

# Hydrological Restoration and Monitoring on Big Pine Key

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Keys Environmental  
Restoration Fund  
Jeanette Hobbs, Manager

# Key Deer Practical Jokers



“Okay! Now don’t move, Andy! ...  
Here comes Mom!”

# KERF Restoration Projects on BPK

- *Audubon Acres*, 1982. Restore tidal circulation to 18 acres
- *Big Pine Slough Culverts*, 2001. Restore tidal circulation to 180 acres.
- *Cactus Hammock Road*, 1982. Restore tidal flow to just under 2 acres.
- *Mosquito Ditch Mapping and Management*, 2000. Mapping of lower keys ditch systems, with installation of earthen plugs at 11 sites to decrease saltwater intrusion into interior habitats.
- *Non-Tidal Fish Restoration*, 2003. De-mucking of freshwater solution holes on several islands to provide habitat to non-tidal fish.
- *Port Pine Heights Freshwater Wetlands*, 1996 & 2003. Create 8 permanent freshwater holes and numerous seasonal pools over 20 acres.
- *Shepard Tract Freshwater Restoration*, 1997. Removal of trash and dump site with creation of a 1.2 acre pond.
- *Tract EV Freshwater Wetlands*, 2001. Debris removal and creation of 1 acre of seasonally inundated ponds.

# Why Big Pine?

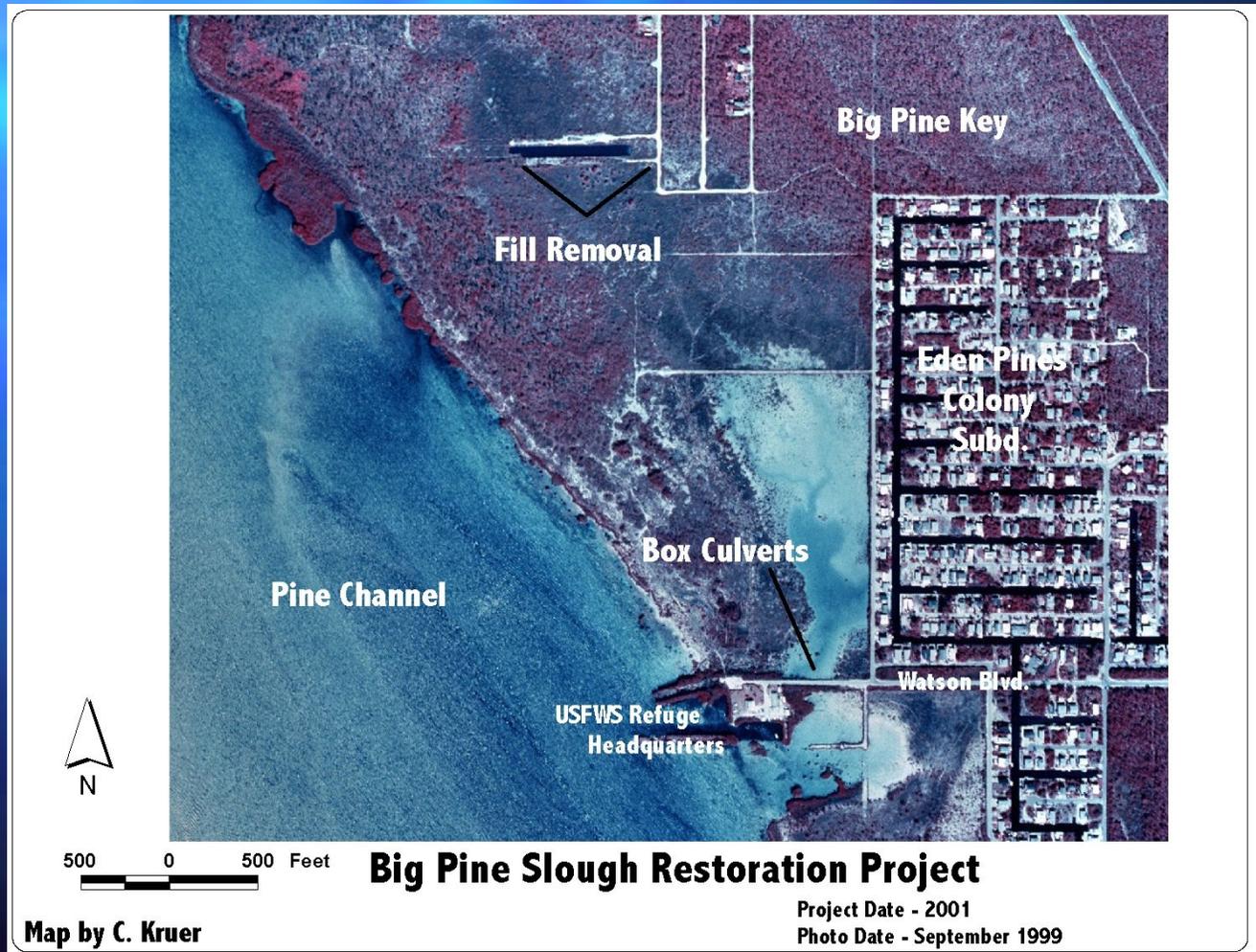
- Freshwater Lenses
- Rare plant assemblages
- Critical habitat for migratory birds & overwintering waterfowl
- 17 Listed species, including:
  - Key Deer
  - Lower Keys Marsh Rabbit
  - Silver Rice Rat
  - Mud turtle
  - Freshwater Fish such as
    1. Mangrove gambusia (*Gambusia rhizophorae*)
    2. *Rivulus marmoratus*

# Current Monitoring Efforts

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- Big Pine Slough Culverts
- Non-Tidal Fish Restoration
- Port Pine Heights Freshwater Restoration
- Tract EV Freshwater Restoration
- Shephard Tract/Central Slough

# *Big Pine Slough Culverts*



# Big Pine Slough Culverts

- Monthly salinity monitoring at 21 fixed stations, October 1997 to present
- Water level monitoring corrected to NGVD at 3 stations
- Fixed photographic stations
- Documentation of wildlife usage and changes to plant communities

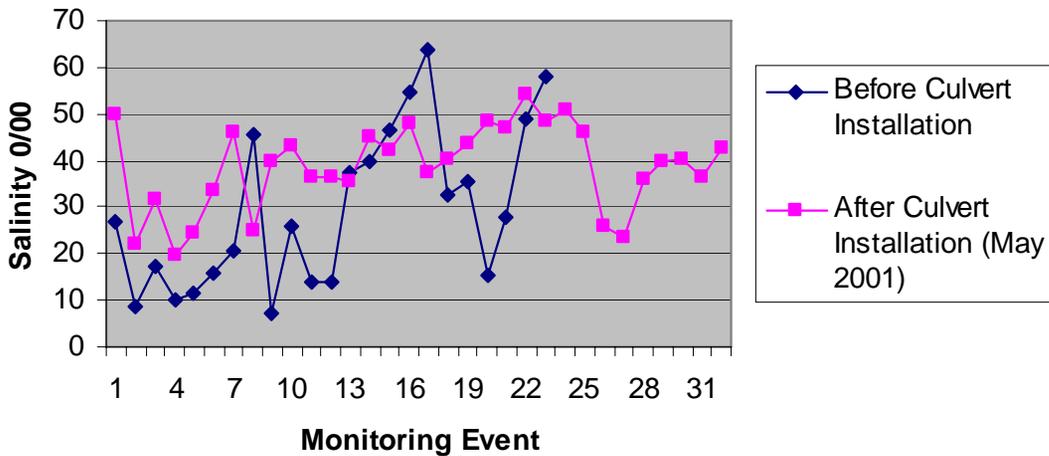
Monitoring Stations - Big Pine Slough Restoration Project  
National Key Deer Refuge - Big Pine Key



Florida Keys Environmental Restoration Trust Fund, 1998

# Big Pine Slough Culverts

## Zone II Salinity Comparison



## Monitoring Stations - Big Pine Slough Restoration Project National Key Deer Refuge - Big Pine Key



Florida Keys Environmental Restoration Trust Fund, 1998  
ZONES REVIEWED FOR AVERAGE SALINITY

# *Port Pine Heights Freshwater Wetlands*



0 500 Feet

Map by C. Kruer

**Port Pine Heights Wetlands Restoration - Big Pine Key**

Project Date - 1996

Photo Date - February 1999

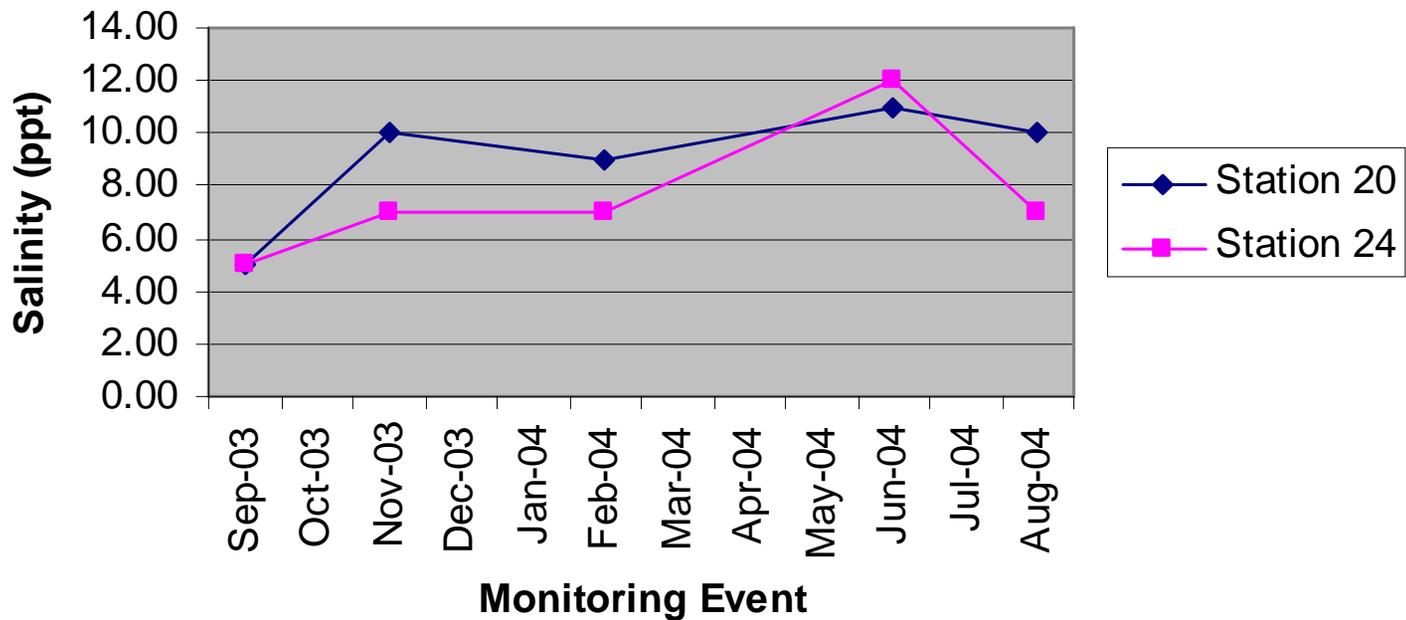
# *Port Pine Heights Freshwater Wetlands*

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- Monthly salinity monitoring at 35 stations, 1996 to 2003 (plus 2 years pre-construction data at select stations)
- 31 fixed photographic stations
- Wildlife usage, changes to plant communities and relative water depth documented
- Phase II completed 2003 with
  1. Three salinity monitoring stations (2 continued from 1996)
  2. Four fixed photographic stations (all continued from 1996)
  3. Continue to document wildlife usage, plant changes, and relative water depths

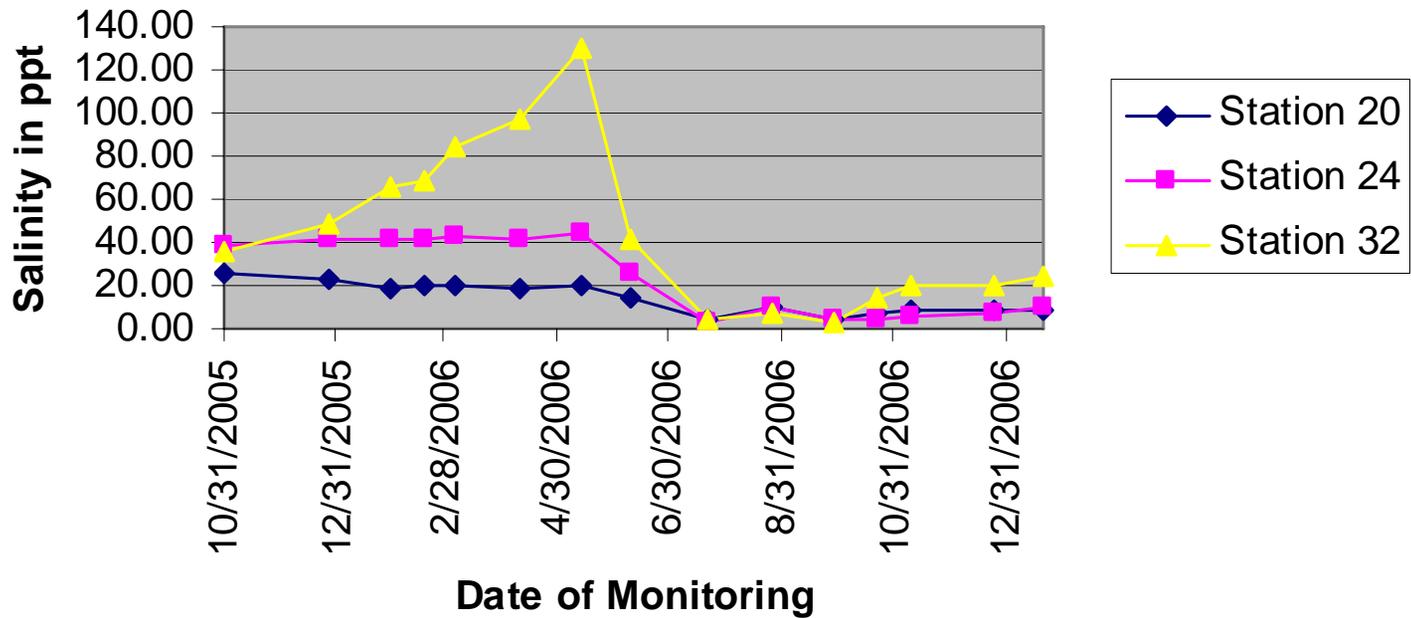
# Phase II Monitoring

## Port Pine Heights Salinity



# Phase II Monitoring

## Port Pine Heights Salinity Post-Hurricane Wilma

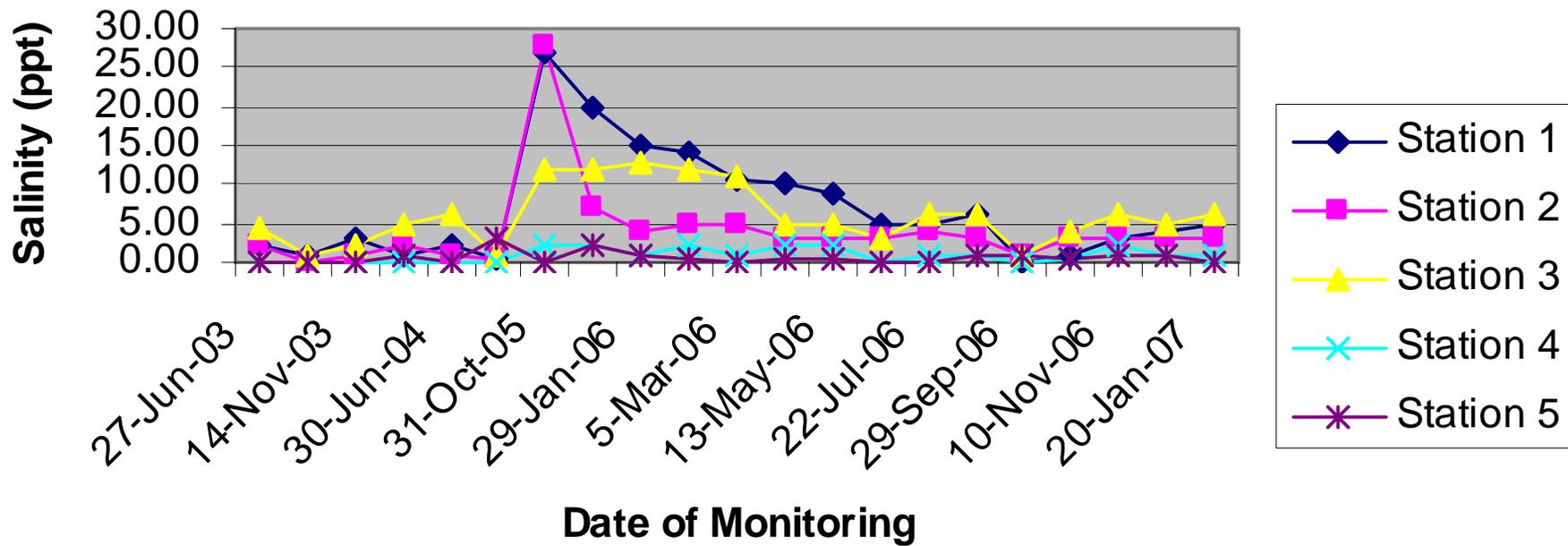


# *Non-Tidal Fish Restoration*

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- Survey of freshwater fish populations in 2000-2001
- De-mucking of 14 freshwater solution holes in 2002-2003
- Monthly photographic and salinity monitoring at 3 de-mucked holes and 2 unaltered controls

## Non-tidal Fish Salinity Monitoring



# Potential threats to freshwater habitats and species:

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- Mosquito ditch networks allow exotic released aquarium animals to disperse with adverse effects on native species
- Potential sea level rise effects:
  - Decrease in size of freshwater lens, either permanent or seasonal?
  - Potential increase in hurricane intensity could mean more frequent storm surges.

# Determine our Future Needs/ Course of Action

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- Do we need to increase our efforts to create refugia?
- How best to monitor the freshwater lenses over the long term?
- Do we need to look at subterranean connections for freshwater solution holes?
- Can we design a hydrological monitoring program that will capture the condition of multiple ecosystems?

# Future Projects

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- Non-Tidal Fish Restoration
- Central Slough culverts
- Castillo Pit Scrapedown

