



# Bird Monitoring in the Colorado River Delta



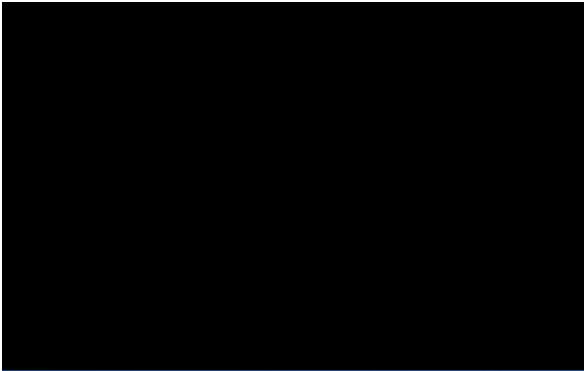


## Drought in the Basin Since 2002

← April 3, 1999

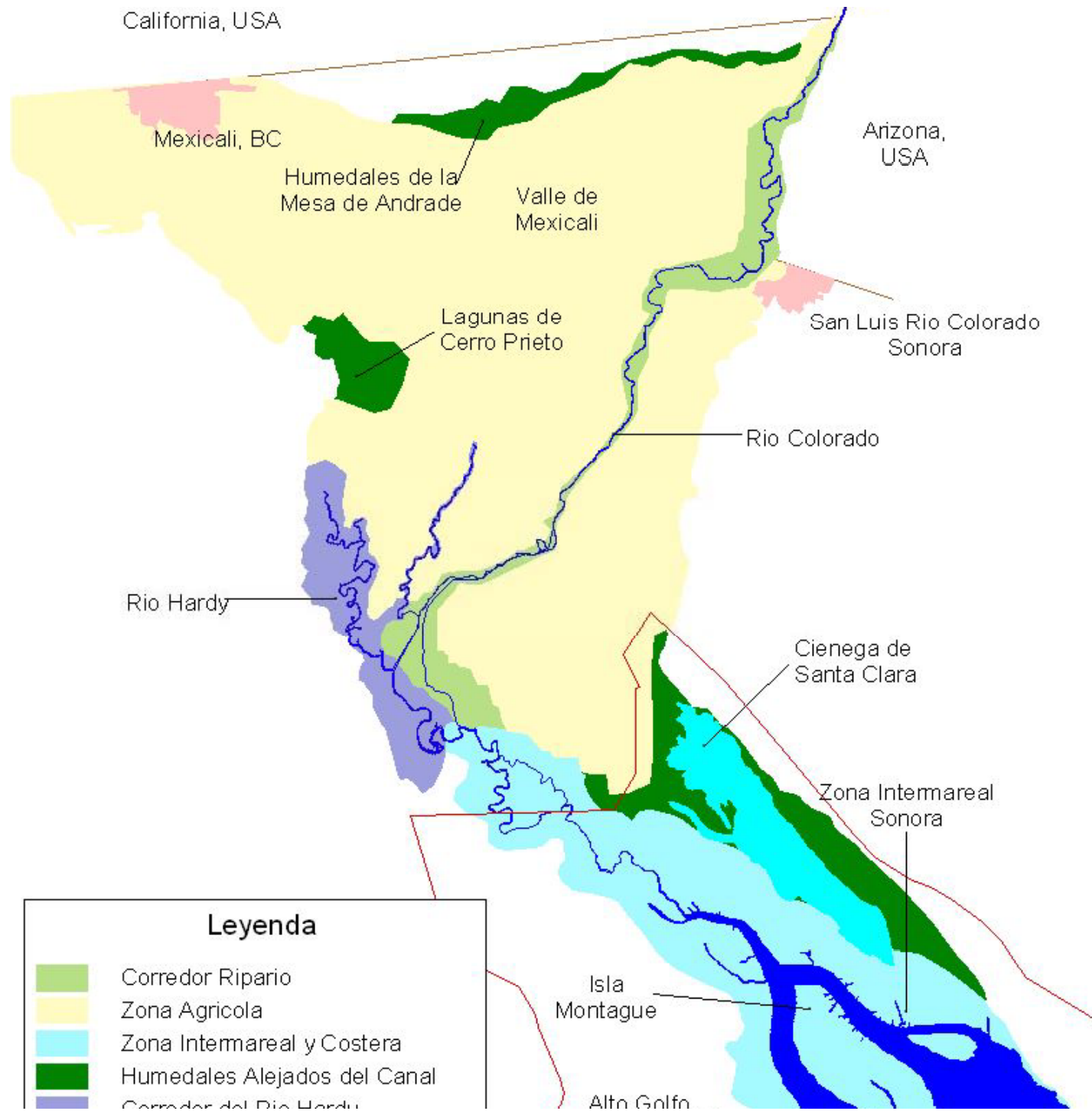


← August 30, 2004





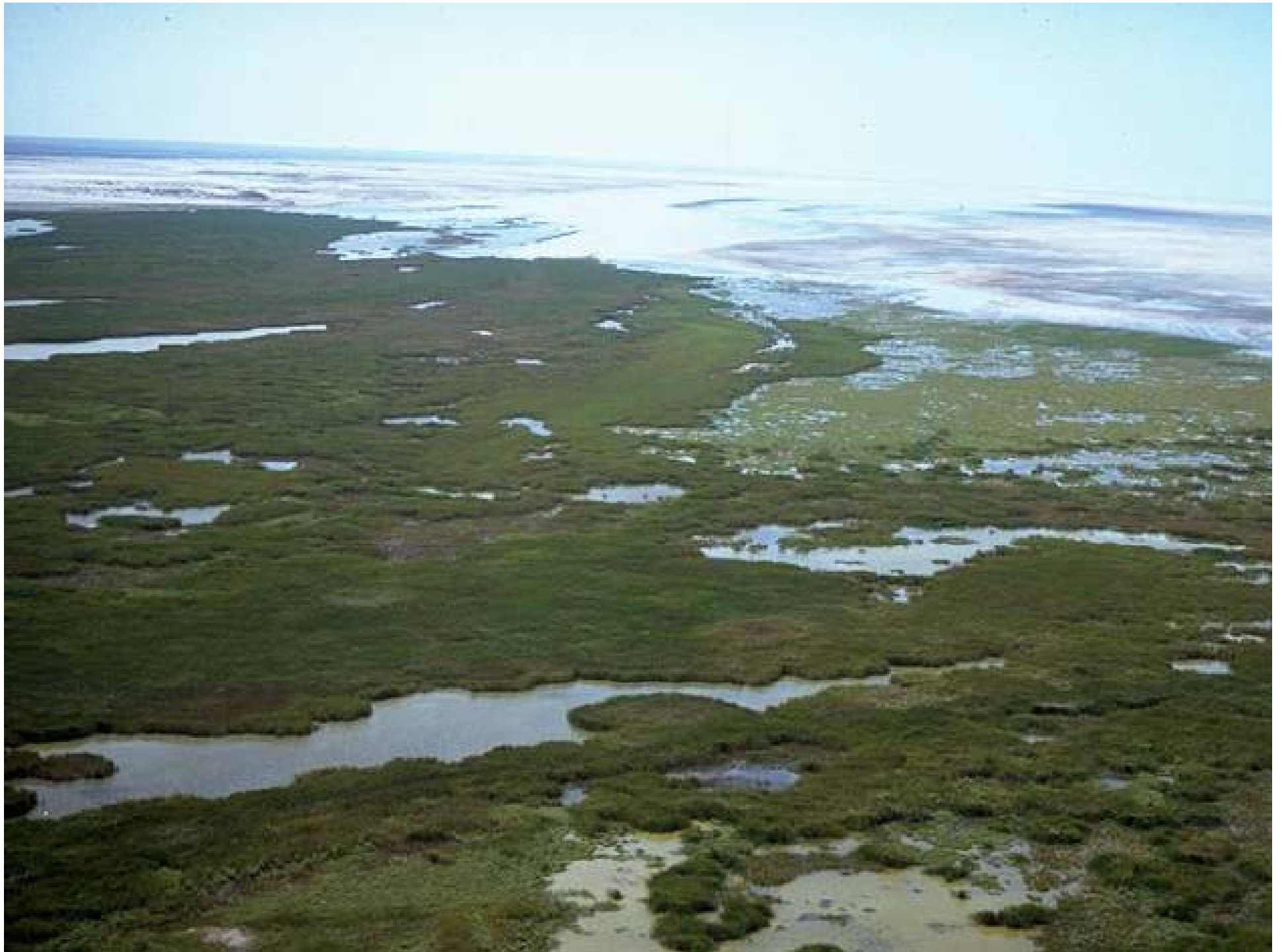






















# Avian Monitoring Program in the Colorado River Delta

- Evaluate population trends: measurement of ecosystem health
- Identify impacts and threats
- Evaluate management actions
- Guide conservation and restoration initiatives



# Avian Monitoring Program in the Colorado River Delta

- **Monitoring of Riparian Birds**
- **Marshbird Monitoring**
- Shorebird counts (ground and aerial) in the delta and Upper Gulf of California
- Migration monitoring for landbirds in Spring: Mist-netting

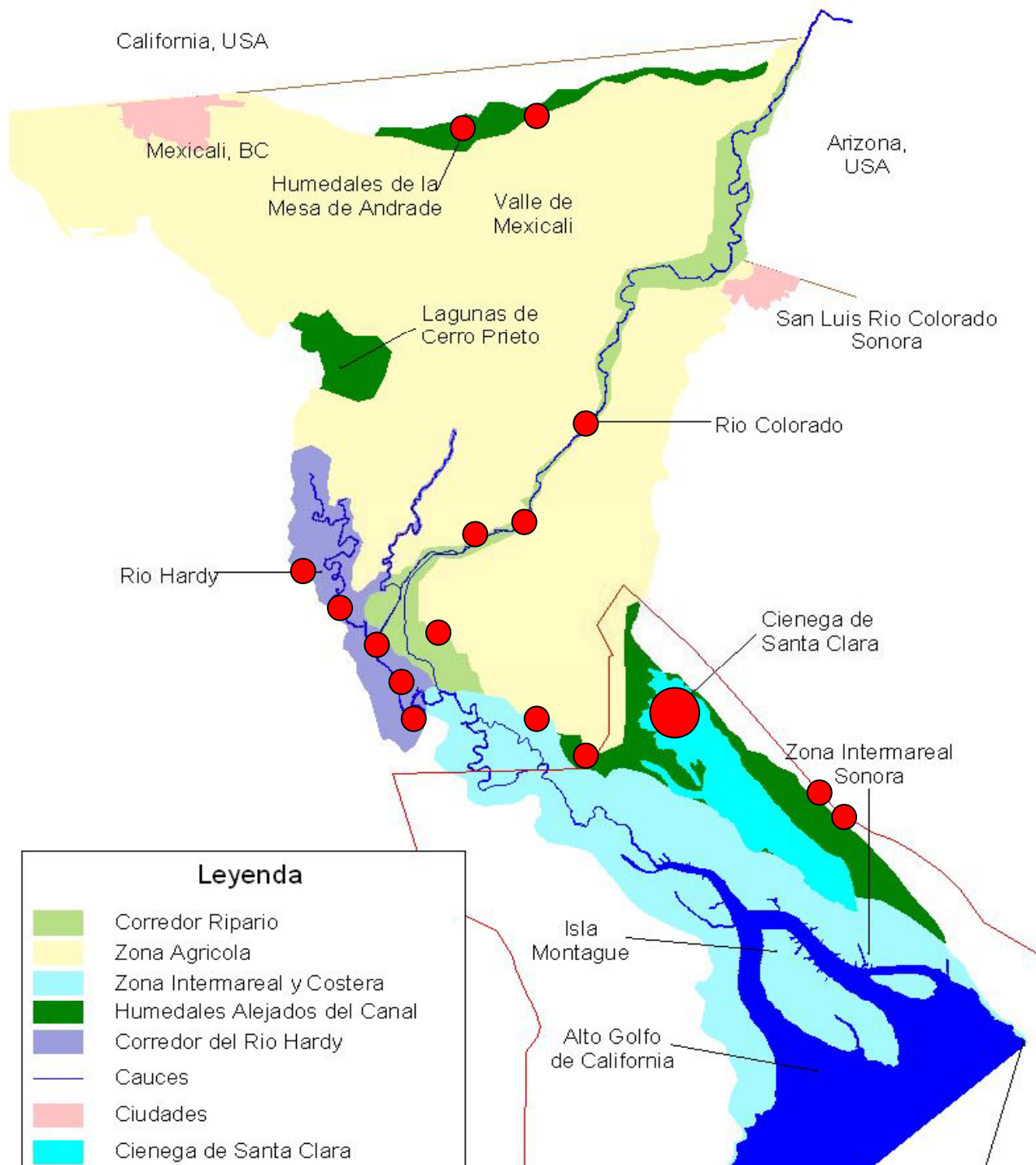




# Protocol

- Standardized Protocol for Monitoring Marshbirds in North America
- BLRA, SORA, LEBI, VIRA, CLRA, AMBI
- Two times per year: March and May
- 7 years of data: 2003-2009
- 1999-2002: CLRA and BLRA only



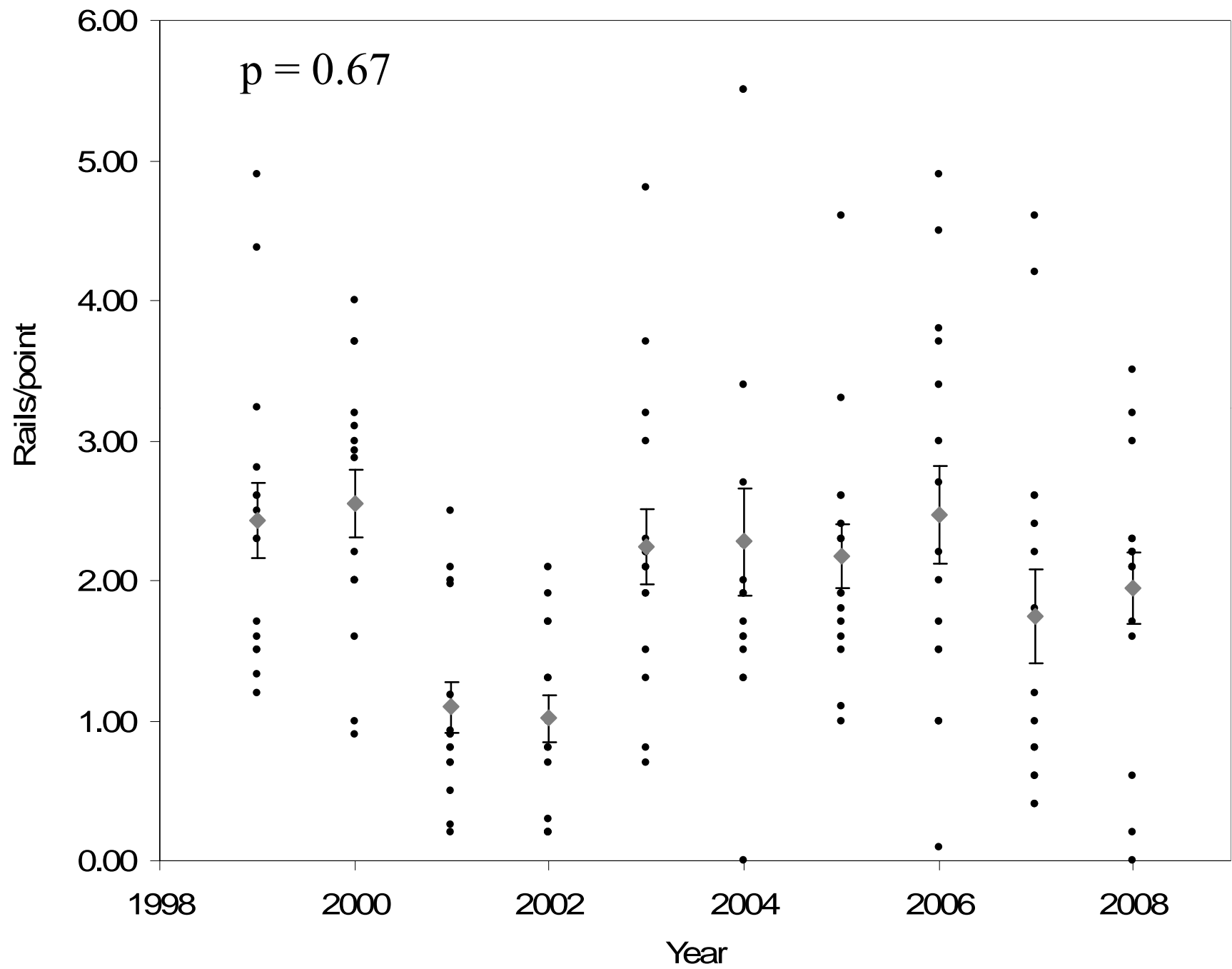


- 30 transects in 6 wetland areas
- Each transect with 5-10 points
- 15 transects in the Cienega de Santa Clara

# Results

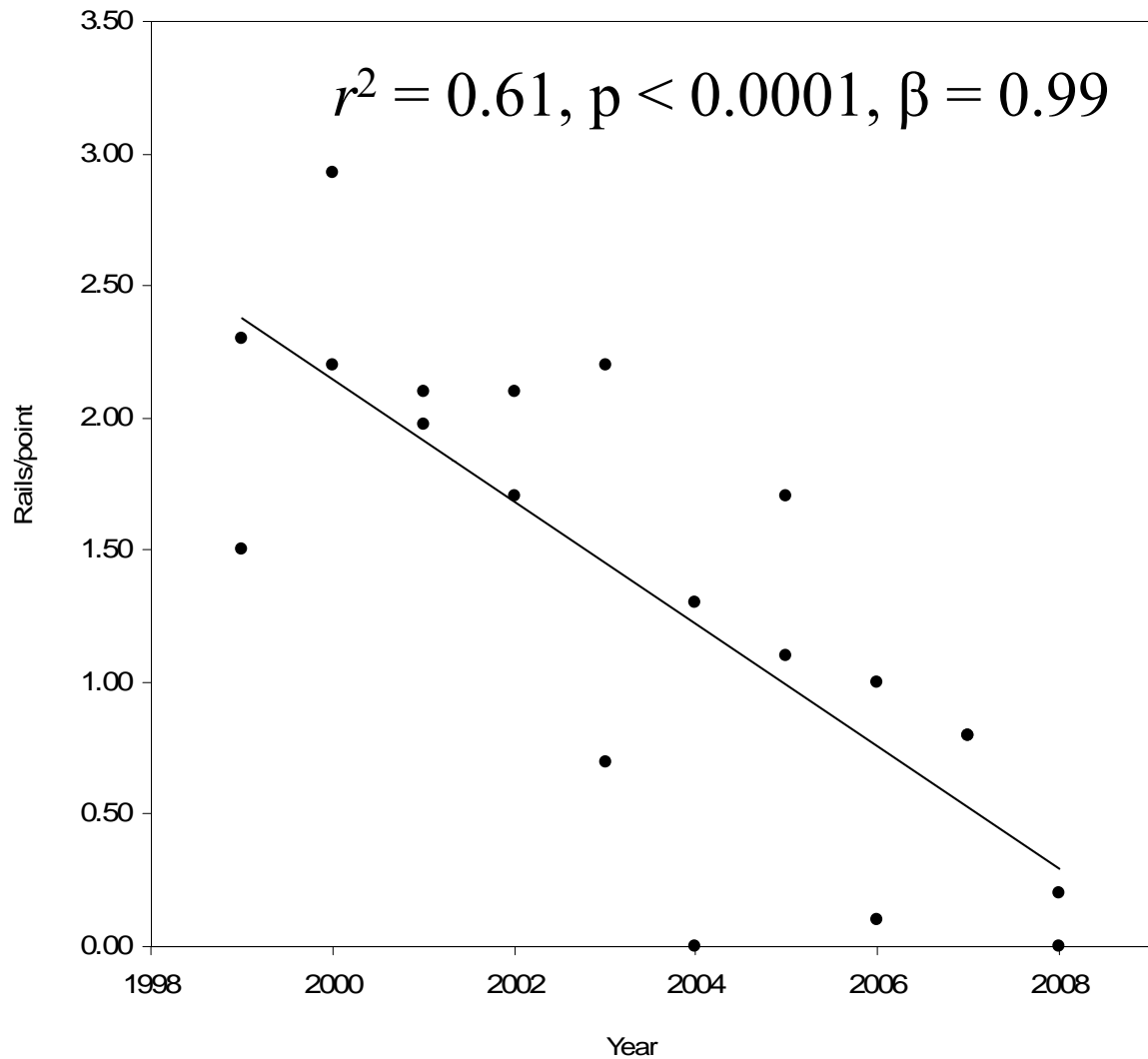
- The population of Yuma Clapper Rails in the Ciénega has fluctuated, but overall has remained without a detectable trend for the period 1999-2008
- However there was a slight decrease in 2007 and 2008





Year	Density of CLRA (rails/ha)	Pop Estimate
2006	1.03 (0.81 -1.29)	5,974 (4,698 – 7,482)
2008	0.59 (0.43 – 0.80)	3,564 (2,623 – 4,842)

- This reduction is related to the dry-out on the southwestern portion of the Ciénega.
- Flows were blocked by sediment build-up in MODE canal



Reduction of 10%  
( $\pm 1.73$ ) per year  
from 1999 to 2008  
in SW Cienega

From 2.56 rails  
per point in 2000  
to 0.10 rails per  
point in 2008



# Conclusions Clapper Rails

- Good population of Yuma Clapper Rail in the Cienega
- Fluctuations, but still in good numbers
- Maintenance of MODE canal (dredging built up sediment) is allowing SW area of the Cienega to recover
- Binational agreement for Cienega protection and monitoring during YDP trial run



## Riparian Monitoring

- Document Trends of Riparian Birds and Vegetation in the Colorado River, in Relation to River Flows
- Monitoring: 136 point counts (17 transects), 4 times per year (once per season) from Spring 2002 to Winter 2007 (surveys continue up to date)



# Riparian Monitoring

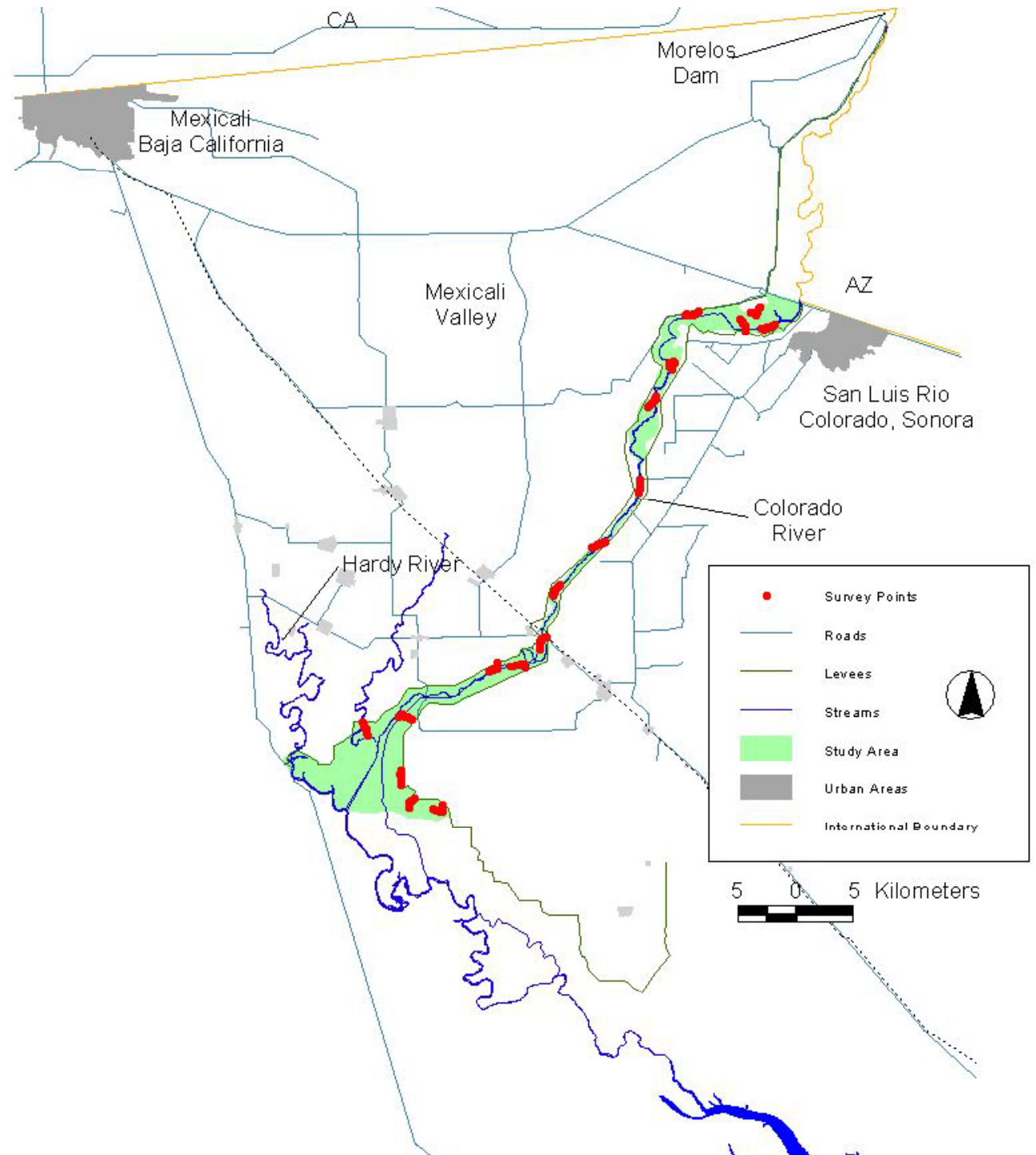
- Vegetation survey: percent coverage of surface water, vegetation strata and species, and habitat vertical structure. Measured in 2002 and 2007.
- Vegetation Biomass estimated with NDVI from MODIS satellite images
- Flow data at SIB (from IBWC)

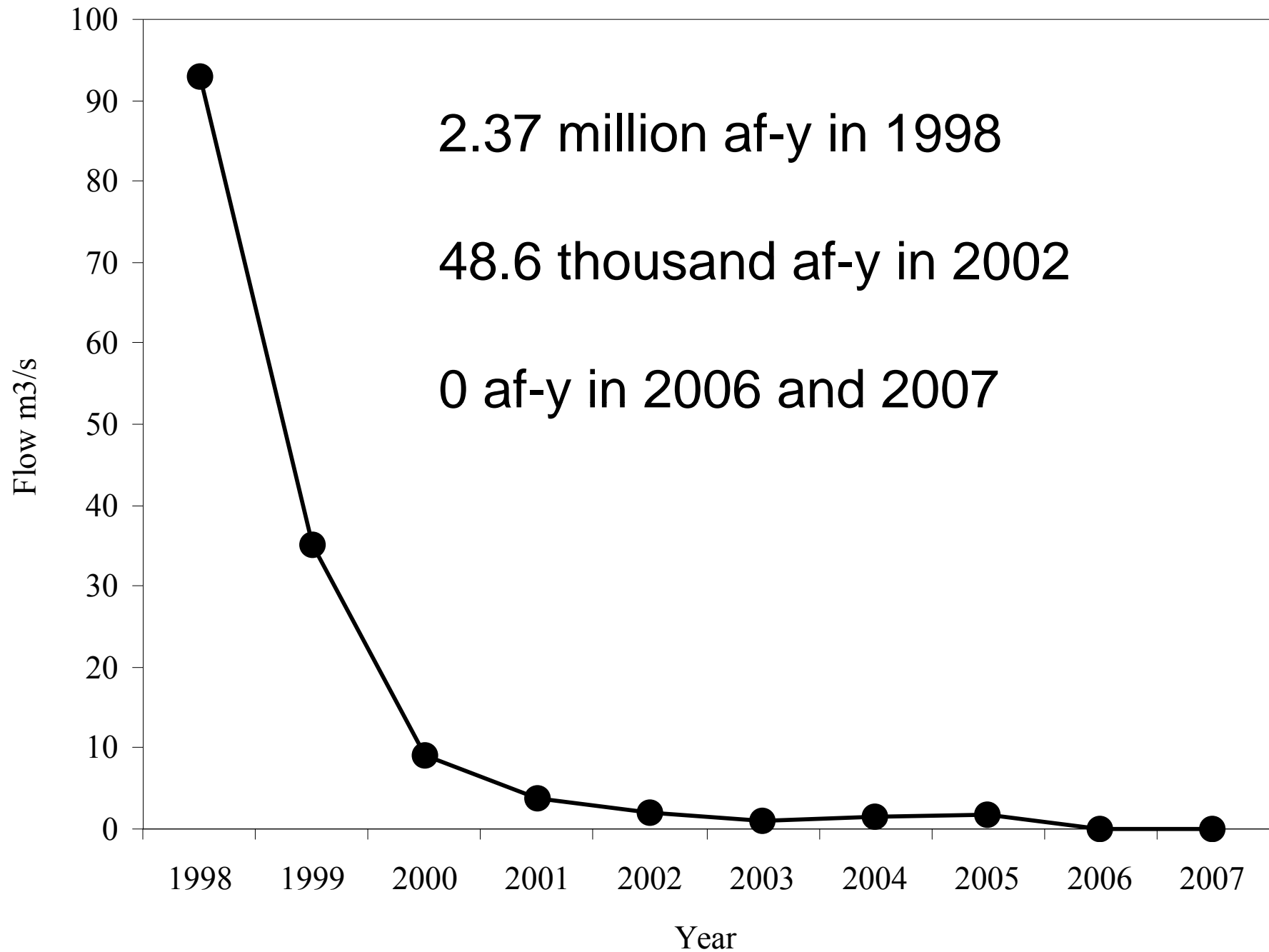
## Study Area

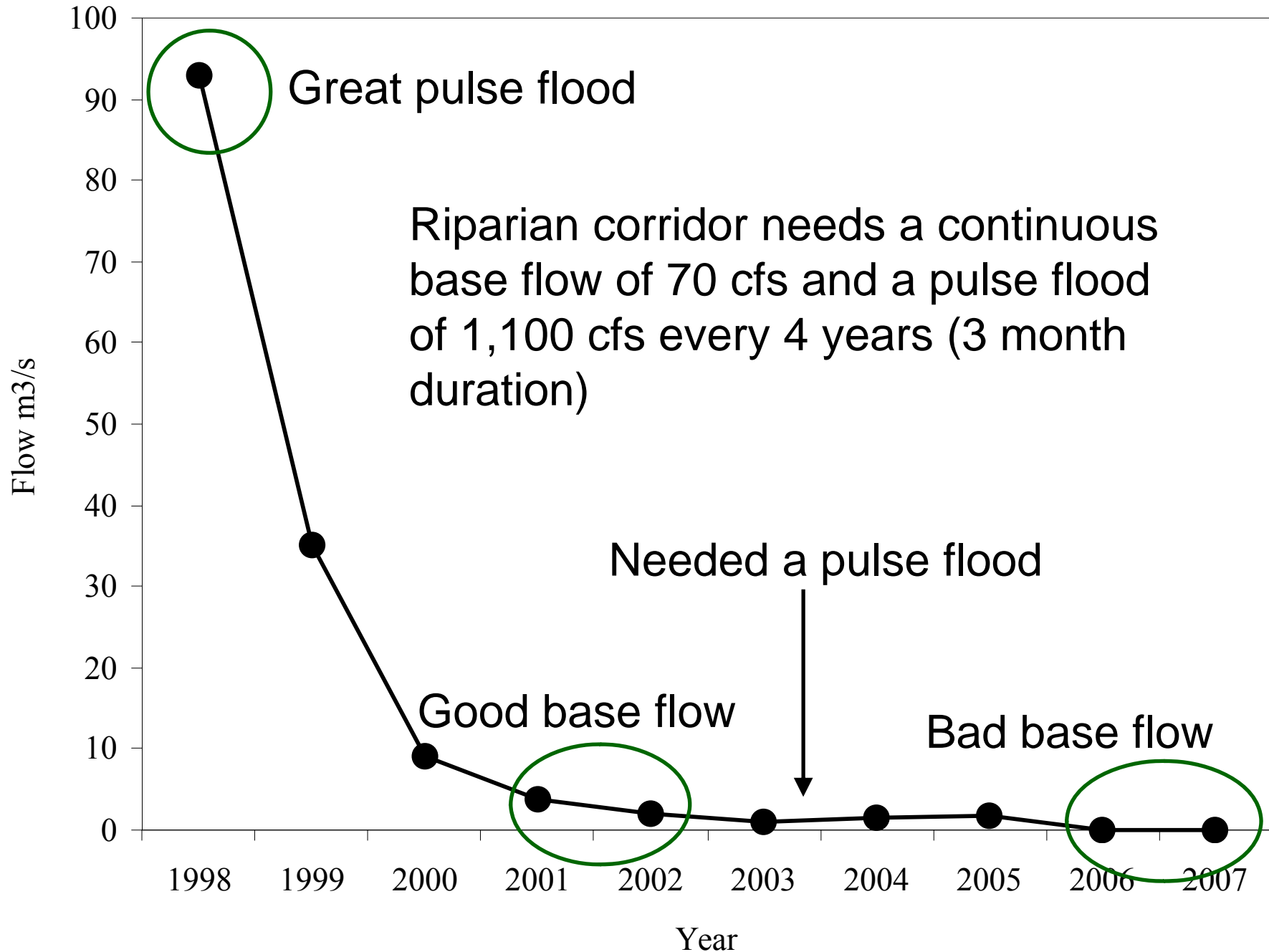
Riparian Corridor of  
the Colorado in  
Mexico, excluding  
the Limitrophe  
section

31,500 acres

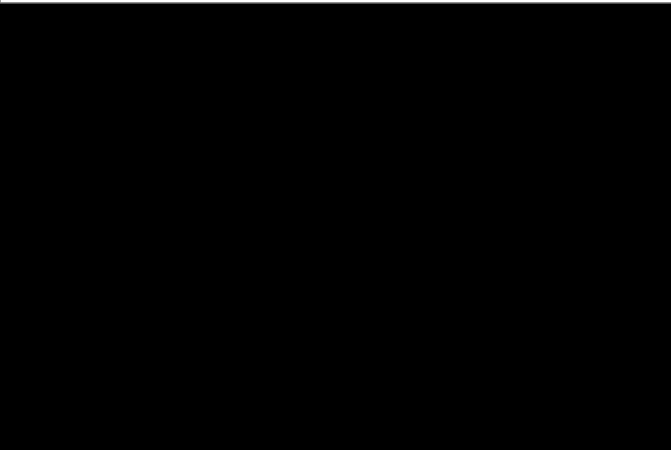
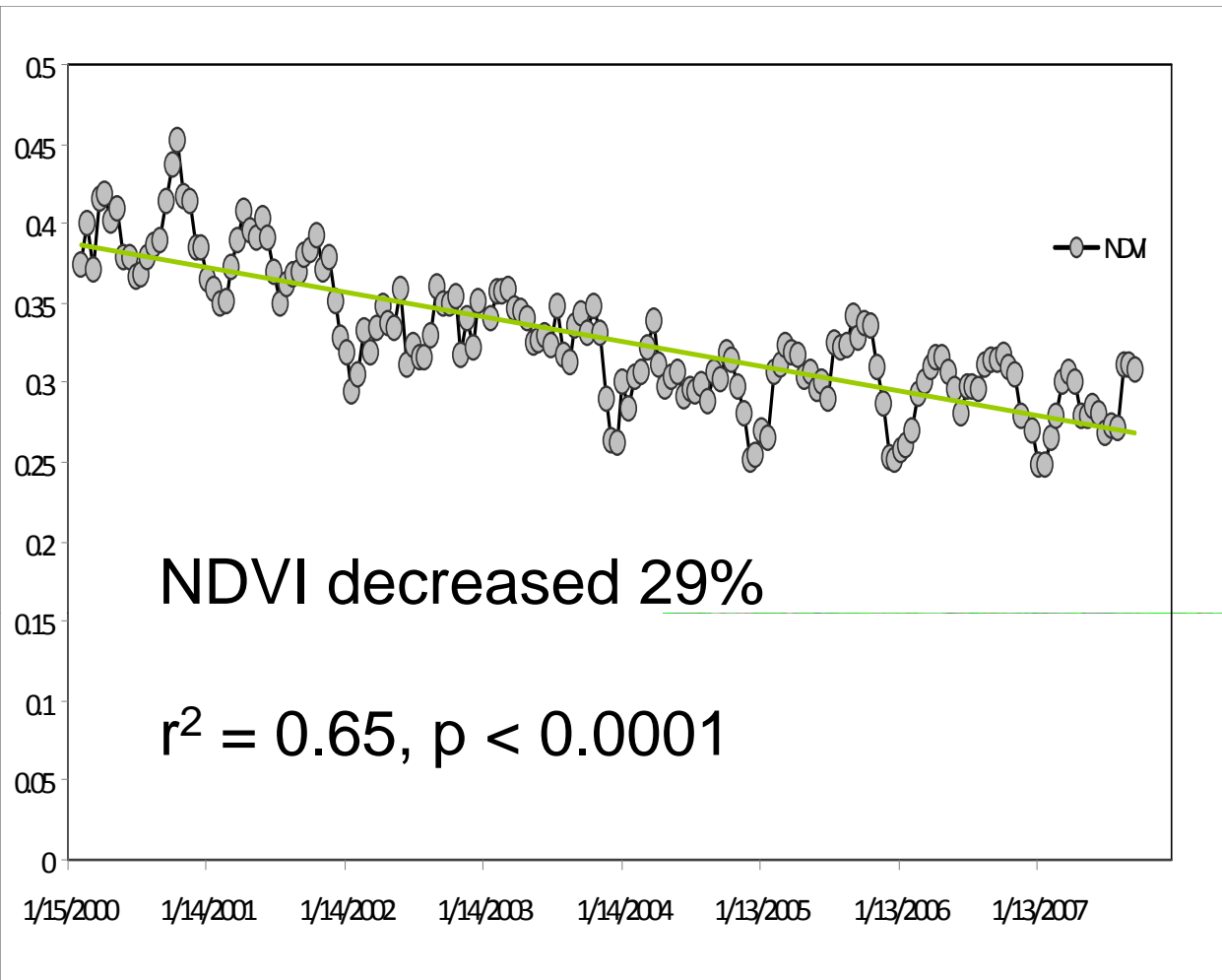
42 river miles

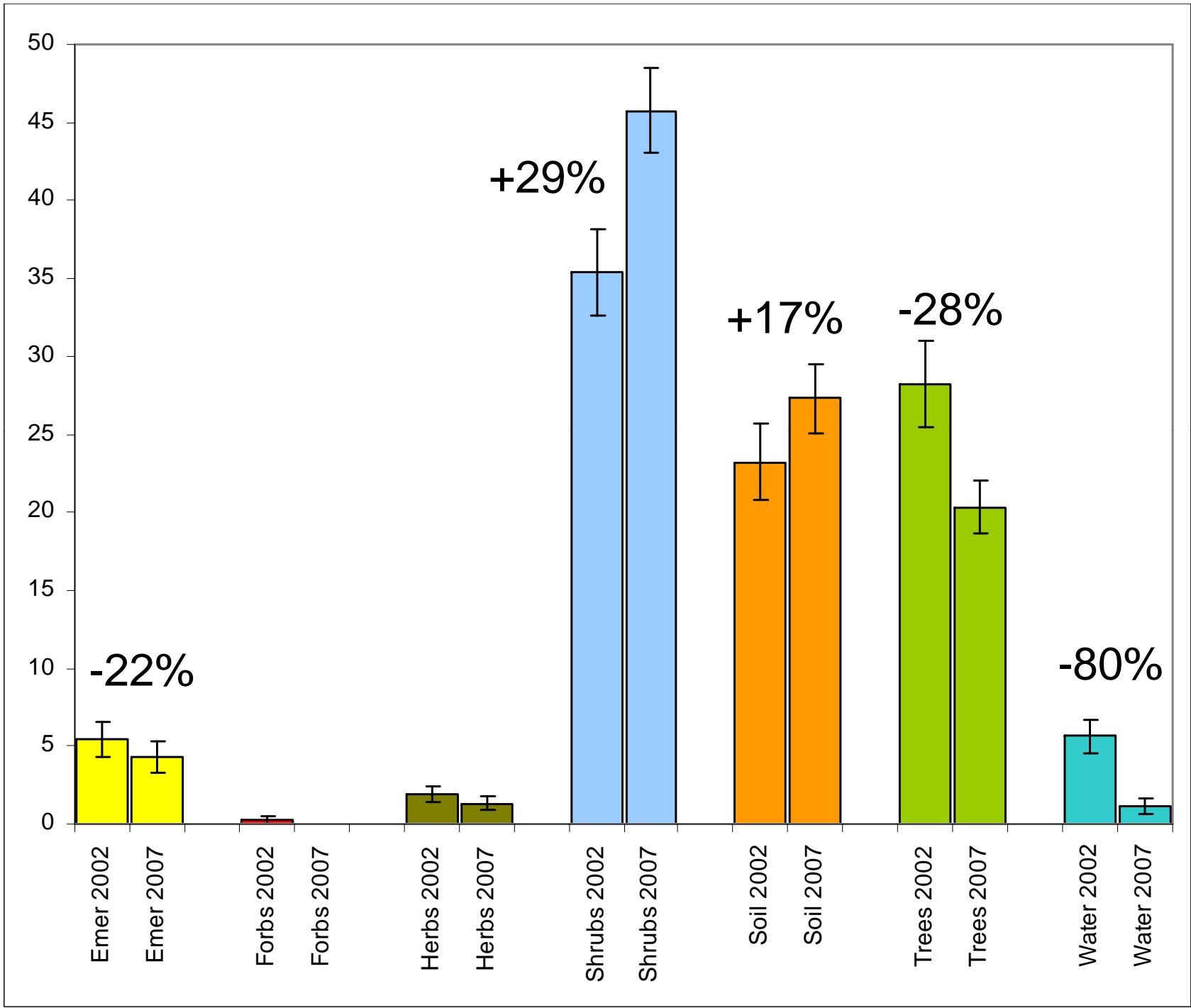


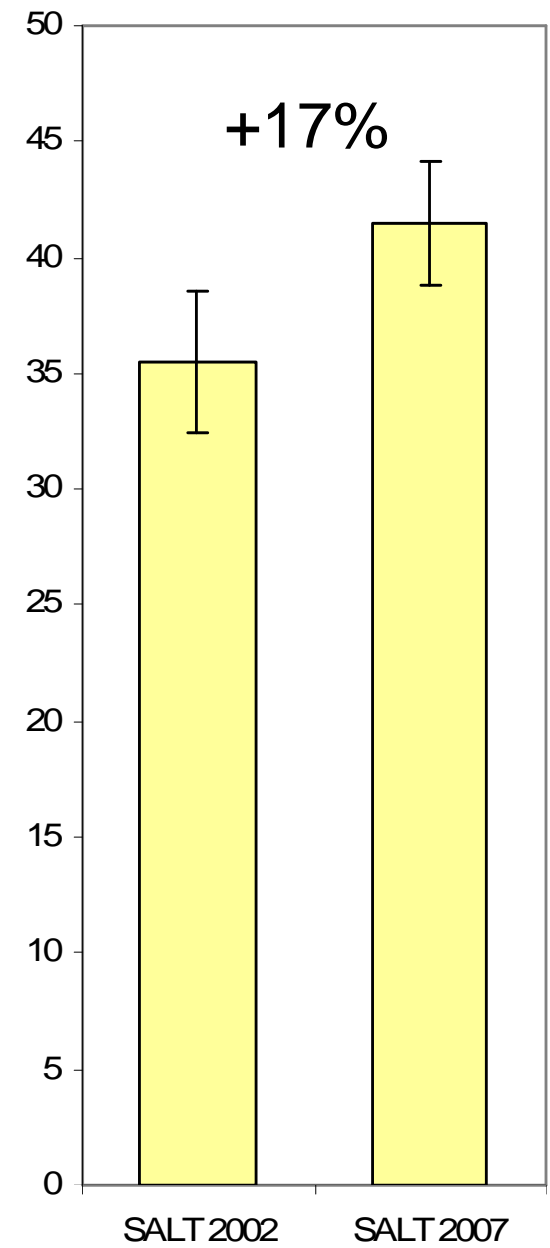
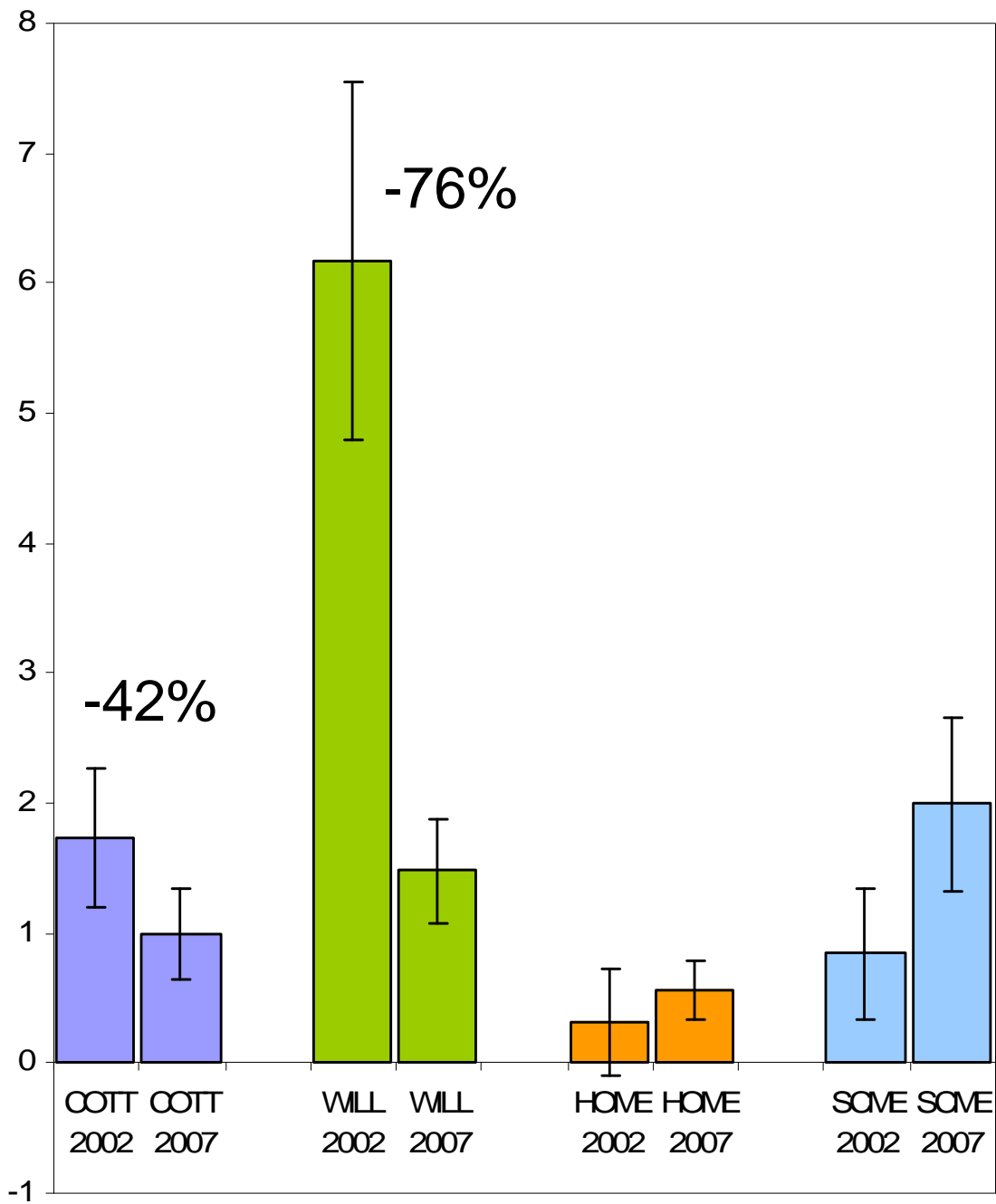












## Changes in Riparian Birds from 2002 to 2007

- No change in overall abundance ( $p = 0.40$ ), with an average of 30 birds per point
- Slight decrease in species richness per point, of 1.82% per year ( $p = 0.08$ )



## Changes in Riparian Birds from 2002 to 2007

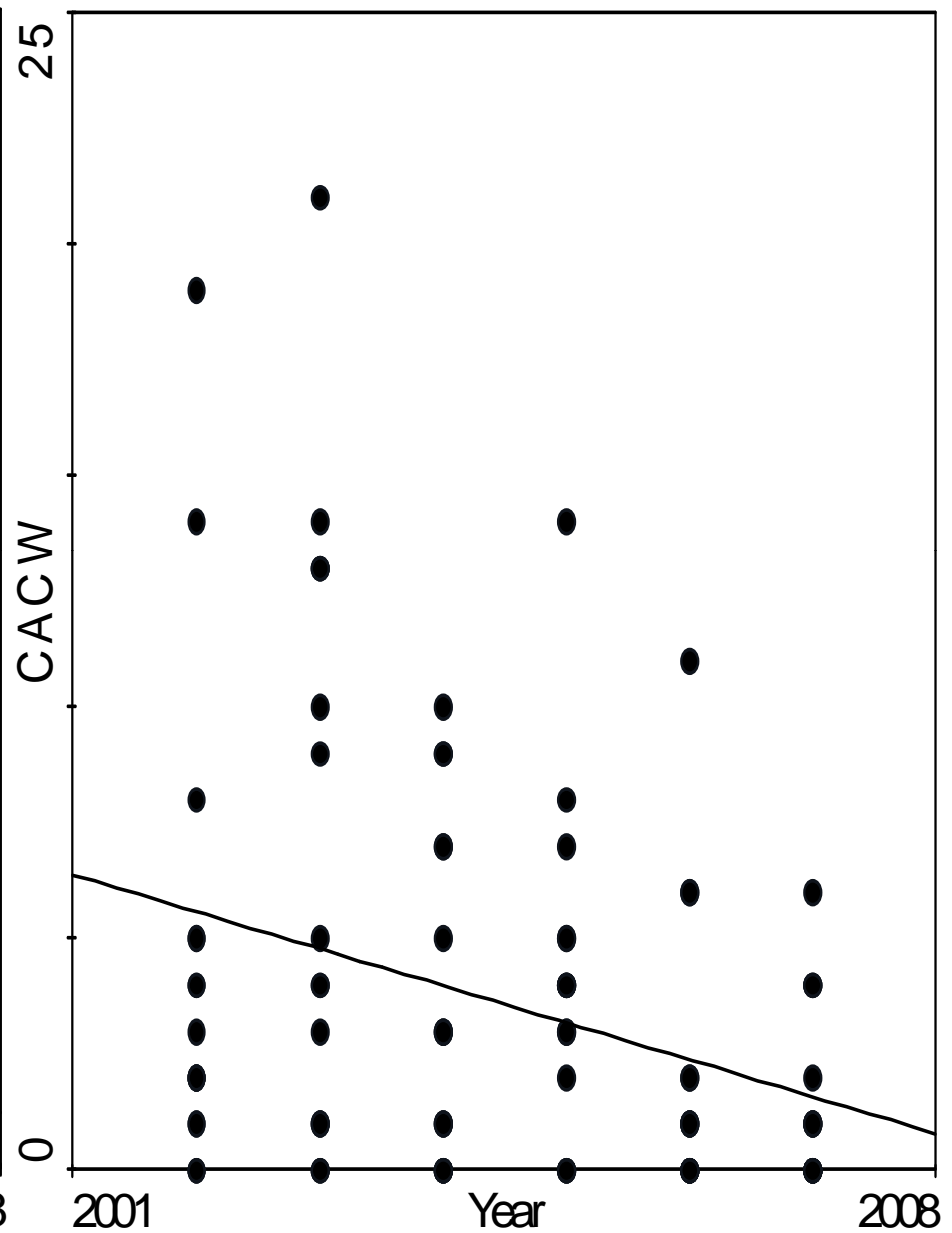
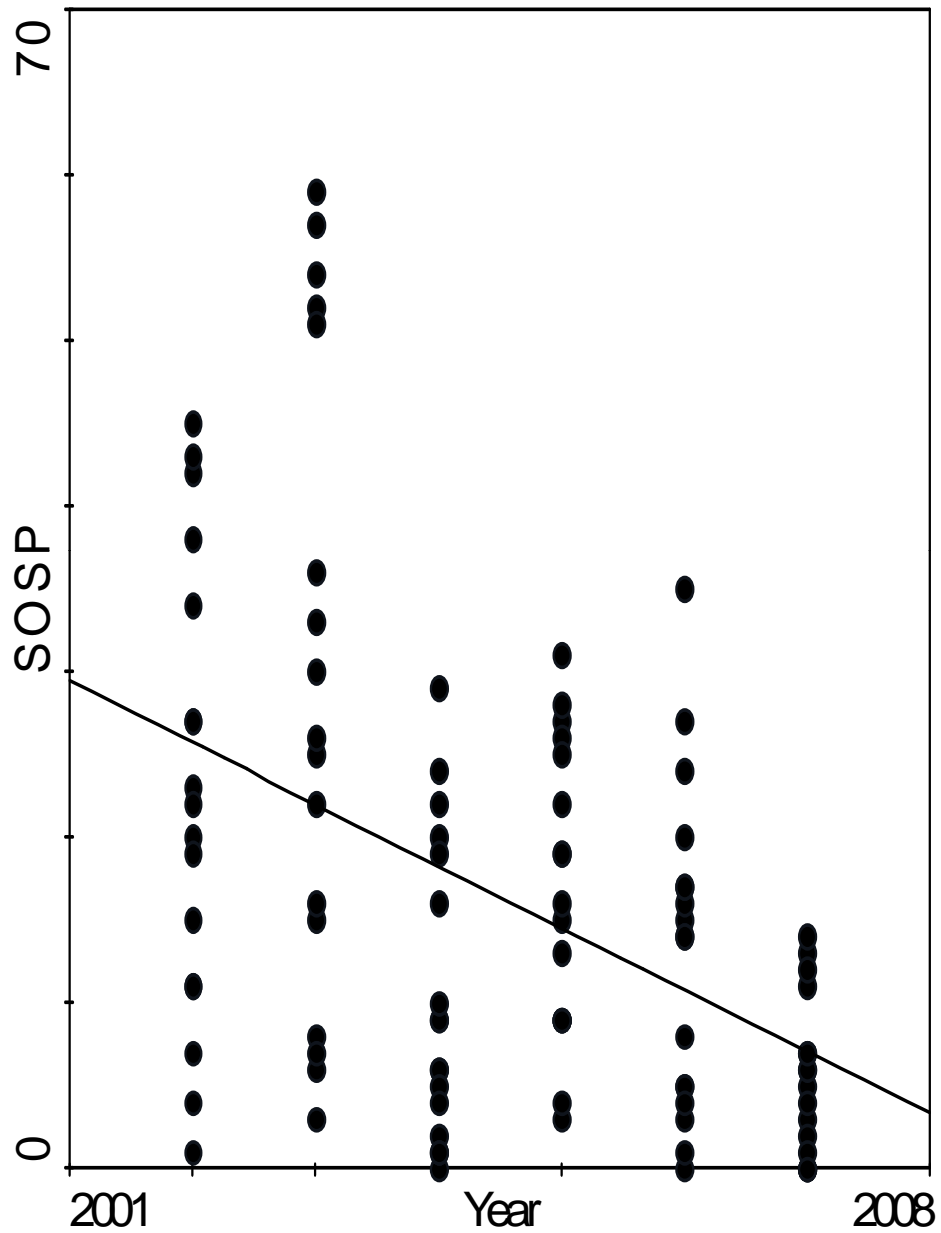
- However, drastic changes in community composition:
  - 28 species had a significant downward trend
  - 21 species had a significant upward trend
- In 2002, MODO and RWBL accounted for 30% of all records, while in 2007 they were 52% of all detections

## Changes in Riparian Birds from 2002 to 2007

Most significant declining species included:

- Resident landbirds

Spp	Trend (per year)	p
SOSP	-16.26%	< 0.0001
CACW	-18.84%	< 0.0001
COYE	-9.52%	0.061
VERD	-5.05%	0.025
BHCO	-16.62%	0.043



## Changes in Riparian Birds from 2002 to 2007

Most significant declining species included:

- Breeding waterbirds

Spp	Trend per year	p
BNST	-10.83%	0.017
SNEG	-15.36%	0.021
KILL	-9.55%	0.038



## Changes in Riparian Birds from 2002 to 2007

Most significant increasing species included:

- Birds related to agricultural development
- Exotic species

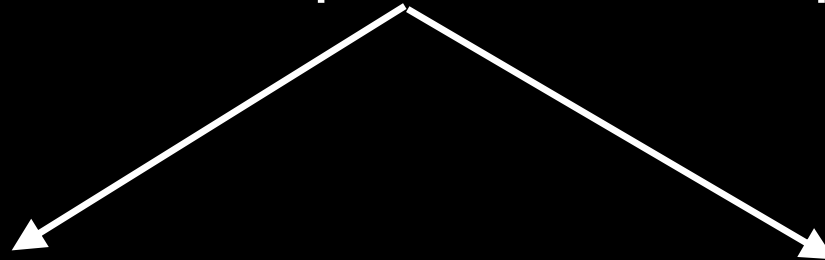
Spp	Trend per year	p
RWBL	38.67%	0.022
MODO	20.67	< 0.0001
EUST	52.46%	0.057
CAEG	5.48 times	0.02
HOFI	5.92 times	< 0.0001

# Changes in Colorado River Mexico, 2002-2007 In Summary

Drought: drastic reduction of flows



Reduction in riparian habitat quality



Population  
decline of  
riparian-related  
birds

Population  
increase of  
agricultural-related  
birds



## Changes in Colorado River Mexico

But, some resiliency  
despite absence of  
surface flows

Still remnant  
populations of  
riparian birds

Agricultural run-off  
and sub-surface  
flows







# Changes in Colorado River Mexico, 2002-2007

## What next?

Low reservoir conditions and climate change: drought might continue and deteriorate river conditions

Risk for riparian birds in the Colorado River in Mexico

We are working to revert the trends, through riparian restoration and allocation of instream flows







# Restoration of the Colorado River Delta: Moving forward!

- Allocation of water is feasible (Water Trust in Mexico)
- Large-scale protection of the floodplain is feasible (Concessions on federal land owned by Pronatura)
- Resilient ecosystem: restoration is feasible
- Binational collaboration is extremely important

