Lake Belt Mitigation Committee and Implementation of the L-31N Seepage Barrier – Phase 1

Water Resource Advisory Commission
February 5, 2015

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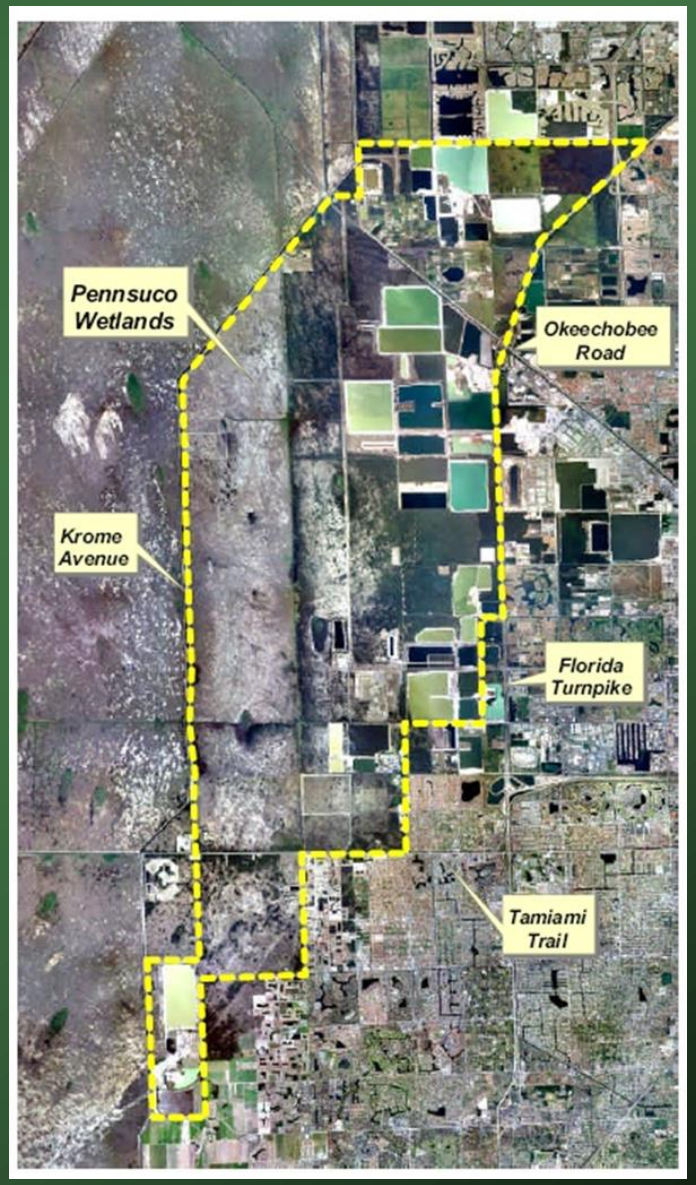
sfwmd.gov

Miami-Dade County Lake Belt Plan

1992 - Legislature set planning process for the lake belt region

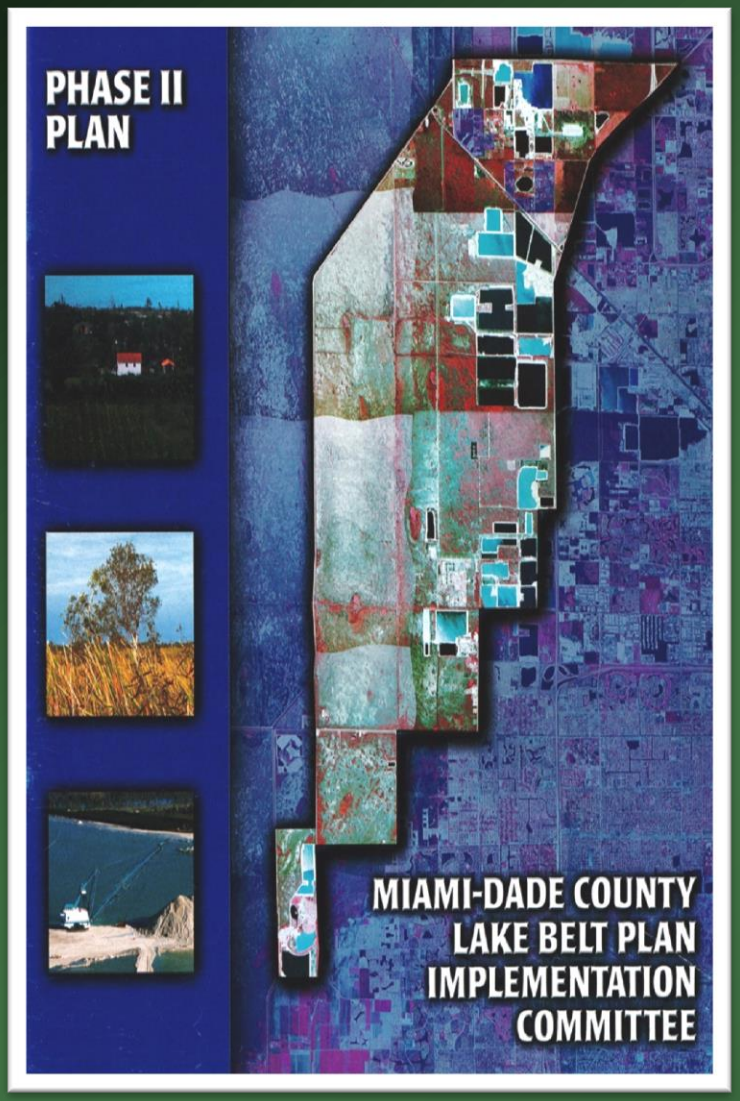
- Dept. Environmental Protection
- Dept. Community Affairs
- Fish & Wildlife Cons. Commission
- Governor's Office
- Miami-Dade County Water Utility, Planning & Env. Depts
- Environmental Organizations
- Rock mining industry
- Non-mining landowners
- Legislative Reps
- Federal Issue Team



1997 Phase I Plan

- Identified where mining was, and was not, appropriate
- State mitigation strategy developed
- Strategy for streamlining the permit process
- Regional review of impacts & mitigation
- Considered in CERP planning process

1999 Legislation: Lake Belt Mitigation Plan



Comprehensive plan to offset the loss of wetlands from mining

Mitigation may include:

- **Wetlands & Uplands**
  - *land acquisition*
  - *enhancement / restoration*
  - *long term management*
- **Purchase of Mitigation Bank Credits**
- **Structural modifications to drainage system to enhance hydrology**

Established a mitigation fee on each ton of lime rock and sand sold from the Lake Belt Area

Lake Belt Mitigation Committee

- **Legislature established an Interagency Committee to oversee expenditure of funds received**

  Miami-Dade Dept of Env. Resource Mgmt

  South Florida Water Management District

  Fish & Wildlife Conservation Commission

  Department of Environmental Protection

  U.S. Army Corps of Engineers

  U.S. Environmental Protection Agency

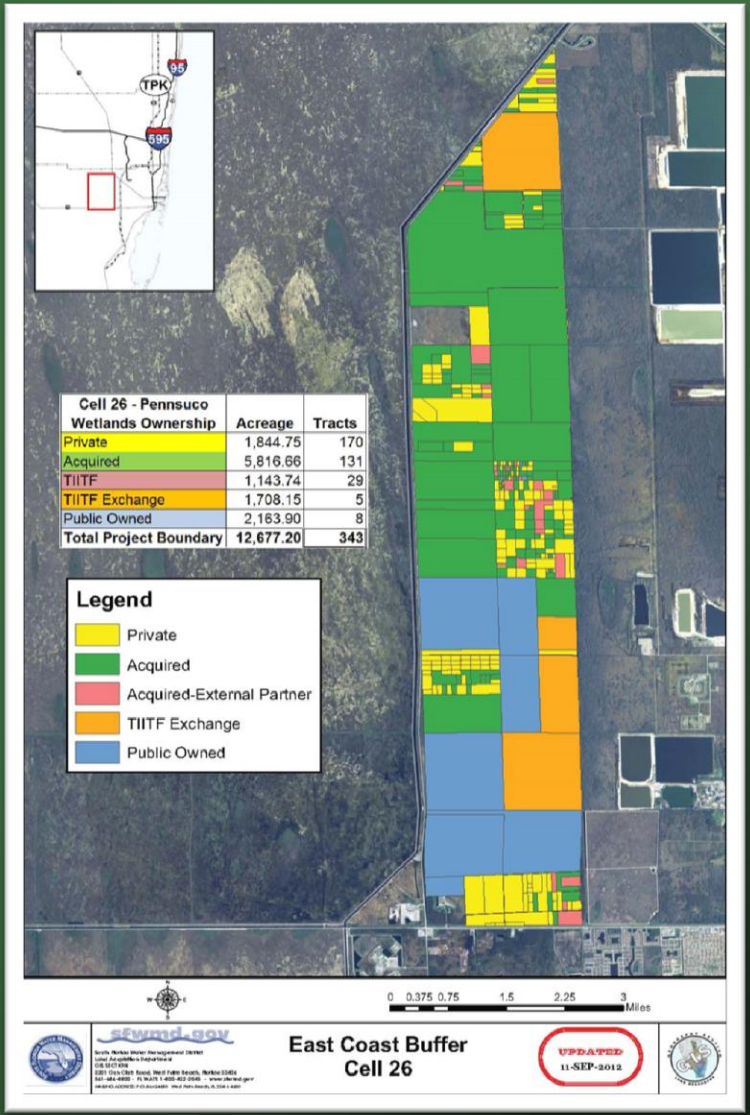
  U.S. Fish and Wildlife Service

  Rockmining Industry (non-voting member)

(Committee authorized to add federal agencies)

Major Mitigation Activities

- **Pennsuco** – acquisition, restoration and long term management +/10,000 acres (District)



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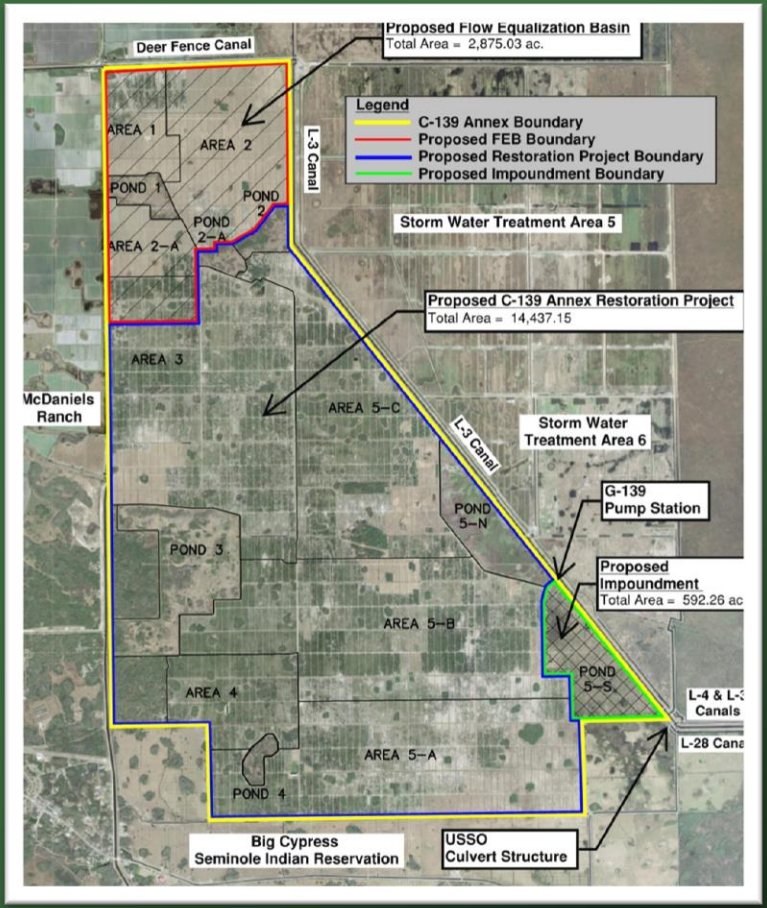

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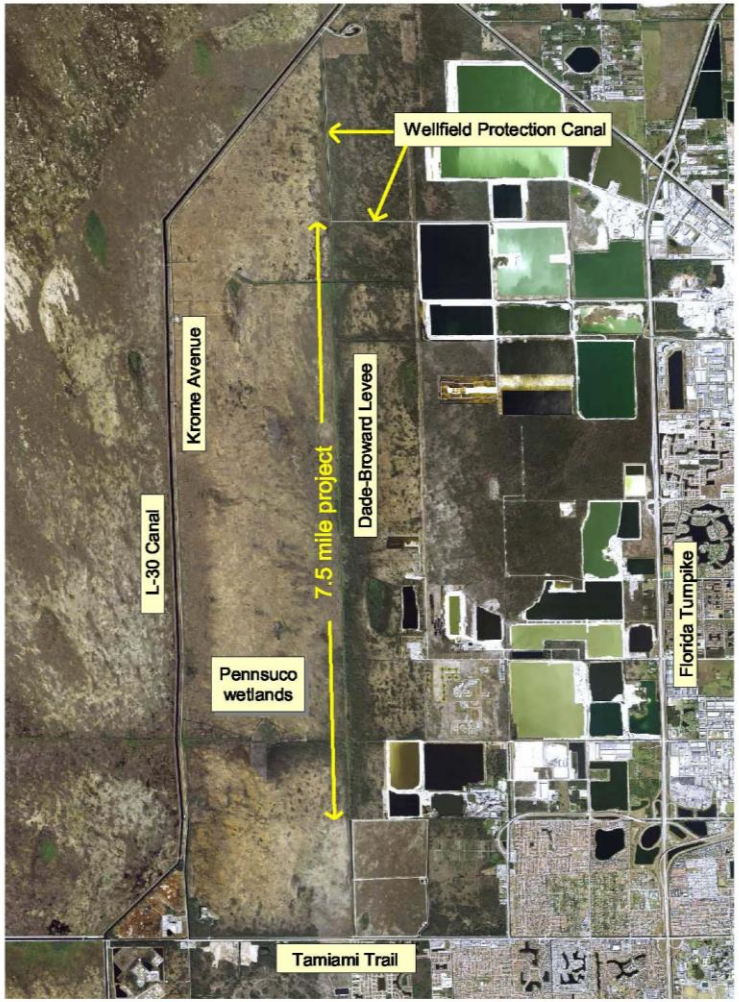
- **Dade / Broward Levee** – gap repair along 7.5 miles to reduce water loss (Miami-Dade Limestone Product Association - MDLPA)



Dade-Broward Levee Project
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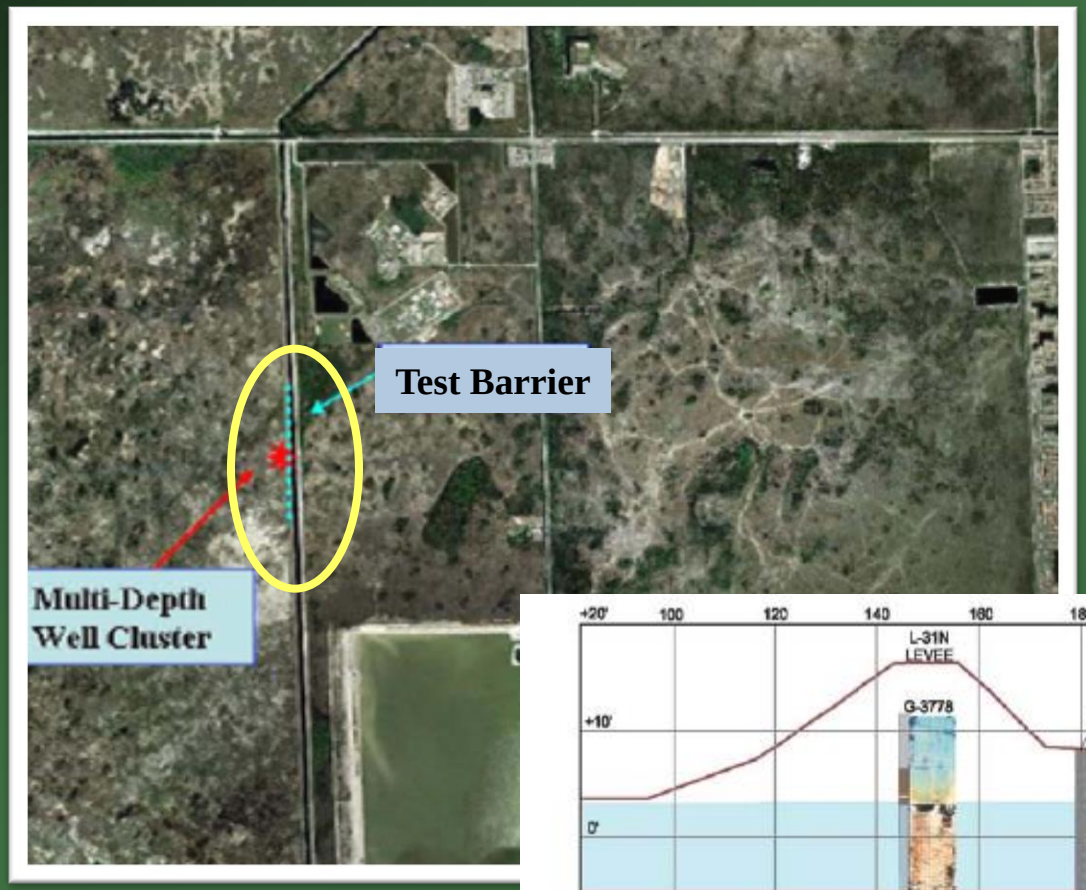
- **L-31N Seepage Barrier** – 2 miles existing, 3 miles proposed (MDLPA)

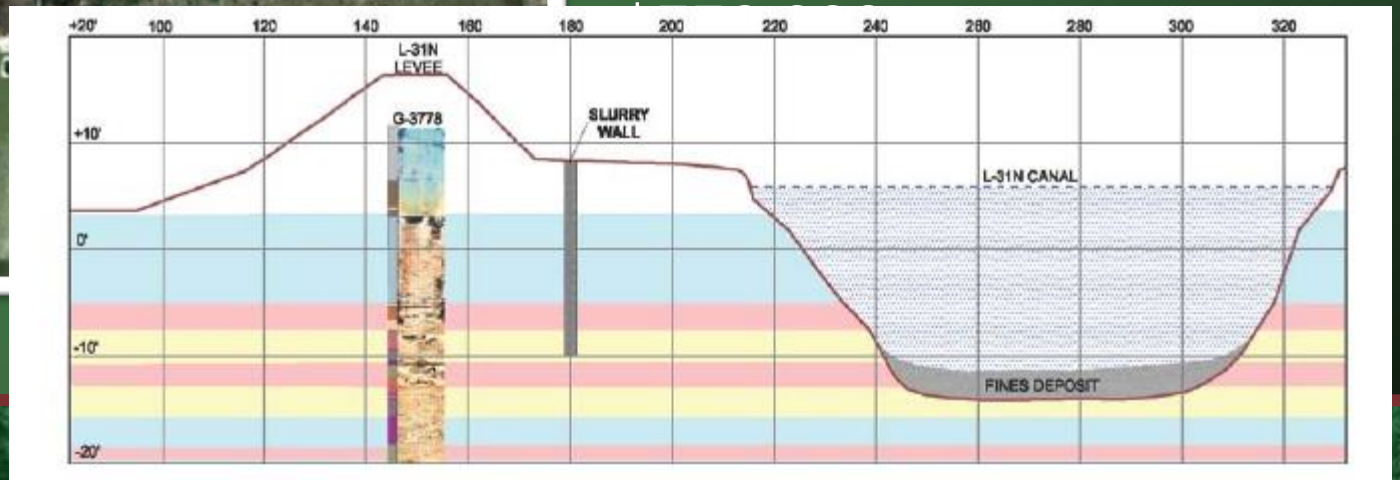
L-31N Seepage Barrier Pilot Test – 2009

Field test to document performance of a partially penetrating flow barrier in reducing groundwater flow to the canal

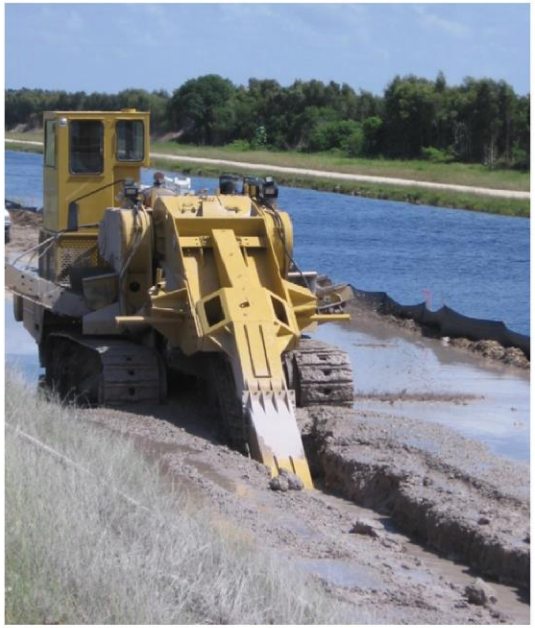


1,000' long, 18' deep trench excavated and backfilled with cement-bentonite mixture

Monitoring of groundwater flow



Pilot Test Construction Aug-Sept 2009



Pilot Test Evaluation

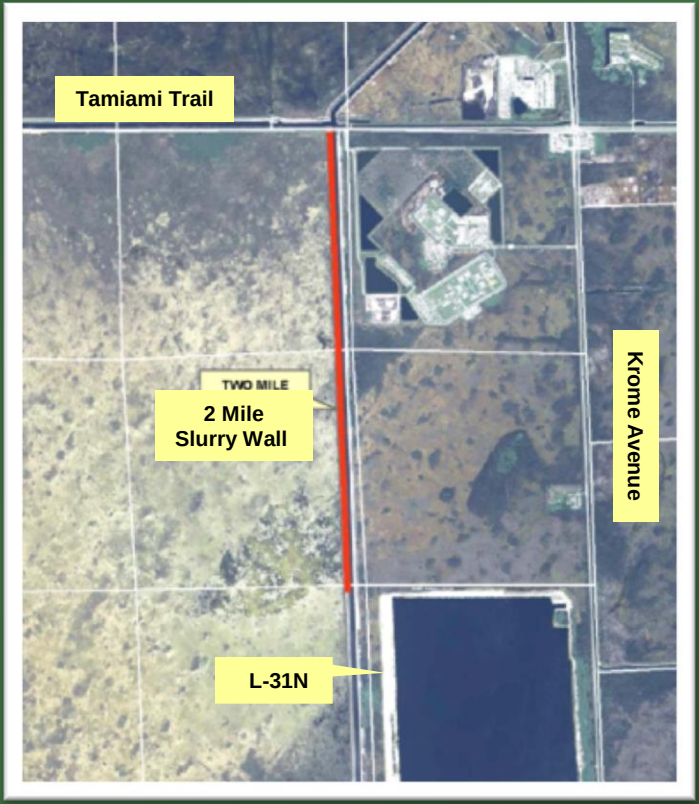
- Groundwater Monitoring
- Barrier Integrity Testing
- Tracer Tests
- Canal Flow Measurements

Conclusions:

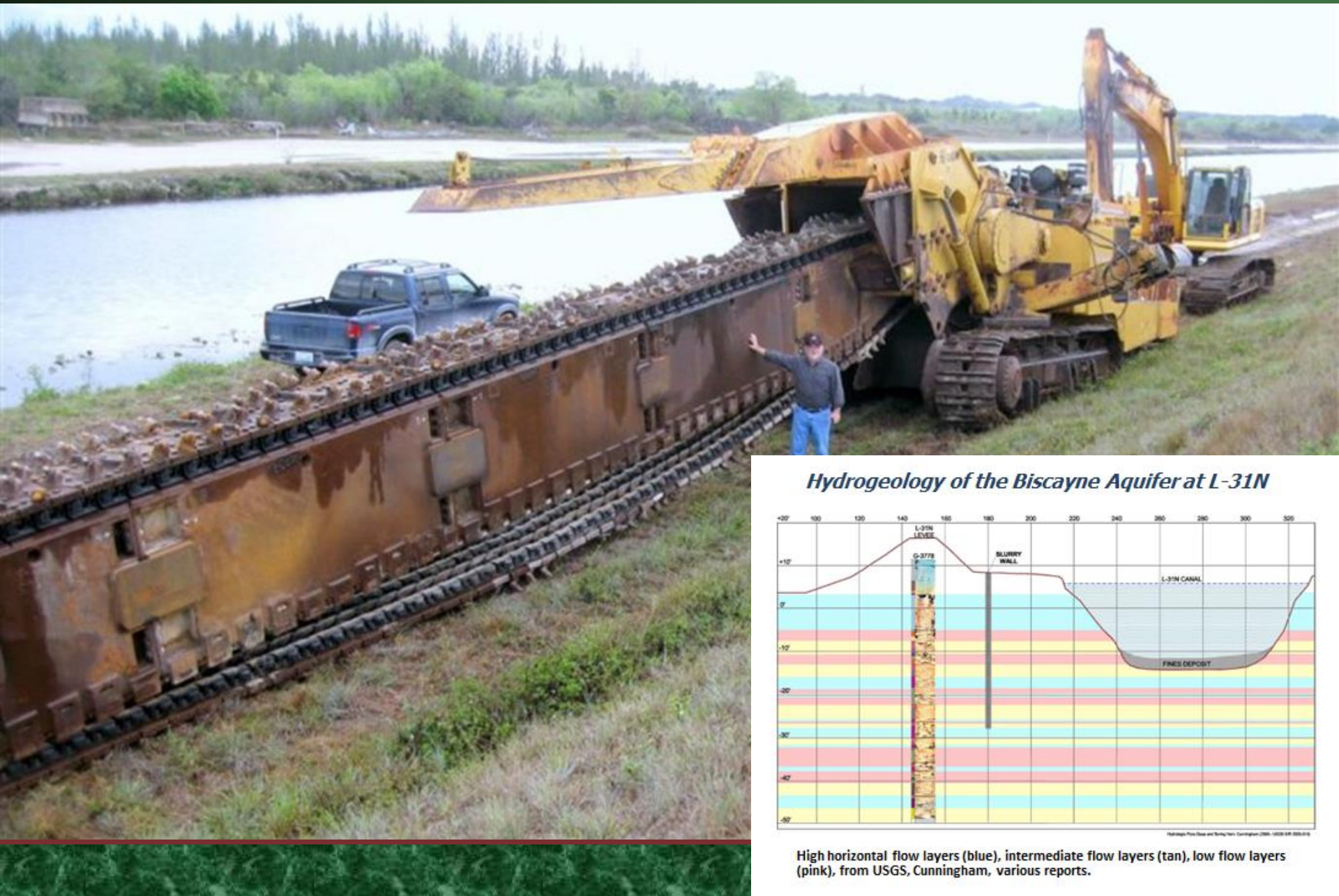
- Barrier affected groundwater flow
- Cement-bentonite barrier did not extend to design depth and construction technique limited proper formation of slurry wall

L-31N Seepage Barrier Phase 1 - 2012

- Based on results of Pilot Test, Lake Belt Committee approved moving forward with Phase 1
- Construction techniques modified
- Modeling of expected area of influence in NE Shark River Slough
- 2 mile long, 36 foot deep barrier
- $7.8 million budget
- Construction Feb – July 2012
- Comprehensive monitoring



Trencher


Hydrogeology of the Biscayne Aquifer at L-31N
L-31N LEVEE
G-3778
SLURRY WALL
L-31N CANAL
FINES DEPOSIT
+10'
0'
-10'
-20'
-30'
-40'
-50'
High horizontal flow layers (blue), intermediate flow layers (tan), low flow layers (pink), from USGS, Cunningham, various reports.

Newly Cut Trench (looking north)

Trench Construction

Concrete-Bentonite Mixing Plant

Adding the Slurry Mix

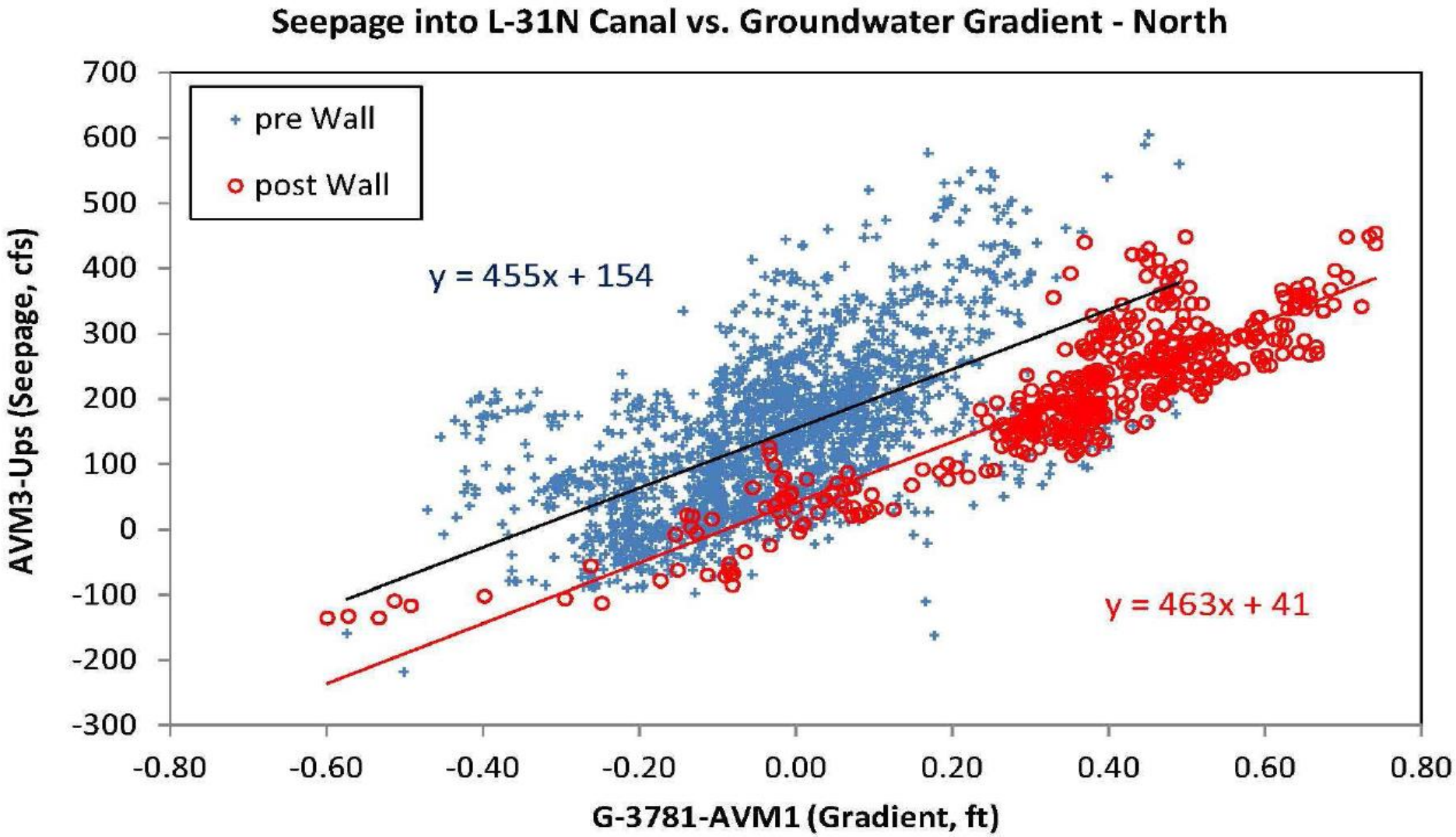
Adding the Slurry Mix

https://www.youtube.com/watch?x-yt-ts=1422579428&v=tOkyPQcC0yY&feature=player_embedded&x-yt-cl=85114404

https://www.youtube.com/watch?v=rjRh6eY1ceg&x-yt-cl=85114404&feature=player_embedded&x-yt-ts=1422579428

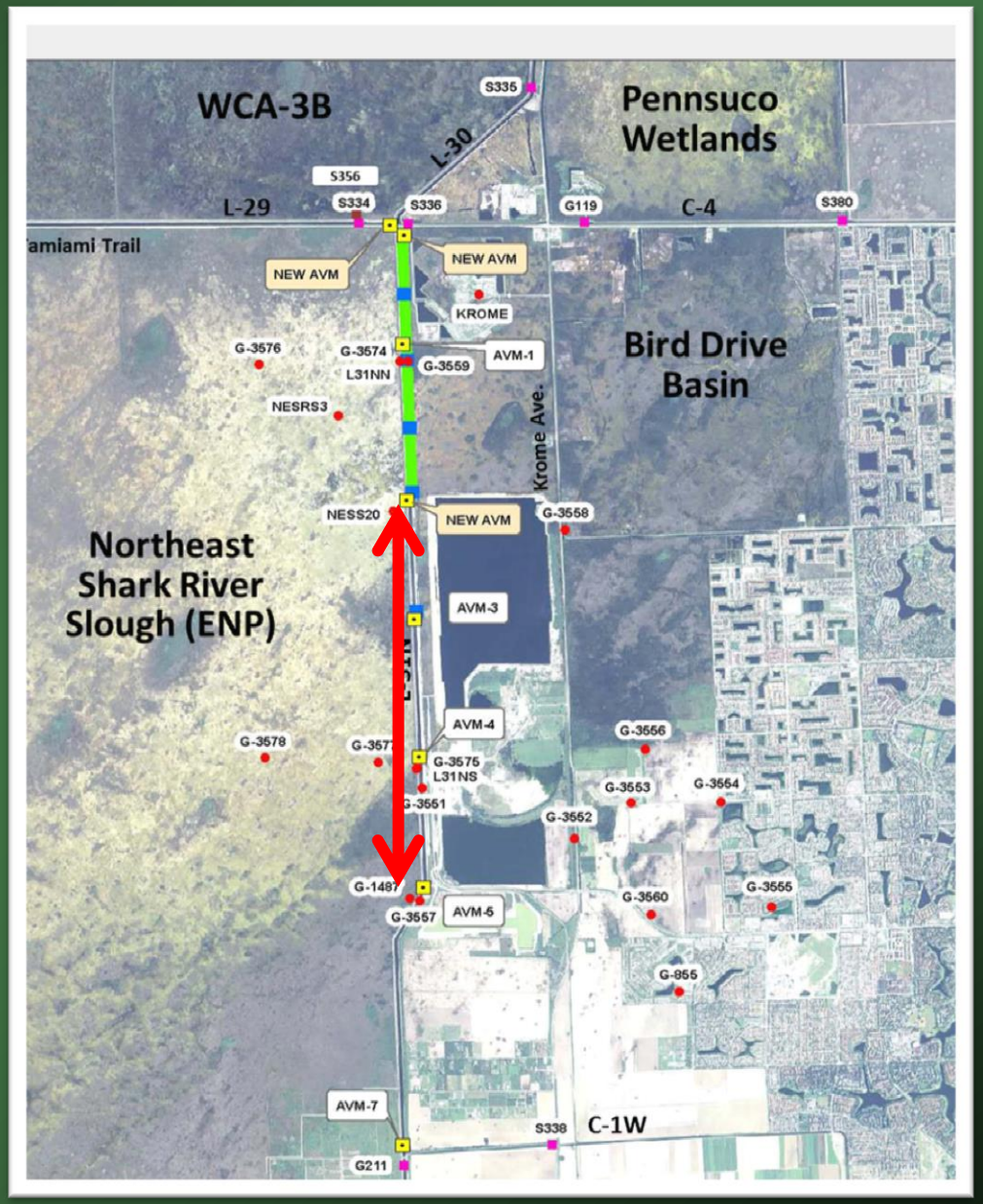
Post-Construction Site Restoration

Reductions in Groundwater Seepage after Seepage Wall Construction



Seepage Wall Monitoring

- Monitoring well and flow meter data indicate that the barrier is influencing water levels and seepage from Everglades National Park into the L-31N Canal
- Measured changes in water levels and seepage reduction are similar to model predictions

Next Steps

- Lake Belt Mitigation Committee currently considering approval and funding for Phase 2
- 3 miles of additional seepage barrier wall constructed by Miami-Dade Limestone Product Association
- Estimated cost = $13,757,000