# Readings - Lecture 14

Wilcove, D. S. 1999. Chapter 6: Bounty at the Borders. [Part I] Pp. 171-179. *in* The Condor's Shadow: the loss and recovery of wildlife in America. New York, W. H. Freeman & Co.

Fraser, C. 2009. Chapter 8. Looking for Kaza Pp. 174-194 *in* Rewilding the World. (not the last section: "The Elephants are going home")

Dorcas, M. E., J. D. Willson, R. N. Reed, R. W. Snow, M. R. Rochford, M. A. Miller, W. E. Meshaka, P. T. Andreadis, F. J. Mazzotti, C. M. Romagosa, and K. M. Hart. 2012. Severe mammal declines coincide with proliferation of invasive Burmese pythons in Everglades National Park. Proceedings of the National Academy of Sciences 109:2418-2422.

Richardson, C. J., and N. A. Hussain. 2006. Restoring the Garden of Eden: An Ecological Assessment of the Marshes of Iraq. Bioscience 56:477-489.

**Revised Annotated Bibliography Proposals due Thursday (last chance for full 25 points)**

**Remember Bb Journaling (10 entries = 25 points)**

WFB 074
Lecture 14

# Wetland Ecosystem Conservation

## Example 1: The Florida Everglades

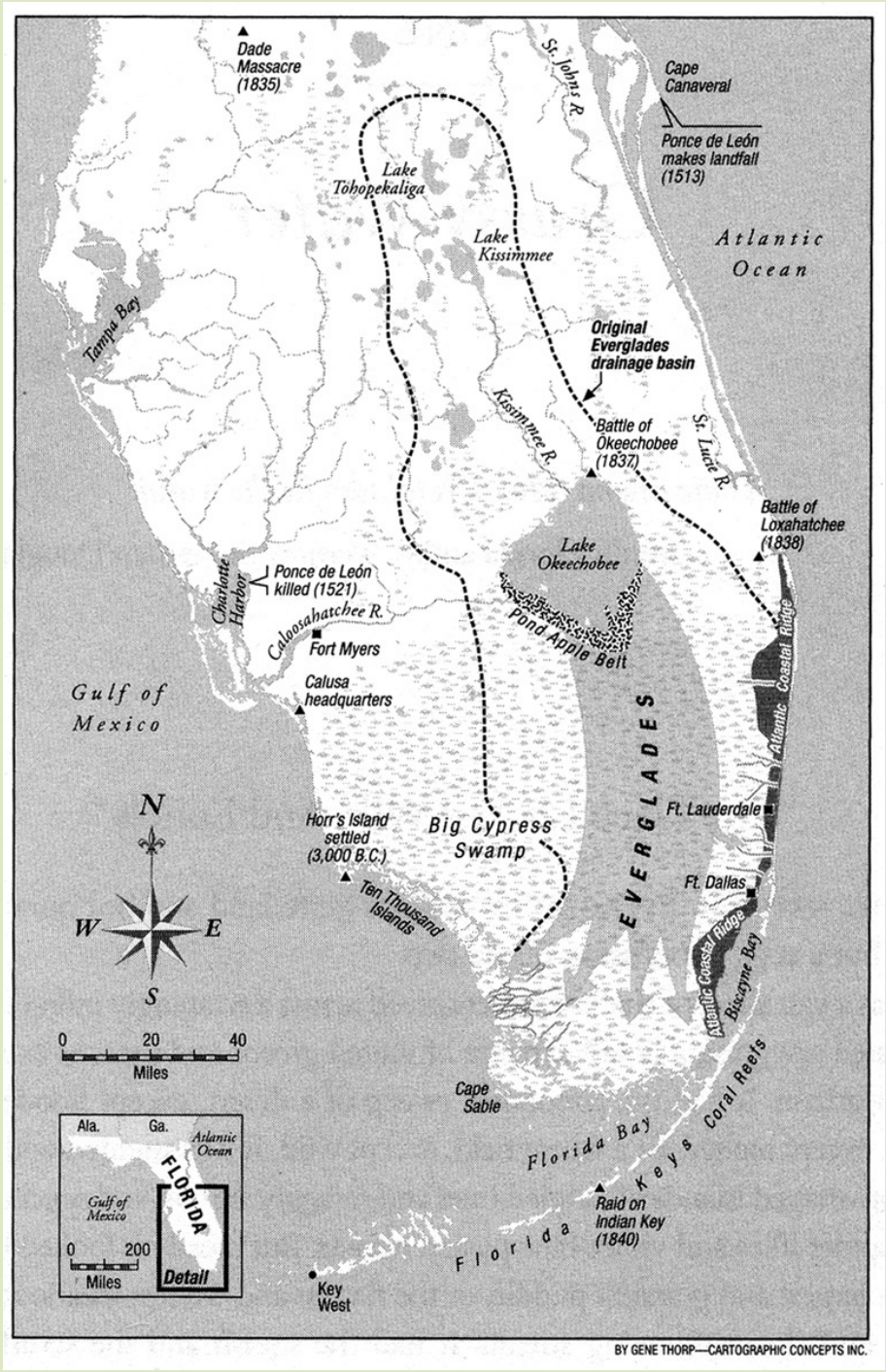
# WFB 074 Lecture 14 - Wetland Ecosystem Conservation

## Example 1: The Florida Everglades

Historically the Everglades Ecosystem covered most of Southern Florida.

Water flowed from the chain of lakes below present day Orlando into Kissimmee River…

…which emptied into Lake Okeechobee.




Map from Grunwald 2006, p.10

WFB 074 Lecture 14 - Wetland Ecosystem Conservation

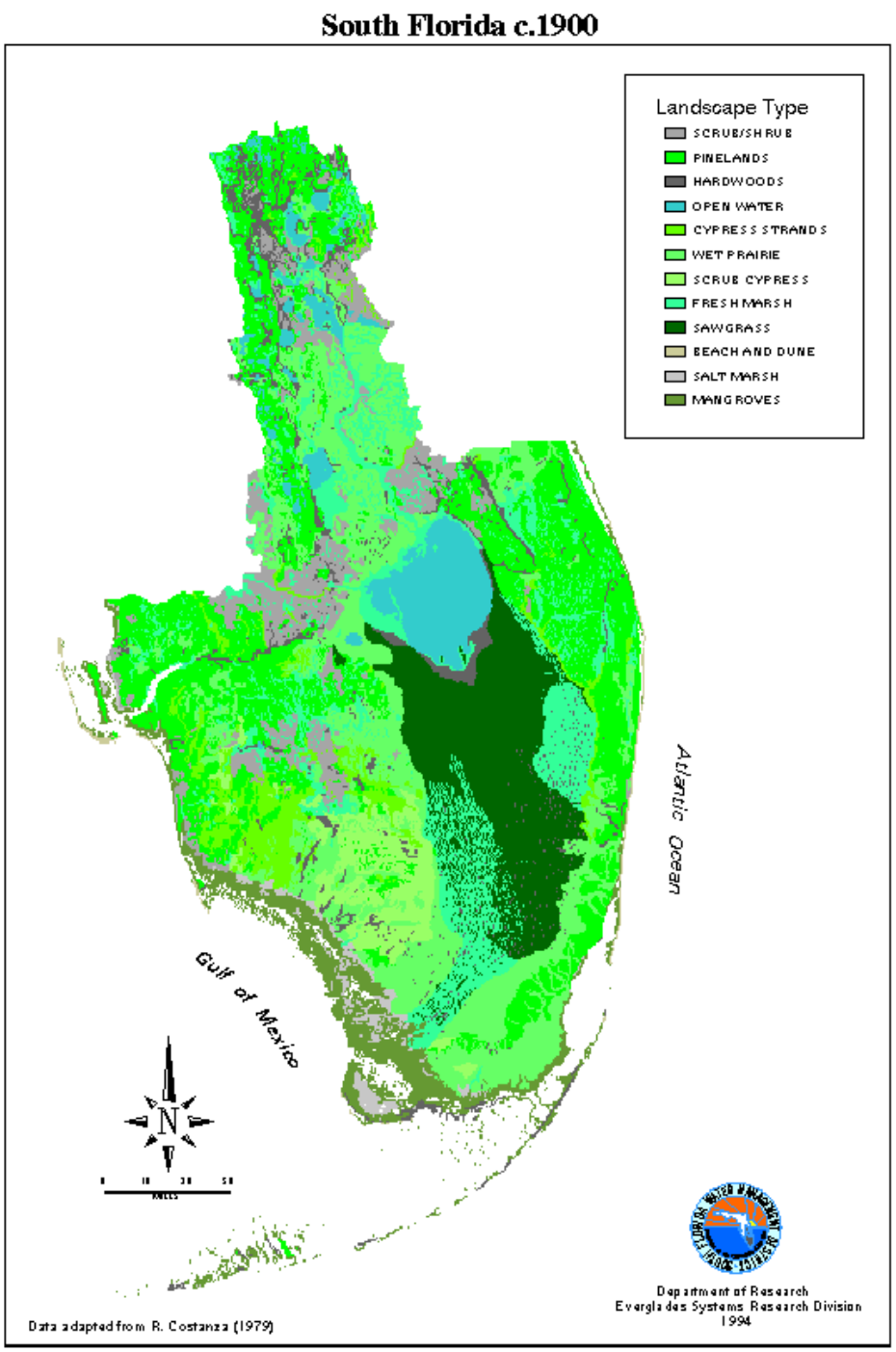
Example 1: The Florida Everglades

Especially during heavy rains and hurricanes Lake Okeechobee spills into the Everglades to the south.

Most of the “River of Grass” trickles south and southwest into Florida Bay

Some of the water crosses the Atlantic coastal ridge into Biscayne Bay.

Map from:
http://www.marietta.edu/~biol/biomes/wetlands.htm



WFB 074 Lecture 14 - Wetland Ecosystem Conservation

Example 1: The Florida Everglades

Seminole Indians called the Everglades *Pa-Hay-Okee*, or Grassy Waters.

Vast areas of Sawgrass – named after its serrated leaves.


Sawgrass (*Cladium jamaicense)*
A sedge, not a grass!

# Wildlife of the Everglades

"The Everglades are the only place on Earth where alligators and crocodiles live side by side." (Grunwald 2006:12)

American Alligator, *Alligator mississippiensis*
NP Service Photo by Rodney Cammauf
[broad snout, fresh water, darker skin)

American Crocodile, *Crocodylus acutus*
NP Service Photo by Rodney Cammauf
(pointy snout, salt water, toothy grin)

Spectacled caiman, *Caiman crocodilus*, is native to Central and South America. Now established in south Florida; a result of numerous intentional releases or pet escapes dating back to the 1960s

# Exotic Reptiles

Introduced Burmese Python

# Exotic Reptiles

The Burmese python *(Python molurus bivittatus)*, a giant constricting snake native to Asia. It is now firmly established across much of southern Florida, including all of Everglades National Park. Although these predators have been recognized as an established invasive species for only 11 years, … Burmese pythons appear to have caused severe declines in many species of once-common mammals in Everglades National Park. The findings suggest that the introduction of large, top-level predators can substantially affect prey populations over short time scales.

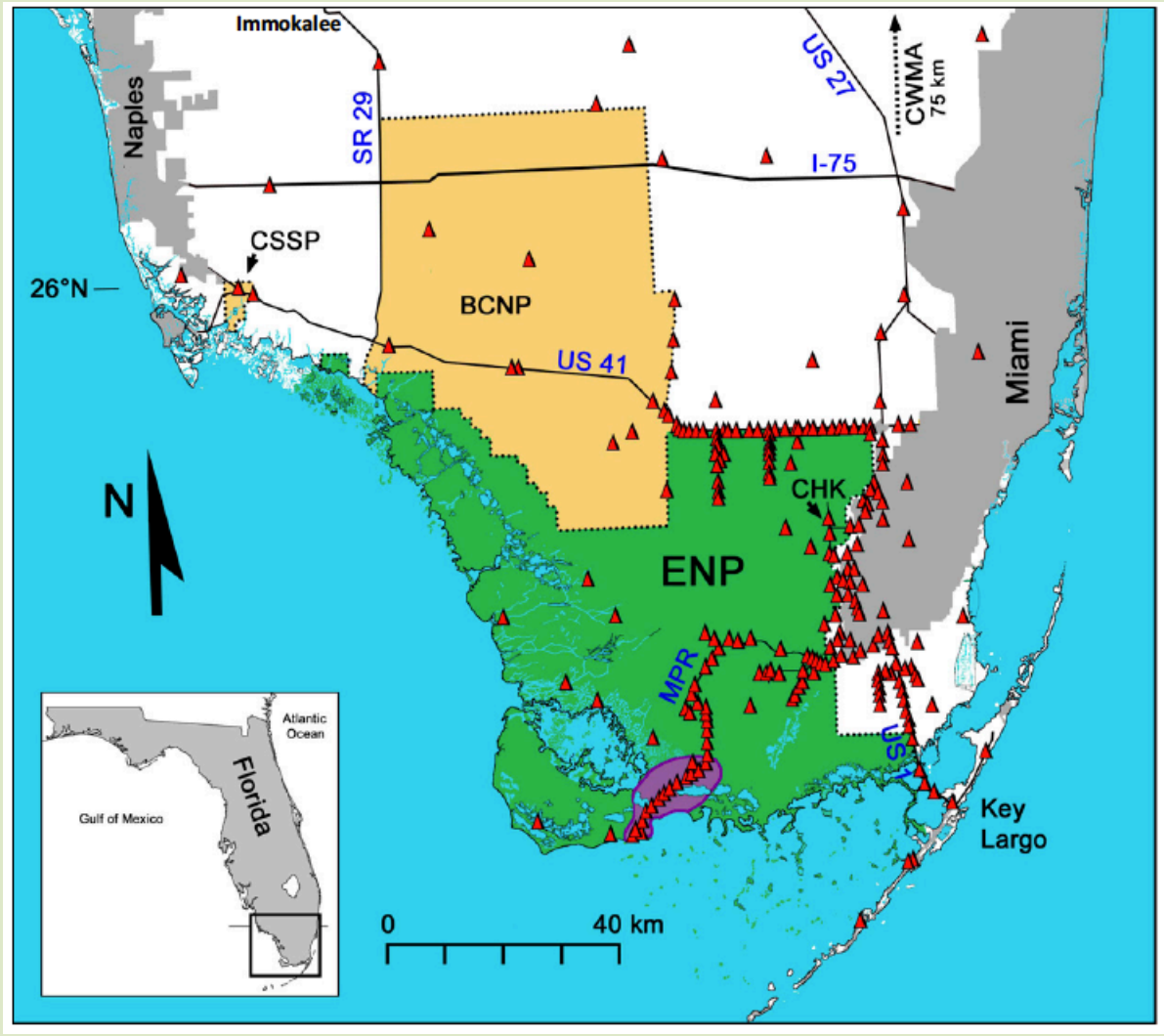
Photo: Christopher Gillette (Florida International University, Miami, FL).

# WFB 074 Lecture 14 - Wetland Ecosystem Conservation Example 1: The Florida Everglades

Map of South FL illustrating sampling locations in relation to python distribution. Road surveys for mammals were conducted in the 1990s and 2000s along the Main Park Road (MPR) in Everglades National Park (ENP).

**Purple**: area of ENP where pythons were found in the 1990s and where reproduction was first reported (16).

Red triangles: Localities of pythons found during 2008–2009.




Decreases in frequency of observation:

99.3% Racoons
98.9% opossum
87.4% bobcat
no more rabbits.

DORCAS, M. E., ET AL. 2012. Severe mammal declines coincide with proliferation of invasive Burmese pythons in Everglades National Park, Proceedings of the National Academy of Sciences 109:2418-2422.

# Large Carnivores

Florida Panther
*(Puma concolor coryi)*

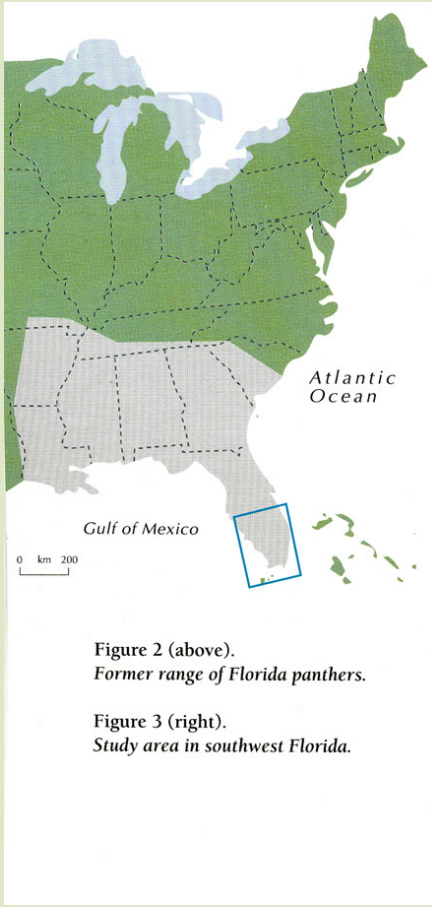
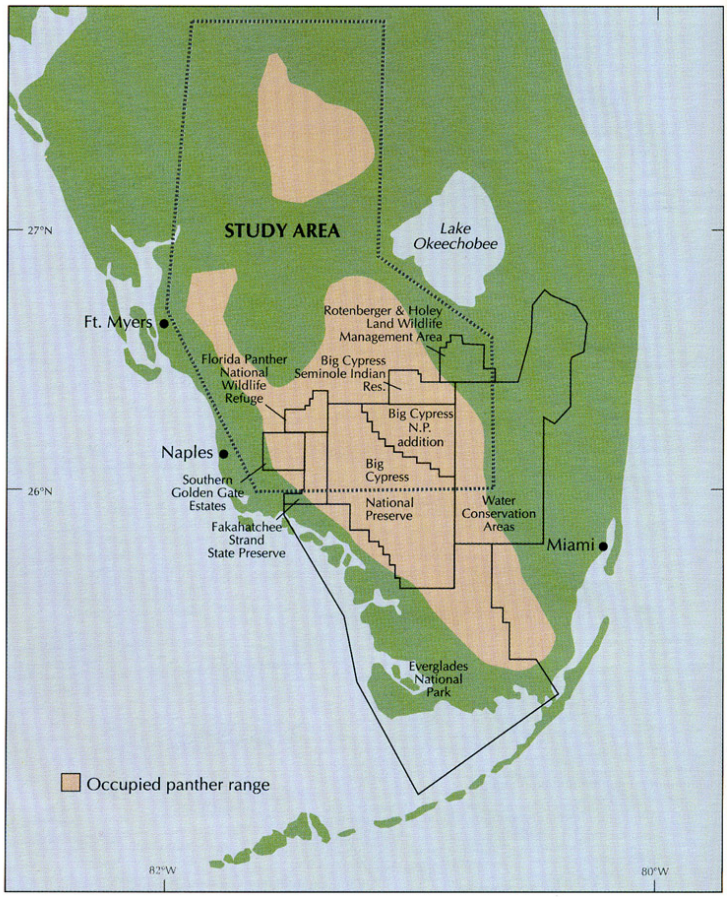



Figure 2 (above).
*Former range of Florida panthers.*

Figure 3 (right).
*Study area in southwest Florida.*




Former and current range of the Florida Panther

Source: Maehr, D. S., E. D. Land, and J. C. Roof. 1991. Florida panthers. National Geographic Research and Exploration 7:414-431.

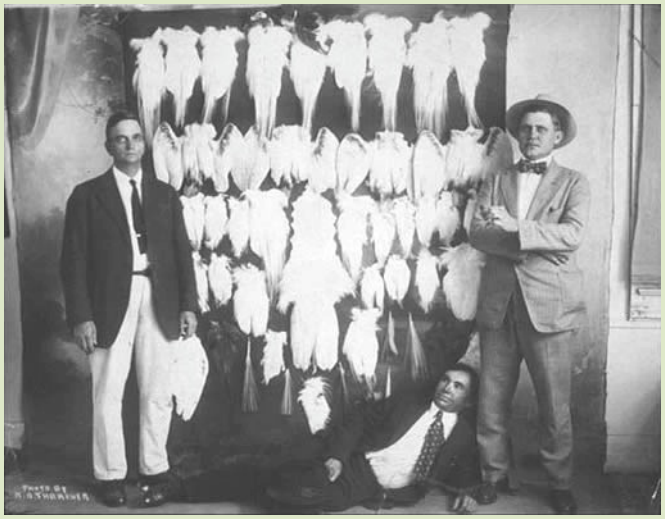
# WFB 074 Lecture 14 - Wetland Ecosystem Conservation
## Example 1: The Florida Everglades

### Birds of the Everglades

White Egret

Roseate Spoonbill

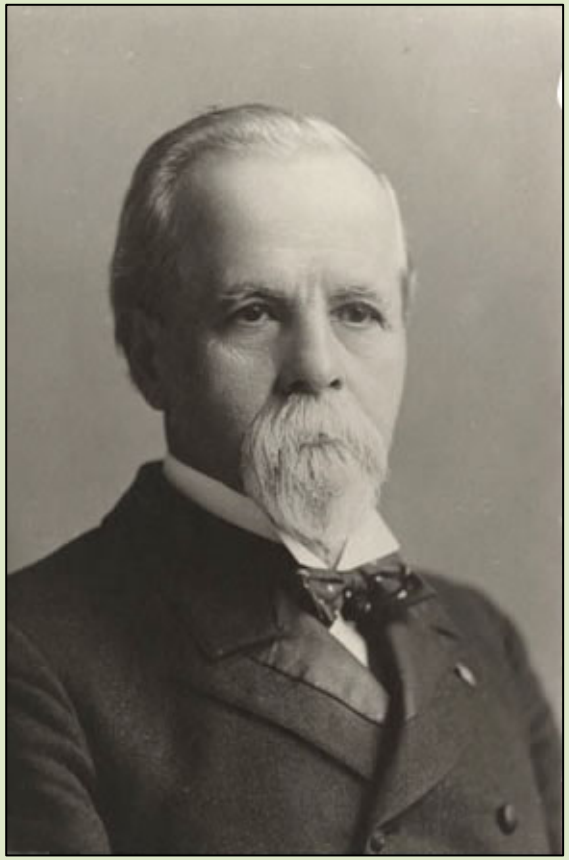
Federal Agents with confiscated Egrets for the millinery (hat) industry.



Bird Hats

## Example 1: The Florida Everglades

**John F. Lacey (1841-1913)**



John F. Lacey, ca. 1905
Republican congressman
from Oskaloosa, Iowa

### Lacey Act of 1894

An *Act To protect the birds and animals in Yellowstone National Park, and to punish crimes in said park, and for other purposes*.

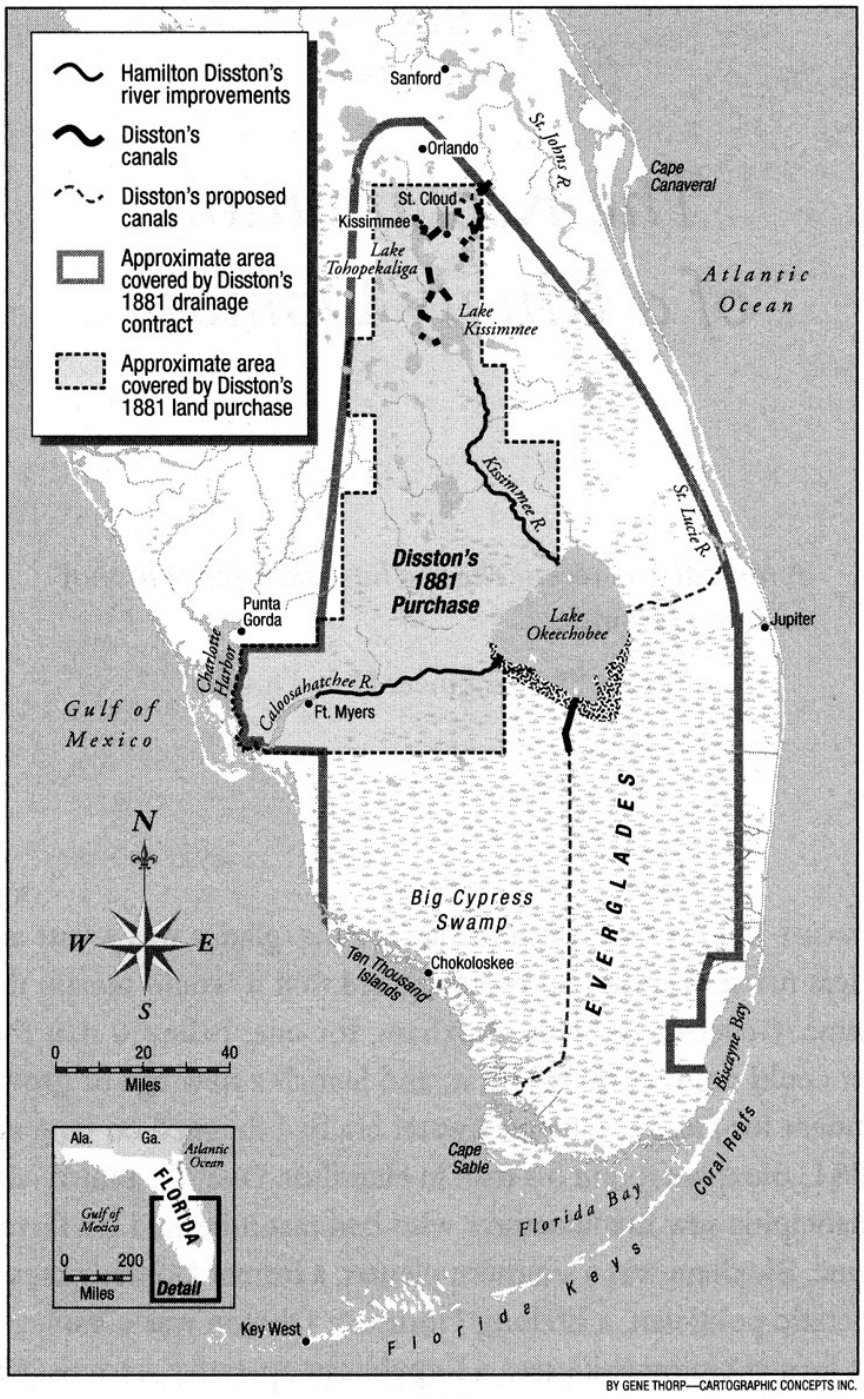
→ Cornerstone of future law enforcement policies in the park

### Lacey Bird and Game Act of 1900

Prohibits trade in wildlife, fish, and plants that have been illegally taken, possessed, transported or sold.

→ helped bring an end to the heedless slaughter of plumed birds in Florida and elsewhere.

For more on the Lacey Bird & Game Act, see:
Ken Burns – The National Parks Episode 2
http://www.pbs.org/nationalparks/parks/everglades/




WFB 074 Lecture 14 - Wetland Ecosystem Conservation
Example 1: The Florida Everglades

1881
Hamilton Disston (1844-1896) signed contracts to drain 12 million acres of the Everglades and buy 4 million acres outright.

Disston … didn't drain the Everglades. His dredges reclaimed some of his own land in the Kissimee and Caloosahatchee basins, but they only began one canal south of Lake Okeechobee, and they never finished it.

Map: Grunwald 2006, p. 82

WFB 074 Lecture 14 - Wetland Ecosystem Conservation

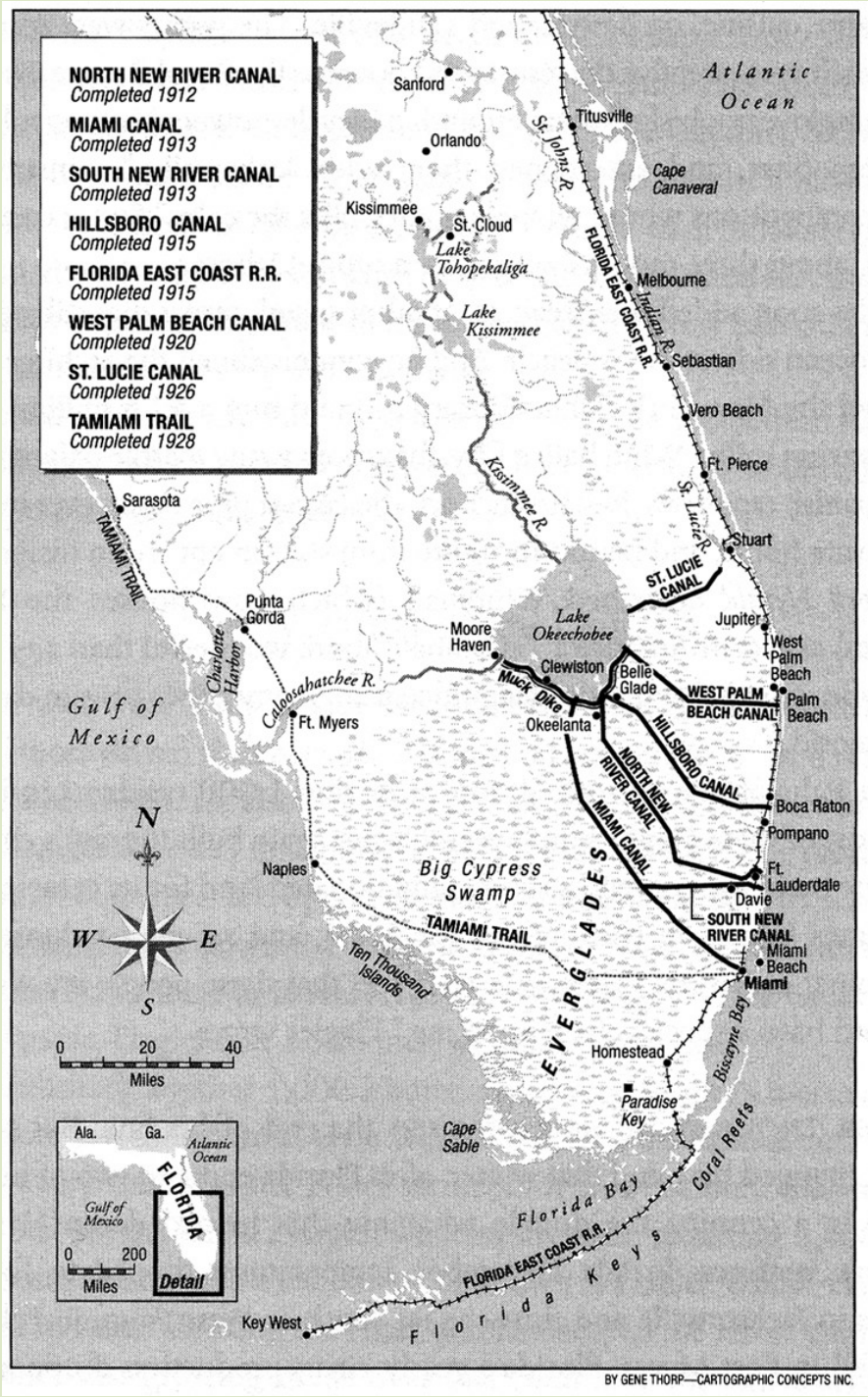
Example 1: The Florida Everglades

1912 - 1928

Henry Flagler's railroad sparked south Florida's first boom, as tourists and pioneers rode his rails down the Atlantic coastal ridge to new cities like West Palm Beach, Fort Lauderdale, and Miami.

Governor Napoleon Bonaparte Broward then drew new plans to drain the Everglades with six canals from Lake Okeechobee – one east, one west and four southeast through the ridge. The dream of an empire of the Everglades drew thousands of settlers to the region's wetlands.

Map: Grunwald 2006, p. 106



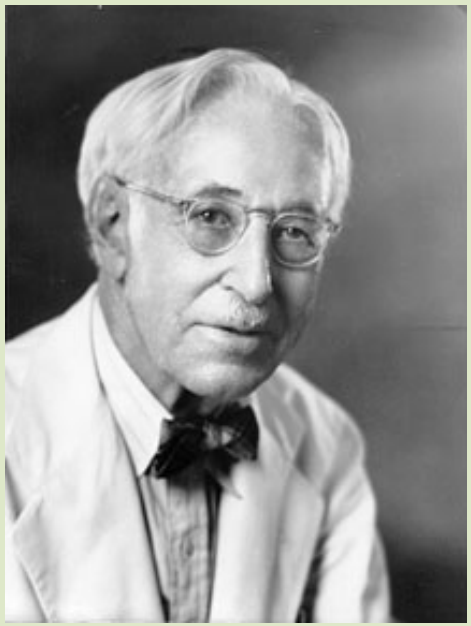
WFB 074 Lecture 14 - Wetland Ecosystem Conservation

Example 1: The Florida Everglades

After the storm of 1928, the Army Corps of Engineers built a dike around Lake Okeechobee, a key step toward taming the Everglades.

After more flooding in 1947, Congress authorized the Central and Southern Florida Project, assigning the corps with 2000 miles of levees and canals.

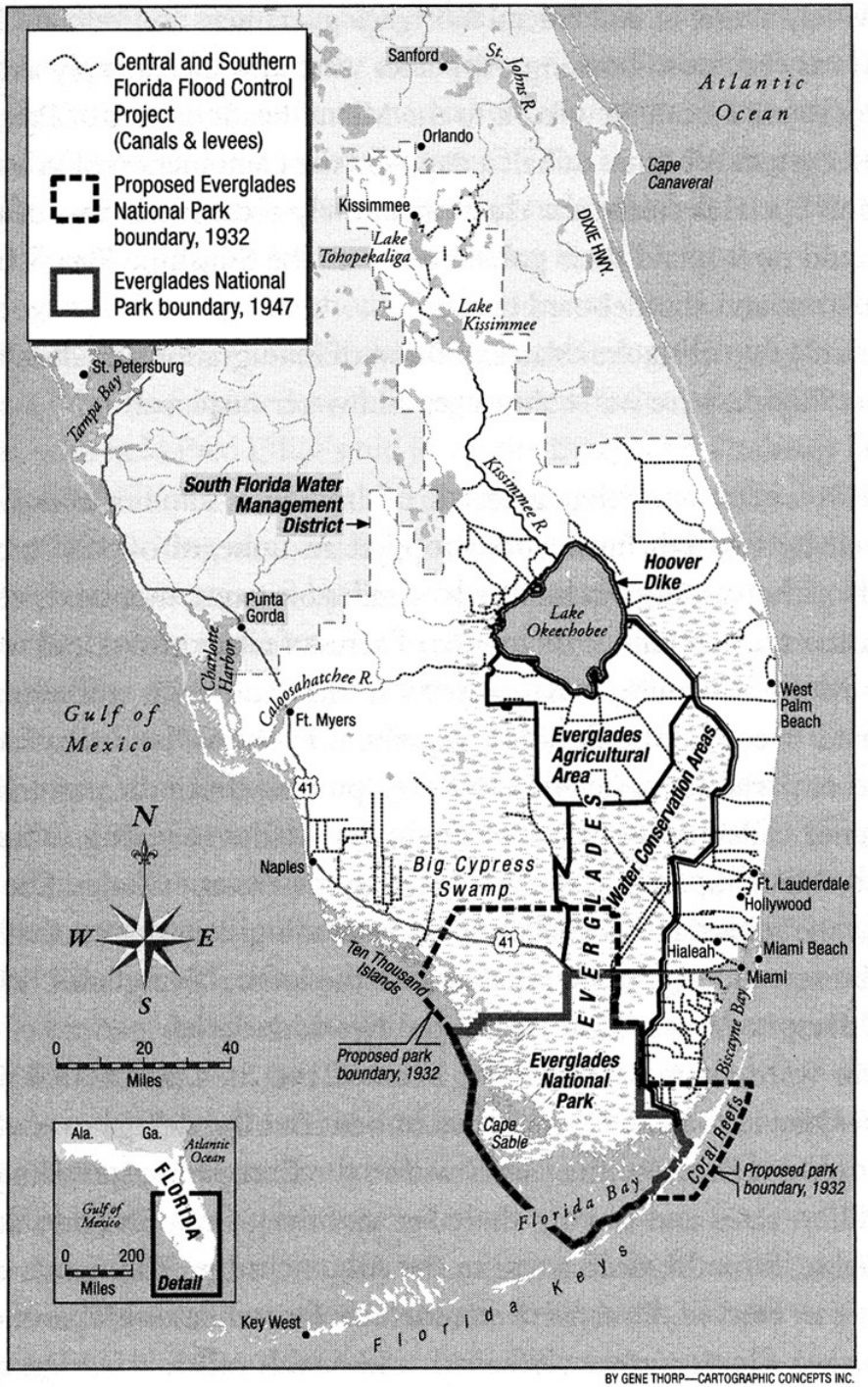
The northern Glades was carved into farmland, the central Glades into reservoirs, and the eastern Glades into suburbs.



The southern Glades was preserved as Everglades National Park, although the Park was less expansive than Ernest Coe had envisioned 15 years earlier.

Ernest Coe (1866-1951)
"Father of the Everglades"

Picture: http://www2.fiu.edu/~glades/reclaim/bios/coe.htm



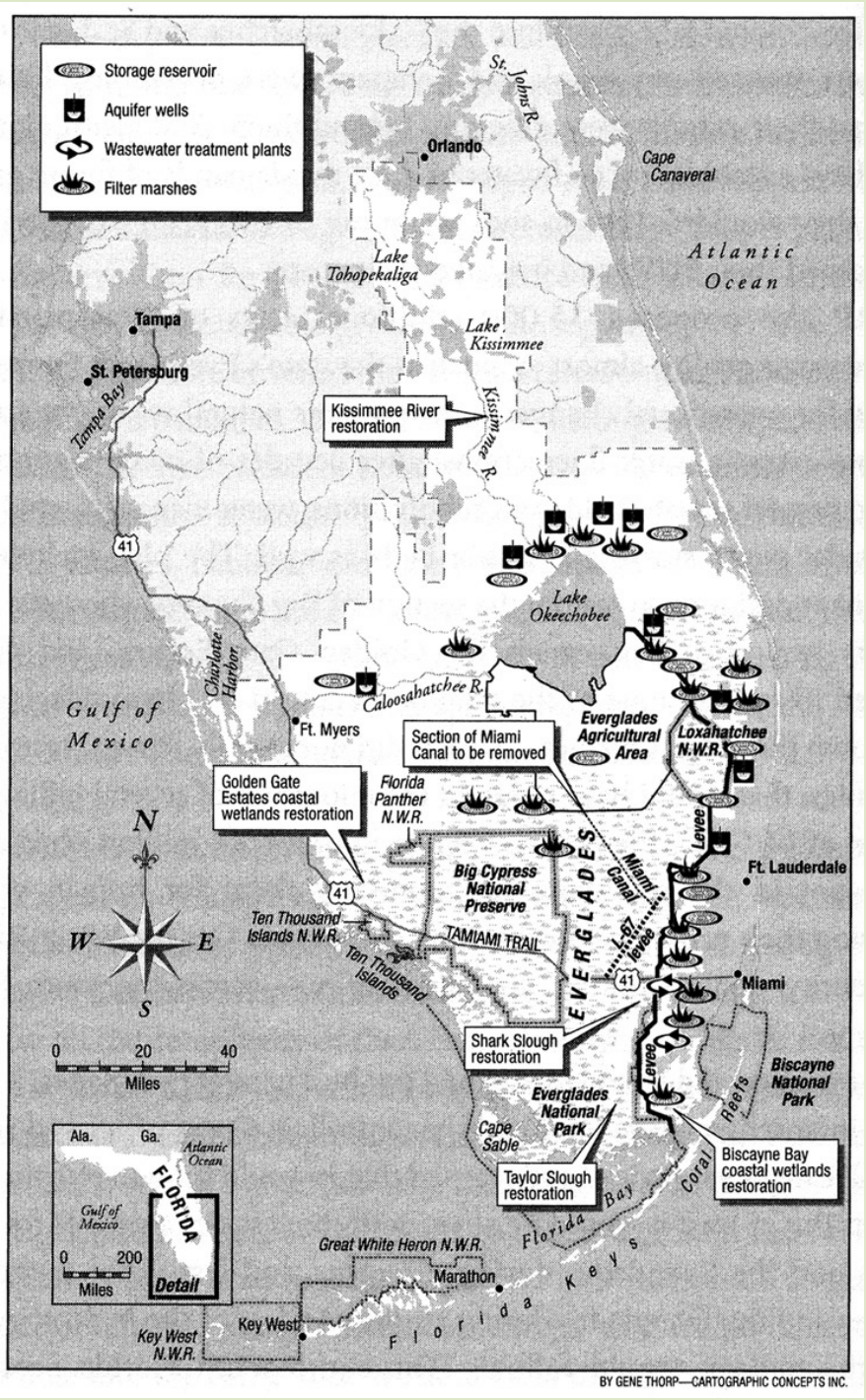

Map:
Grunwald 2006, p. 217

WFB 074 Lecture 14 - Wetland Ecosystem Conservation
Example 1: The Florida Everglades

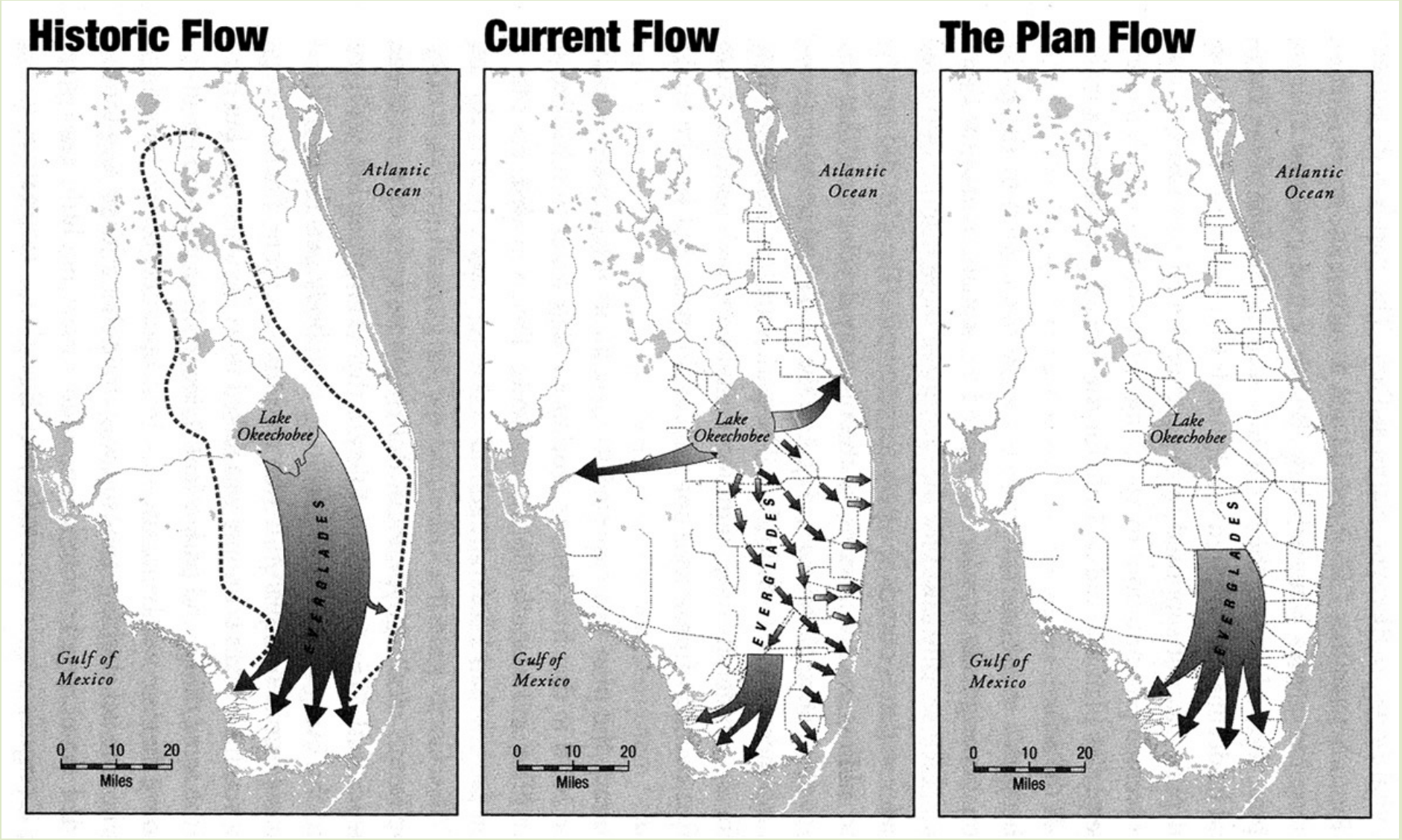
The Comprehensive Everglades Restoration Plan extremely complex, but essentially a storage plan.

The goal was to store more than 1 trillion extra gallons of water for cities, farms, and the Everglades in massive reservoirs and high-tech wells.

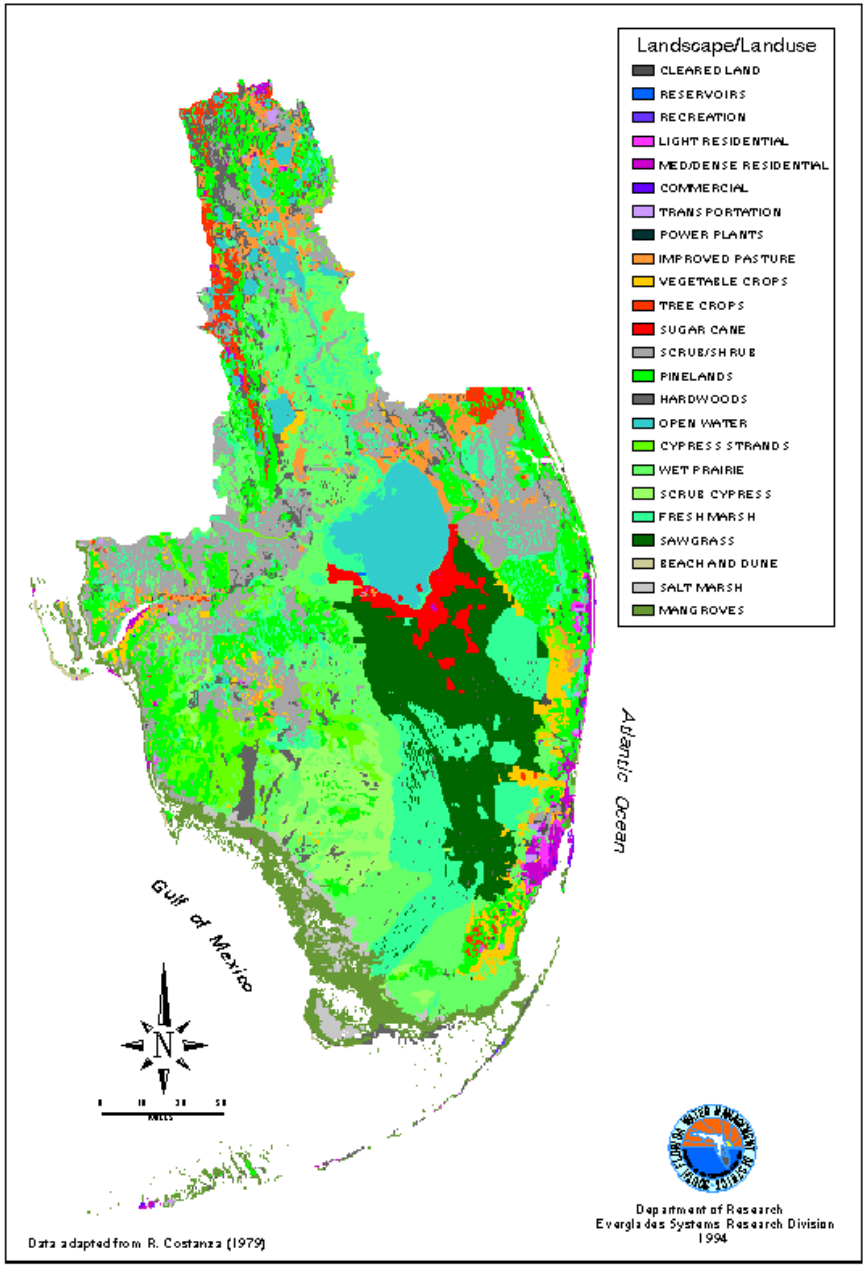
The plan also included seepage controls to keep water from escaping the Everglades, as well as filter marshes to help ensure that the water would be clean.

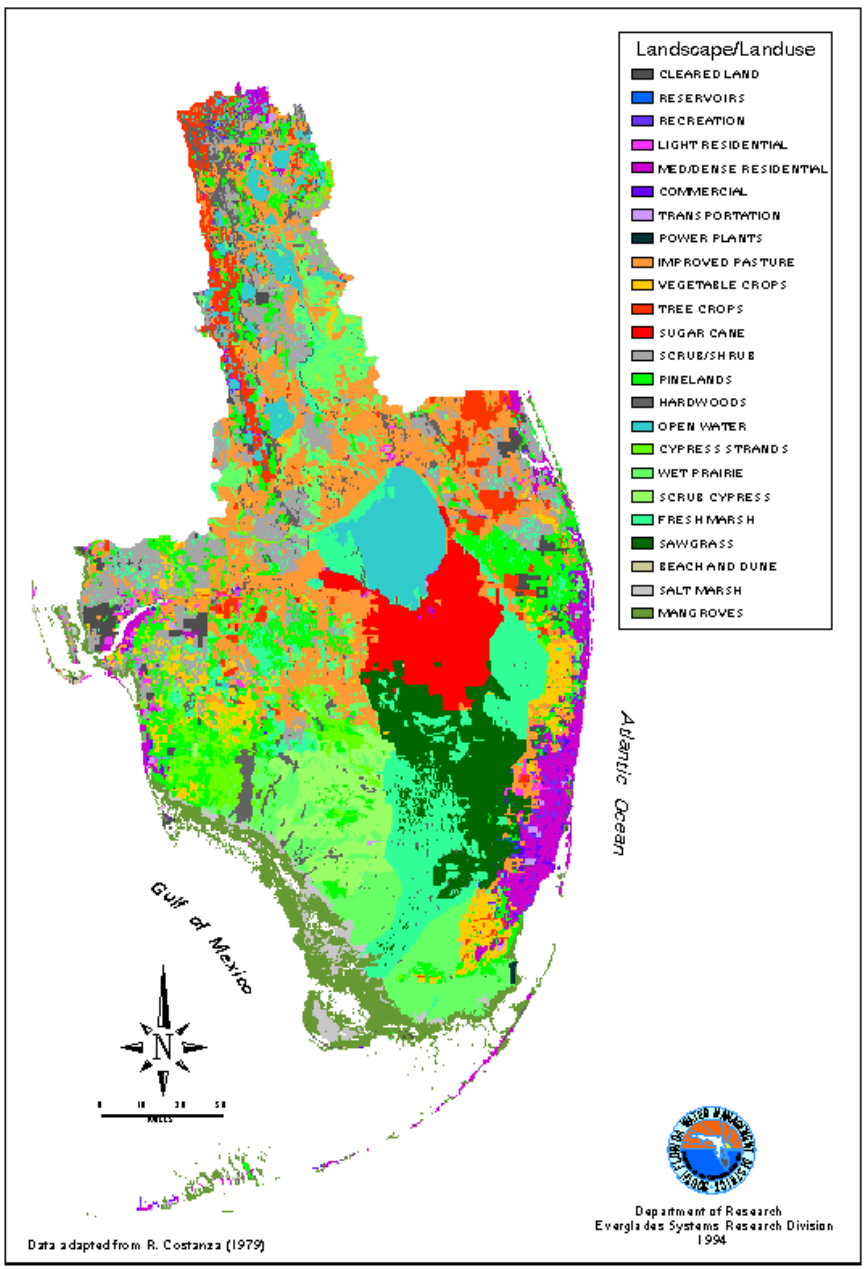



Map: Grunwald 2006, p. 318




Graphic adapted from the Army Corps of Engineers publicity document suggested that the agency's restoration plan would recreate the historic flow of the River of Grass, which had been dammed and diverted by levees, highways and canals. But while the Corps plan eliminated 250 miles of levees and canals, it proposed to add even more than it eliminated. It didn't do much to restore natural flows. (from: Grunwald 2006, p. 3322).


South Florida 1953
Landscape/Landuse
CLEARED LAND
RESERVOIRS
RECREATION
LIGHT RESIDENTIAL
MED/DENSE RESIDENTIAL
COMMERCIAL
TRANSPORTATION
POWER PLANTS
IMPROVED PASTURE
VEGETABLE CROPS
TREE CROPS
SUGAR CANE
SCRUB/SHRUB
PINELANDS
HARDWOODS
OPEN WATER
CYPRESS STRANDS
WET PRAIRIE
SCRUB CYPRESS
FRESH MARSH
SAWGRASS
BEACH AND DUNE
SALT MARSH
MANGROVES
Atlantic Ocean
Gulf of Mexico
N
Data adapted from R. Costanza (1979)
Department of Research
Everglades Systems Research Division
1994


South Florida 1973
Landscape/Landuse
CLEARED LAND
RESERVOIRS
RECREATION
LIGHT RESIDENTIAL
MED/DENSE RESIDENTIAL
COMMERCIAL
TRANSPORTATION
POWER PLANTS
IMPROVED PASTURE
VEGETABLE CROPS
TREE CROPS
SUGAR CANE
SCRUB/SHRUB
PINELANDS
HARDWOODS
OPEN WATER
CYPRESS STRANDS
WET PRAIRIE
SCRUB CYPRESS
FRESH MARSH
SAWGRASS
BEACH AND DUNE
SALT MARSH
MANGROVES
Atlantic Ocean
Gulf of Mexico
N
Data adapted from R. Costanza (1979)
Department of Research
Everglades Systems Research Division
1994

# WFB 074 Lecture 14 - Wetland Ecosystem Conservation
## Example 1: The Florida Everglades

In Class VIDEO: Ken Burns – The National Parks Episode 5,
Scene: Land by the Gallons

http://www.pbs.org/nationalparks/parks/everglades/

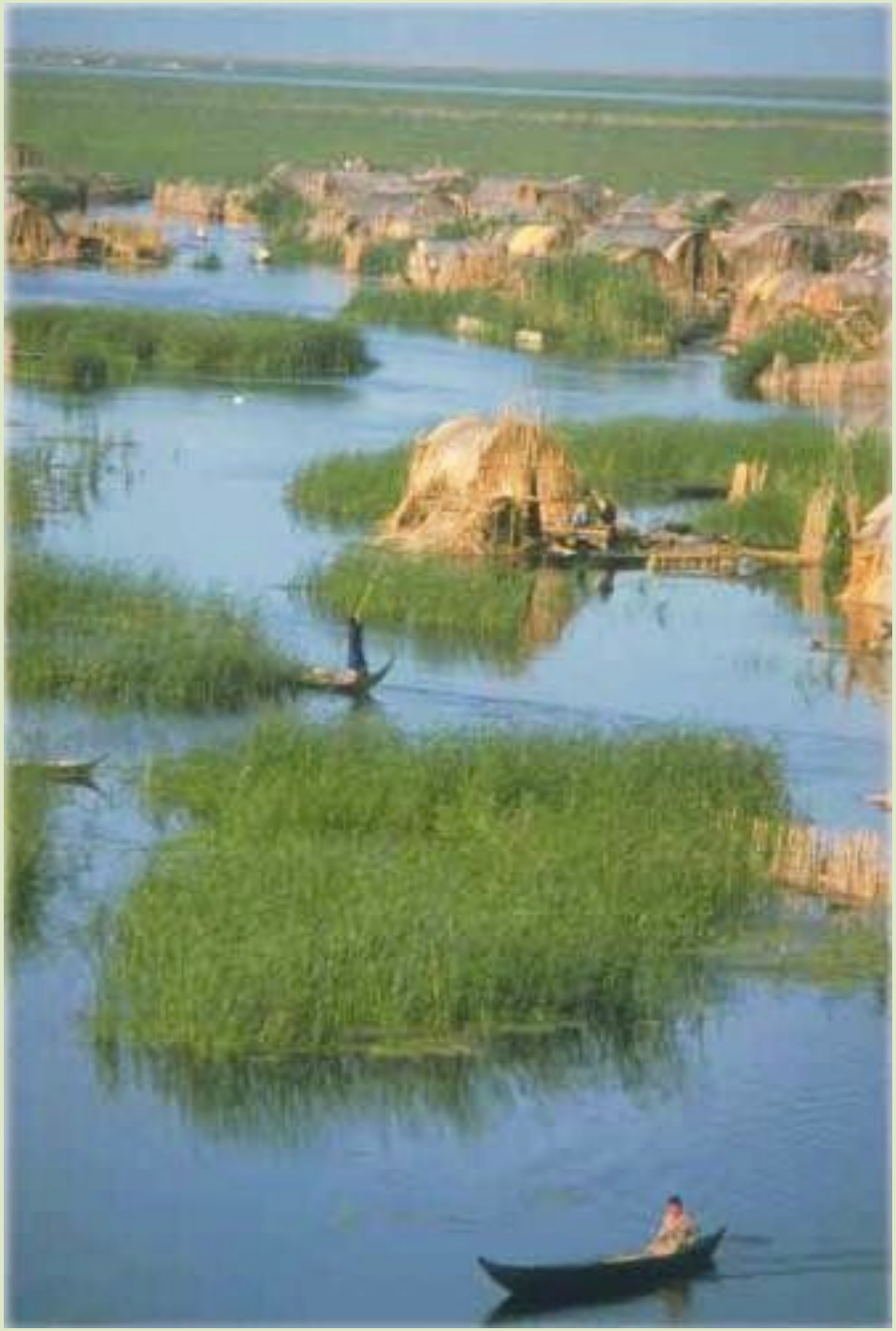
Example 2:

## 2. The Marshlands of Iraq

"Garden of Eden" Marshes between the Tigris and Euphrates Rivers.

Natural Filter for waste and other pollutants in the Tigris and Euphrates River before they enter the Persian Gulf.

Twice the Size of the Everglades.



WFB 074 Lecture 14 - Wetland Ecosystem Conservation.

Example 2: **The Marshlands of Iraq**

Important Stopover for Eurasian Bird Migration

Spawning Grounds for Persian Gulf Fishes

80 Bird Species in 1970s.

Rare Species:

**Marbled Teal** (*Marmaronetta angustirostris*)
40-60% of world population (IUCN Vulnerable)

**Basra Reed Warbler** (*Acrocephalus griseldis)* has increased in numbers since the re-flooding of the marshes. More than 90% of the world population.
(IUCN Endangered)

Photo Credit: Omar Fadil, Nature Iraq.

WFB 074 Lecture 14 - Wetland Ecosystem Conservation.

Example 2: **The Marshlands of Iraq**

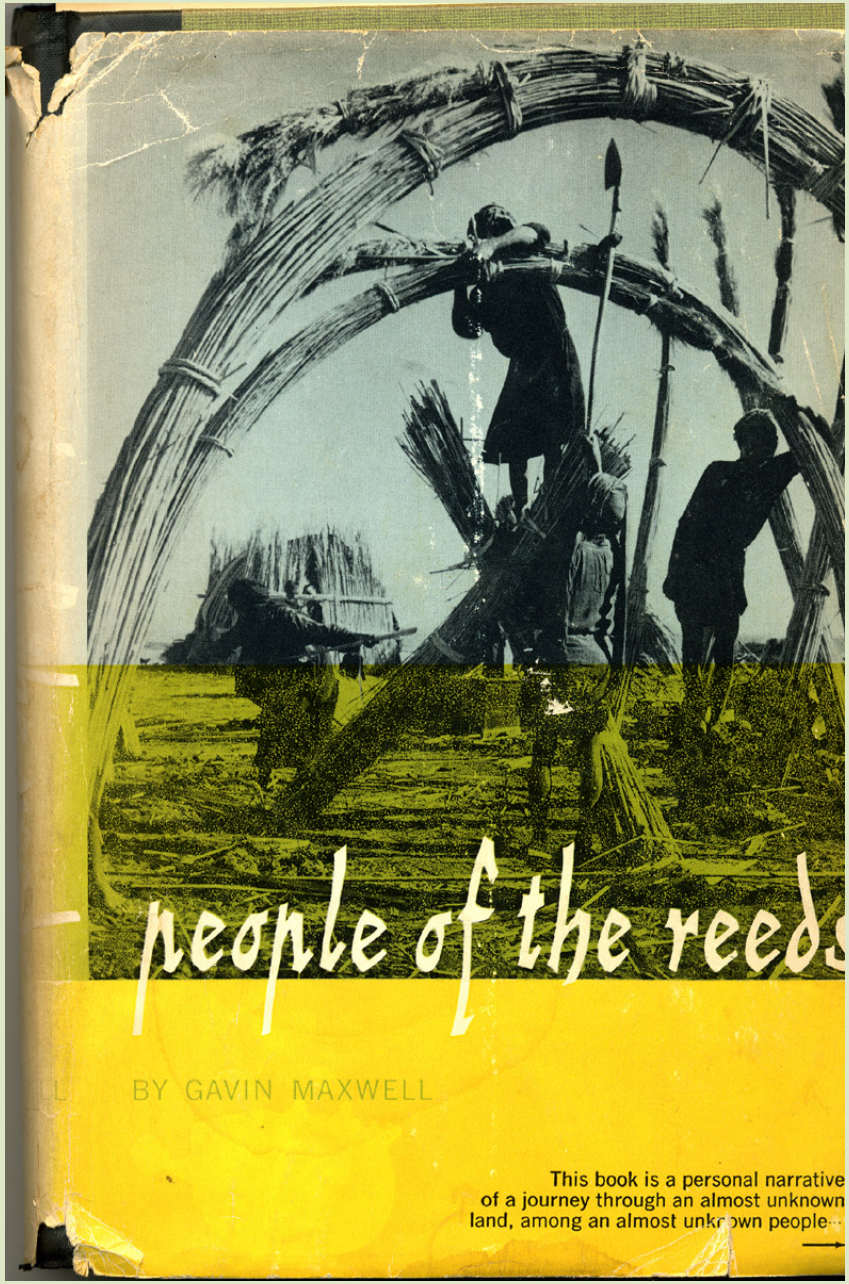
Known through the book by British explorer and travel writer Sir Wilfred Thesiger:

…"*I lived in the Marshes of Southern Iraq from the end of 1951 until June 1958…I spent these years in the Marshes because I enjoyed being there…Soon the Marshes will probably be drained; when this happens, a way of life that has lasted for thousands of years will disappear.*"

The Marsh Arabs, Wilfred Thesiger,1964

Also: Gavin Maxwell's: *A Reed Shaken by the Wind — a Journey through the Unexplored Marshlands of Iraq* (1959)

US Title: *People of the Reeds*




My tattered copy of: Gavin Maxwell, People of the Reeds.

WFB 074 Lecture 14 - Wetland Ecosystem Conservation.

Example 2: **The Marshlands of Iraq**

Homeland to 300,000-500,000 “Marsh Arabs”

Image: http://www.spiegel.de/fotostrecke/fotostrecke-57722.html

WFB 074 Lecture 14 - Wetland Ecosystem Conservation.

Example 2: **The Marshlands of Iraq**

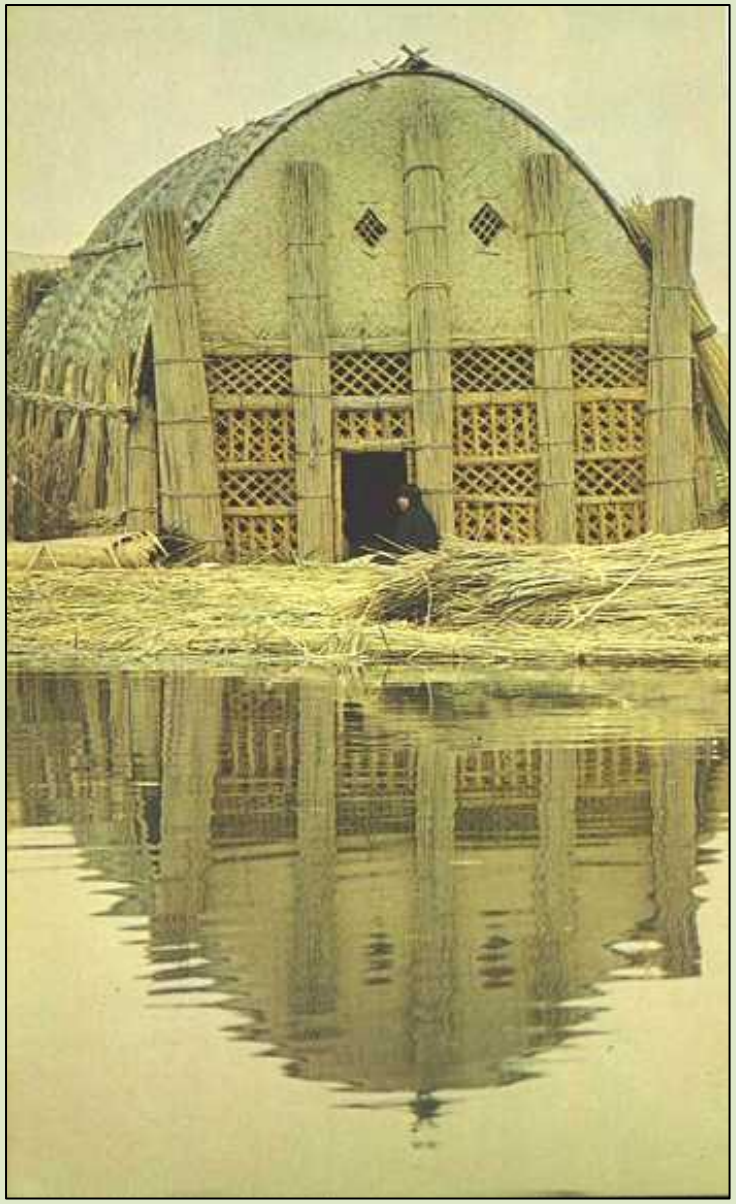
Homeland to 300,000-500,000 “Marsh Arabs”

## Example 2: **The Marshlands of Iraq**

Traditional Marsh Arabs live on floating islands with their Water Buffalos *(Bubalus arnee*).

Wild Water Buffalo
IUCN Endangered
< 4000 in wild

From: G. Maxwell. 1957.
People of the Reeds



Summerian Reed House (ca. 700 BC)

Modern Iraqi reed house (called a *mudhif*)

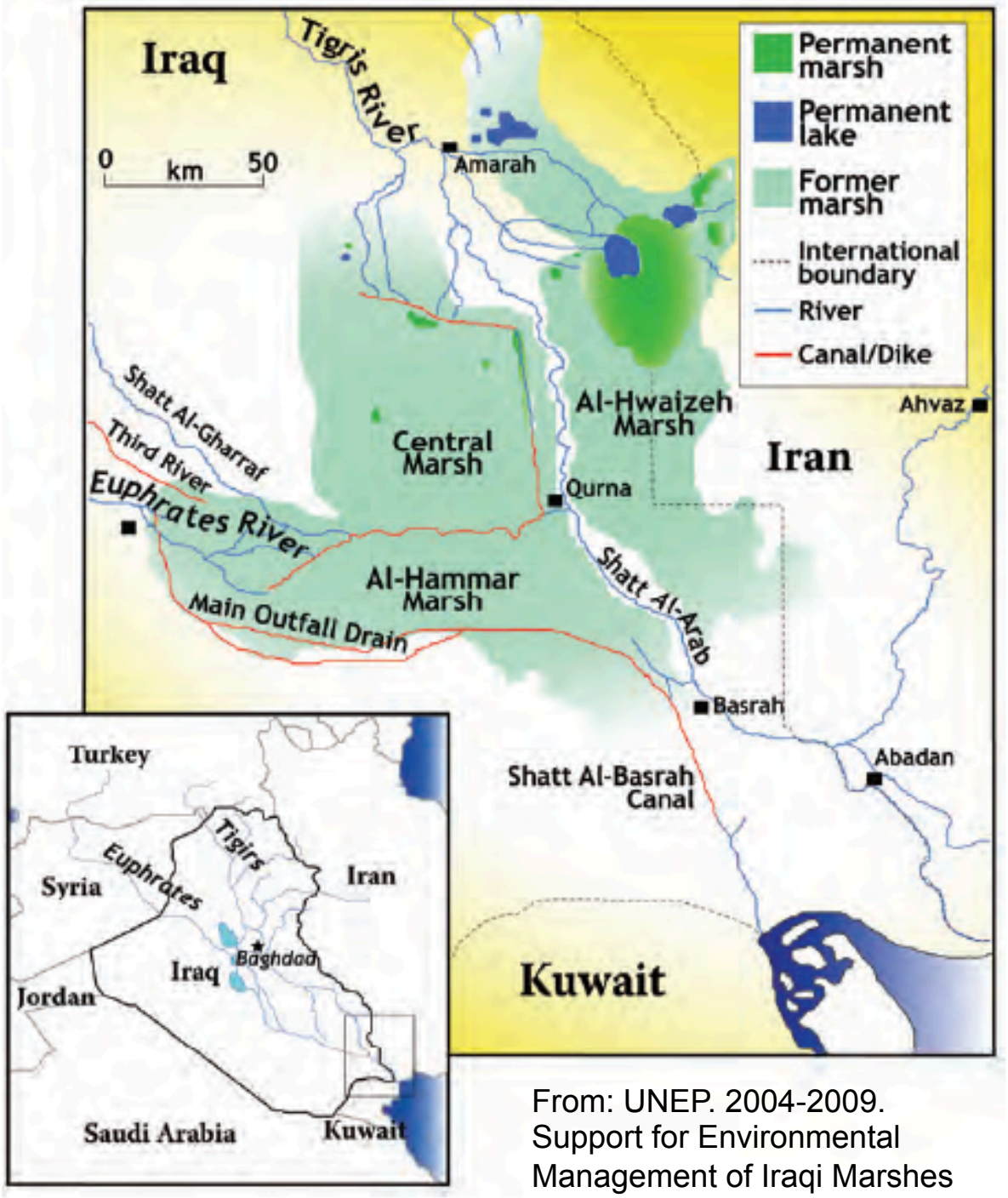
WFB 074 Lecture 14 - Wetland Ecosystem Conservation.
Example 2: The Marshlands of Iraq

After the first Gulf War In 1991 Saddam Hussein punished the Marsh Arabs for a failed uprising by draining their swamps, and building massive canals.

6000 square miles of marshes were converted into desert.

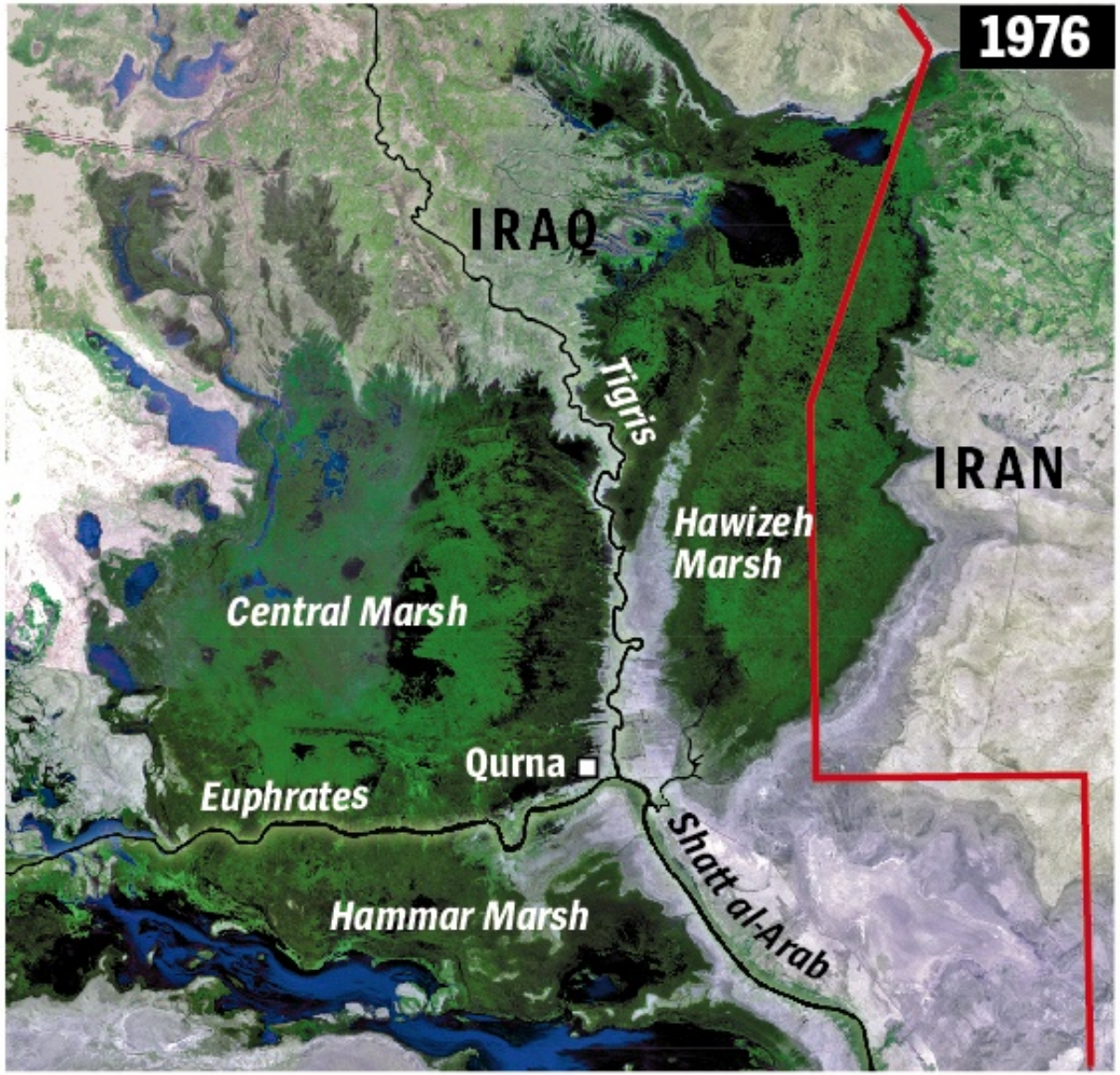
After the fall of Baghdad in 2003 Azzam Alwash and other Iraqi exiles began pushing to re-flood “Eden”. Their model was the restoration of the Everglades.

→ USAID supported New Eden Project




From: UNEP. 2004-2009. Support for Environmental Management of Iraqi Marshes

# The marshes of southern Iraq, before being drained

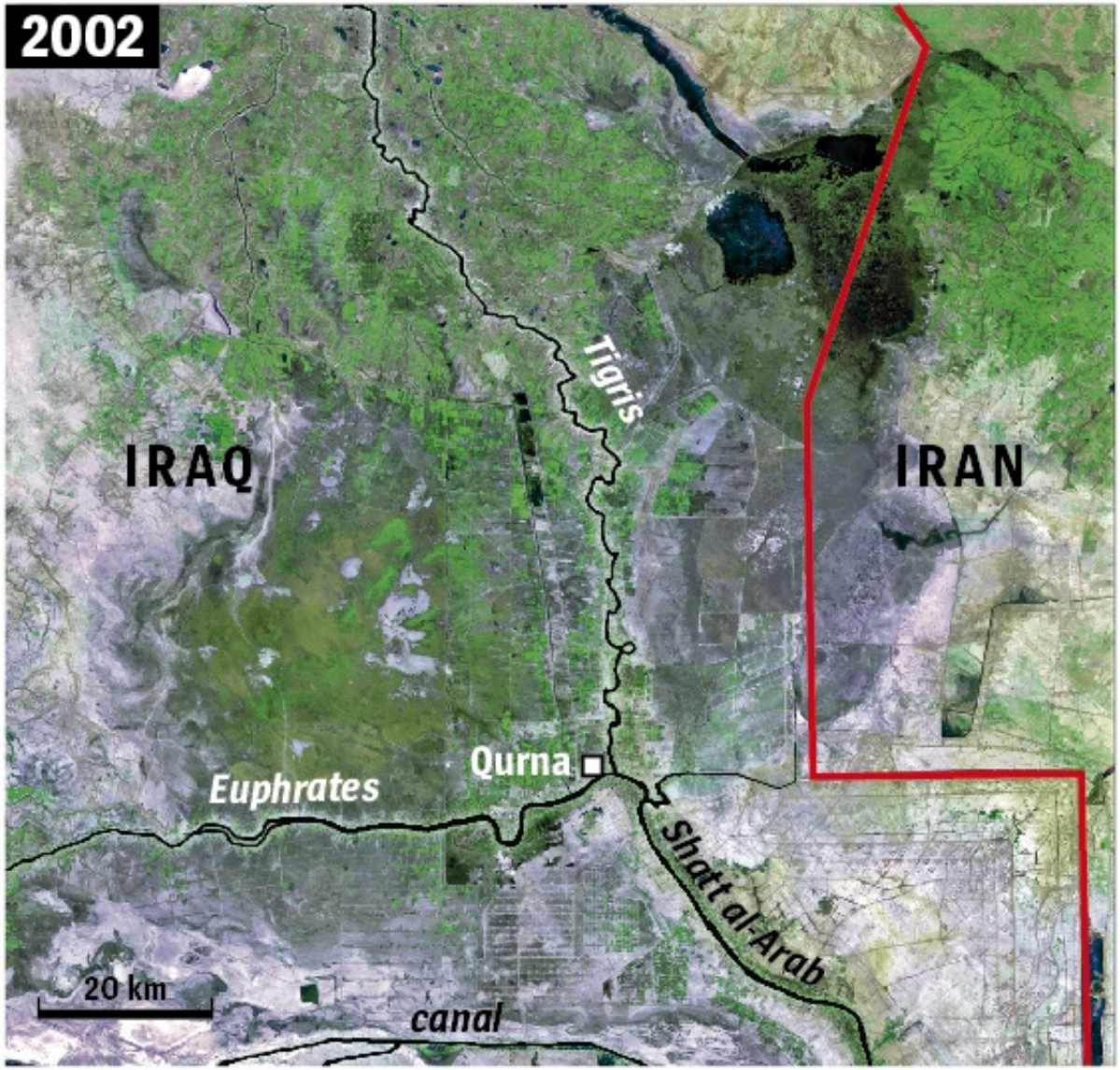

DER SPIEGEL

permanent lakes
seasonal lakes
marsh vegetation

Source: Studio Galli Ingegneria

Image source: http://www.spiegel.de/fotostrecke/fotostrecke-57722-2.html

# The marshes of southern Iraq, after being drained


DER SPIEGEL

permanent lakes
seasonal lakes
marsh vegetation

Source: Studio Galli Ingegneria

Image source: http://www.spiegel.de/fotostrecke/fotostrecke-57722-2.html

Ma'dan (Marsh Arabs) in the restored Iraqi Wetlands. Photo: Heathcliff O'Malley

2005 survey of restored marshes:

74 species of birds including 10 rare and endangered species not seen in 25 years.
(Richardson and Hussein 2006)

Iraq Babbler *Turdoides altirostris*

## Example 2: The Marshlands of Iraq

**VIDEO: Nature Iraq Staff Embrace Magical Marshlands, by TRACEY SHELTON**

http://www.wildlifeextra.com/go/news/iraq-marshes011.html#cr

**VIDEO: The Revival of an Ancient Technique in the Marshlands of Iraq - By TRACEY SHELTON**

http://www.youtube.com/watch?v=VXjNTEVwxQA

Time Lapse Annual Images if the Mesopotamian Marshes:
http://en.wikipedia.org/wiki/File:Mesopotamian_Marshes_2000-2009.gif

# Readings for Lecture 15 (Thursday)
## (Guest Lecture: Prof. Ellen Marsden on Fisheries Conservation)

Wilcove, D. S. 1999. *The Condor's Shadow: the Loss and Recovery of Wildlife in America.* pp.105-137, Chapter 4: *Troubled Waters*. New York: W. H. Freeman & C.

Madenjian, Charles P. et al. 2008. Adverse effects of Alewives on Laurentian Great Lakes Fish Communities. North American Journal of Fisheries Management 28:263–282