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The Distribution of Anurans in a Hydrologically Modified Watershed

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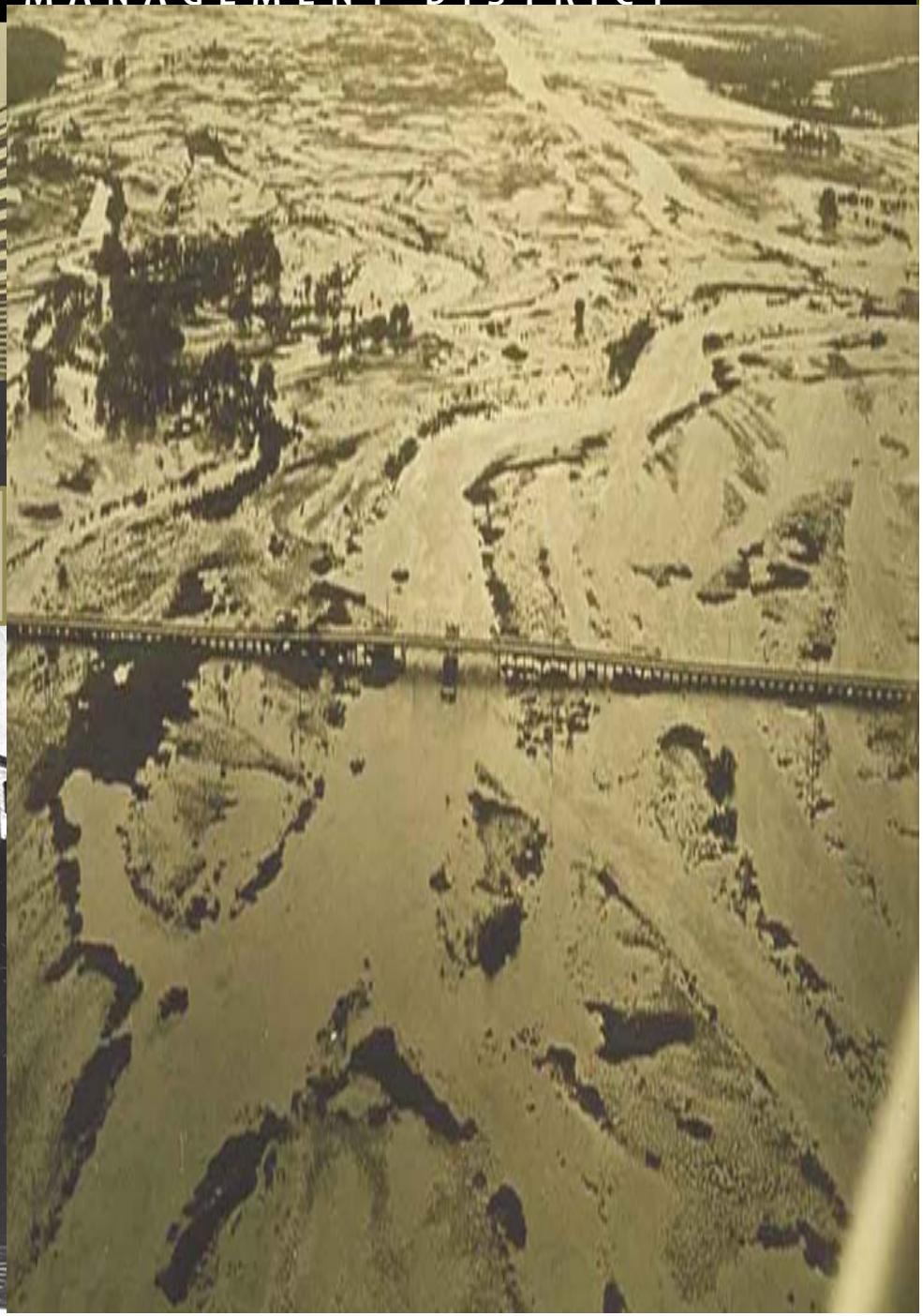
Kissimmee River Restoration Evaluation

- Large-scale river/floodplain restoration
- Using ecologically based performance measures to evaluate project success
- Anurans require diverse aquatic habitats for breeding to maintain long-term populations and diverse community structure
- Anticipate increased abundance of breeding populations in response to restoration


Kissimmee River
2008 Osceola County Aerial Photography
2008 Polk County Aerial Photography
2008 Highlands County Aerial Photography
2004-05 SFWMD Aerial Photography
Streaming 100%
©2007 Google
27°39'27.92" N 81°16'58.76" W
Eye alt 114.27 mi


Historic Kissimmee River
Wet Season



Kissimmee Flooding
circa 1948

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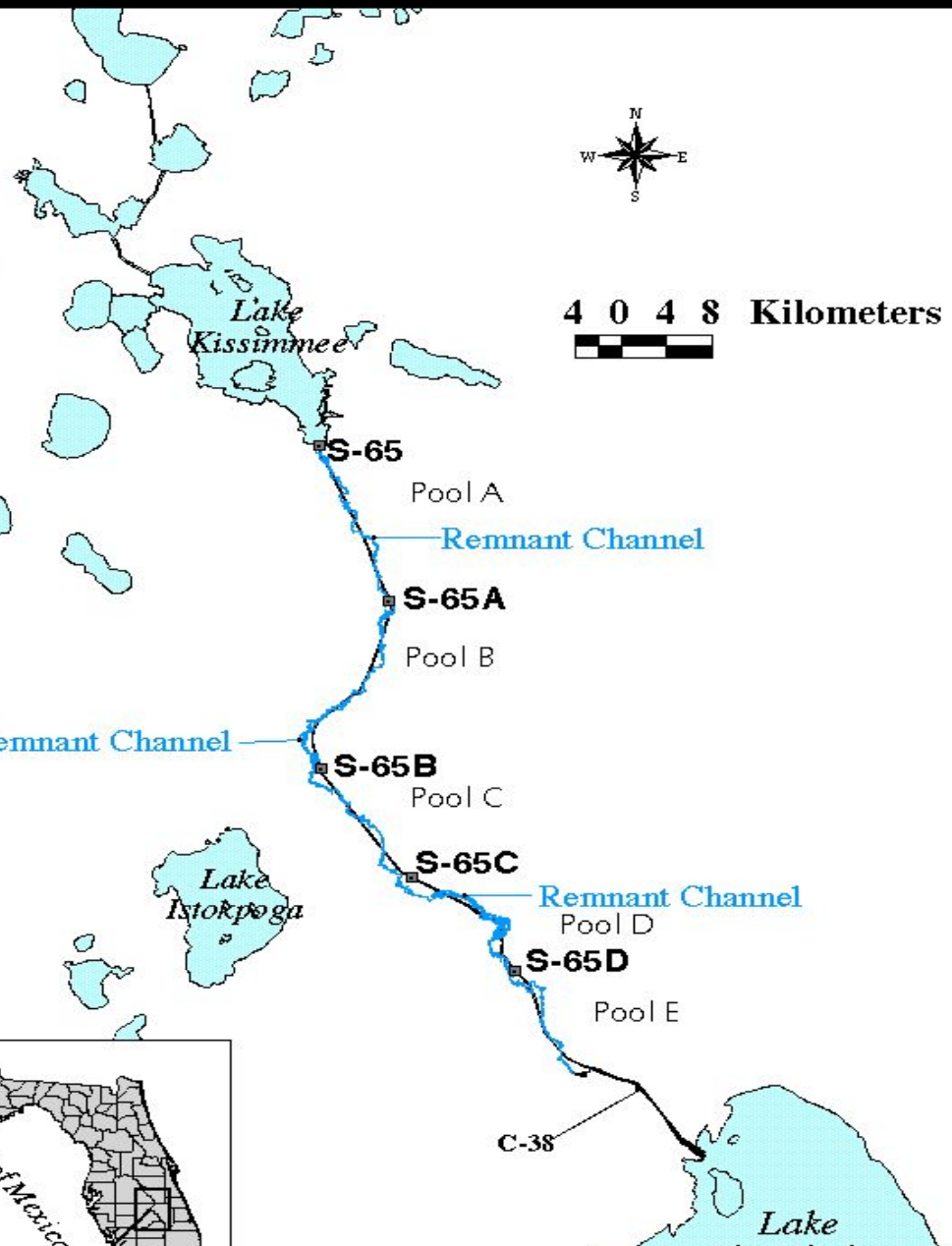
Channelization 1962-1971

Channelized Kissimmee River



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Effects of Channelization

Pre-channelization

Post-channelization

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Effects of Channelization & Water Regulation

oss of flood pulse

- Shift to terrestrial plants
- Loss of highly productive floodplain wetland habitats
- Interruption of nutrient cycling and food web dynamics
- Associated decline in wetland dependent biota including anurans

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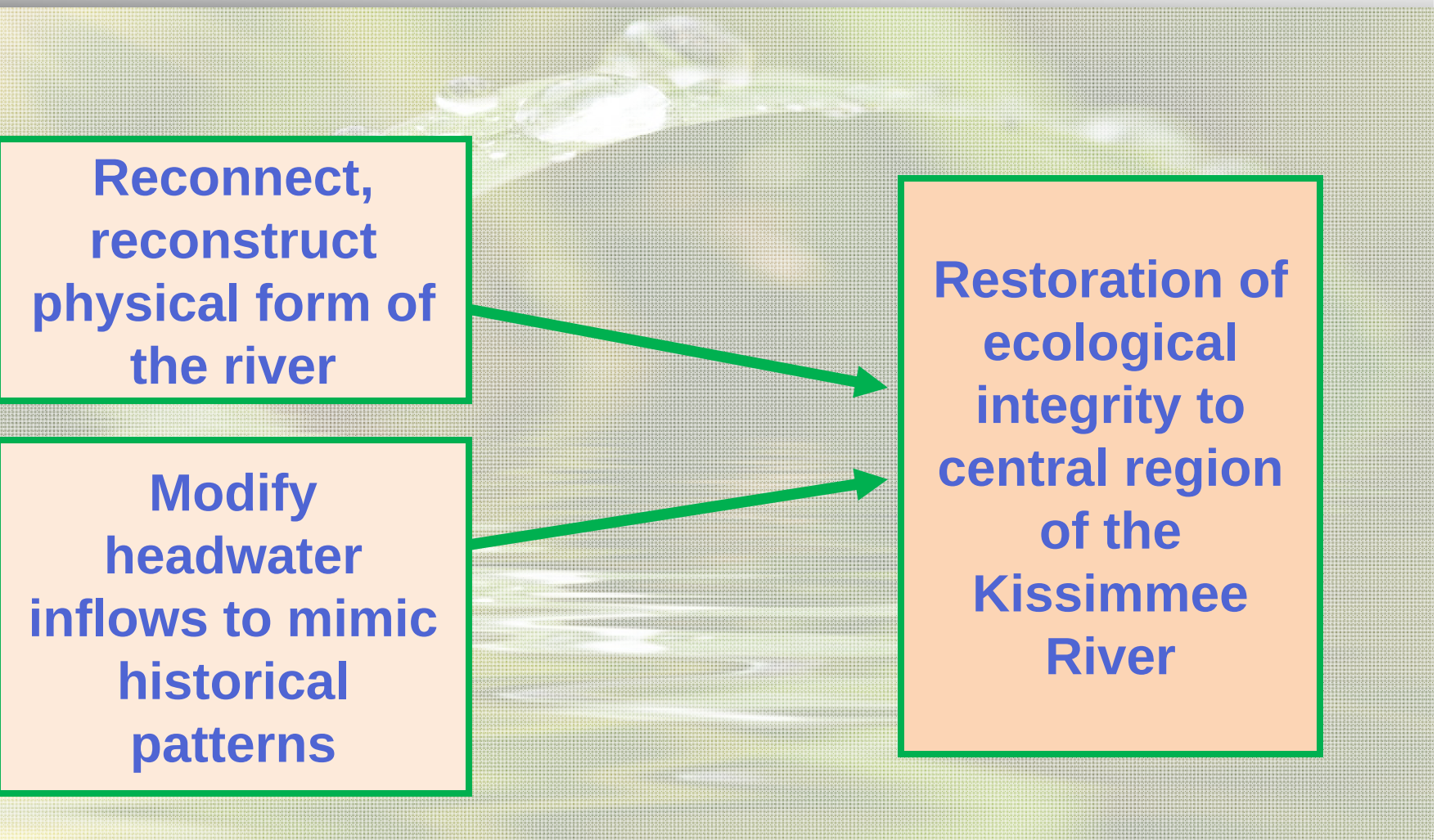
Approach for the Kissimmee River Restoration Project



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Restoration in Progress

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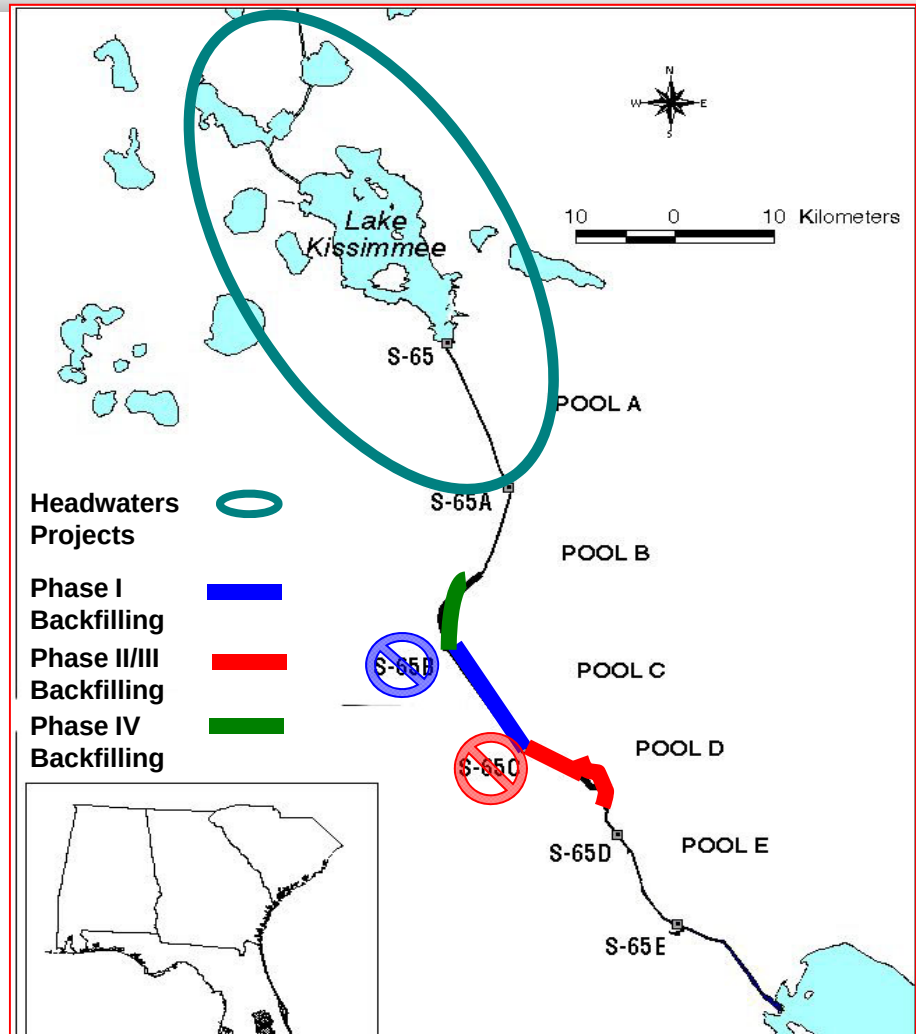
issimmee River Restoration Project

- ackfill 22 miles of C-38 nal
- econnect 45 miles of river annel
- emove 2 water control uctures
- mic historic inflows – 2019
- estoration Evaluation ogram
  - Establish baseline condition



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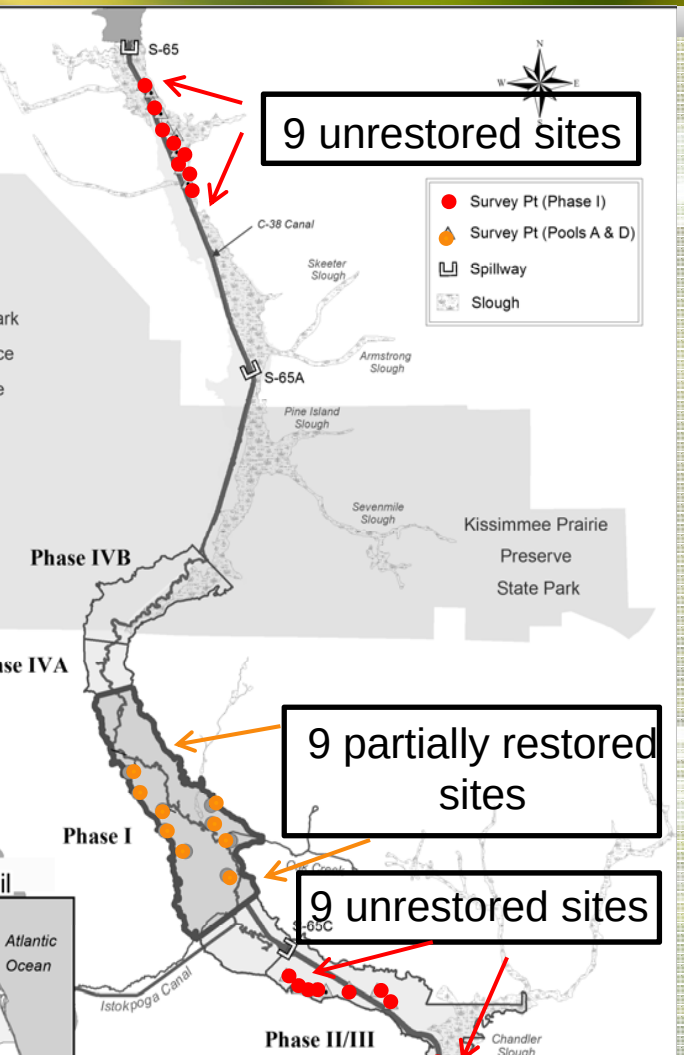
Herpetological Evaluation

aseline study to evaluate species richness, diversity, stribution, and abundance of wetland breeding urans in partially restored and unrestored odplain marsh due to interim hydrology to address:

Are there differences in species composition?

Are there differences in sizes of breeding populations?

Study Sites



- 9 sites per treatment
  - Unrestored “always”
  - Unrestored “to be restored”
  - Partially restored
- Unrestored habitat
  - Upland pasture
  - Isolated, short-hydroperiod wetlands (<1 month)
  - 2° channels, farm ditches
- Partially restored habitat
  - Medium to long-hydroperiod wetlands (167-255 days to permanent)

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Study Sites

Restoration area habitat

Channelized area habitat

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Restoration Area Habitat

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Channelized Area Habitat

Survey Methods

- Nighttime vocalization surveys
- 30 mins after sunset to midnight
- Year-round for 16 months
- 3 consecutive nights
- Alternated starting habitat

Evaluation Metrics

Community composition

- Species Richness (S)
- Species Diversity (H')
- Community Evenness (J')

Occurrence of breeding choruses

- By species
- All choruses by habitat type combined

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Quantification of Breeding Population Size

Number of vocalizing male adults ranked:

1 = 1 individual

2 = 2-5 individuals

3 = 6-10 individuals

4 = >10 individuals

(per Zampella and Bunnel 2000)

Community Composition

Metric	Restoration area	Channelized area
cies richness (S)	10	12
cies diversity (H')	1.79	1.70
munity evenness (J')	0.78	0.74

Anuran Occurrence

estoration Area

10 of 12 natives

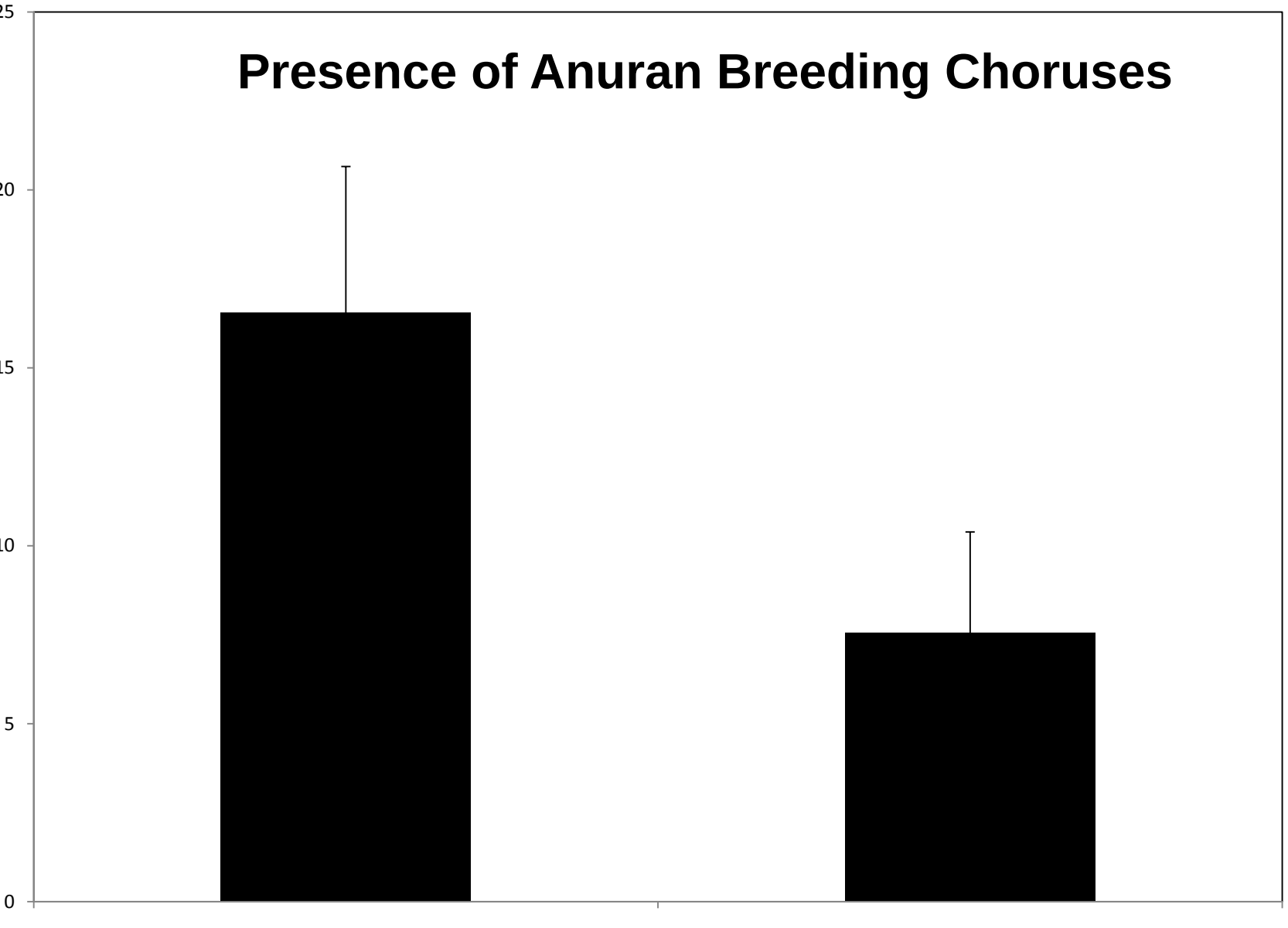
No exotic species

Channelized Area

- 10 of 12 natives
- 2 exotic species
  - Cuban treefrog
  - Greenhouse frog

	N	Restoration area	Channelized
currences	27	9	18
es grylio	27	100%	100%
es sphenocephala	26	89%	100%
erea	27	100%	100%
irella	27	100%	100%
oralis	4	11%	17%
llus dorsalis	23	89%	72%
ris ocularis	6	33%	17%
nryne carolinensis	25	100%	89%
s terrestris	19	89%	55%
s quercicus	7	67%	6%*
us septentrionalis*	8	0%	44%*

- Frequency of Occurrence


Presence of Anuran Breeding Choruses
25
20
15
10
5
0

	N	Restoration area	Channelized
urrences	27	9	18
s grylio	8	89%	0%*
s sphenocephala	8	67%	11%*
rea	27	100%	100%
rella	24	89%	89%
oralis	0	0%	0%
llus dorsalis	12	78%	28%*
is ocularis	1	0%	6%
ryne carolinensis	8	44%	22%
terrestris	10	44%	33%
quercicus	3	33%	0%*
*s septentrionalis***	1	0%	6%
*odactylus planirostris***	0	0%	0%

- Chorus Frequency of Occurrence

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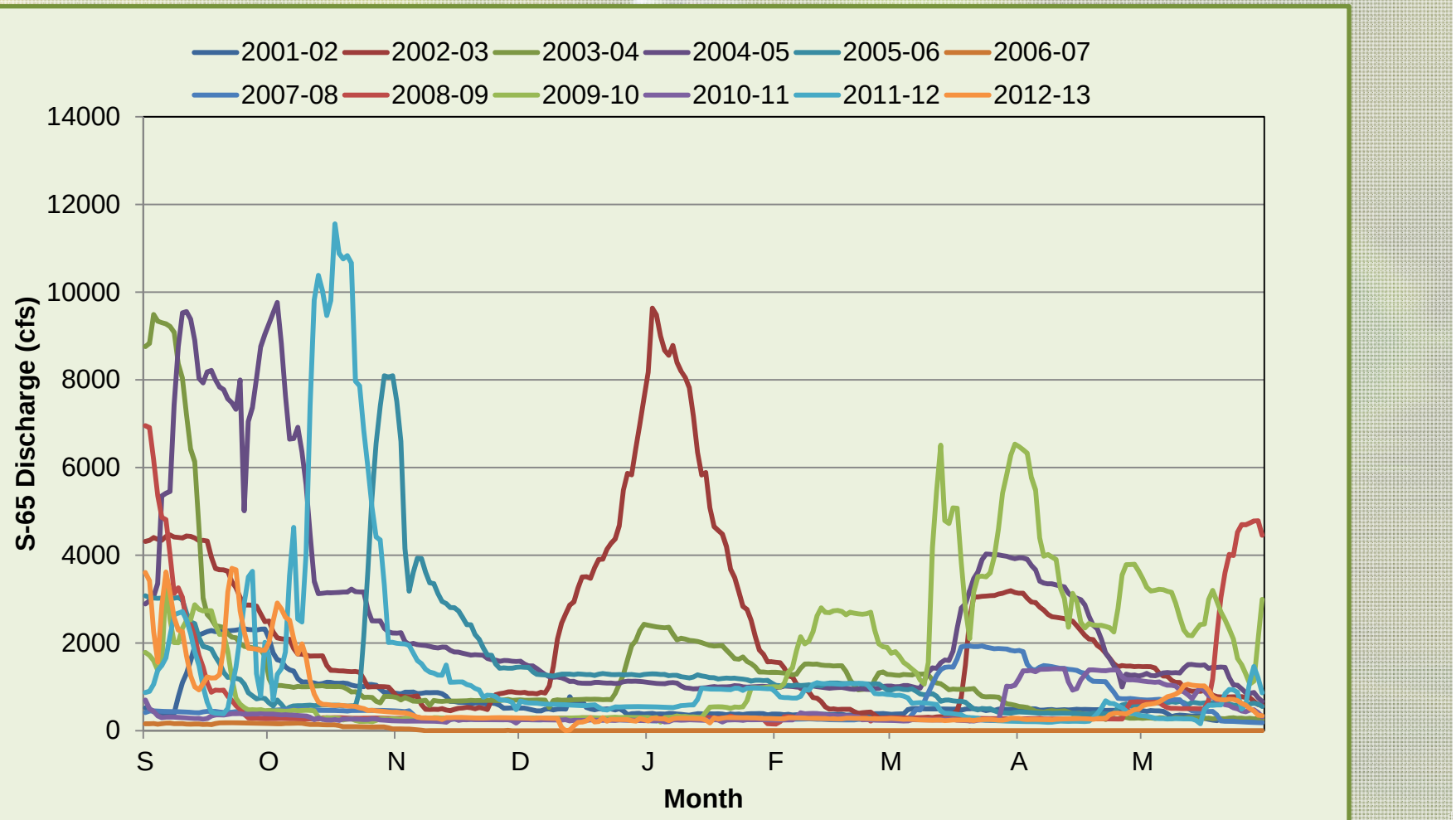
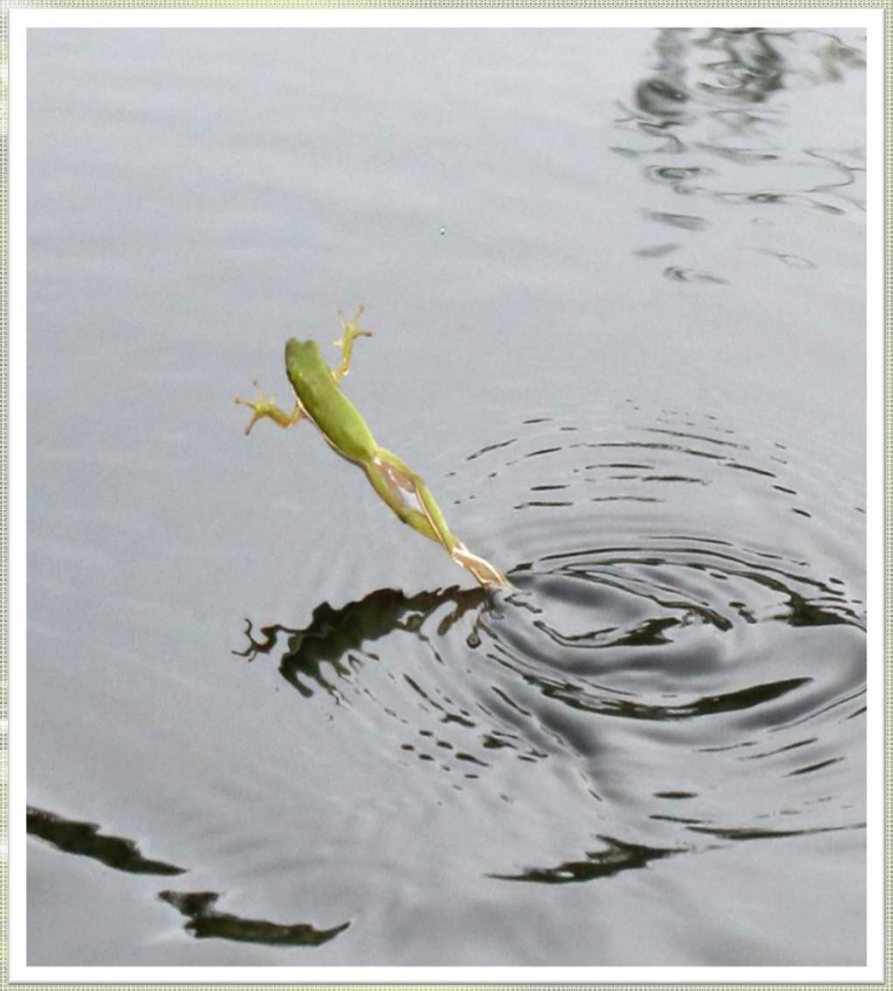
Interim Hydrology



Summary

- Similar species present in both habitats
- Channelized area support exotics
- Partially restored area supports significantly greater numbers of breeding populations
- Post-restoration hydrology expected to increase trend




ANK YOU!
QUESTIONS?