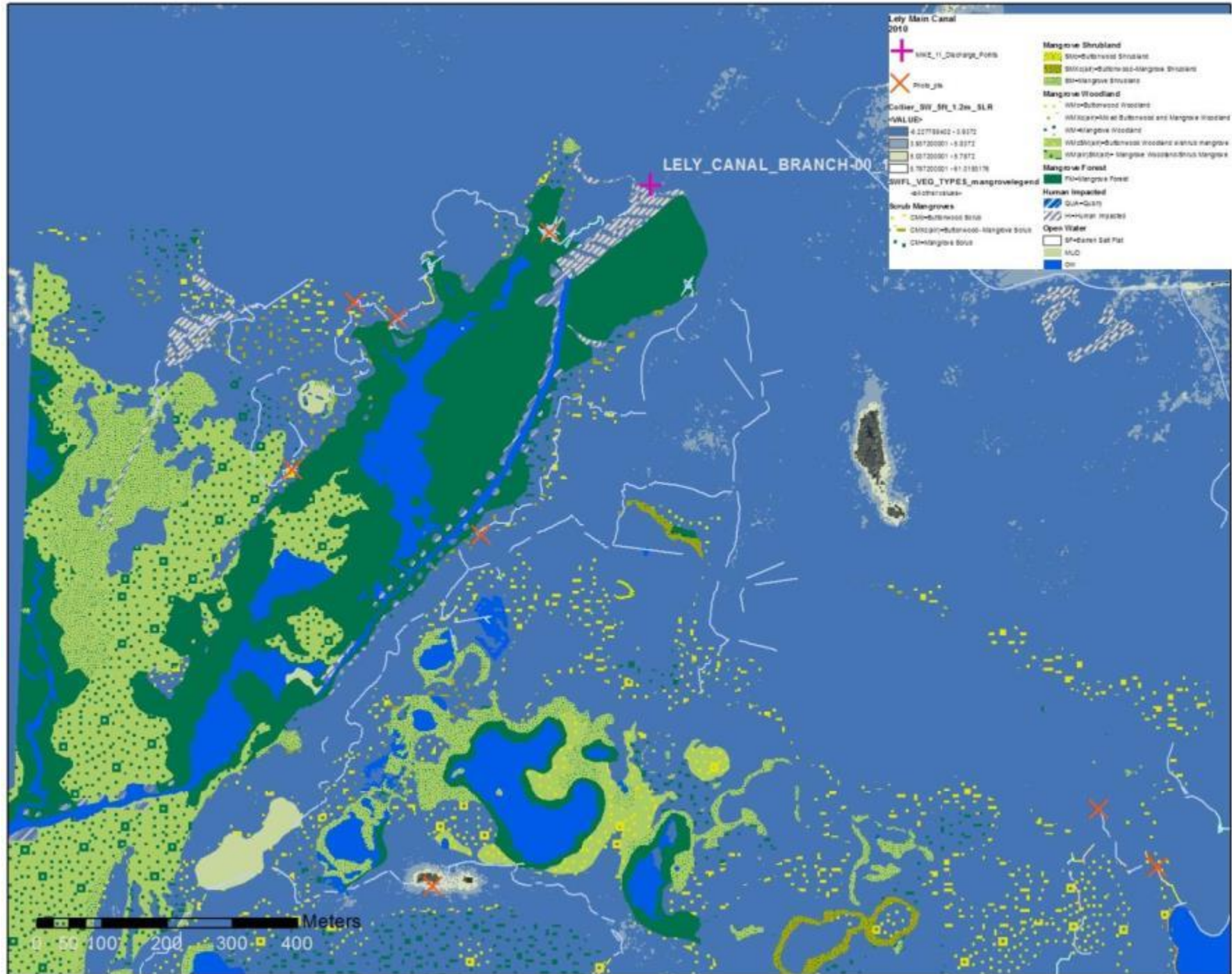














# Vegetation shifts

**Ecosystems Shifting inland from the sea... two forces: Higher tides and less freshwater flow due to drainage further inland**



note higher up a  
pine on the edge  
just now dying

Note mangroves start here, but  
that was marsh and mangroves  
were 200+ m to left in 1940

Former pineland, note dead sabal palms, last to  
die, pine stumps on ground already





# Questions

