

# Yellow-billed Cuckoo Distribution and Habitat Use, Lower Colorado River Multi-Species Conservation Plan, 2007 Results

Matthew Johnson, Scott Durst and Mark Sogge  
USGS/Southwest Biological Science Center  
Colorado Plateau Research Station  
Northern Arizona University  
Flagstaff, AZ



# Lower Colorado River Multi-Species Conservation Plan (LCR-MSCP)

## Yellow-billed Cuckoo Objectives

### GOALS

Maintain and increase Yellow-billed Cuckoo numbers

- Conduct surveys and research and better define cuckoo habitat requirements.
- Restore 4,050 acres of Yellow-billed Cuckoo habitat.
- Monitor and manage cuckoos and habitat



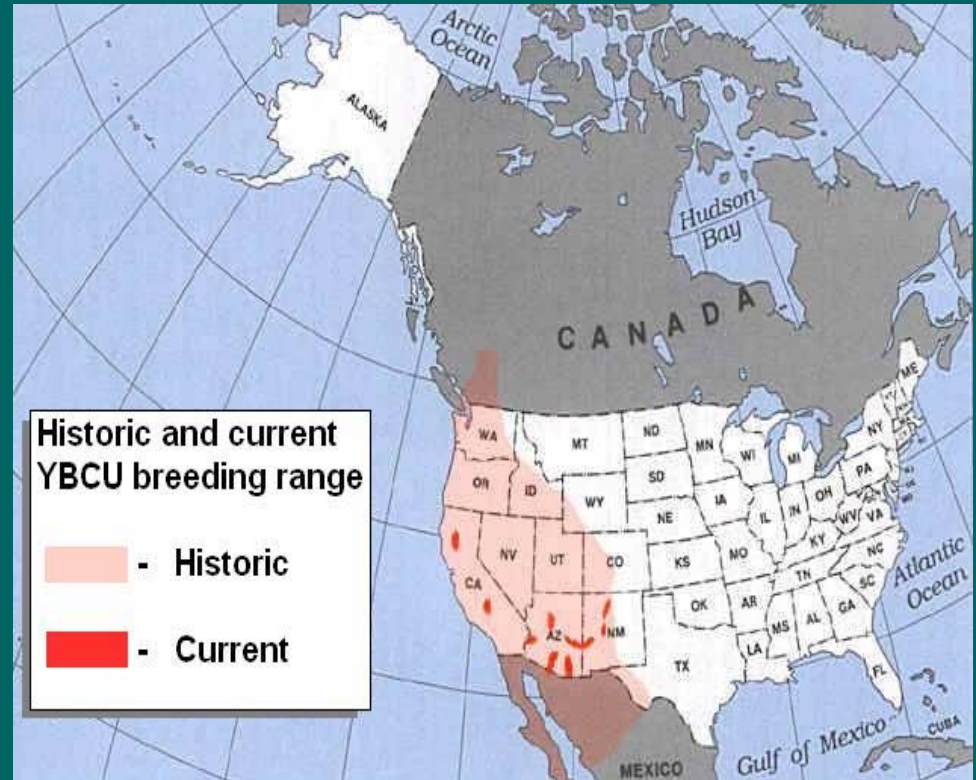
# Yellow-billed Cuckoo Objectives Under the LCR-MSCP

- Conduct comprehensive, repeatable surveys in all potentially suitable habitat types within the MSCP project boundary.
- Evaluate the effectiveness of the current yellow-billed cuckoo breeding season survey protocol.
- Identify cuckoo habitat requirements.
- Identify core yellow-billed cuckoo breeding habitat.



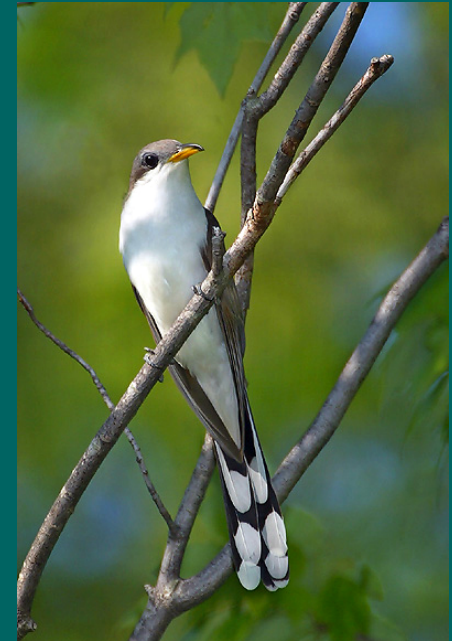
# Natural History

- Neotropical migrant
- Two populations
  - Eastern and Western
- Western Yellow-billed cuckoo is a riparian obligate
- Non-territorial



# Yellow-billed Cuckoo Survey Methods

- Identified survey sites using historical detections (Dawson 1981) and the “look-see” method (Bibby et al. 1992)
- Five survey periods conducted between 10 June - 10 September
- Conducted playback surveys using “*kuk-kowlp*” call
- 100 m between points, 300 m after detection
- Supplemental non-survey visits to monitor behavior and determine breeding status



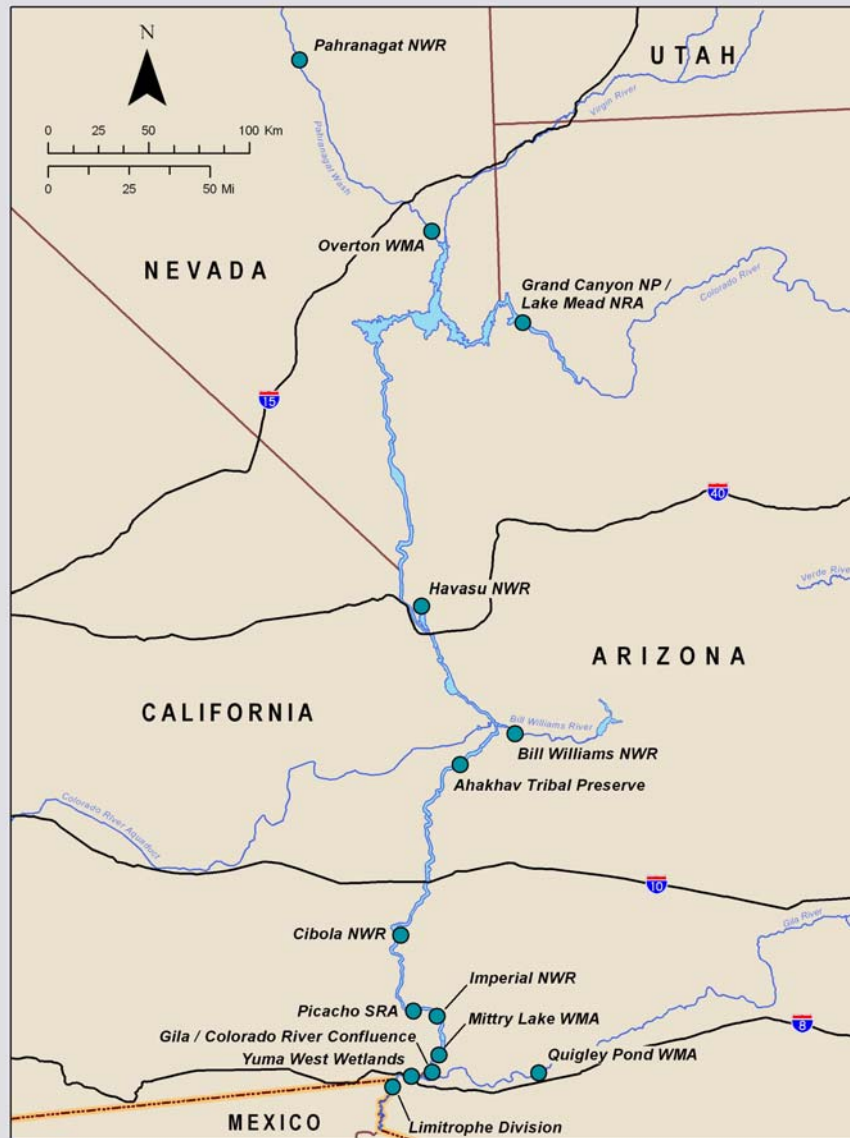


# Definitions

- **Detection** – Aural and/or visual confirmation of a Yellow-billed Cuckoo's presence on a survey
- **Occupied Patch** – A patch with Yellow-billed Cuckoo detections on two or more surveys

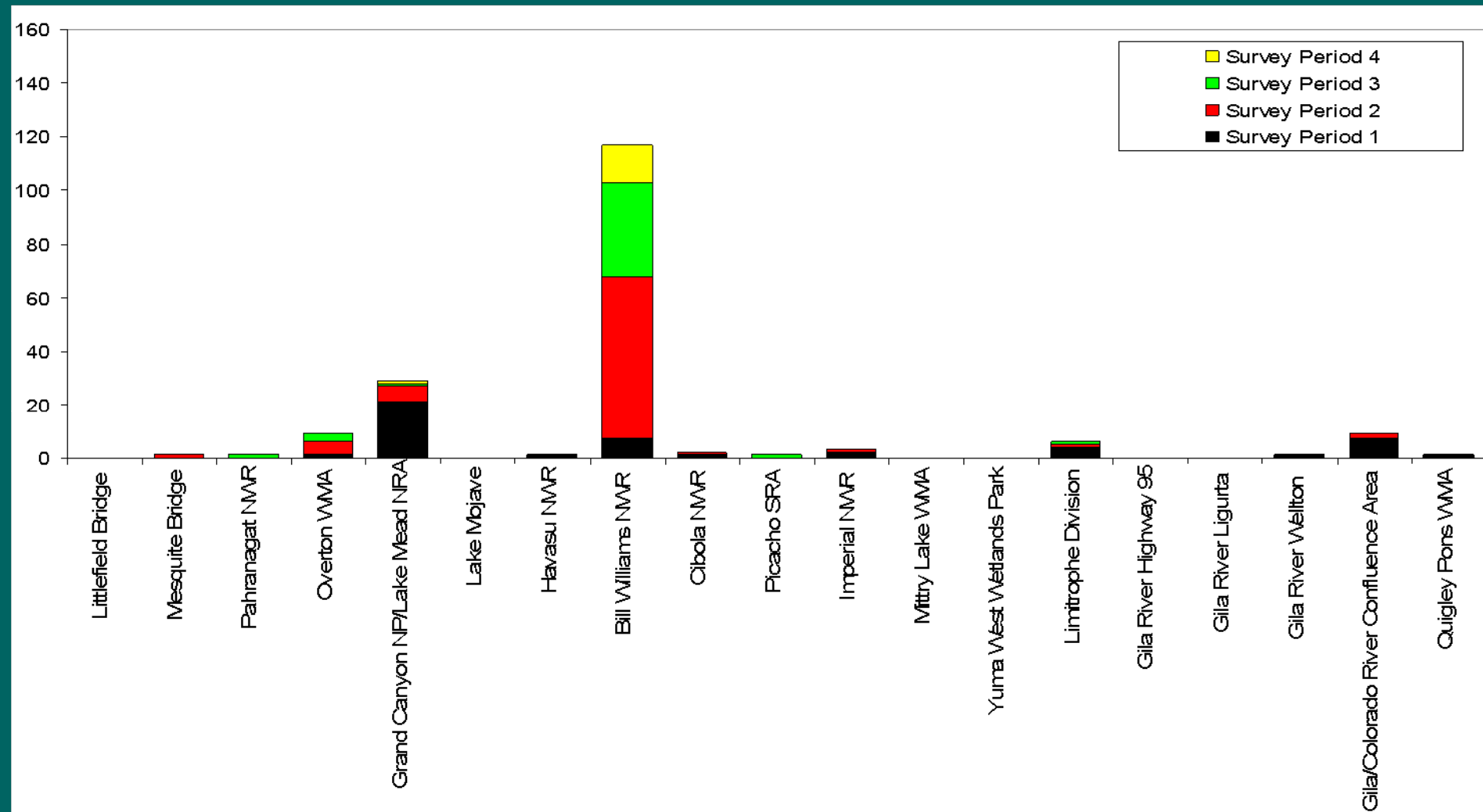


# Cuckoo Study Areas



# 2006 Yellow-billed Cuckoo

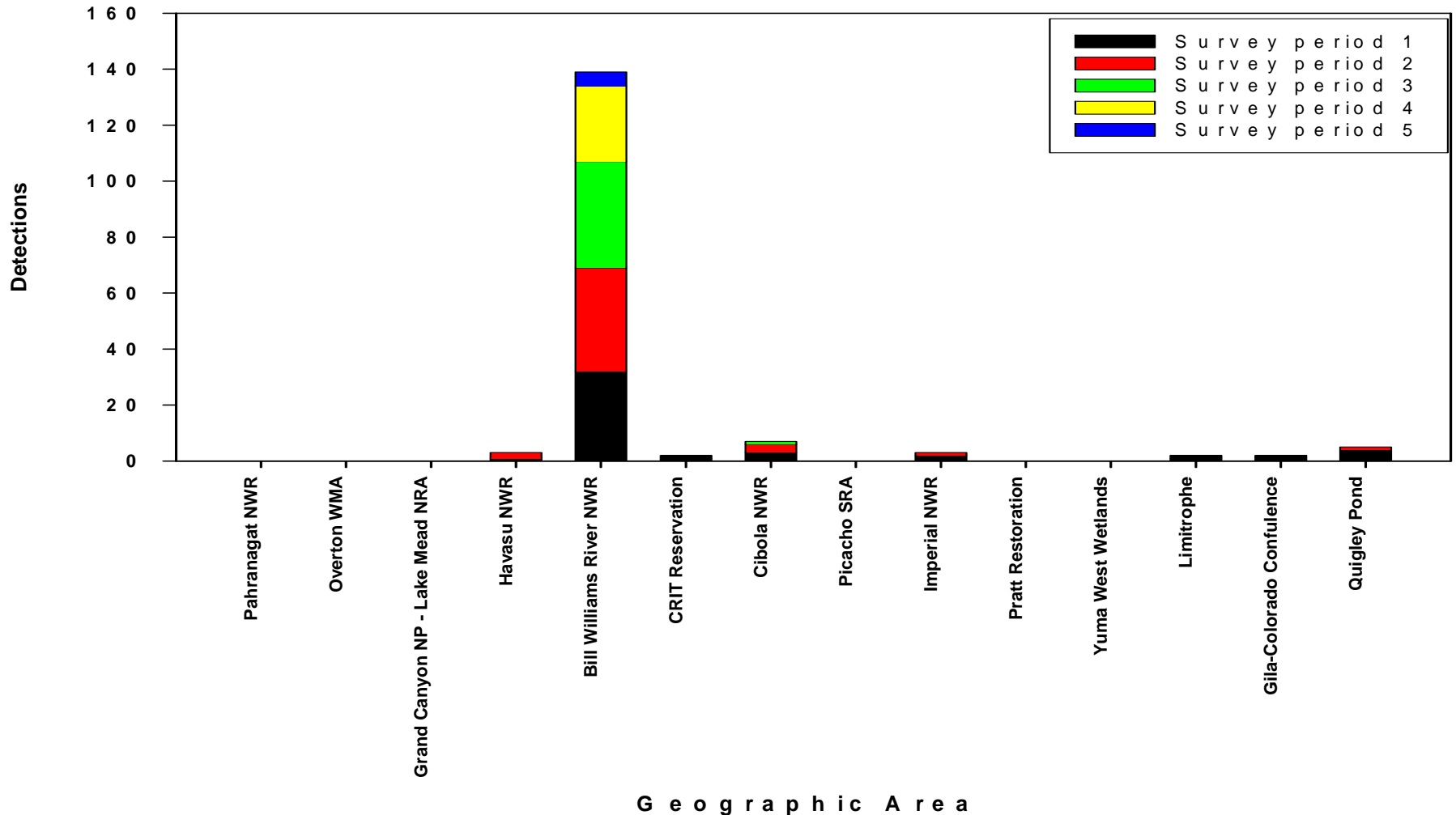
## Yellow-billed Cuckoo Survey Results



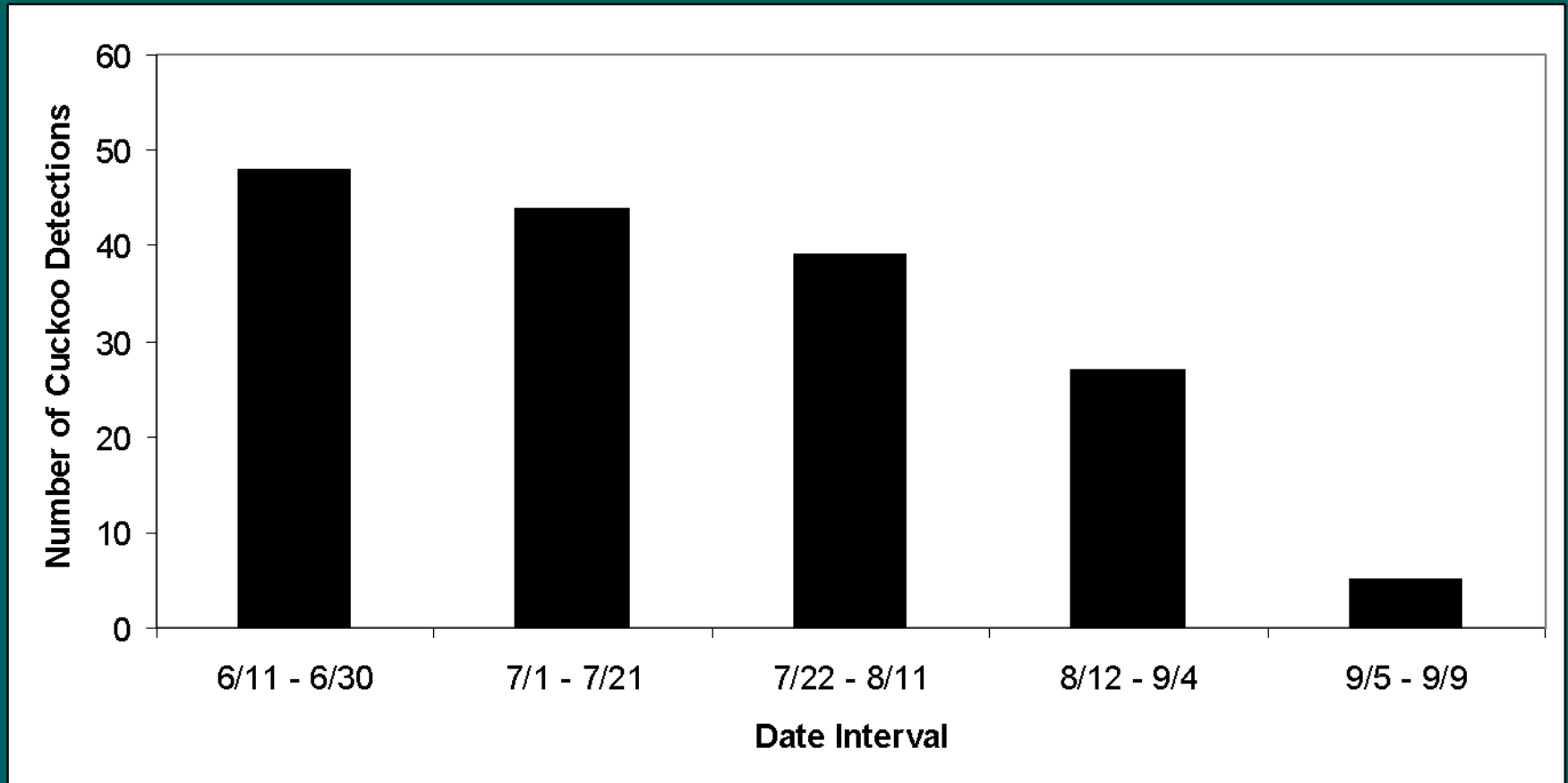


# 2007 Yellow-billed Cuckoo

## Yellow-billed Cuckoo Survey Results

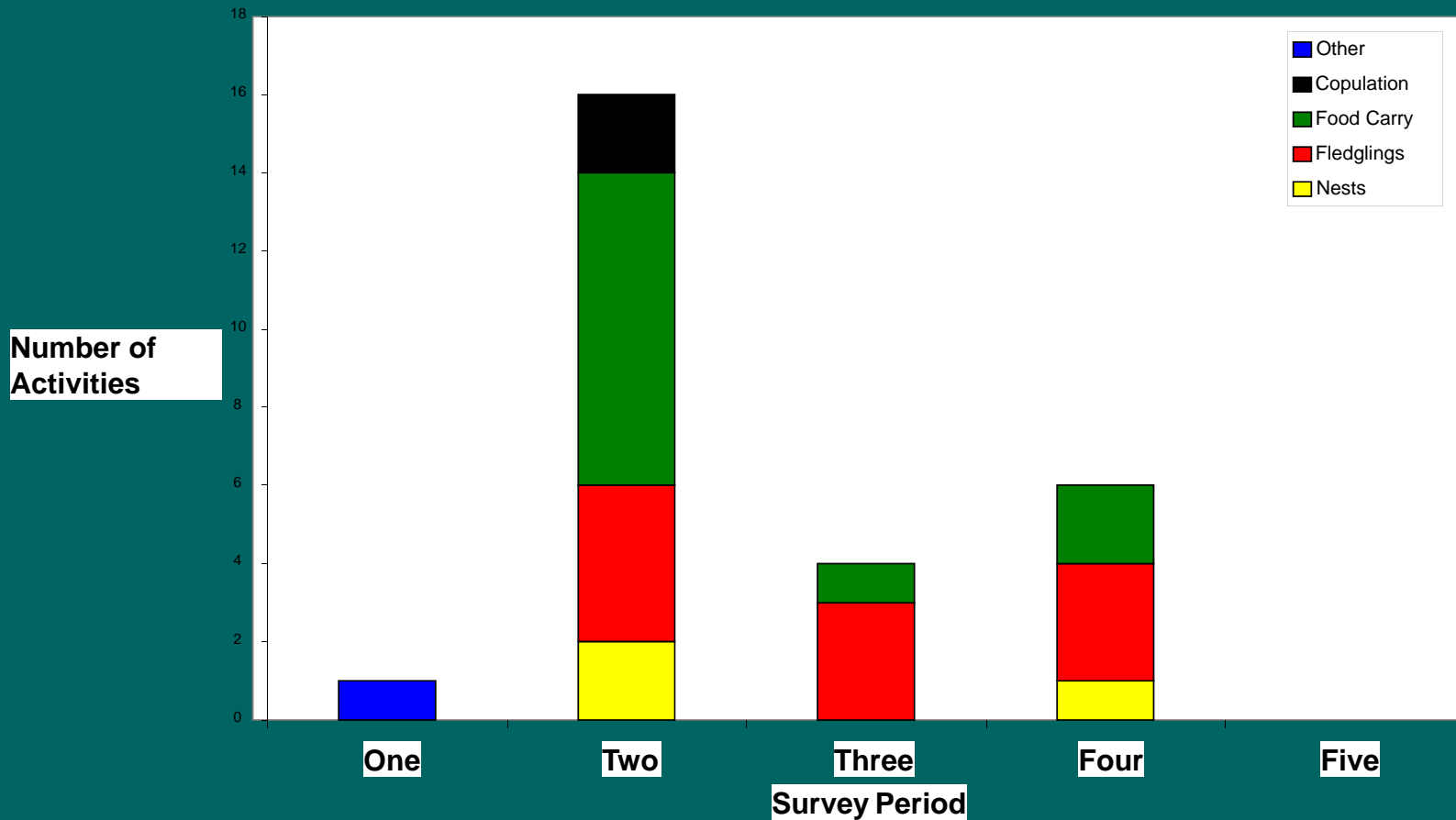


# Yellow-billed Cuckoo Detections by Survey Period



Survey Area	YBCU Detections		# of YBCU Occupied Sites		# YBCU Breeding Detections	
	2006	2007	2006	2007	2006	2007
Pahrnagat NWR	1	0	0	0	0	0
Overton WMA	7	0	2	0	0	0
Grand Canyon NP/Lake Mead NRA	29	0	3	0	1	0
Havasu NWR	1	3	0	1	0	0
Bill Williams River NWR	117	139	8	12	10	27
Ahakhav Tribal Preserve - CRIT	NA	2	NA	0	0	0
Cibola NWR	3	7	1	1	0	0
Picacho State Recreation Area	1	0	0	0	0	0
Imperial NWR	3	3	1	1	0	0
Pratt Restoration Area	0	0	0	0	0	0
Gila-Colorado River Confluence	9	2	1	0	0	0
Yuma West Wetlands	0	0	0	0	0	0
Limitrophe Division	6	2	1	0	0	0
Quigley Pond WMA	1	5	1	1	0	0

# Cuckoo Breeding Activity at Bill Williams River NWR



# Evaluation of Yellow-billed Cuckoo Survey Method, 2007

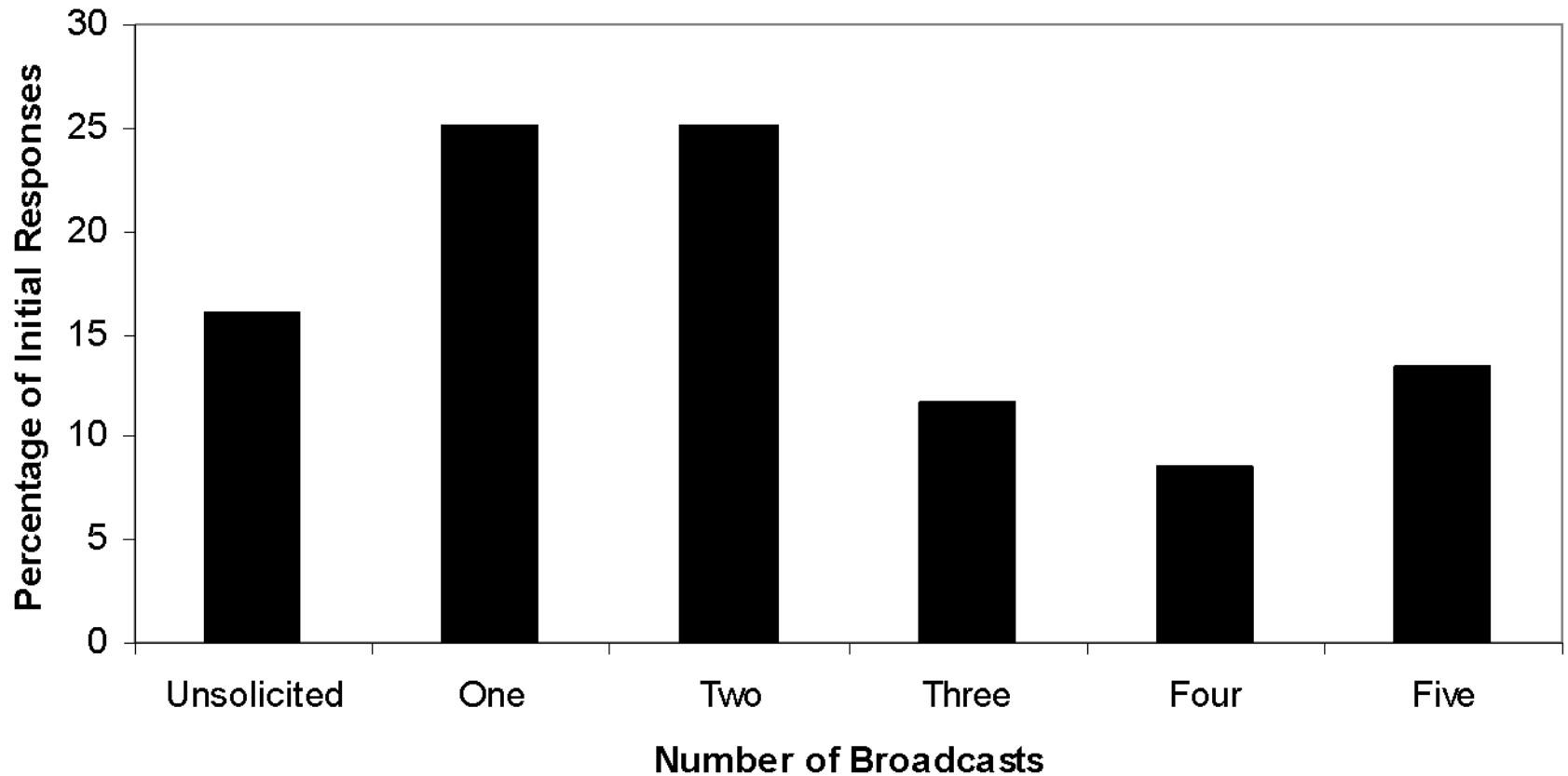
## OBJECTIVES

1. Examine patterns in cuckoo responses to the number of playback recordings played.
2. Examine Cuckoo detection rates according to study areas.
3. Examine Cuckoo detection rates across the breeding season.

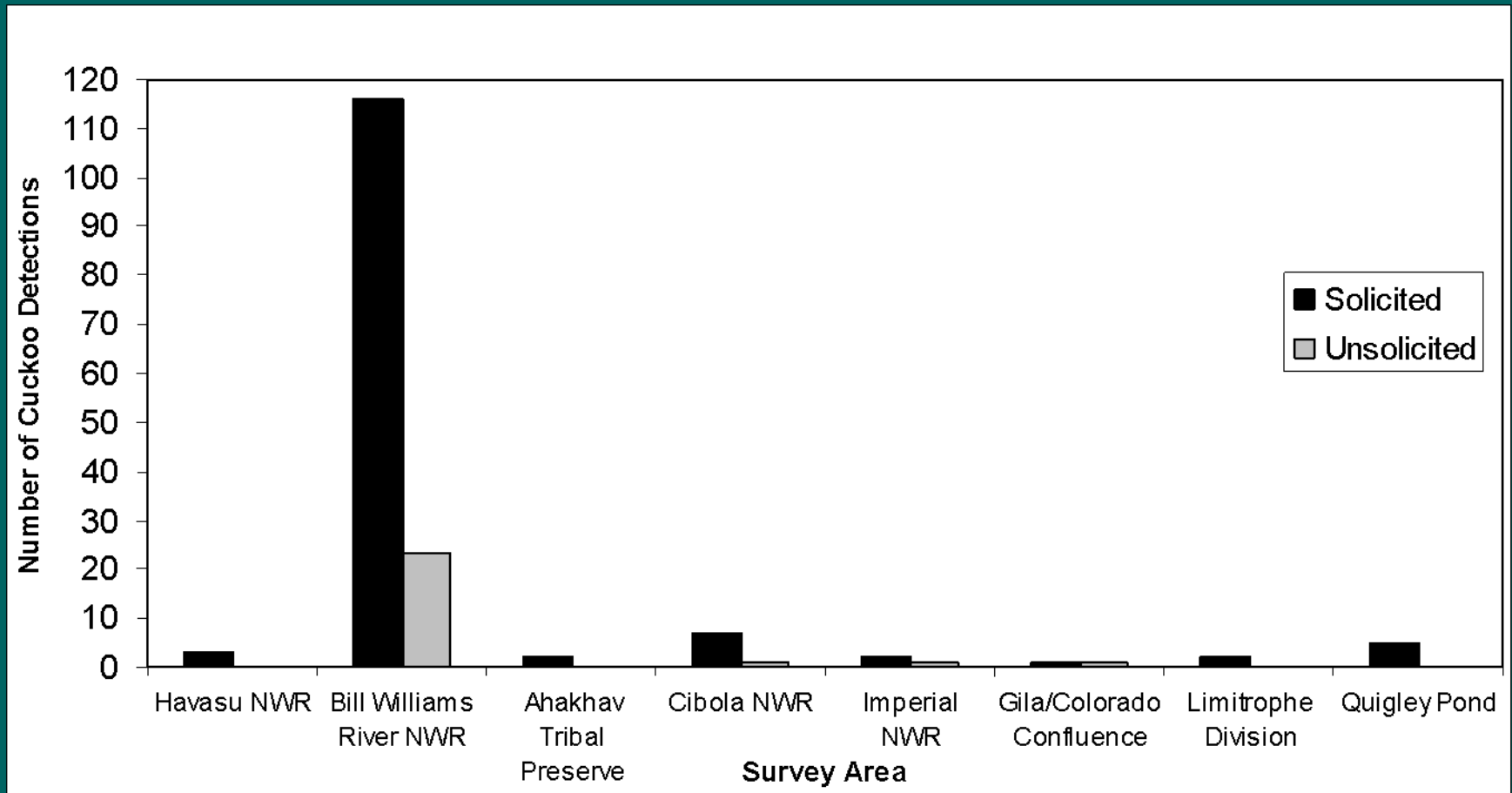




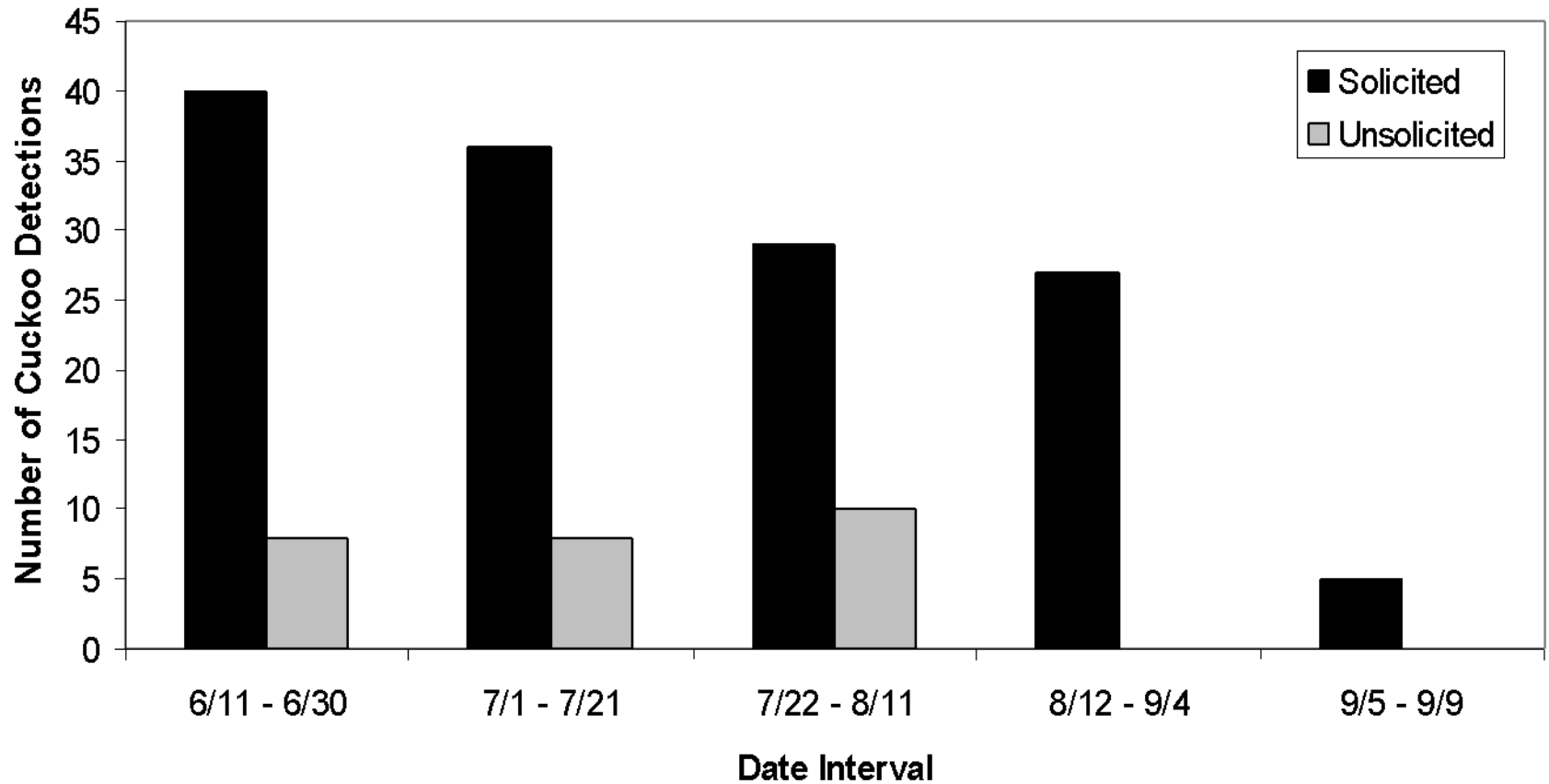
# Yellow-billed Cuckoo responses to the number of playback recordings played, 2007



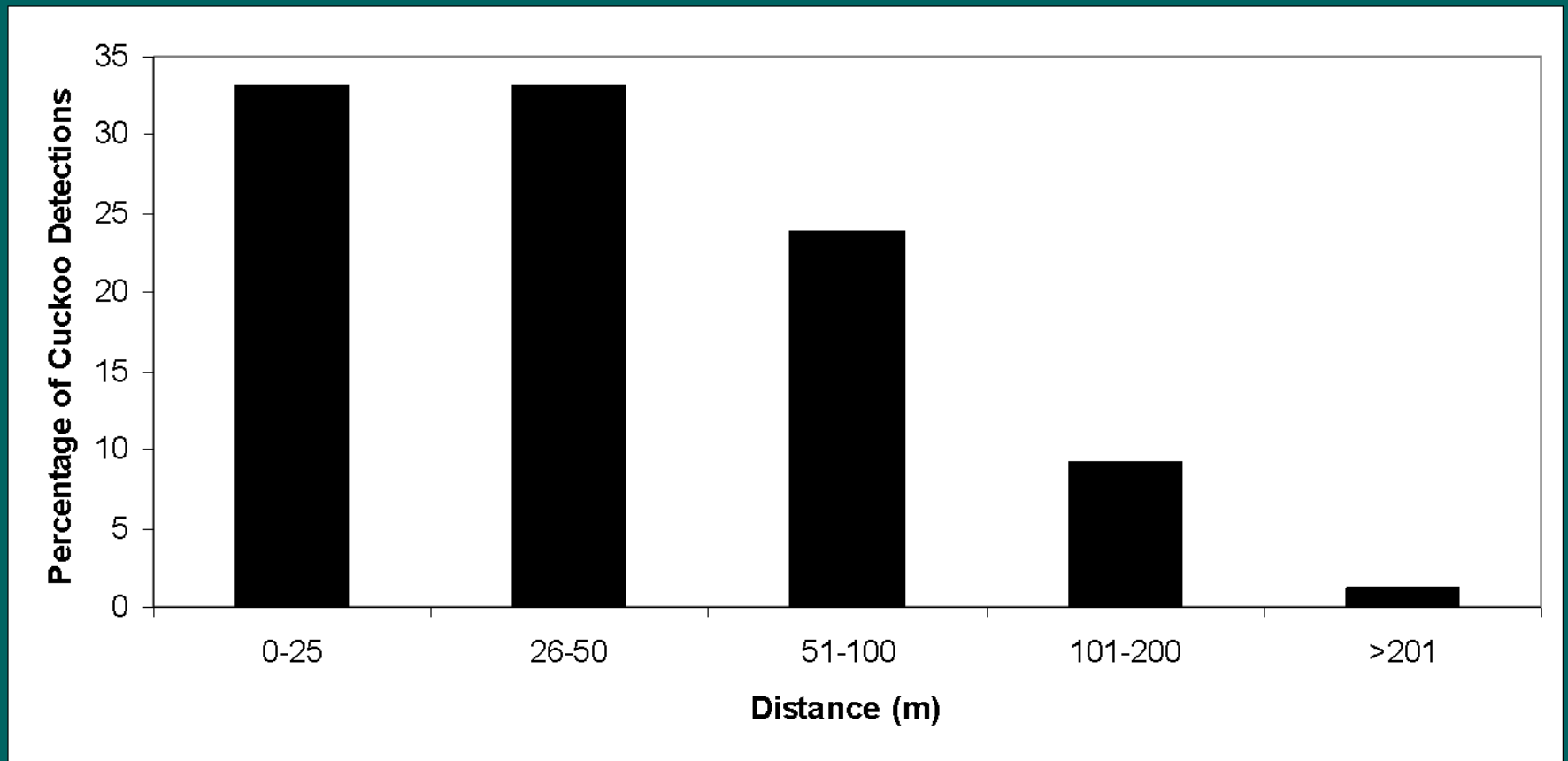
# Unsolicited Initial Cuckoo Responses to Broadcasts in each Geographical Area, 2007



# Cuckoo Detection Rates across the Breeding Season, 2007



# Yellow-billed Cuckoos Detected within Categories of Distance from the Survey Point, 2007



# Characterizing Yellow-billed Cuckoo Habitat, 2007

To improve knowledge of Yellow-billed Cuckoo habitat requirements we:

1. Selected point-based sampling measures that characterize riparian habitat at the survey site/patch level rather than at the nest or territory scale.
2. Sampled occupied and unoccupied patches to describe vegetation composition and structure.





# Vegetation Measurement Methods, 2007

Plots were done in both occupied and unoccupied sites.

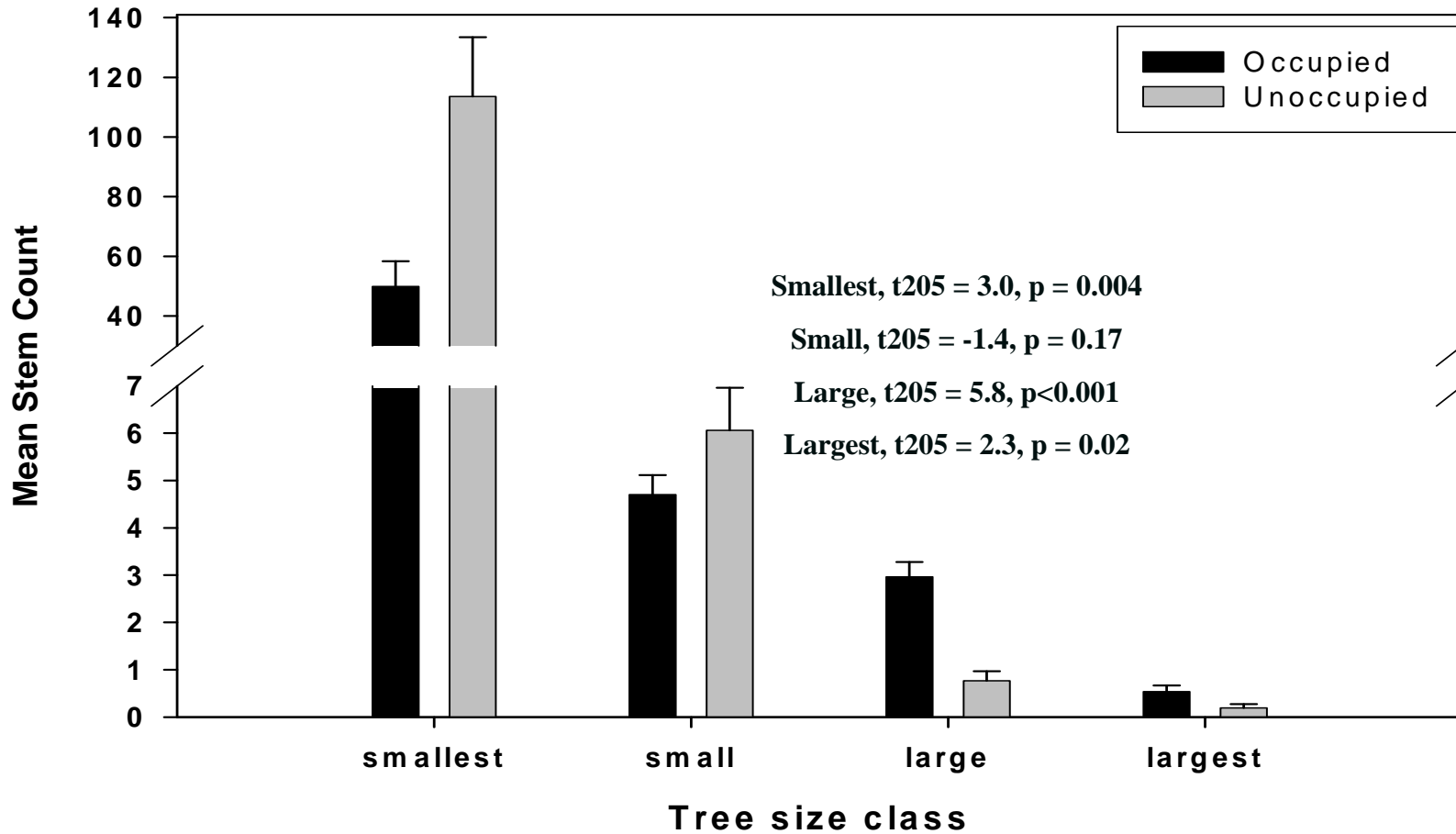
Plots assigned to random UTM coordinates within appropriate habitat boundaries using aerial photographs.

Vegetation characterization method: Modified B-Bird

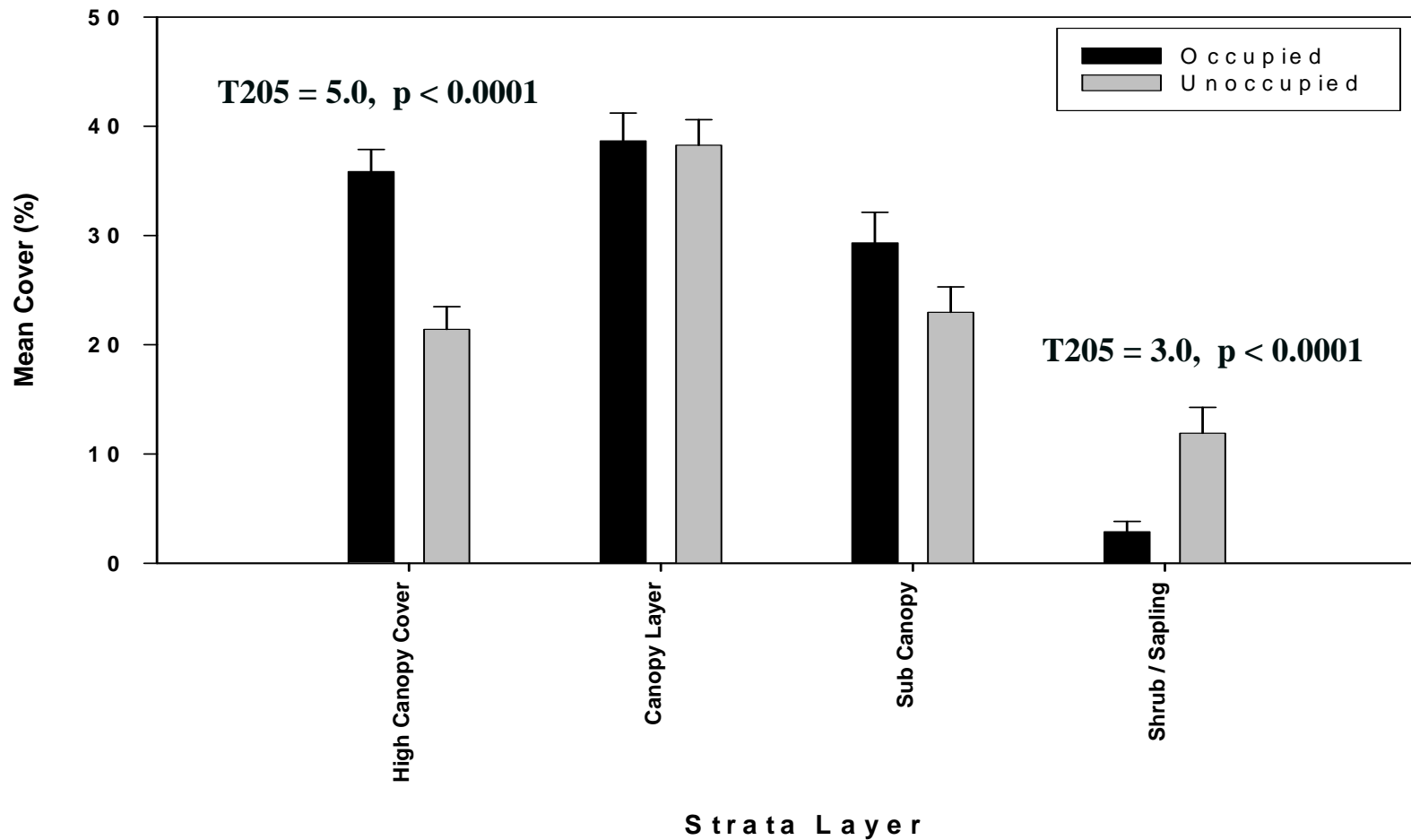
- Canopy cover
- Canopy height
- Identify Vegetation Strata Layers
- Distribution and density of woody species
- Ground cover



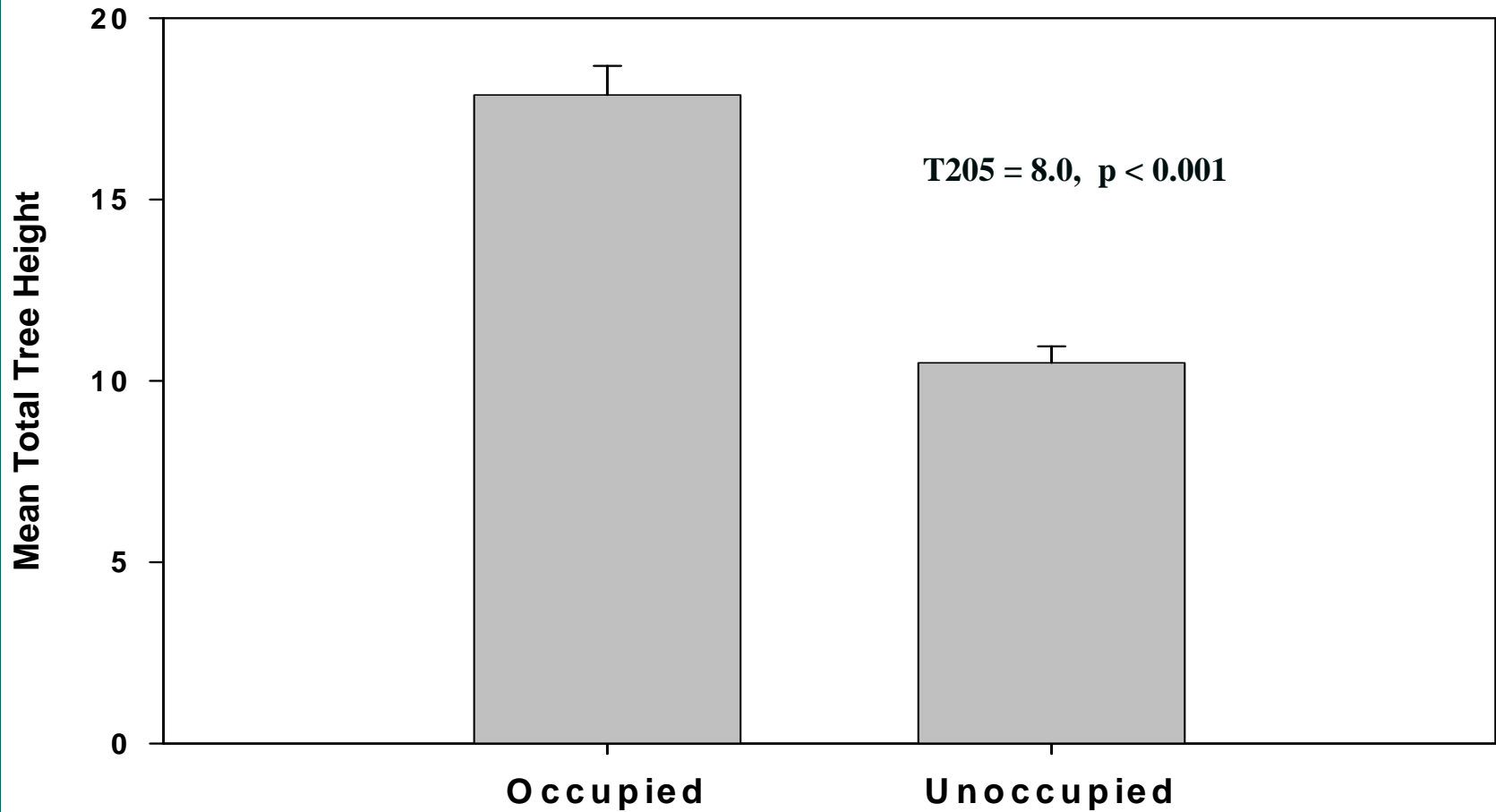
# Total Tree Count by Size Class, 2007



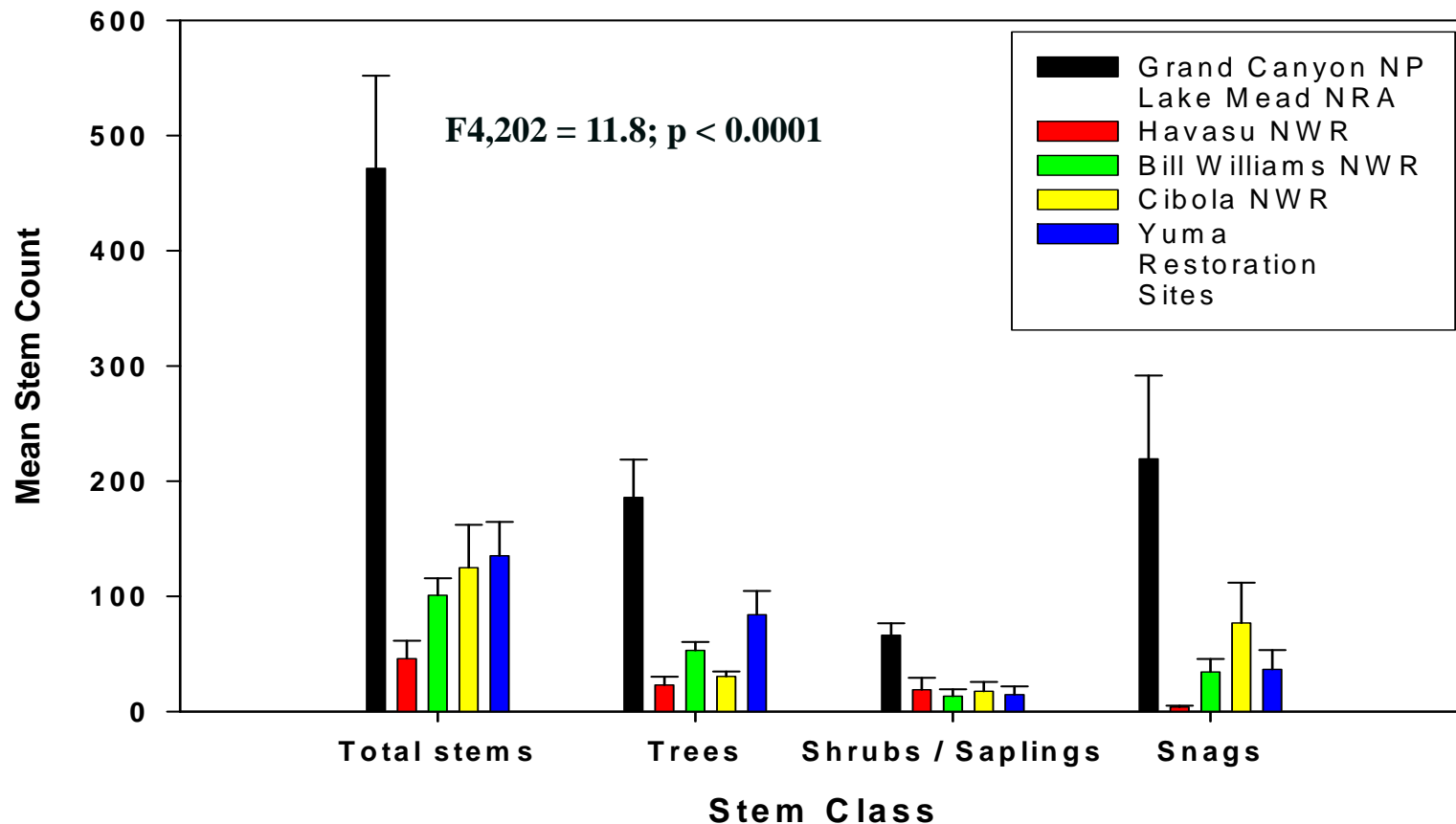
# Strata Layer Cover, 2007



# Mean Total Tree Height, 2007

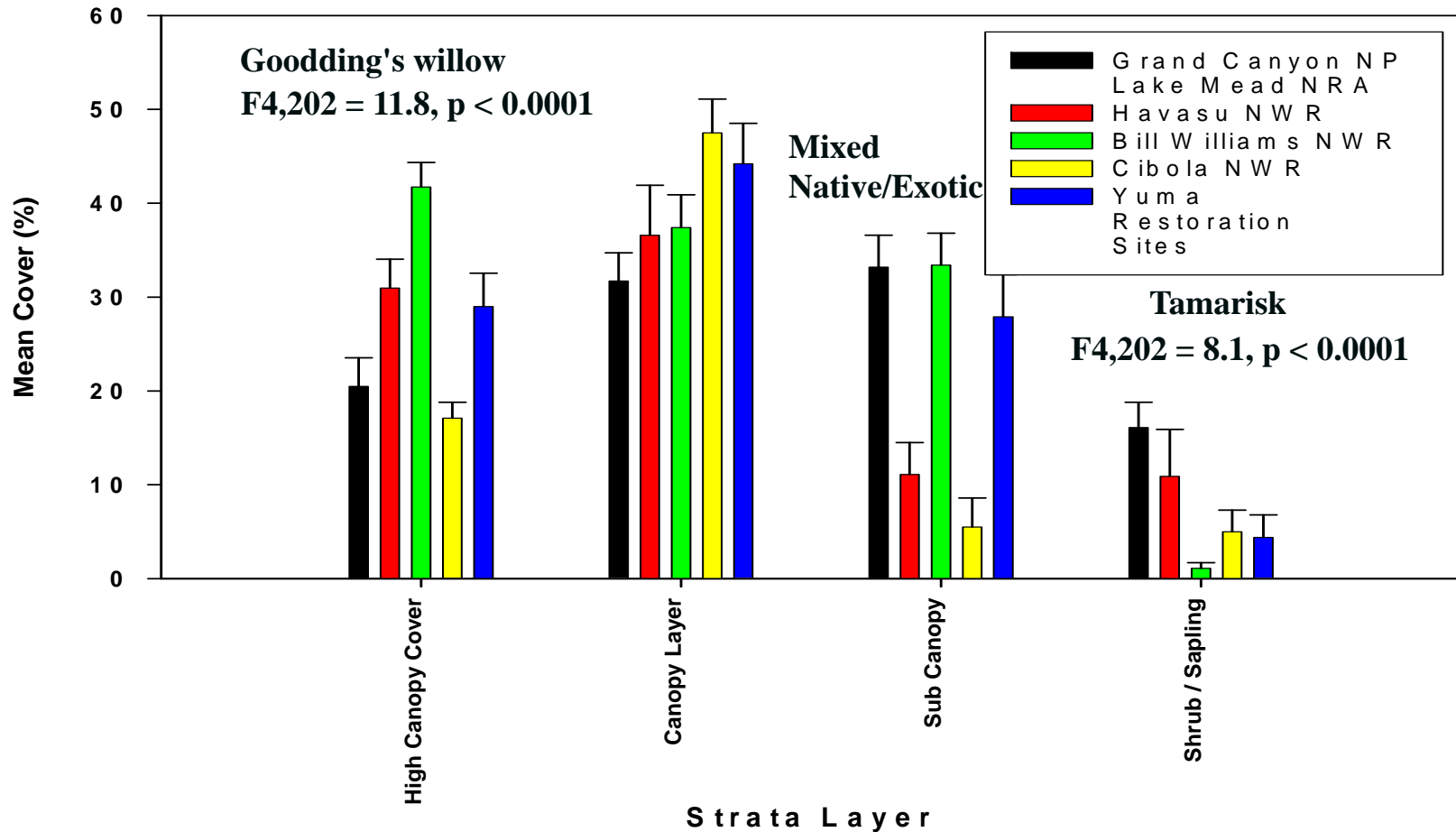


# Mean Stem count by Geographic Areas, 2007

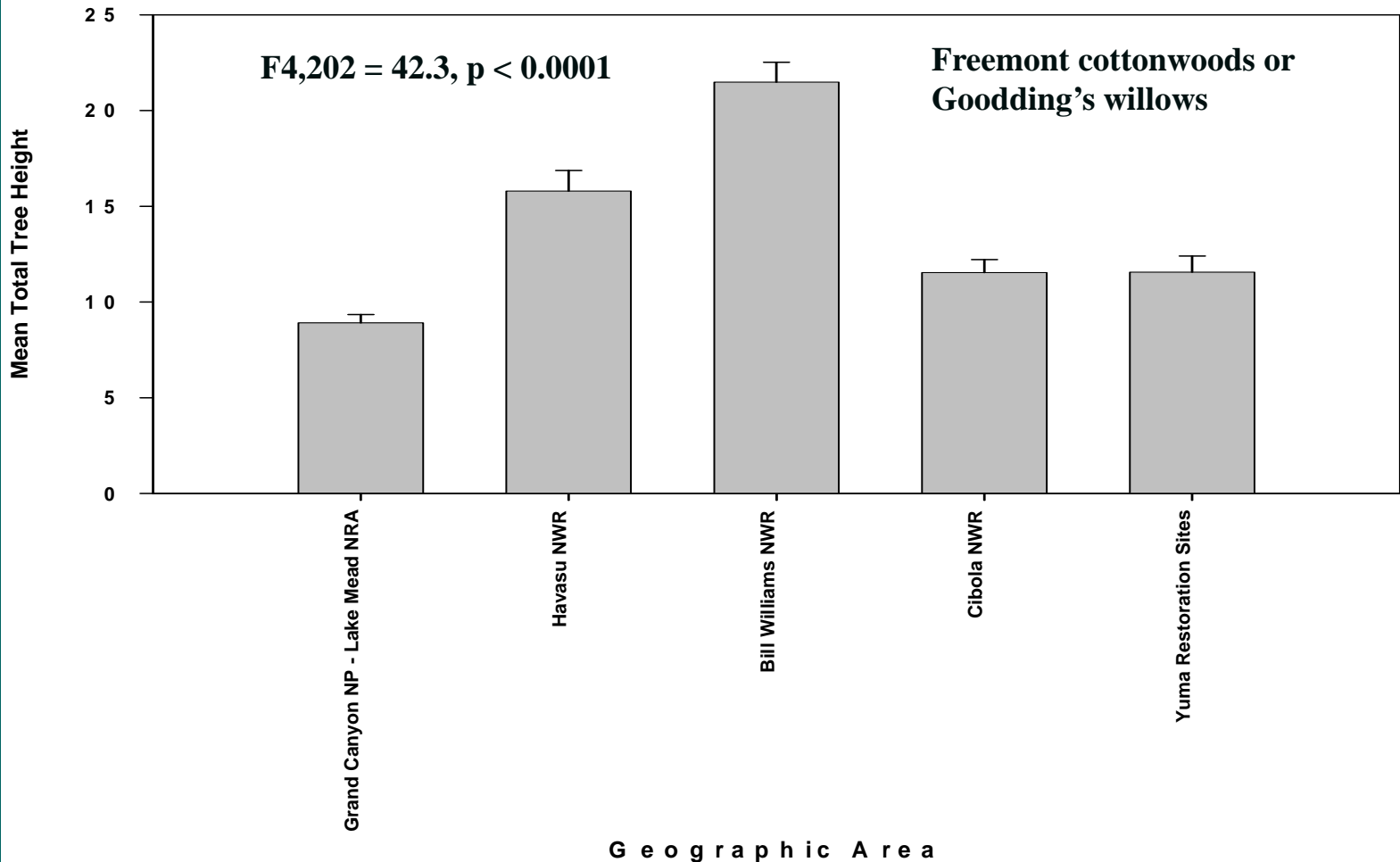




# Canopy Cover, Canopy Layer, Sub-Canopy, and Shrub/sapling Layer, 2007



# Mean Total tree Height by Geographic Area, 2007



# Microclimate Characterization of Yellow-billed Cuckoo Habitat, 2007

## OBJECTIVES

- Examined how microclimate (temperature and relative humidity) vary between Yellow-billed Cuckoo occupied and unoccupied sites and between geographic locations.
- Compared soil moisture at Yellow-billed Cuckoo occupied and unoccupied sites and between geographic locations.
- Finally, microclimate variables to vegetation structure and species composition.

# Microclimate Methods, 2007

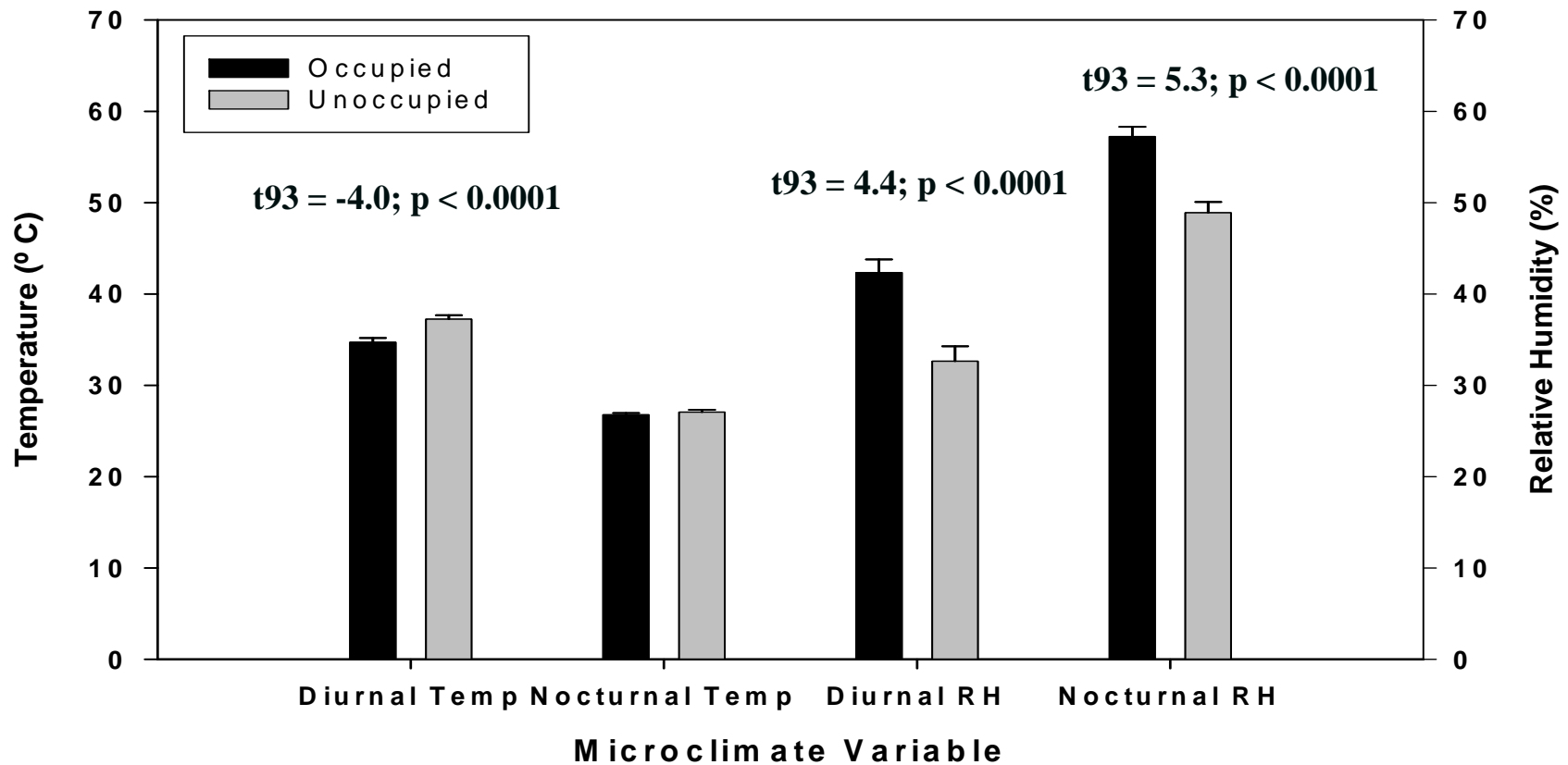
## Temperature and Relative Humidity

- Multiple random samples within a site/patch were placed to describe the patch/site.
- Random UTM coordinates were assigned from aerial photographs from each study site within appropriate cuckoo habitat boundaries.

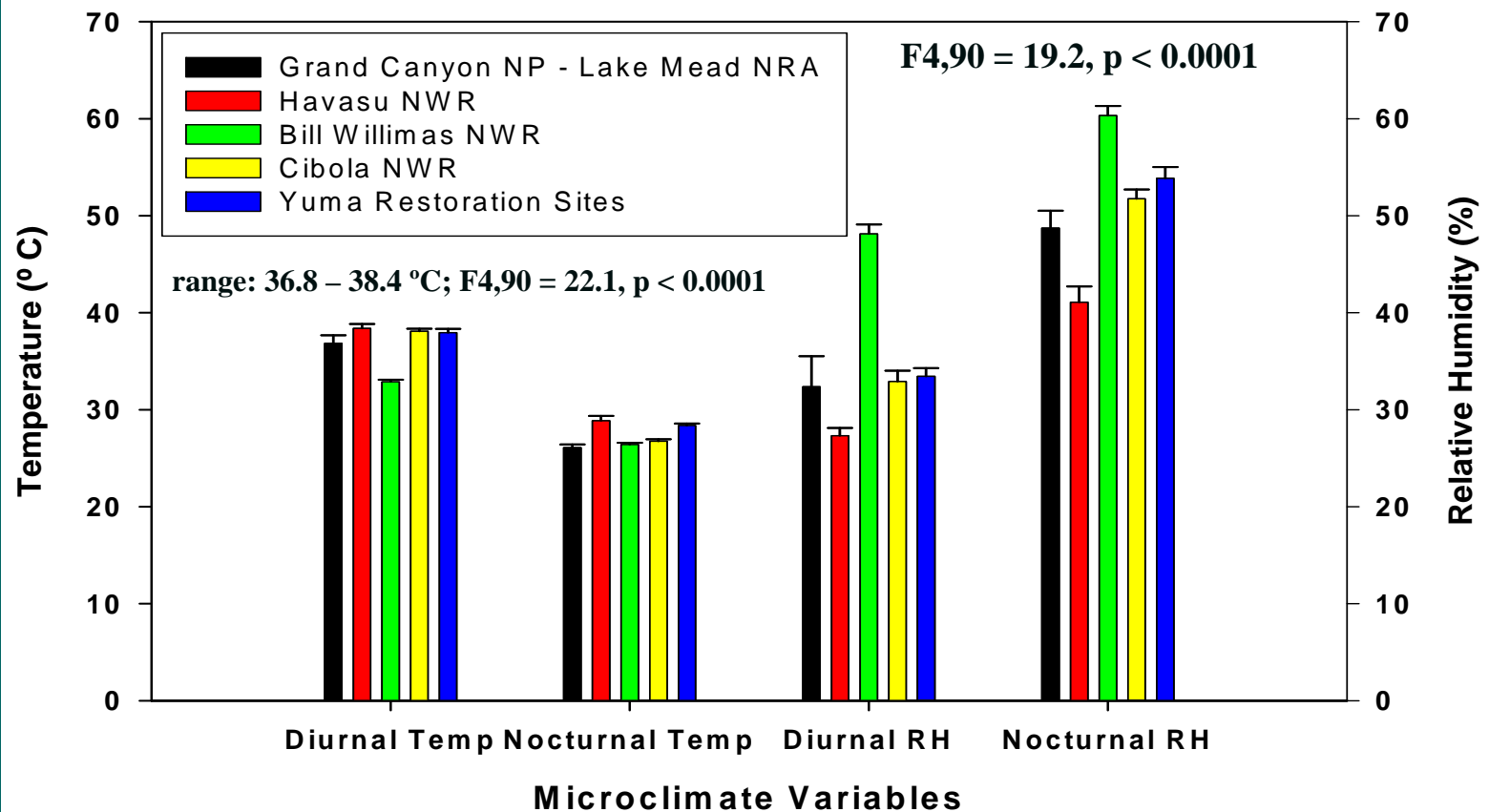
## Soil Moisture

- Soil moisture was recorded below each HOBO, and at 1.0 m, 2.0 m, and 3.0 m in each cardinal direction.

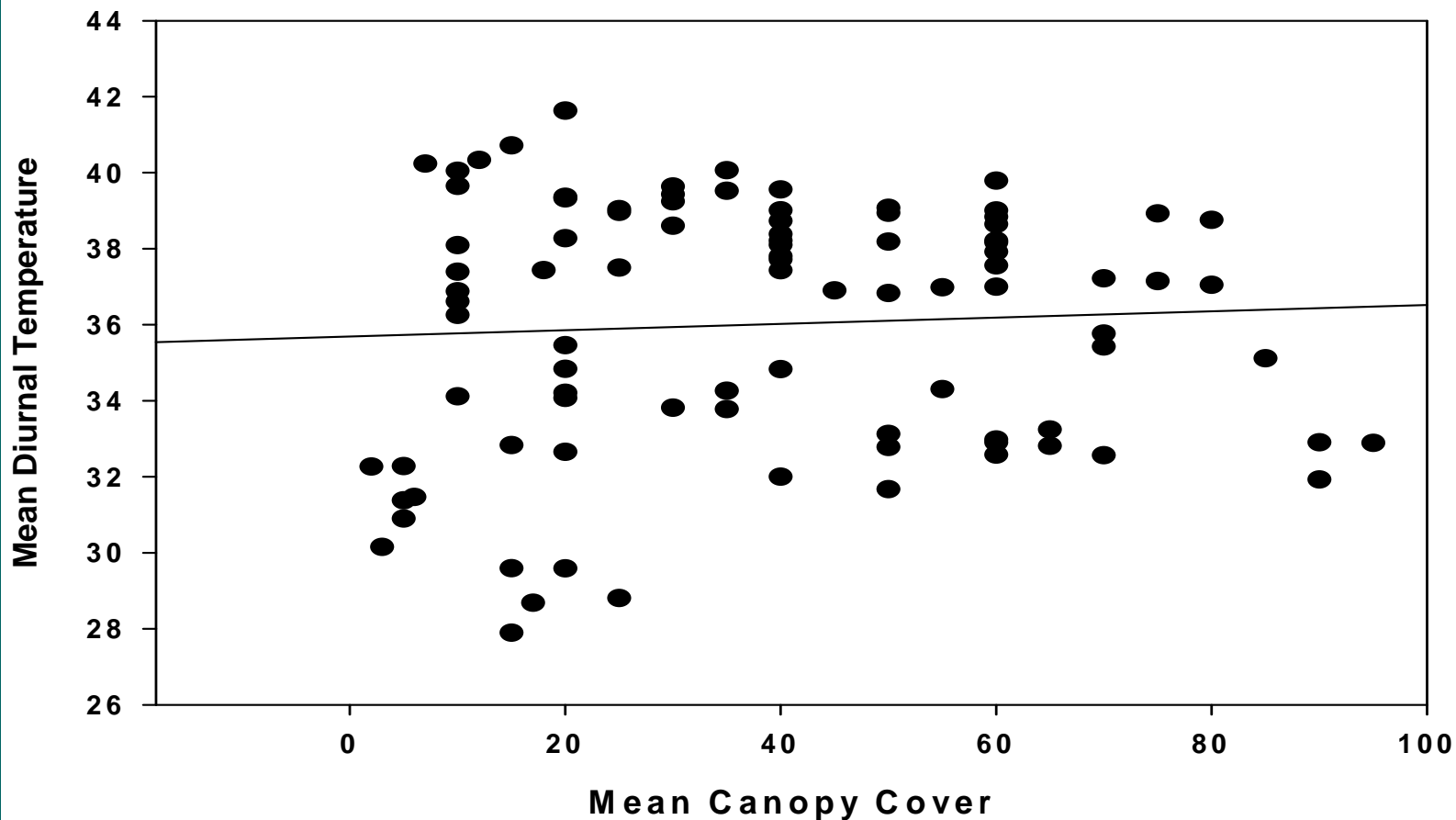
# Diurnal and Nocturnal Temperature and Relative Humidity of Occupied and Unoccupied Cuckoos Areas, 2007.



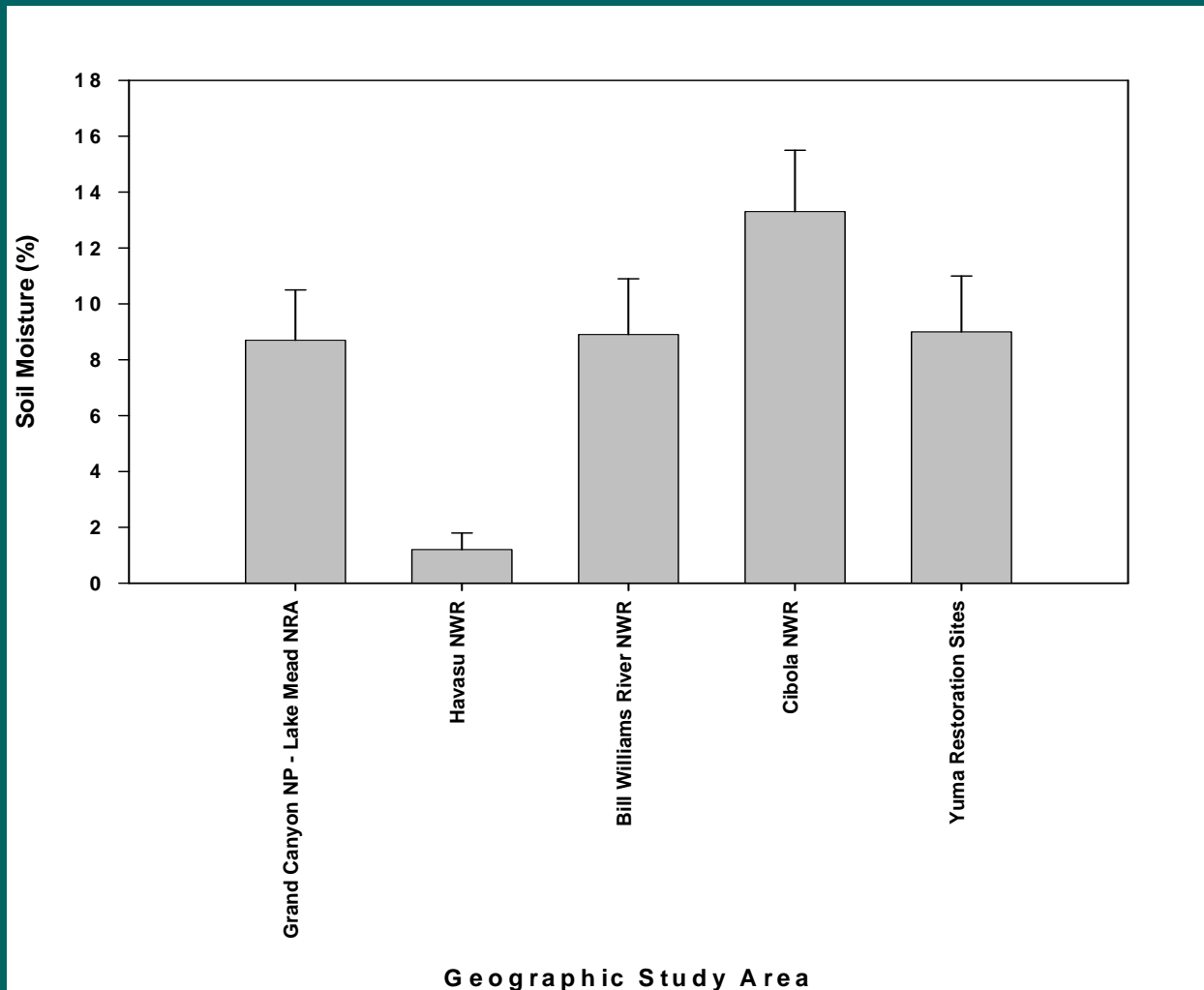
# Mean Diurnal and Nocturnal Temperature and Relative Humidity among Cuckoo Geographic Study Areas, 2007



# Mean Diurnal Temperature Versus Mean Canopy Cover, 2007



# Mean soil moisture among yellow-billed cuckoo Geographic Study Areas, 2007





# Occupied Sites



Bill Williams River NWR



# Unoccupied Sites



Limitrophe Division



Havasu NWR – Topock Tamarisk



# Restoration Sites

CRIT Restoration



Topock Marsh Restoration



Pratt Restoration

# Lake Mead NRA – Chuckwalla Cove



2007



# Lake Mead NRA – Iceberg Ridge

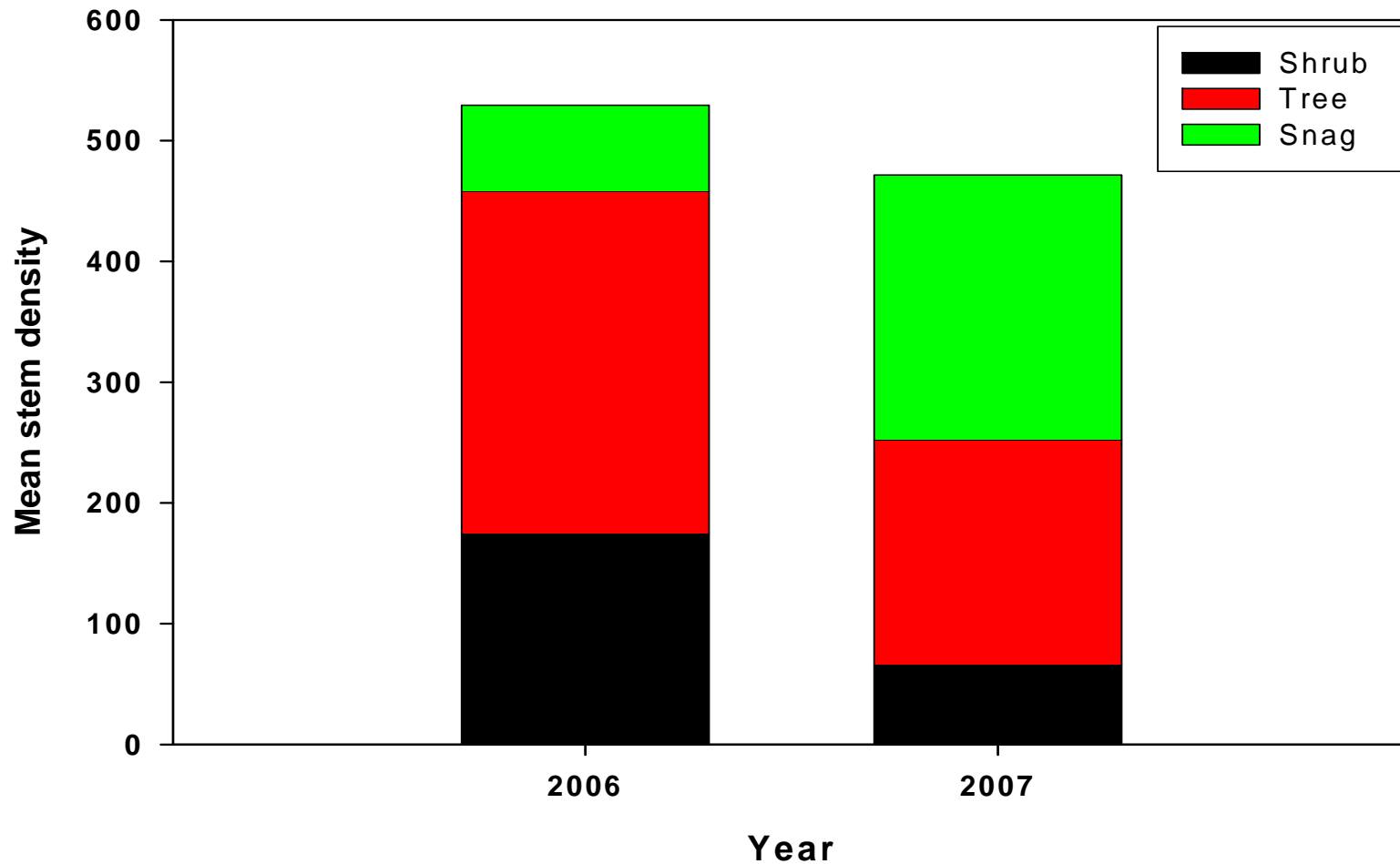


# Lake Mead NRA - Cuckoo Beach

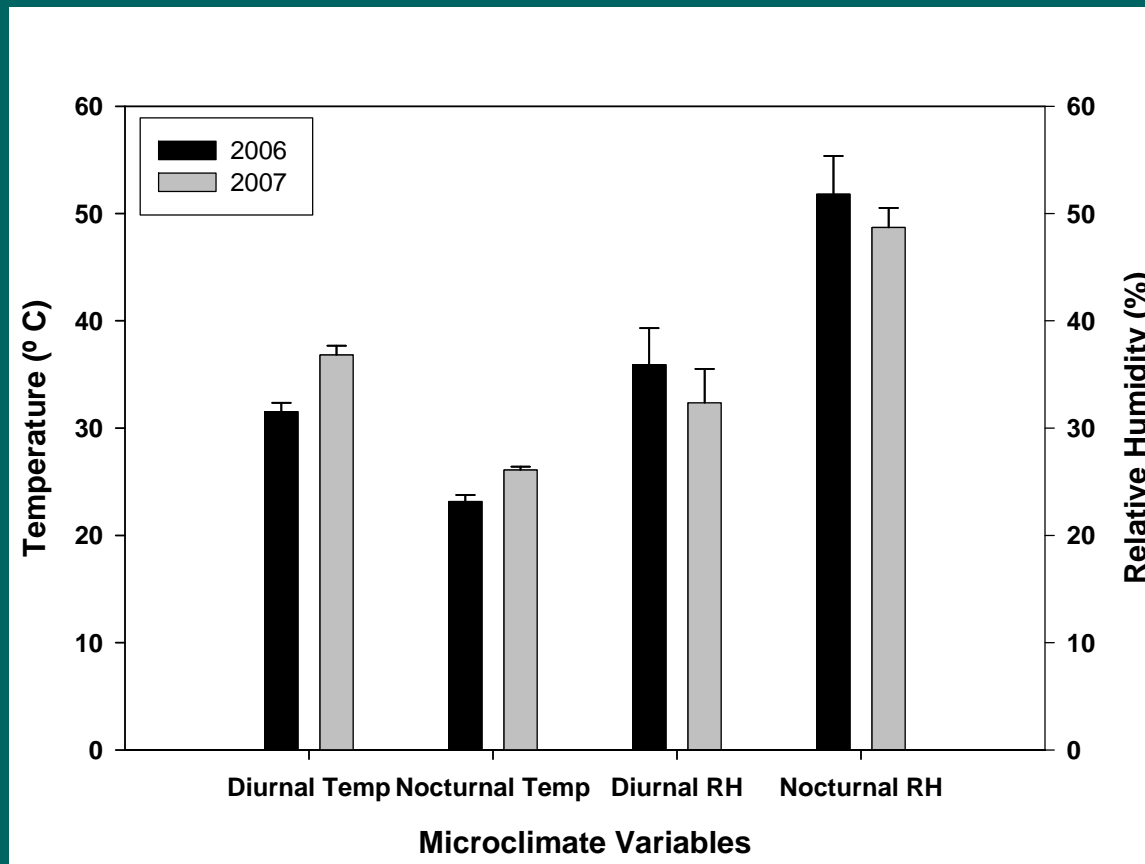


2007

# Stem Density at Grand Canyon NP – Lake Mead NRA 2006, 2007



# Microclimate at Grand Canyon NP – Lake Mead NRA 2006, 2007





# Results, 2007

- The majority of detections occurred at the Bill Williams River NWR.
- Observed changes in cuckoo detections, sites occupied and breeding in Grand Canyon NP/Lake Mead NRA.
- Occupied sites have a lower density of the smallest trees – these smallest trees are mostly tamarisk.
- Occupied sites have greater numbers of larger, native trees than unoccupied sites.
- Occupied sites were cooler and higher relative humidity.



# Future Yellow-billed Cuckoo Habitat Characterization

- Continue within-patch habitat measures of vegetation.
- Examine patches at the landscape level.
- Continue to evaluate survey protocol.
- Continue to identify core cuckoo breeding habitat.



# ACKNOWLEDGEMENTS

U.S. Bureau of Reclamation, Boulder City, NV.  
USGS Southwest Biological Science Center, Flagstaff, AZ  
Bureau of Land Management  
Arizona Game and Fish Department  
Bill Williams River NWR  
Imperial NWR  
Cibola NWR  
Pahrnagat NWR  
Overton WMA  
Colorado River Indian Tribes

The success of the project is ultimately due to the efforts of the field personnel on the 2006 and 2007 USGS field crew.