





**A science-based, project-driven, non-profit organization dedicated to the conservation of hummingbird diversity and abundance throughout the Americas**

Founders: Susan Wethington, George West, Barbara Carlson

501(C)(3) Status: in 2004

# Why does the lineage of *Trochilidae* need specialized conservation focus

1. Small Size
2. Physiological constraints
2. Pollinator lifestyle
3. **Unique flight abilities**
4. Unknown life history information
5. **Detectability**
6. **Specialized handling requirements**
7. Limited methodologies



photo by Jeremy Stein



Investigating what hummingbirds need to survive, successfully reproduce, and maintain thriving populations through science-based monitoring, research, habitat restoration/ enhancement, and education/outreach projects



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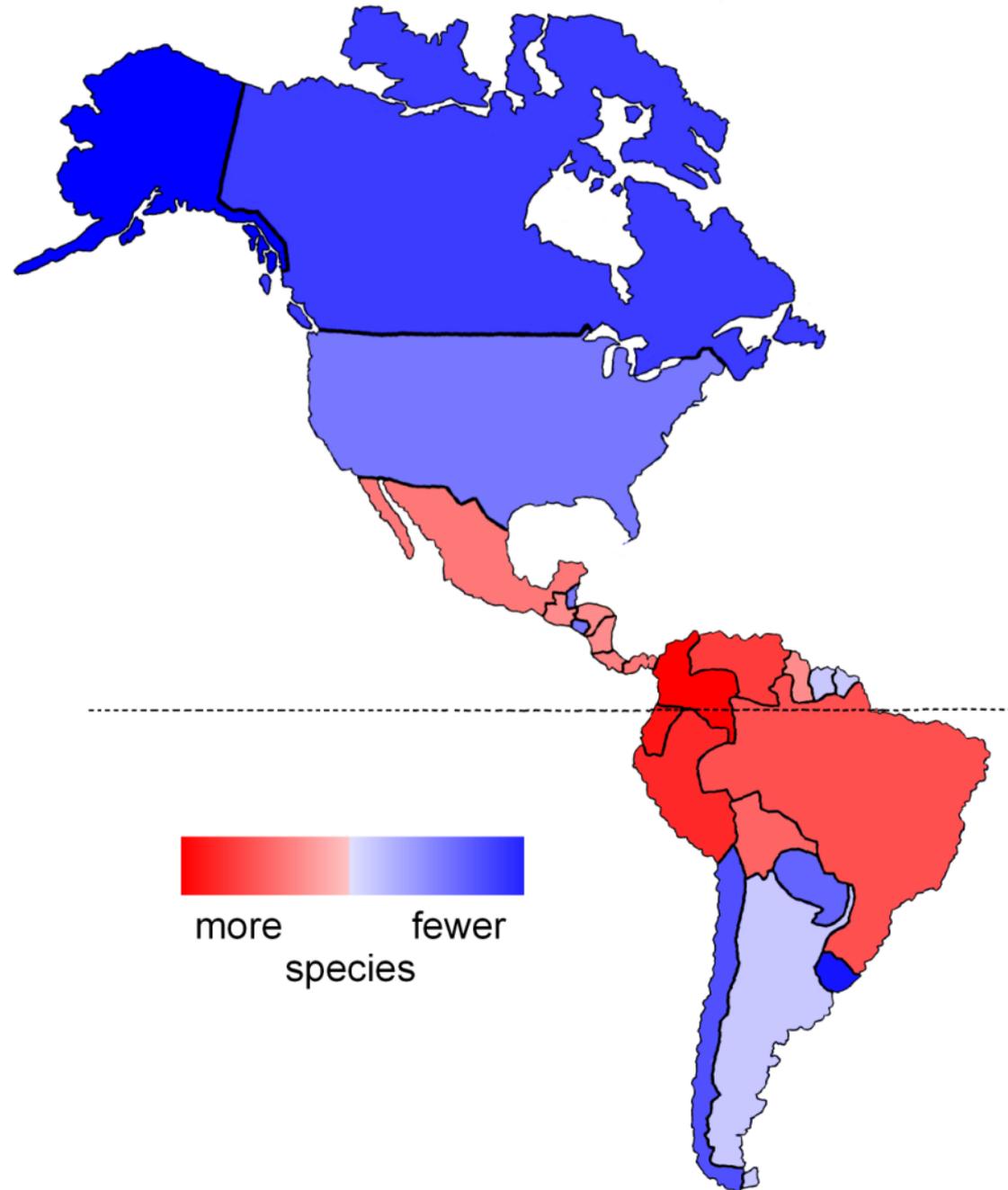
# HMN's Coordinated Monitoring Program



- Systematic Banding Program (constant effort, robust design)
- Stratified by geography and vegetation
- Protocols developed for hummingbirds
- Bait with feeders
- Each Site sampled once every 2 weeks within a week period
- Citizen Science Based
- Diverse Site Partners

Drawn by GC West

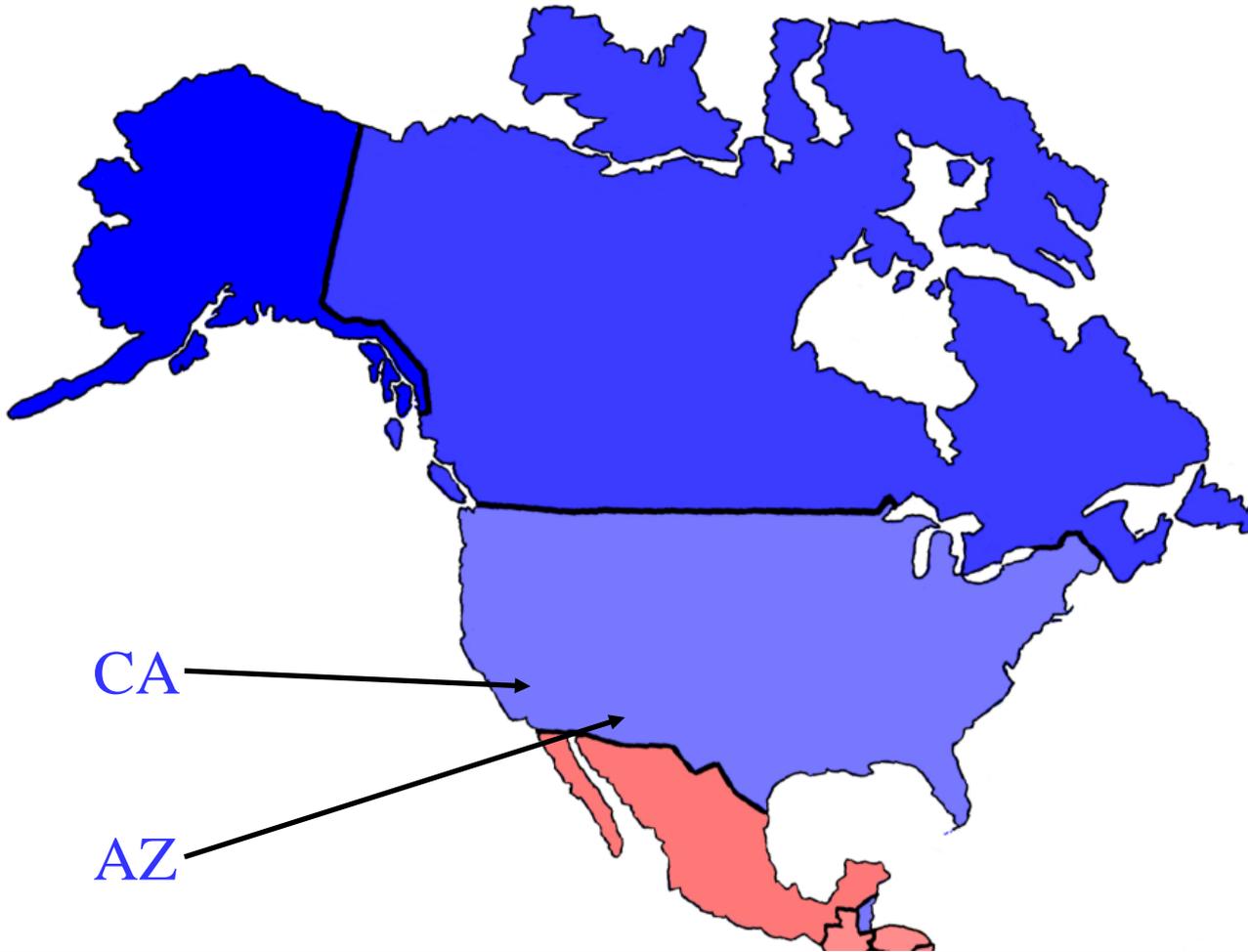
# Distribution of hummingbird species by country (~338 species)



Drawn by GC West,

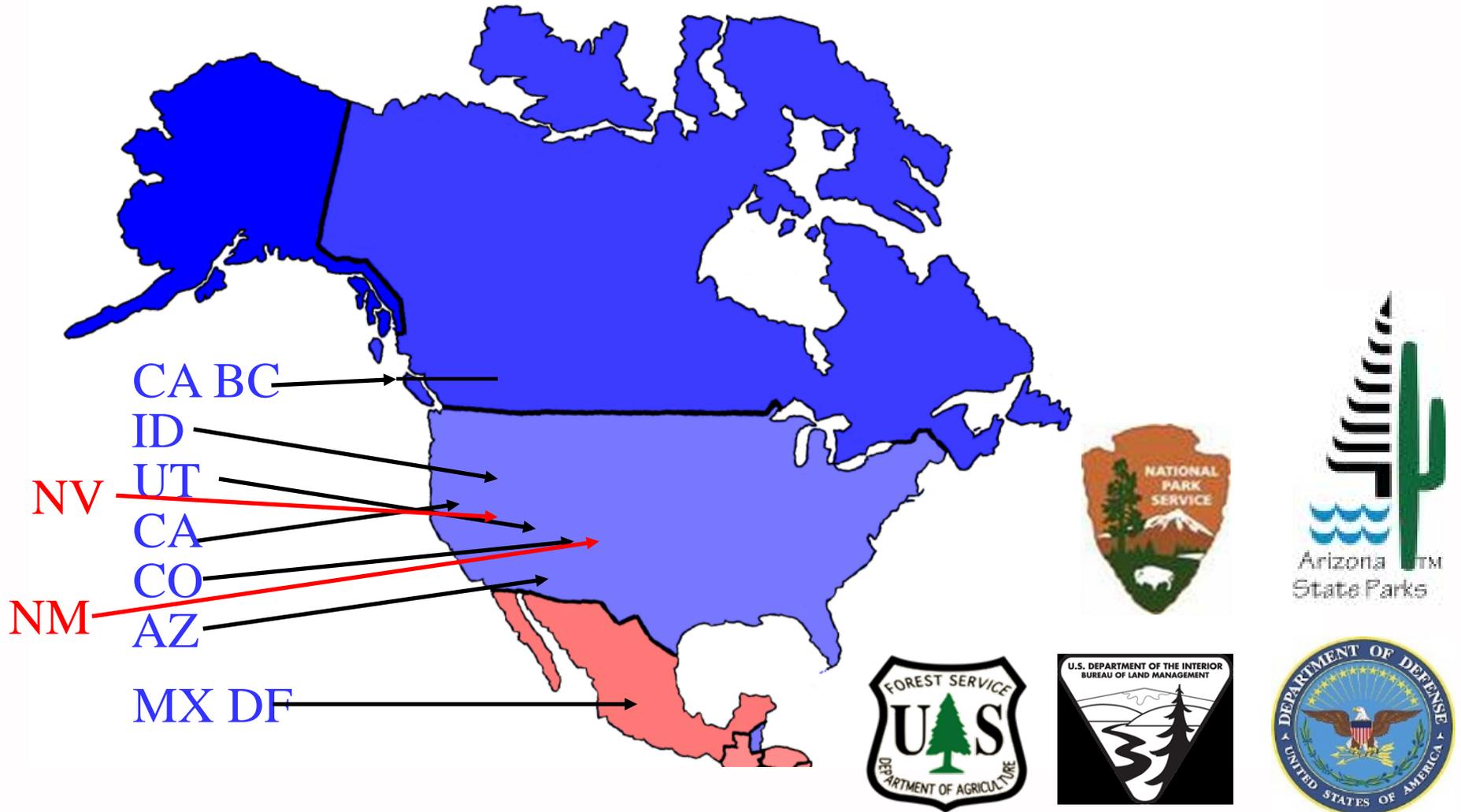
Diversity data from S. Finnegan

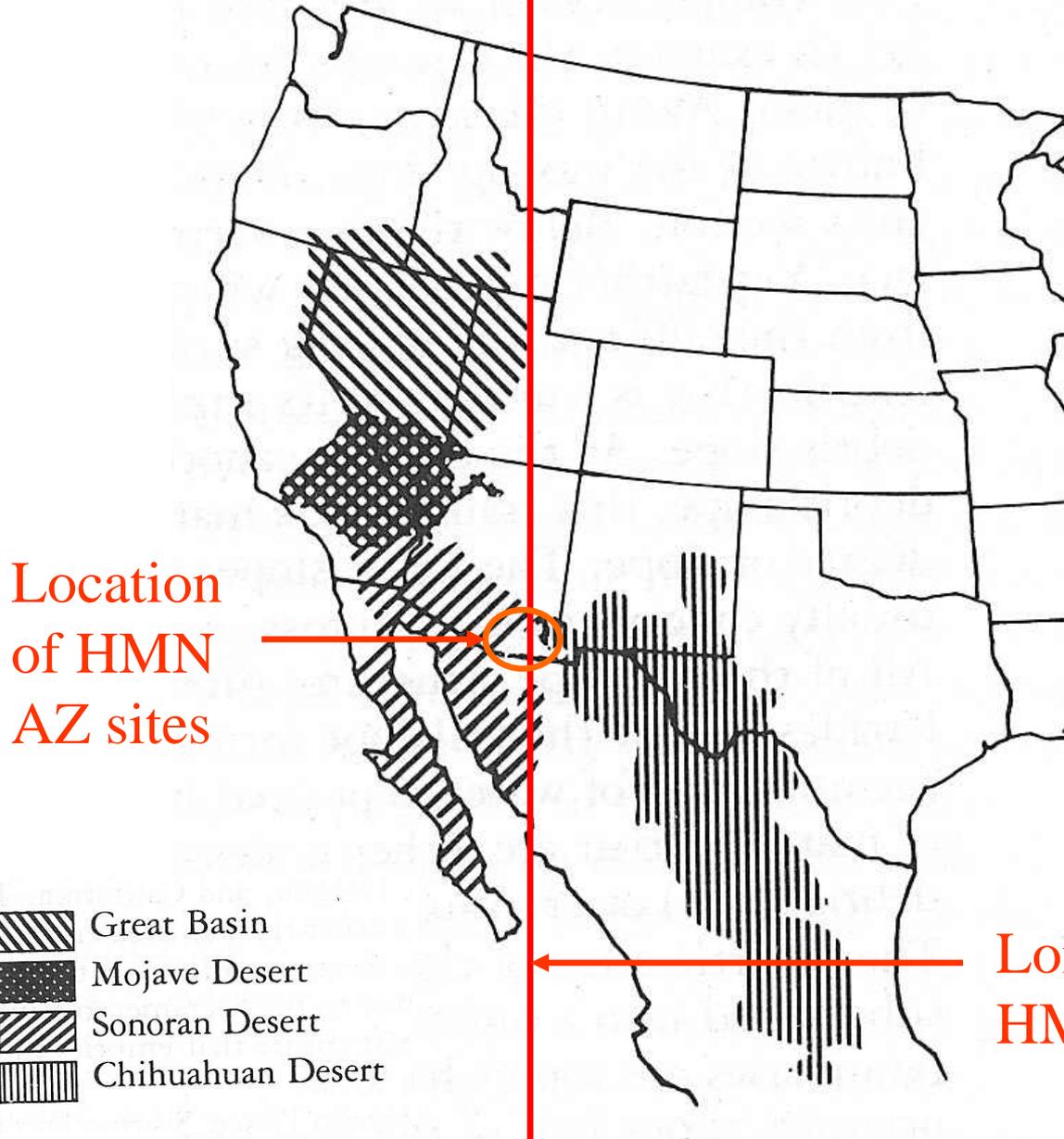
# HMN Study Sites - 2002



# HMN Study Sites – 2012

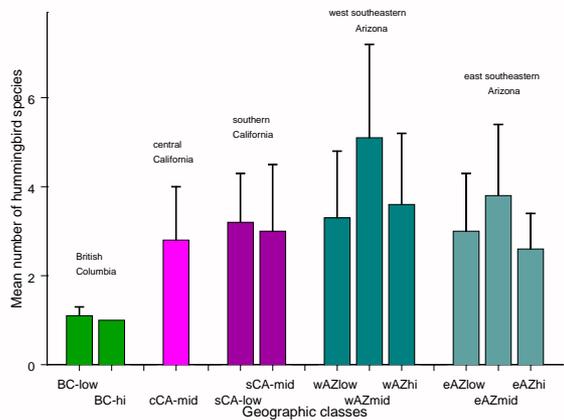
With Current Agency Partners highlighted





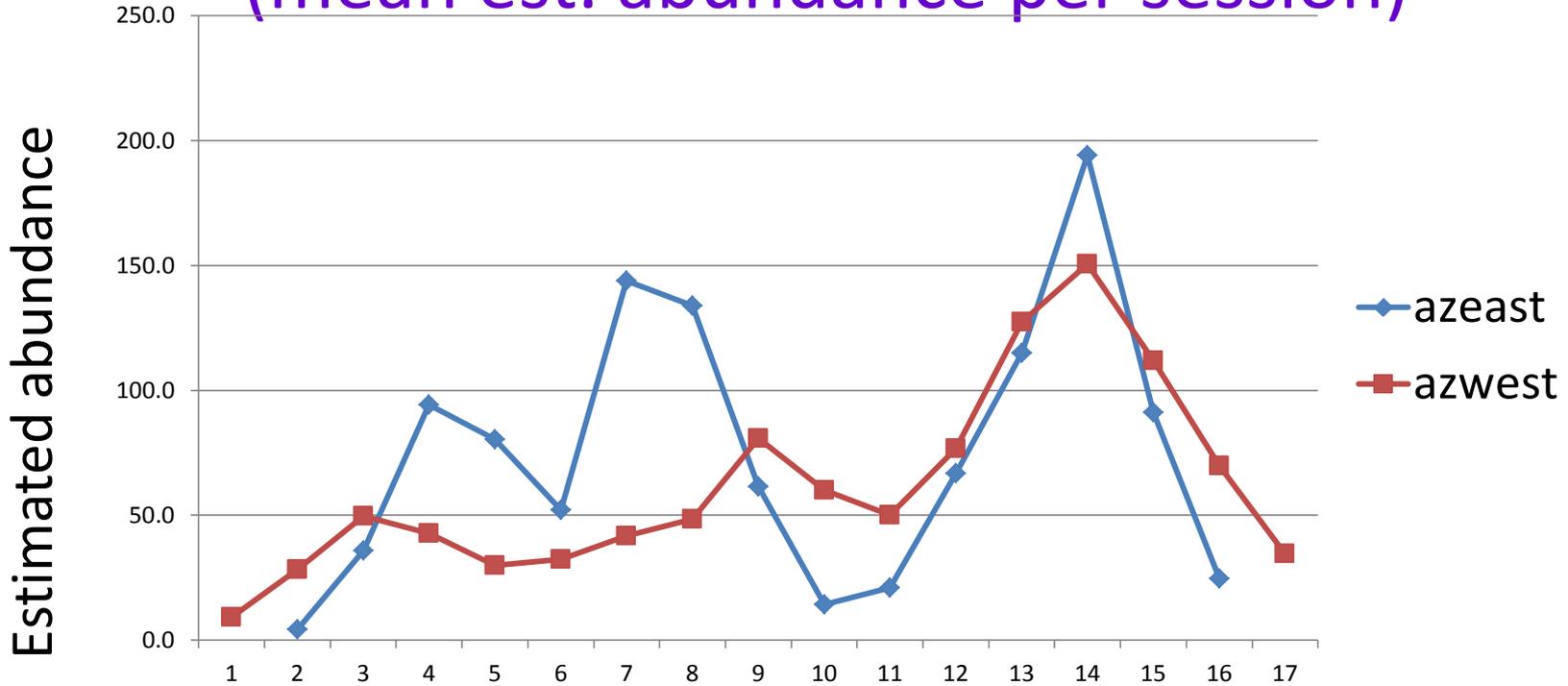
Intriguing coincidence  
Or results capturing a larger biogeographic pattern?

Longitudinal line dividing HMN's E. and W. AZ sites



# Movement Patterns in SE Arizona

(mean est. abundance per session)



Long. class	2002	2003	2004	2005	2006	2007	2008	2009	2010	Number of sites
<b>AZeast</b>	5	6	5	7	4	3	3	3	3	
<b>AZwest</b>	4	8	8	8	8	7	6	7	7	

# BORDERLANDS HABITAT RESTORATION INITIATIVE



**Founders:** Ron Pulliam-University of Georgia,  
Richard Pritzlaff-Biophilia,  
Josiah and Valer Austin-Cuenca Los Ojos,  
Gary Nabhan-University of Arizona,  
Susan Wethington-HMN



# 1. Restore Physical Processes (e.g. Hydrology, Fire)



# 2. Strengthen the food web



# 2. Beginning with pollinator habitats

# 3. Engage communities to help restore local ecosystems



# Developing a Comprehensive Coordinated Monitoring Program for Hummingbirds

Primary Investigators: Wethington, HMN & Dra Coro Arizmendi, UNAM

- Integrated into UNAM student research



- Part of HMN Internships
- Effectiveness Restoration Need

Funders: USFWS NMBCA Grant 5087, Biophilia, CONABIO, CLO, UNAM, HMN

# HMN Mexican Graduate Student Internship Program



2012 Point Count Workshop led By Dr. Jorge Schondube, UNAM,  
with Gabriel Lopez, Rocio Meneses, Monica Quiroga

**Funded by:** Clark Family Foundations, USFWS NMBCA-5087, Biophilia,, CLO, USFS IP, HMN

# Curso Teorico-Practico: Monitoreo De Picaflores

Manu Paradise Lodge, PERU  
November 15-19, 2011



**Contributors: Oscar González, Victor Martinez** (Grupo Aves del Peru), **Gary Stiles** (Universidad Nacional de Colombia), **Catherine Graham** (Stony Brook University), and **Susan Wethington** (HMN)



Partially funded by: NSF-DEB 0820490, USFWS NMBCA-5087, NASA-10-BIOCLIM10-0094

# Combining Remote Sensing and Biological Data to Predict the Consequences of Climate Change on Hummingbird Diversity

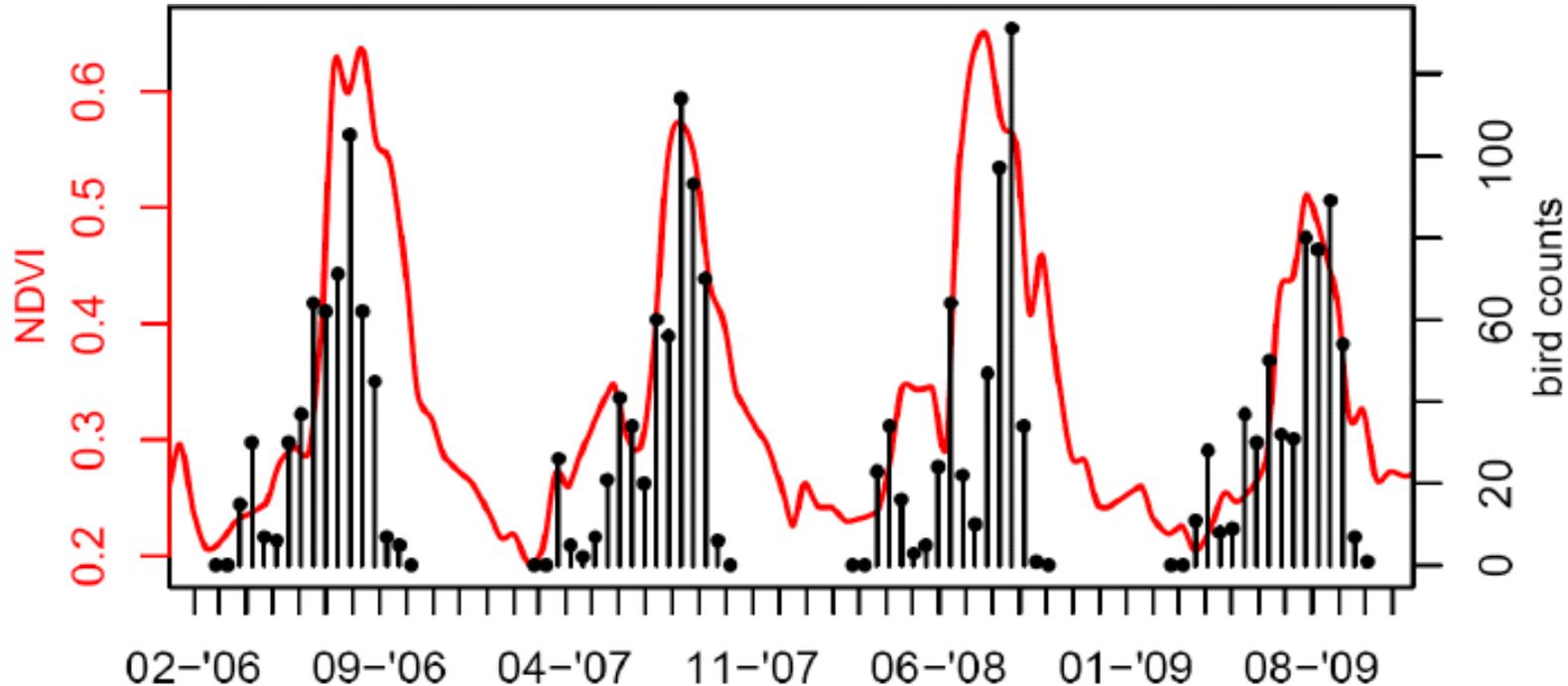


Figure 2. MODIS EVI (red line) and abundance of black-chinned hummingbird on a seasonal basis between 2006 and 2009 at Harshaw Creek, Patagonia mountains, Arizona.

**Lead Scientist:** Catherine Graham, Stony Brook University with Scott Goetz and Pieter Beck-Woods Hole Research Center, Don Powers-George Fox University, Susan Wethington- HMN

Funded by NASA: 10-BIOCLIM10-0094

# Research Objectives and Initial Projects for 10-bioclim10-0094

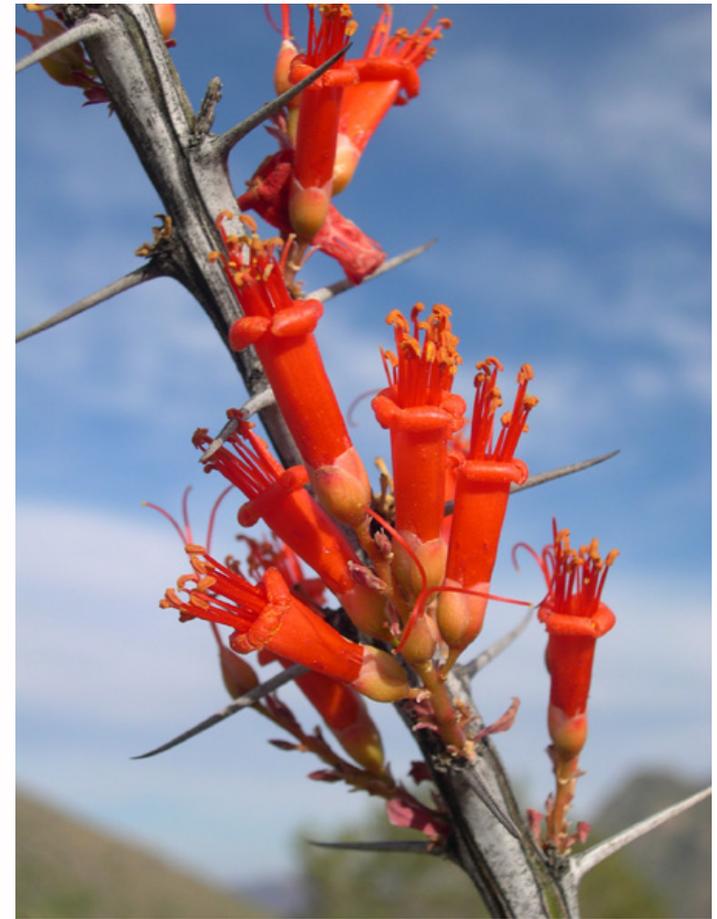
1. Time series analyses – hummingbird and environment
  - Initial analyses of hummingbird environment relationships
  - Distribution changes of Broad-tailed Hummingbirds tied to climate anomalies
2. Evaluate biological mechanisms behind observed environment hummingbird relationships
  - Hummingbird Resource Use and Availability (e.g. Networks in Ecuador)
  - Physiological Constraints & Measures
3. Data integration with modeling to predict future persistence of hummingbirds
  - Statistical Niche Modeling



# INVESTIGATE/ INTEGRATE



Phenology, Physiology, Migration,  
and Climate Change



KEY NECTAR PLANT  
FOR  
NORTHBOUND  
MIGRATING  
HUMMINGBIRDS



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# SINCERE THANKS TO:

Our Partners, Collaborators,  
Citizen Scientists, Volunteers  
And Associates

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in Semiarid Ecosystems (RISE) Symposium, 2012

**By:** Susan Wethington, Executive Director, HMN

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Mark Heitlinger, SRER, for his support



