

Predrainage Hydrology of Lake Okeechobee

Relationship to downstream wetlands.

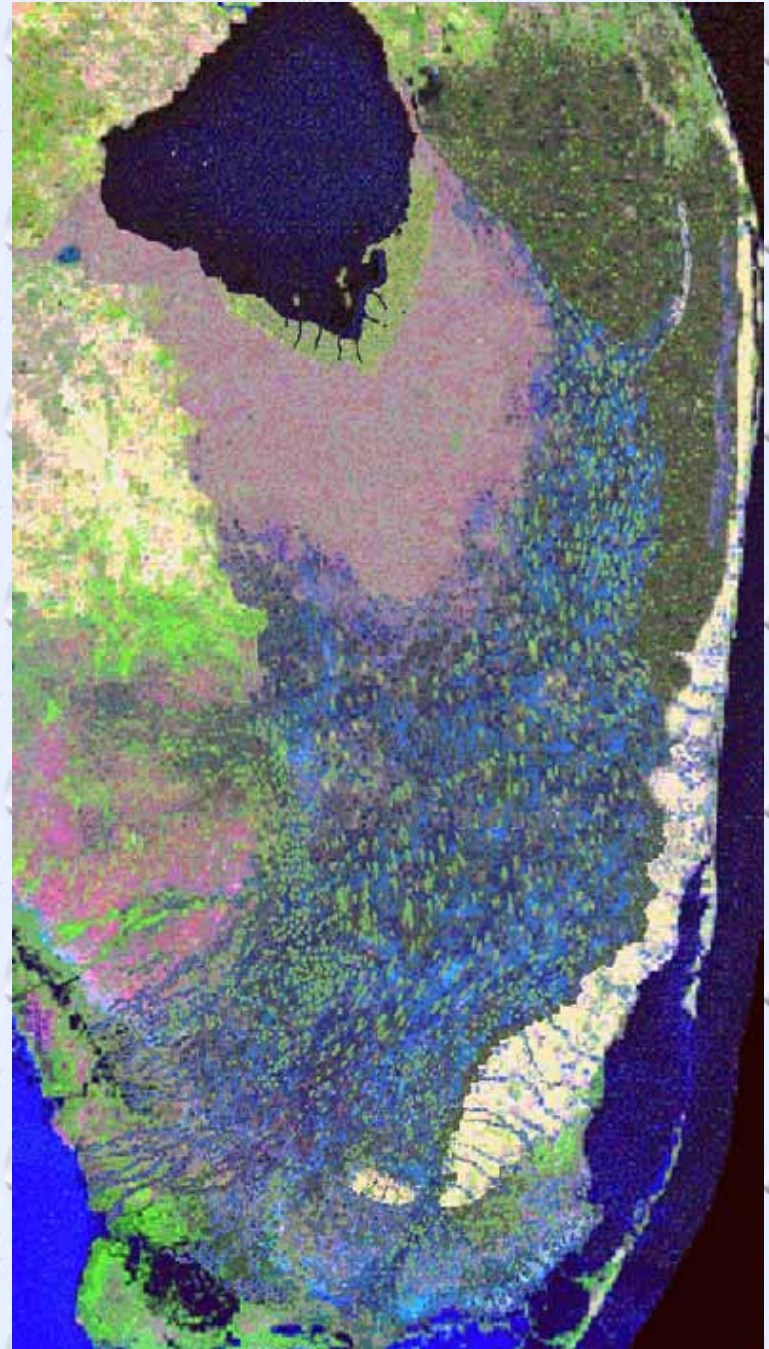
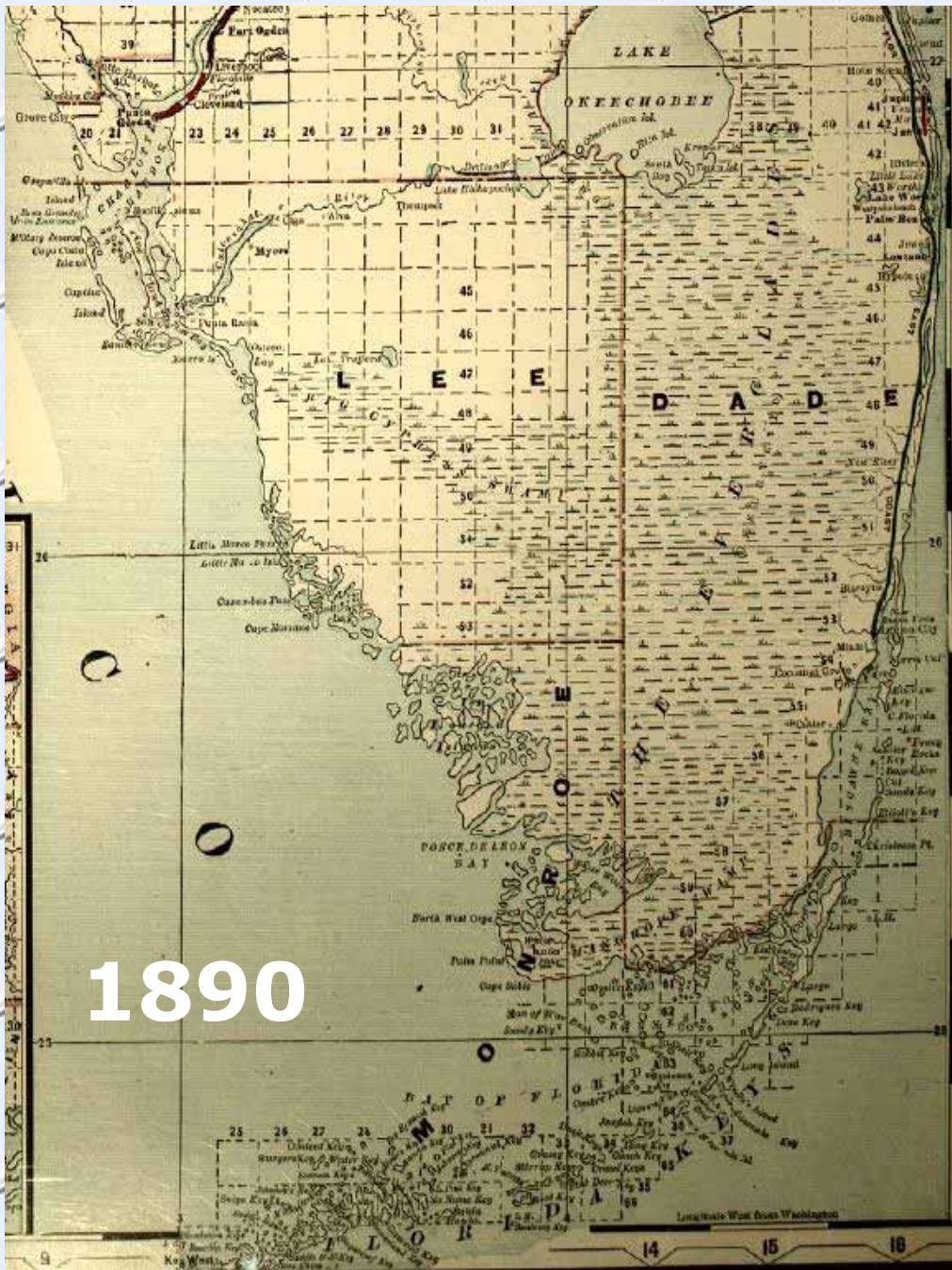
Persistent outflow along the southern shore provided the head to maintain constant flow through the Everglades.

Quantitative information on flows and stages

Reconstruction of downstream topography

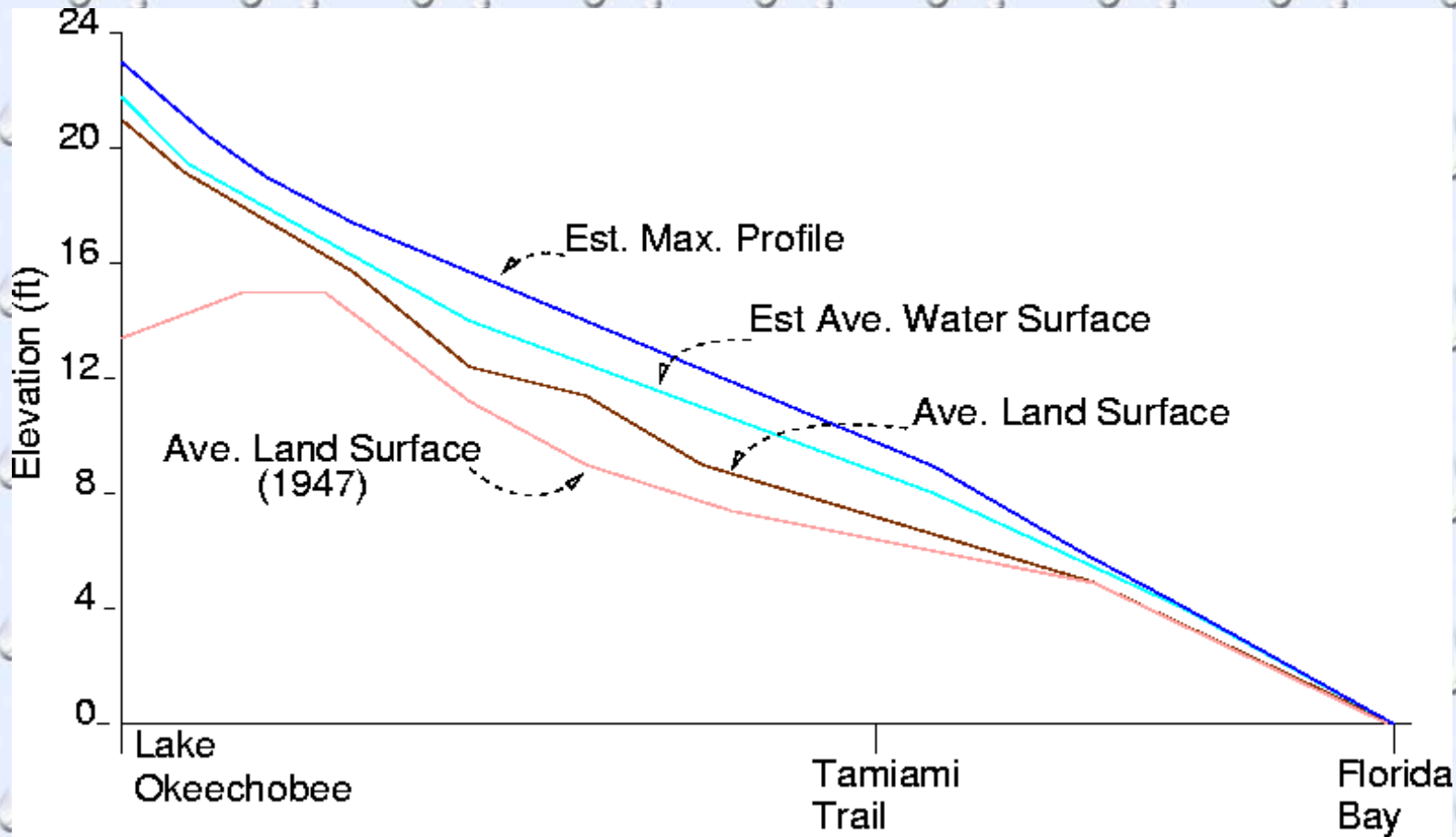
Use models to simulate downstream conditions.

Pre-project Landscape



Source: Adapted from SFWMD

Pre-drainage Everglades Profile



Source: Adapted from US Army Corps of Engineers, 1960

Lake Okeechobee

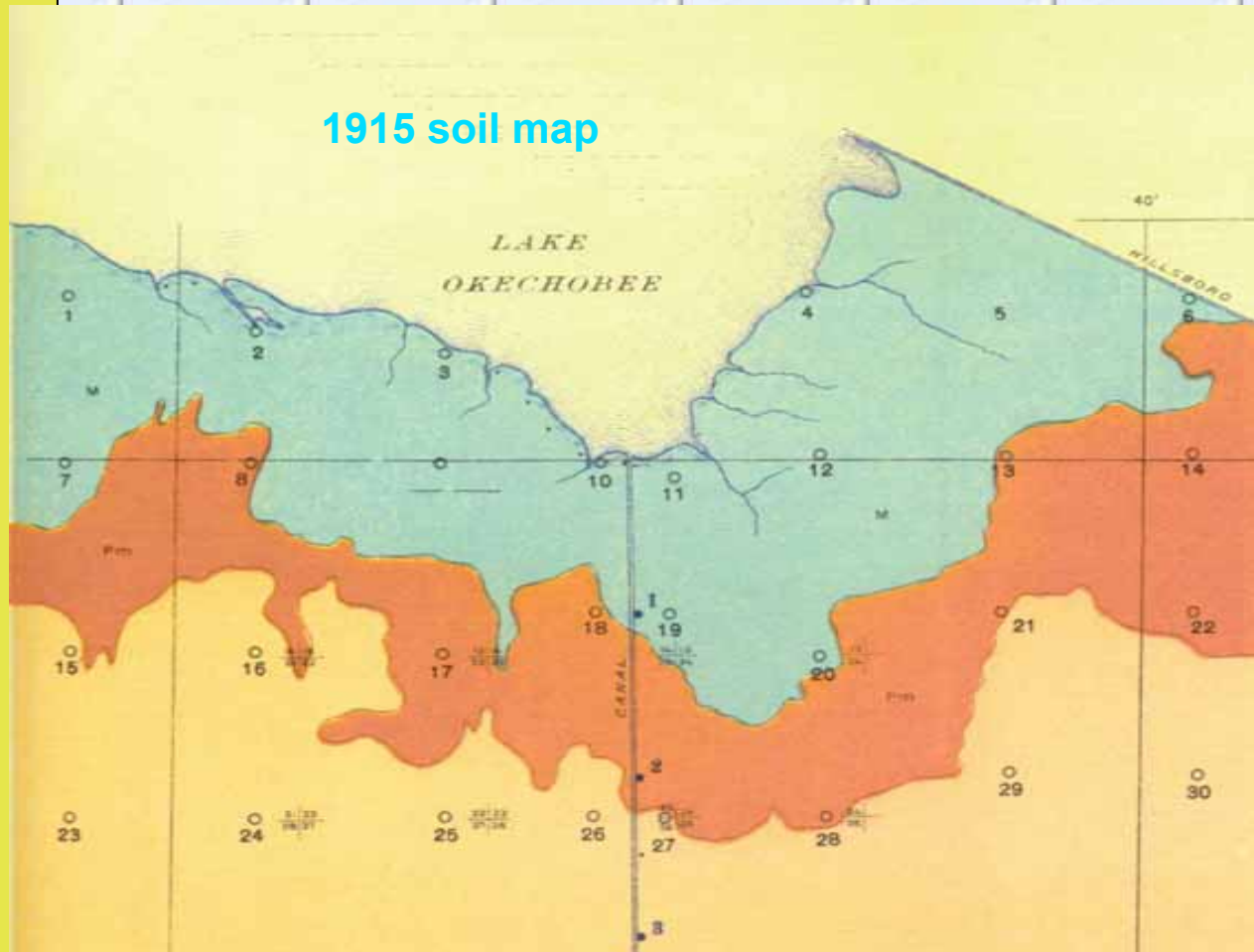
Shoreline was custard apple.
Cut through by rivers.
Overflow at 20.1 ft.

Bull.25: As little as
500,000 AF/yr in dry years.

FEEC 1914: 25 mi. spillway
at 2 fps, depth 0.1ft.
 $Q = 26,400$ cfs.

Times-Democrat expedition:
Water marks in custard apple
5 ft. high.

After 1910 event:
Water marks on spoil piles
of South New River Canal
5 ft. above level of land.



Source: *Soil Survey of the
Fort Lauderdale Area, 1915.*

Quantitative information on stages and flows

Useful to calibrate the overland flow component of pre-drainage hydrology models

Estimates of early flows to Lake O range from one to two mAF/yr.

Flows:

1940-1951 2.3 mAF/yr

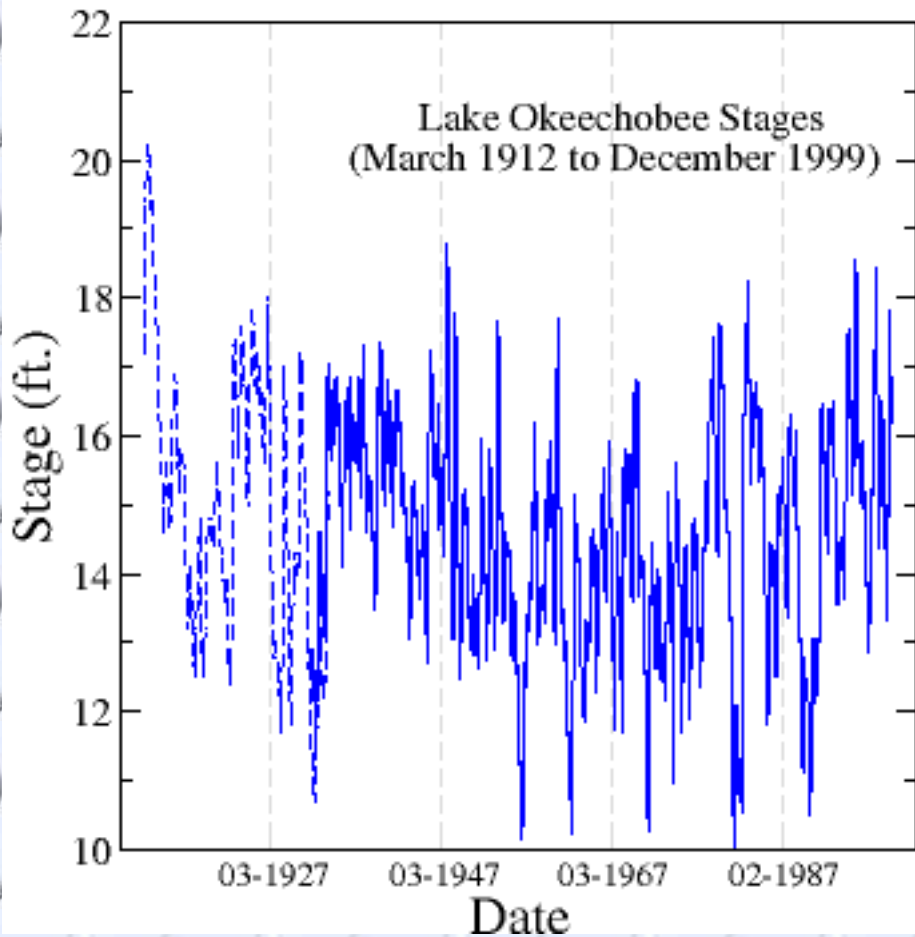
1952-1963 2.4 mAF/yr

Outflow to the Everglades:

1940-1951 1.3 mAF/yr

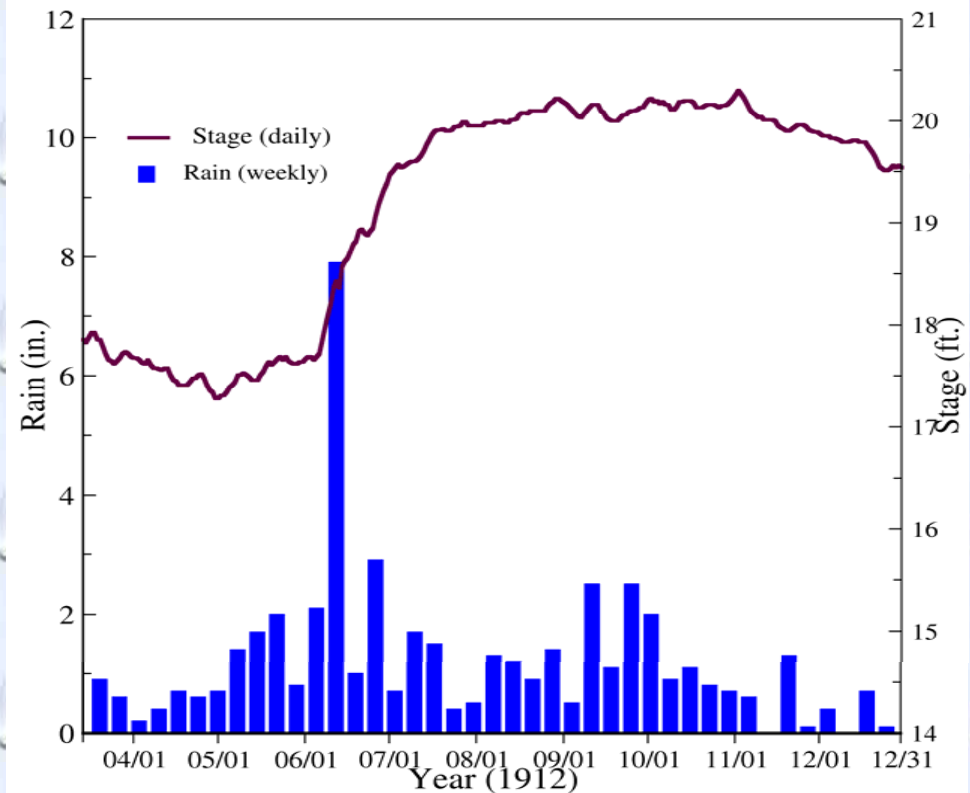
1952-1963 1.8 mAF/yr (2 ft. deficit)

The 1912 Stage and Rainfall Data.



Heavy rainfall in June, 1912 raised Lake Okeechobee to overflow.

Change in Storage: 5/1 to 7/18
1,200,000 AF.



Canal outflow 1913
1.3 mAF/yr

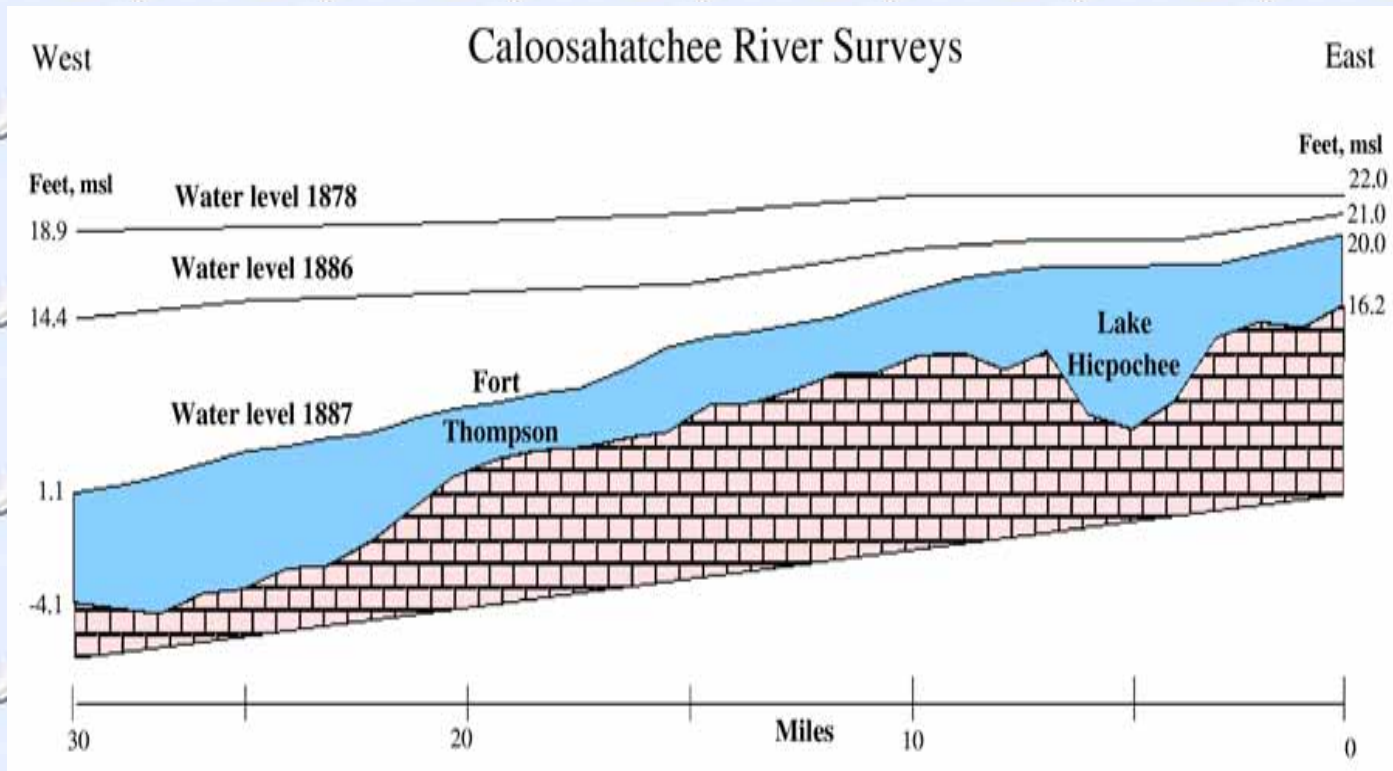
Outflow from Lake Okeechobee

Bank overflow along southern shoreline

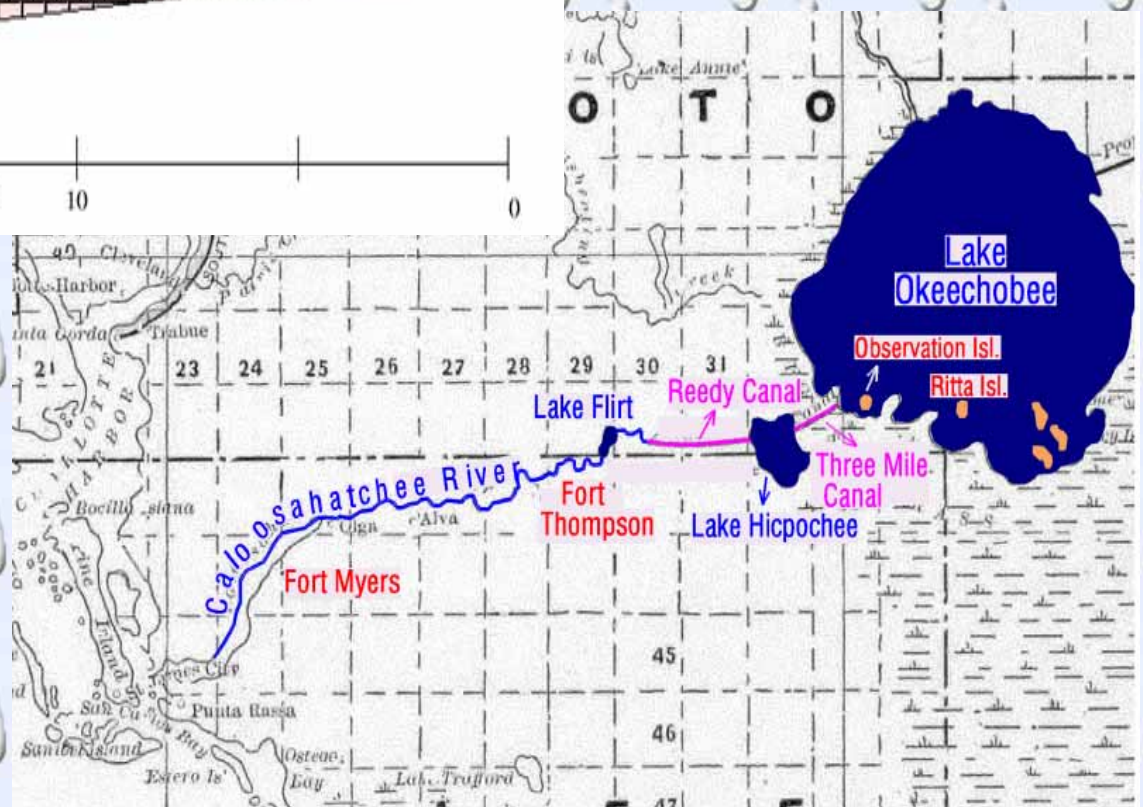
Channel flow into pond apple and sawgrass

Little connection with Caloosahatchee

Caloosahatchee surveys



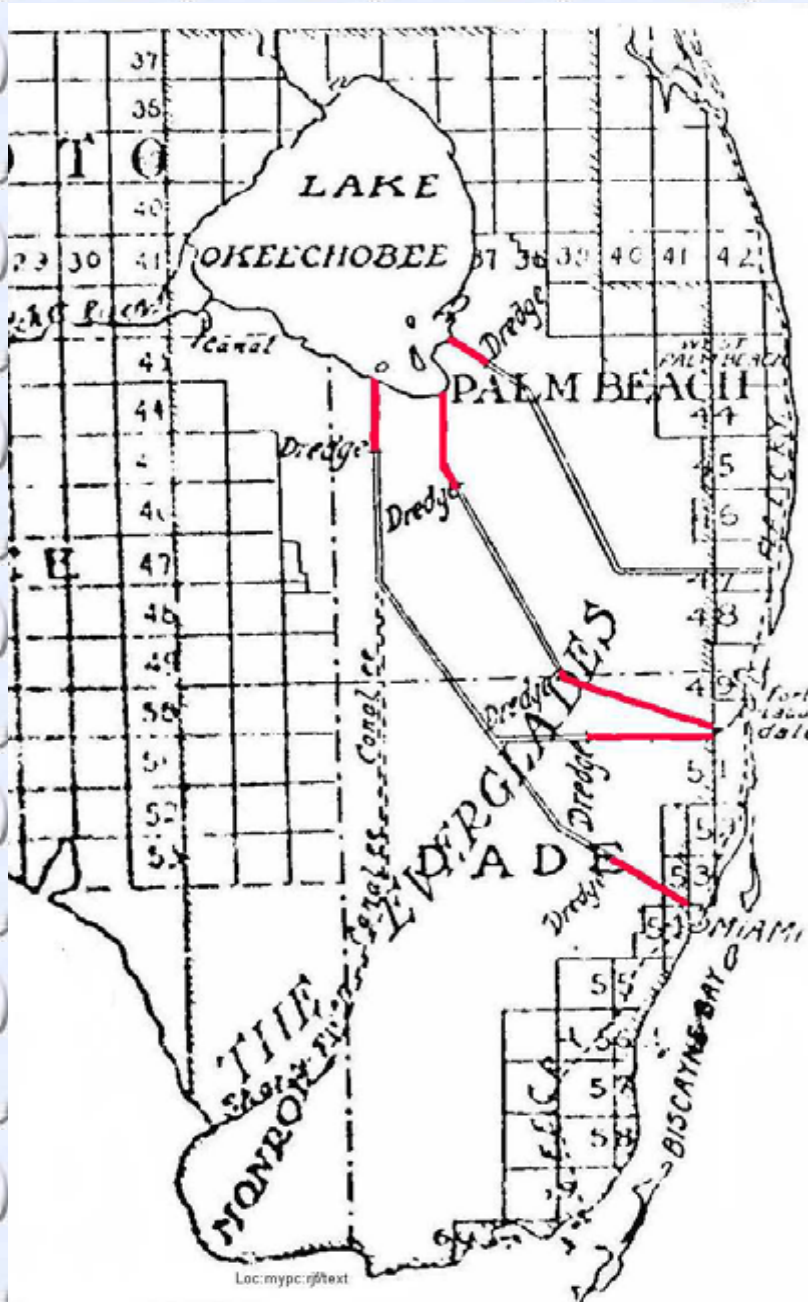
Stage drop in
Lake Tohopekaliga
by 1883: 4.5 ft.



May 11, 1911 canal completion

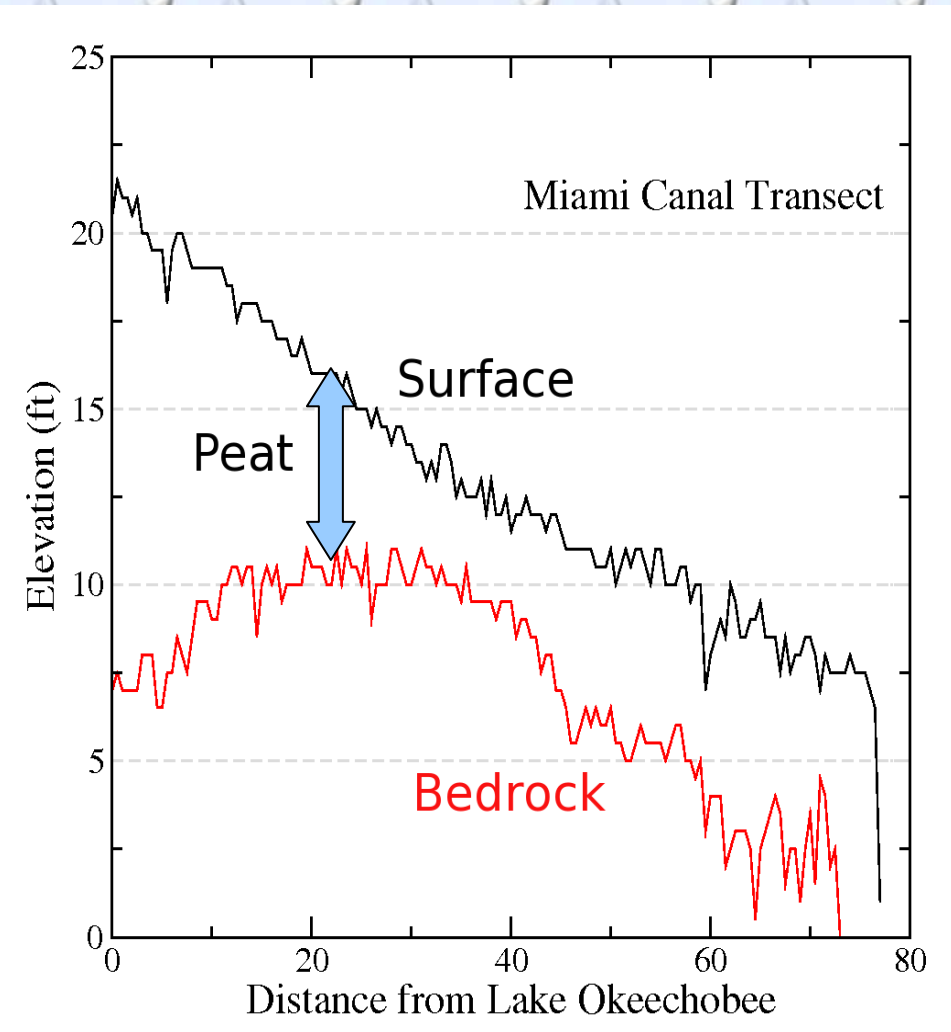
Construction of major drainage canals well underway by 1911.

Elevations and peat depths were published by Florida Everglades Engineering Commission in Senate Doc. 379, 1913.

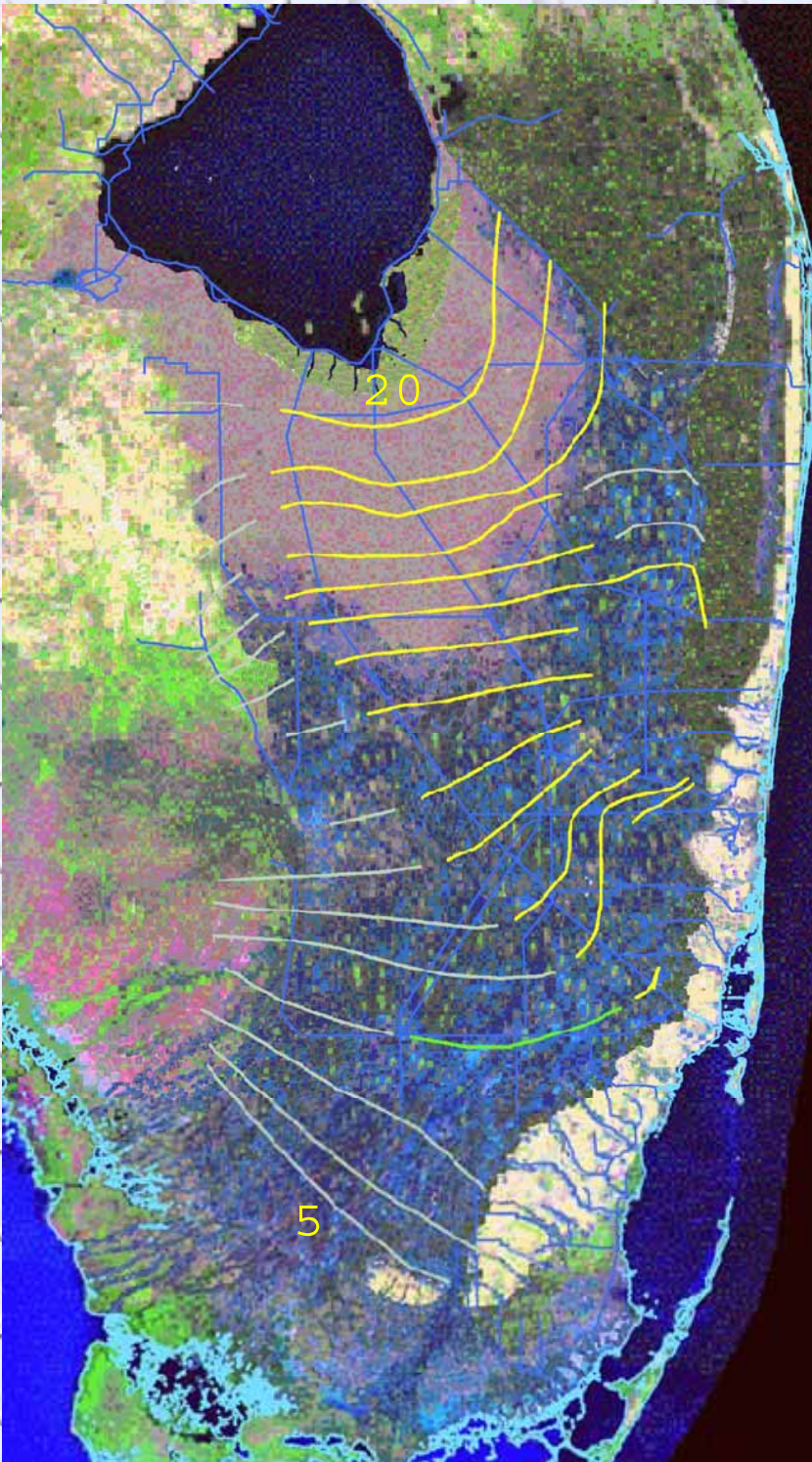


Profiles

West Palm Beach Canal
Hillsboro Canal
North New River
South New River
Miami Canal



Florida Everglades Engineering Commission
in Senate Doc. 379, 1913



Pre-drainage Elevation contours

- Canal profile data
- Subsidence data

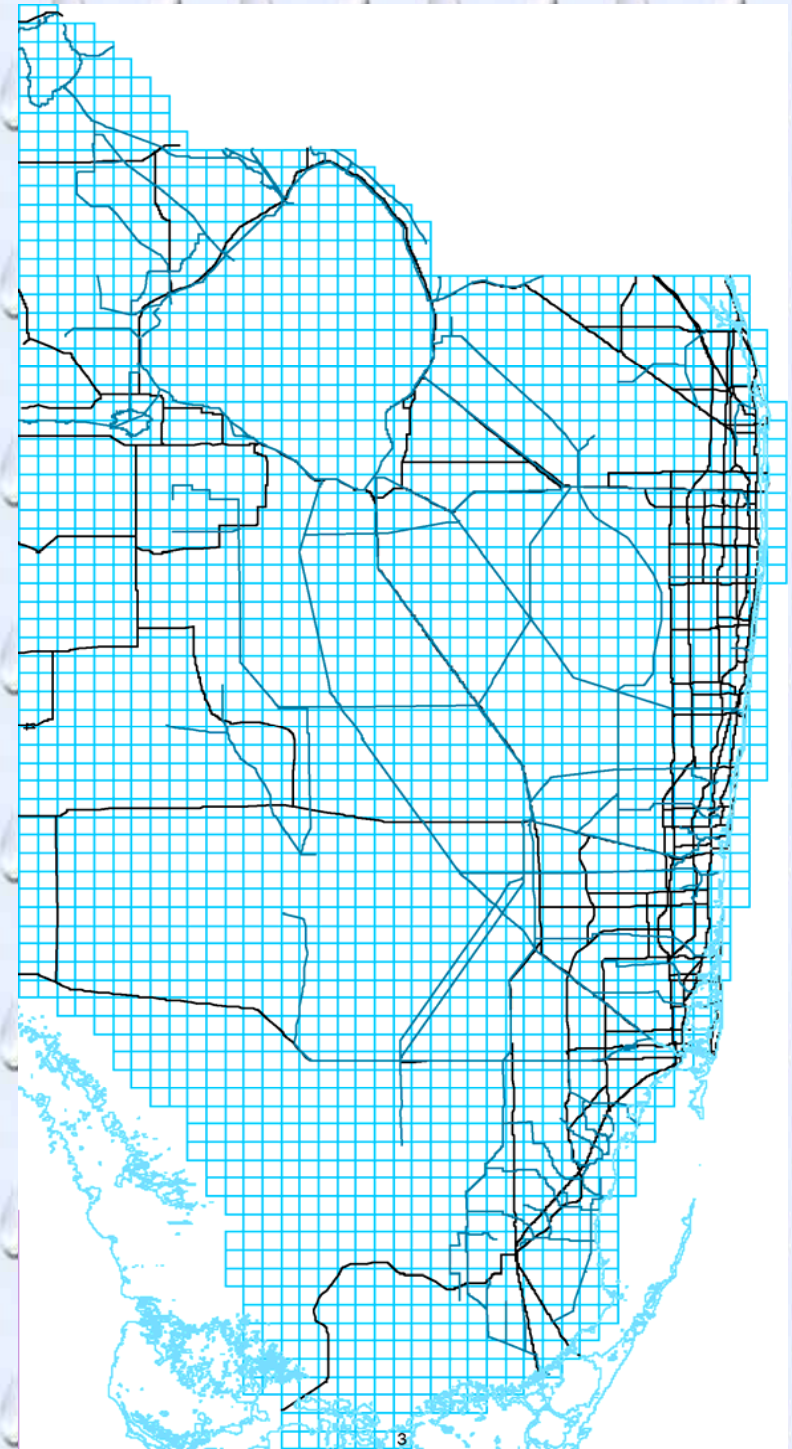
5000 year peat deposition
resulted in fairly broad
smooth landscape

Hydrologic Model

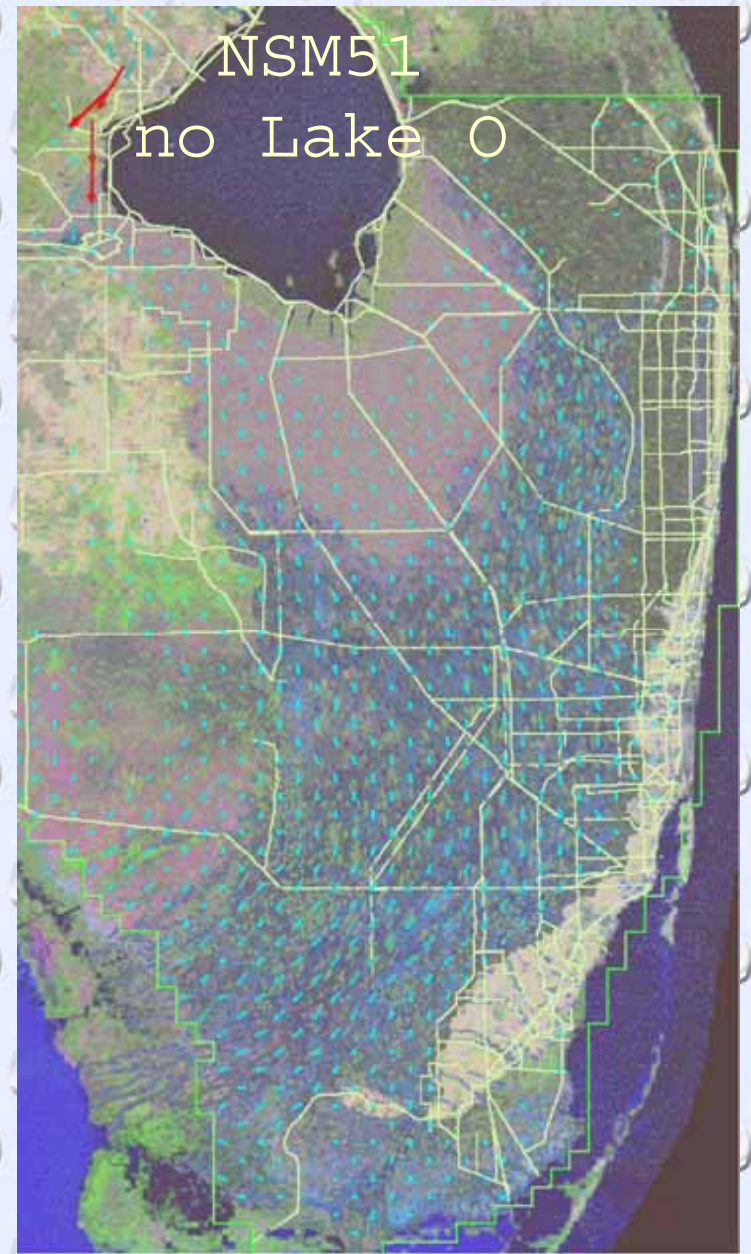
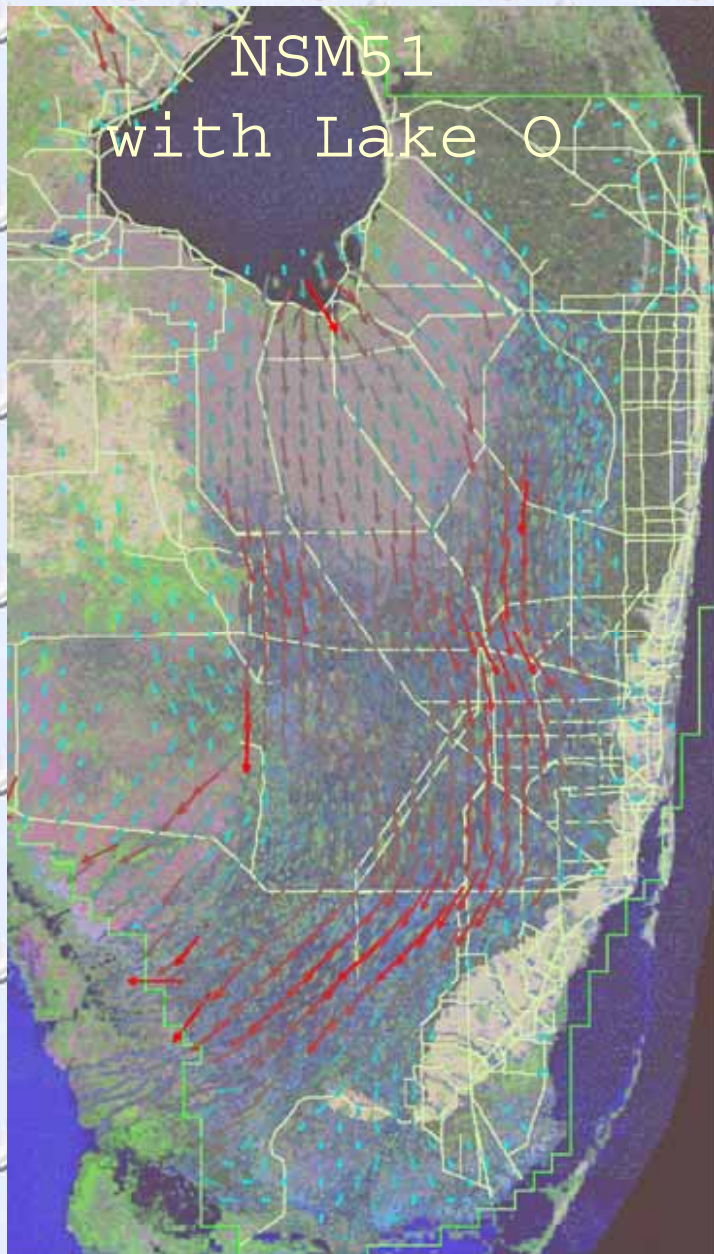
Natural System Model

Simulates all major hydrological components.

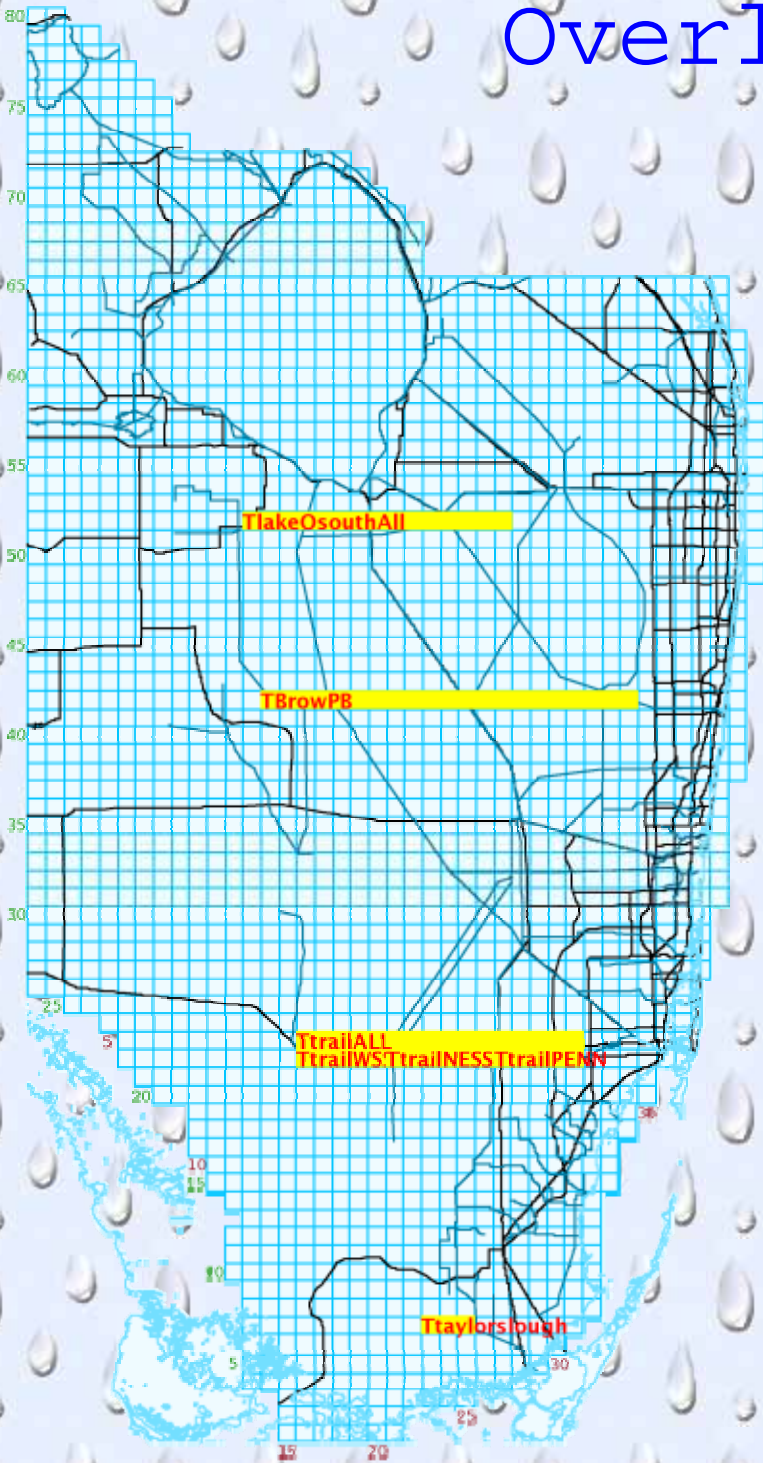
Output: Flows and stages.



Overland flow vectors



Overland flows (acre-feet/yr)



	NSM51	NSM462	NSM5 noLakeO
Lake O	1,221,532	716,771	28,324
BrwPB	2,169,434	1,471,351	1,256,476
TamTrl	1,786,096	1,791,822	1,271,518
WSS	518,154	501,723	362,257
NESS	623,787	843,299	436,578
PENN	644,178	446,781	624,108
TAY	136,627	48,097	48,113

Lake Okeechobee to Everglades connection was an important hydrological component, influenced flows and stages from the pond apple to Florida Bay.

In the current landscape, Lake Okeechobee's large storage potential is crucial to the all the downstream users.

Holistic approach to Everglades stabilization must include Lake Okeechobee.

Alternatives need to be evaluated which provide for downstream stakeholders and maintain the ecology of the Lake.