



# Demographic Monitoring and Migratory Connectivity: Linking Canada, the U.S. and Mexico

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*Photo: Nigel*

# Why Monitor Birds?



## Ecosystem Services

- Pollination
- Pest Control
- Seed dispersal

## Environmental Change

- Abundant
- Easily observed, vocal, diurnal
- Intermediate longevity
- Rapid metabolism
- High trophic position
- People love them





# Why Monitor Birds?



**They're excellent indicators of environmental change**



# IBP's Approach: Exploring factors that regulate bird populations



Gain insight into the **What, When, Where, and Why** of species decline;

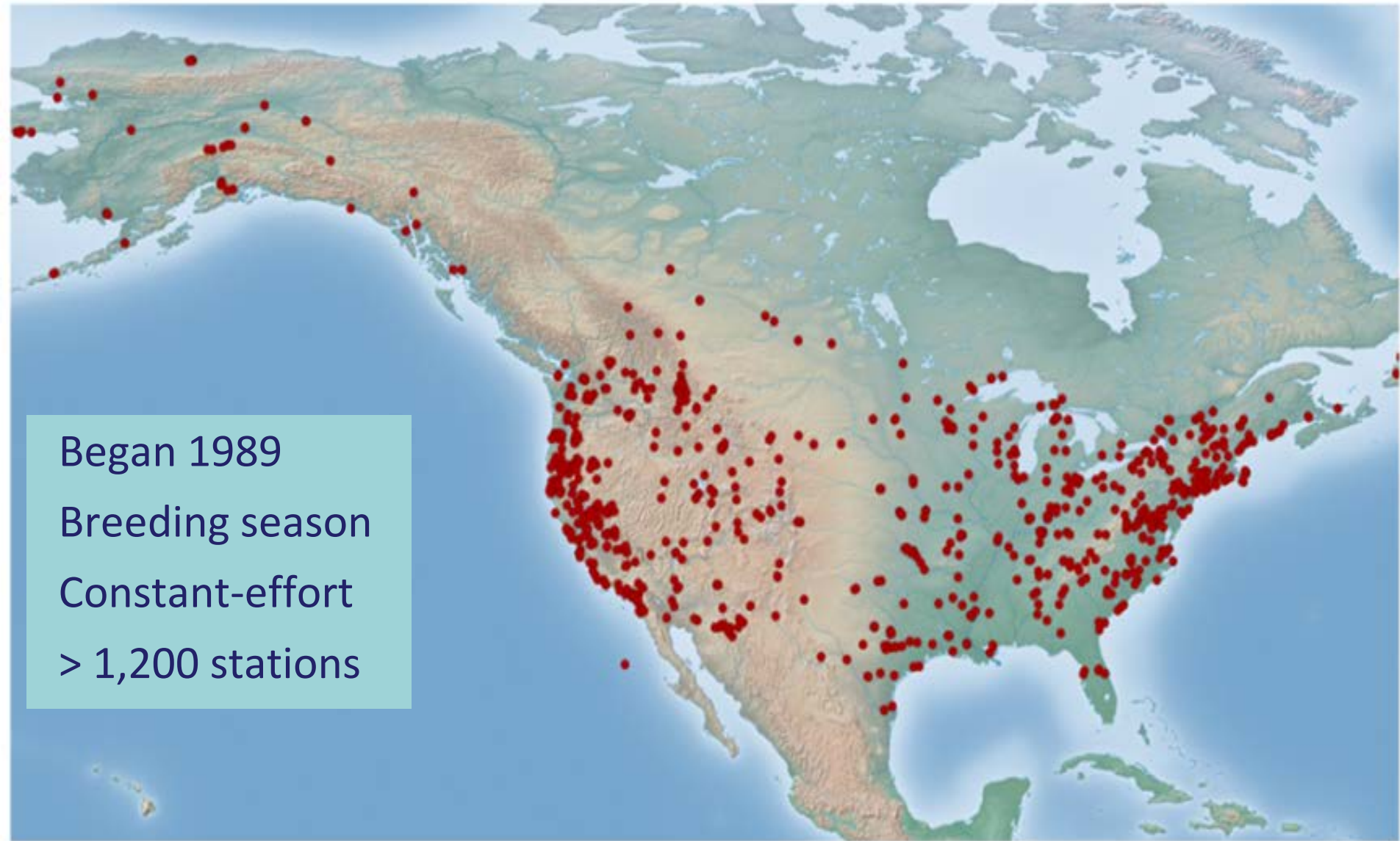
Direct Conservation at the **Times and Places in the Annual Cycle** where it will do the most good





# MAPS – Monitoring Avian Productivity and Survivorship

Began 1989  
Breeding season  
Constant-effort  
> 1,200 stations



# Demography and Vital Rates

We measure Demography

Age

Sex

Reproductive Status

Population Structure



So we can estimate/model

Vital Rates

Productivity

Survivorship

Recruitment







# Point Counts vs. Demographic Monitoring

## Point Counts – Abundance

Cost effective  
Larger area, less intensively  
Retrospective  
No Proximate Causes

## MAPS – Demographics

Labor Intensive  
Smaller area, more intensively  
What's happening now  
Yes, Proximate Causes  
Productivity,  
Survival  
Recruitment



Photo: Kelly Colgan Azar



Any effort to increase... habitat in the less limiting season...will have relatively little effect on population size in the most limiting season.

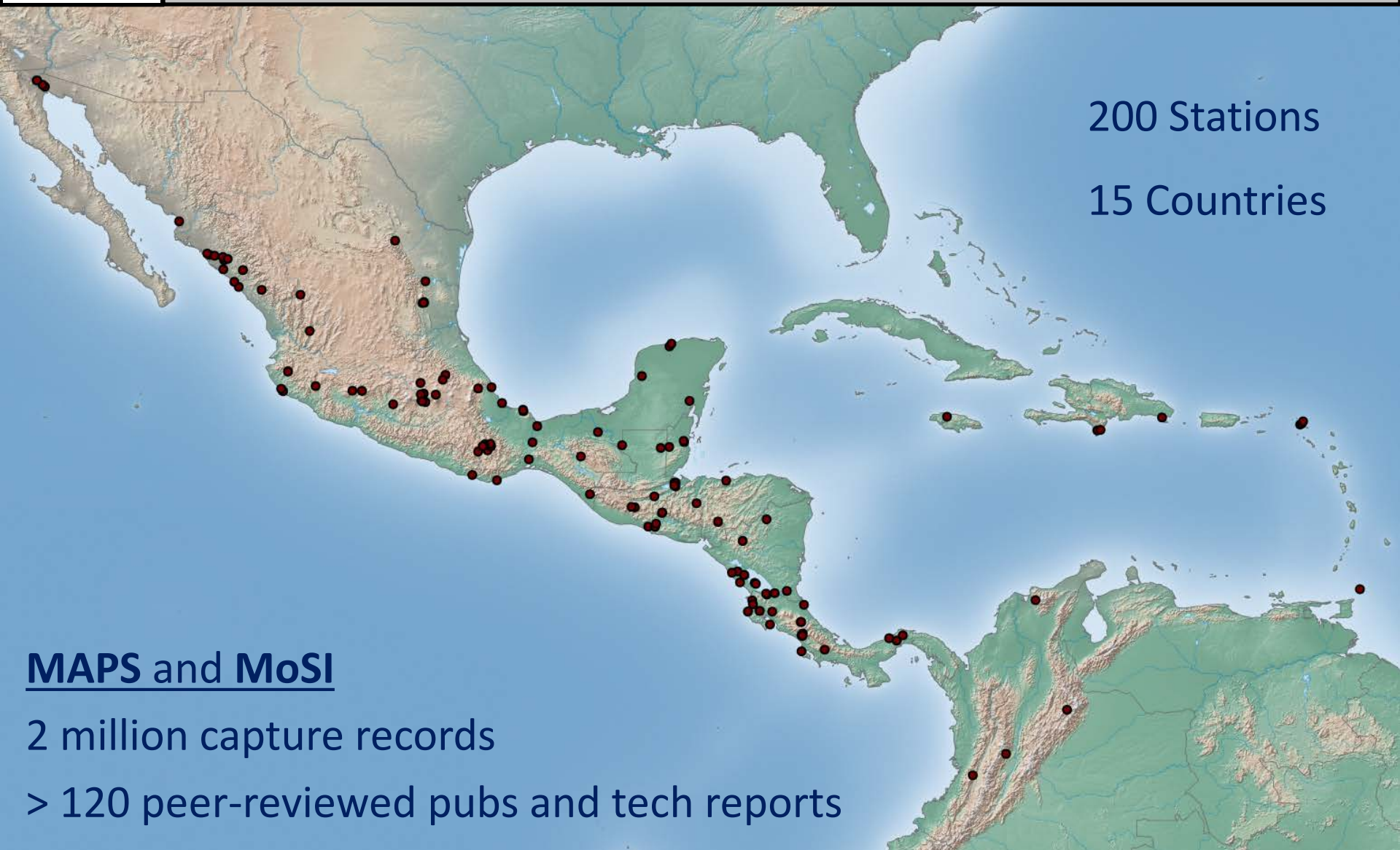
-- Sherry and Holmes







# MoSI: Monitoreo de Sobrevivencia Invernal

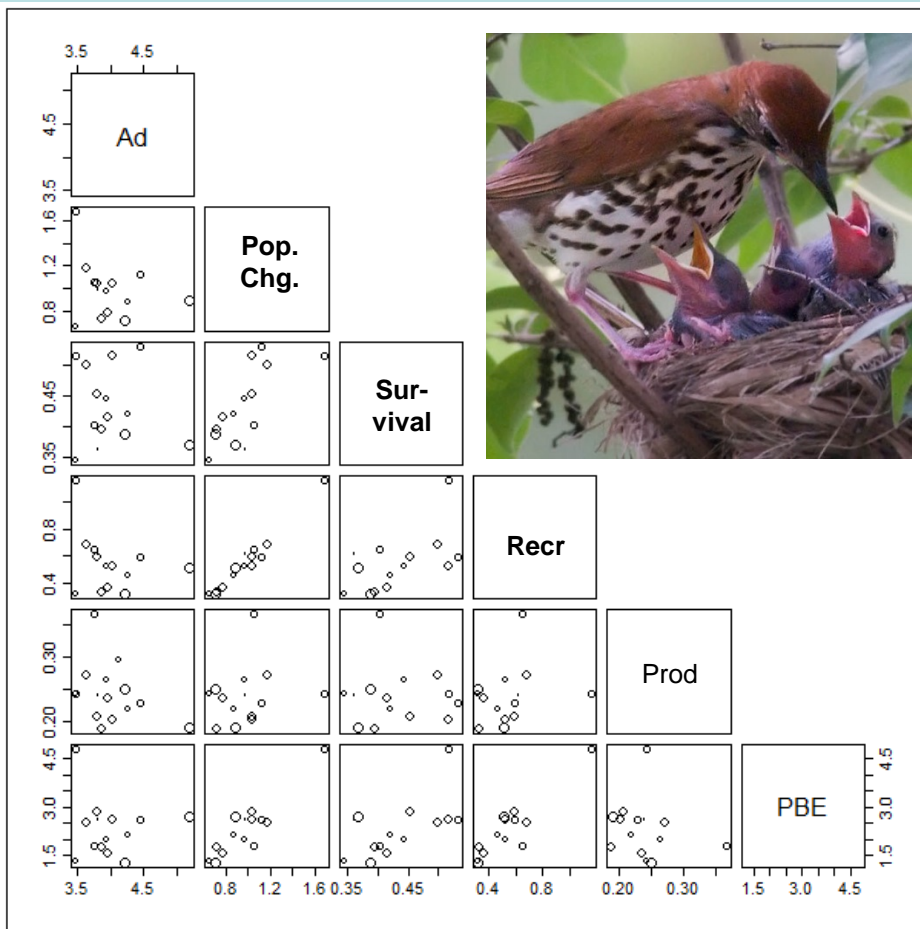


## MAPS and MoSI

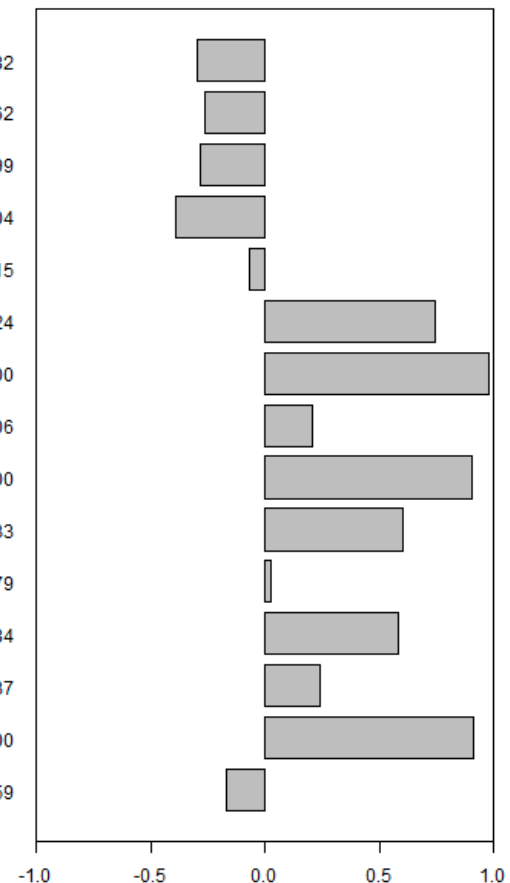
2 million capture records

> 120 peer-reviewed pubs and tech reports

# Correlations Among Vital Rates for WOOD THRUSH

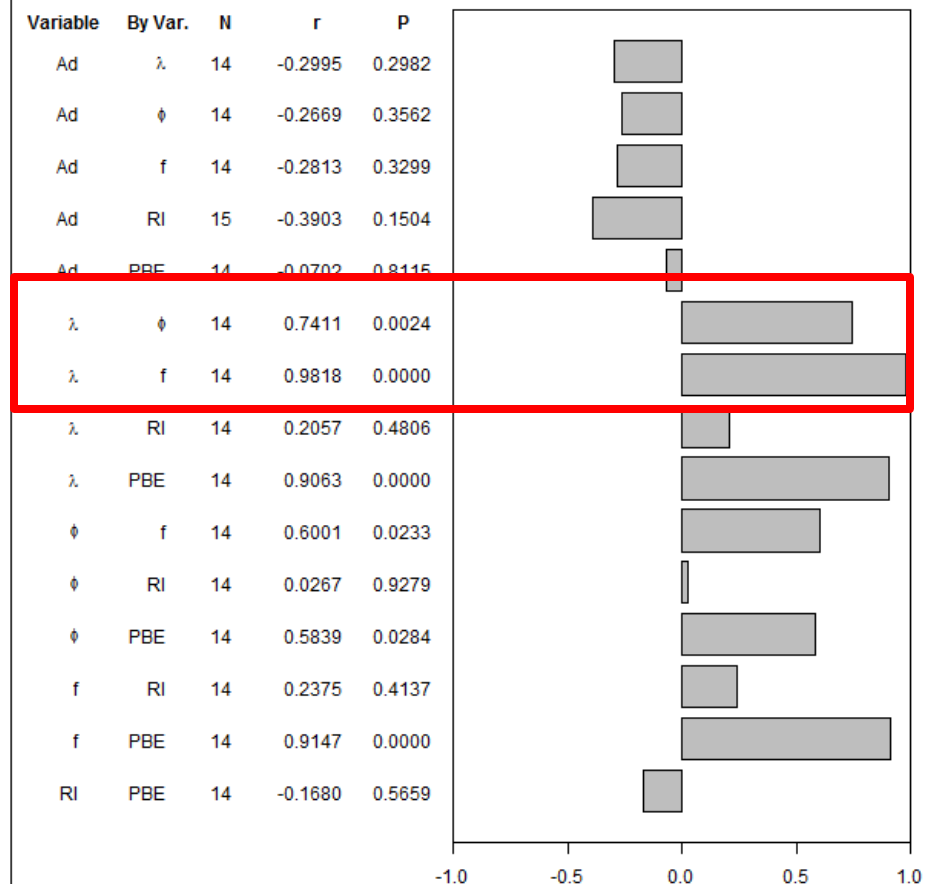
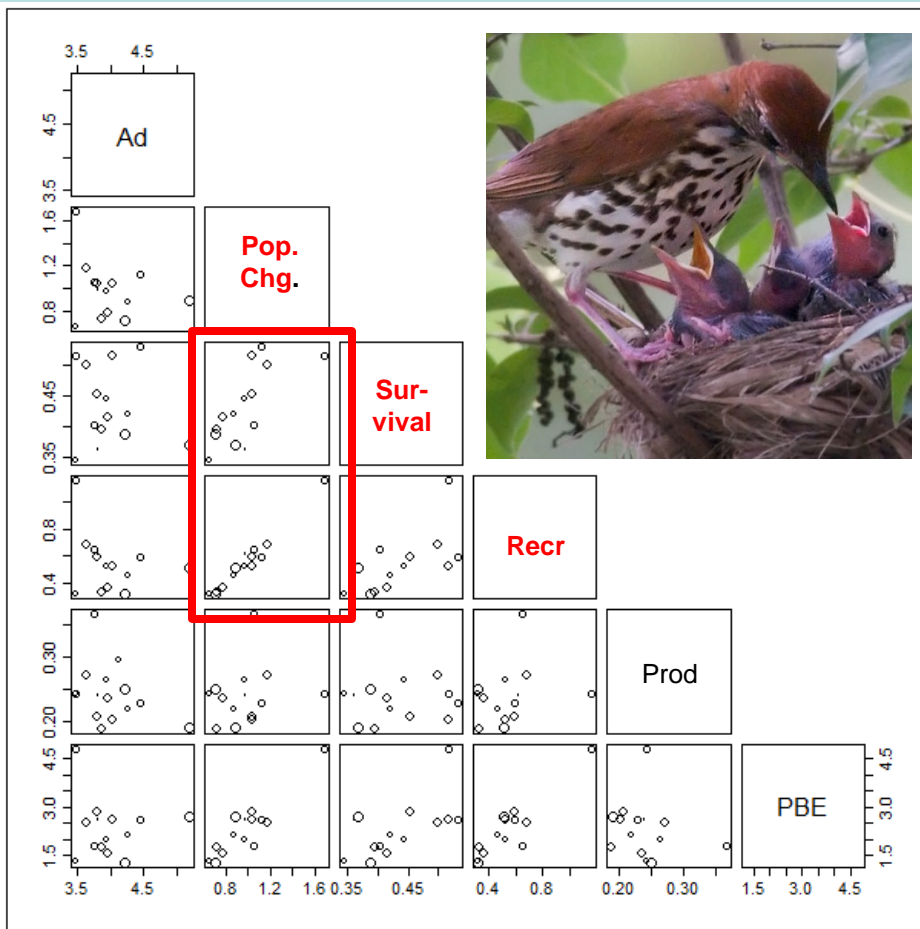


Variable	By Var.	N	r	P
Ad	$\lambda$	14	-0.2995	0.2982
Ad	$\phi$	14	-0.2669	0.3562
Ad	f	14	-0.2813	0.3299
Ad	RI	15	-0.3903	0.1504
Ad	PBE	14	-0.0702	0.8115
$\lambda$	$\phi$	14	0.7411	0.0024
$\lambda$	f	14	0.9818	0.0000
$\lambda$	RI	14	0.2057	0.4806
$\lambda$	PBE	14	0.9063	0.0000
$\phi$	f	14	0.6001	0.0233
$\phi$	RI	14	0.0267	0.9279
$\phi$	PBE	14	0.5839	0.0284
f	RI	14	0.2375	0.4137
f	PBE	14	0.9147	0.0000
RI	PBE	14	-0.1680	0.5659





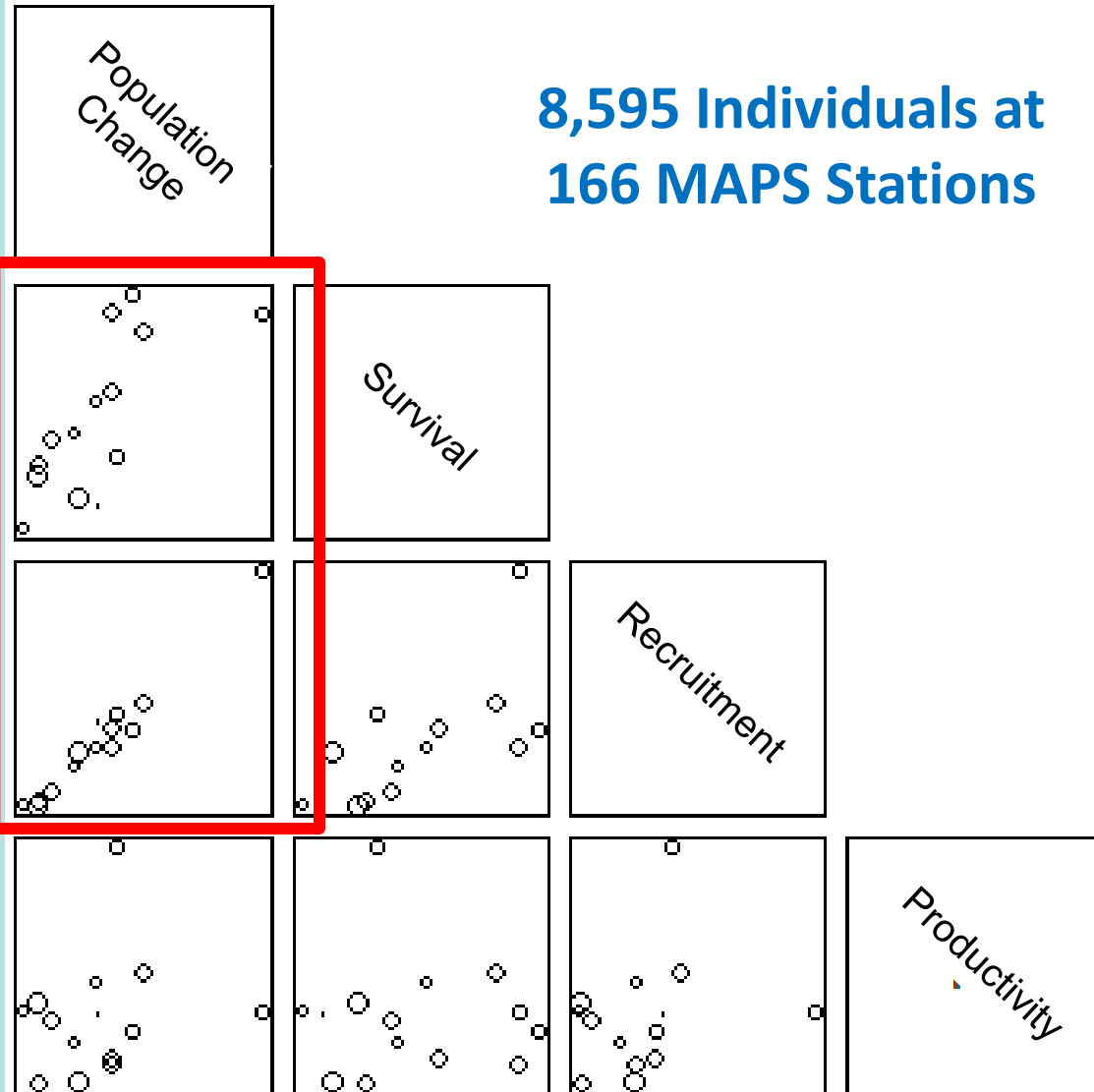
# Correlations Among Vital Rates for WOOD THRUSH



# Correlations Among Vital Rates

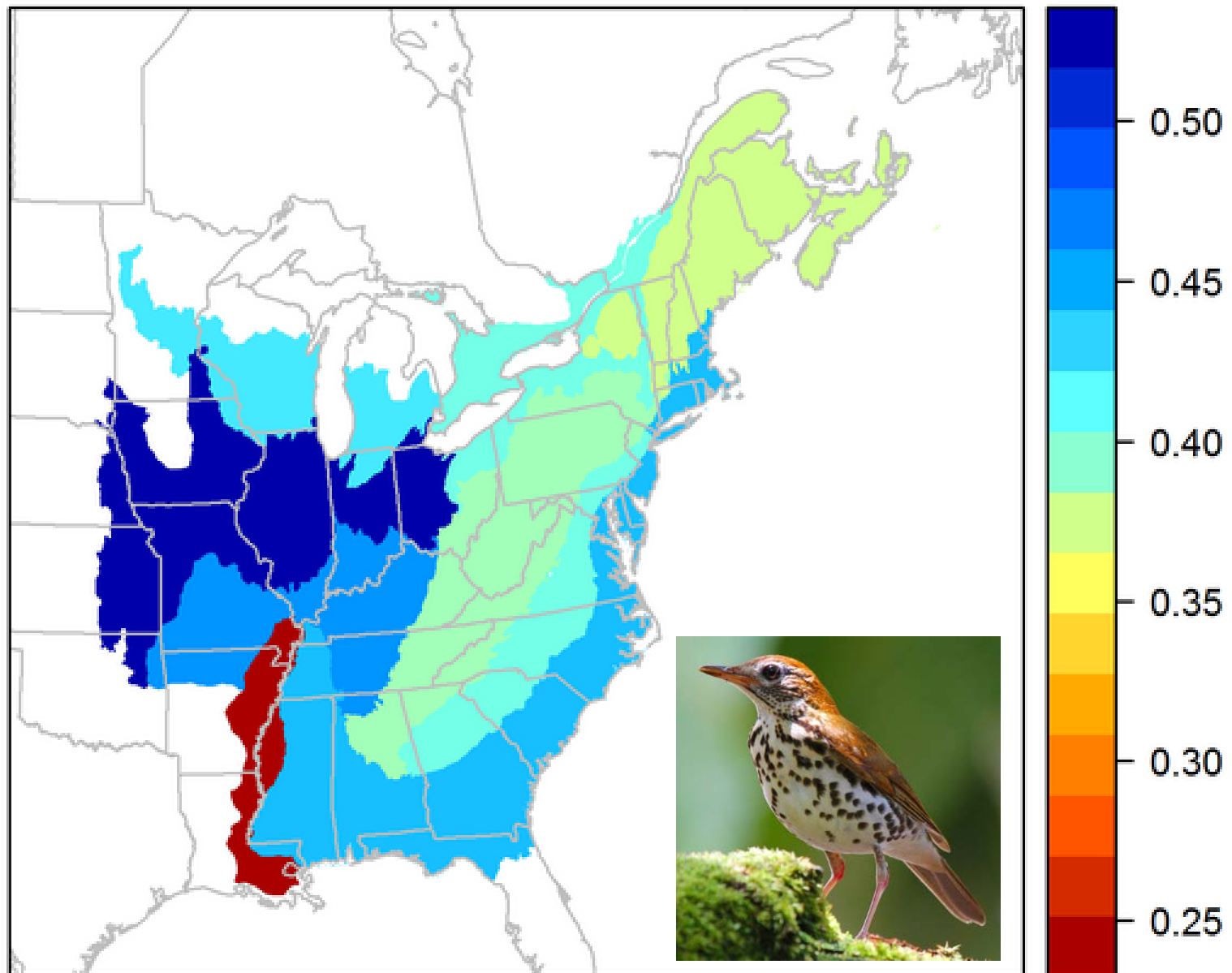
## WOOD THRUSH

8,595 Individuals at  
166 MAPS Stations





# Wood Thrush (*Hylocichla mustelina*)



Adult apparent survival ( $\phi$ )

# Wood Thrush

## Demographic Summary



Adult Survival very low compared  
to other thrushes

Annual variation driven by  
Recruitment and Survival

Population regulation driven  
primarily by factors operating  
**on the non-breeding grounds**





# Vital Rates and Long-term Monitoring: What MAPS and MoSI database can do

## Population Trend

- Increasing
- Stable
- Declining

## Migration Strategy

- Neotropical
- Short dist. migrant
- Resident

## Spatial Scales

- Elevations or Habitats
- Region
- NABCI Unit or Cluster

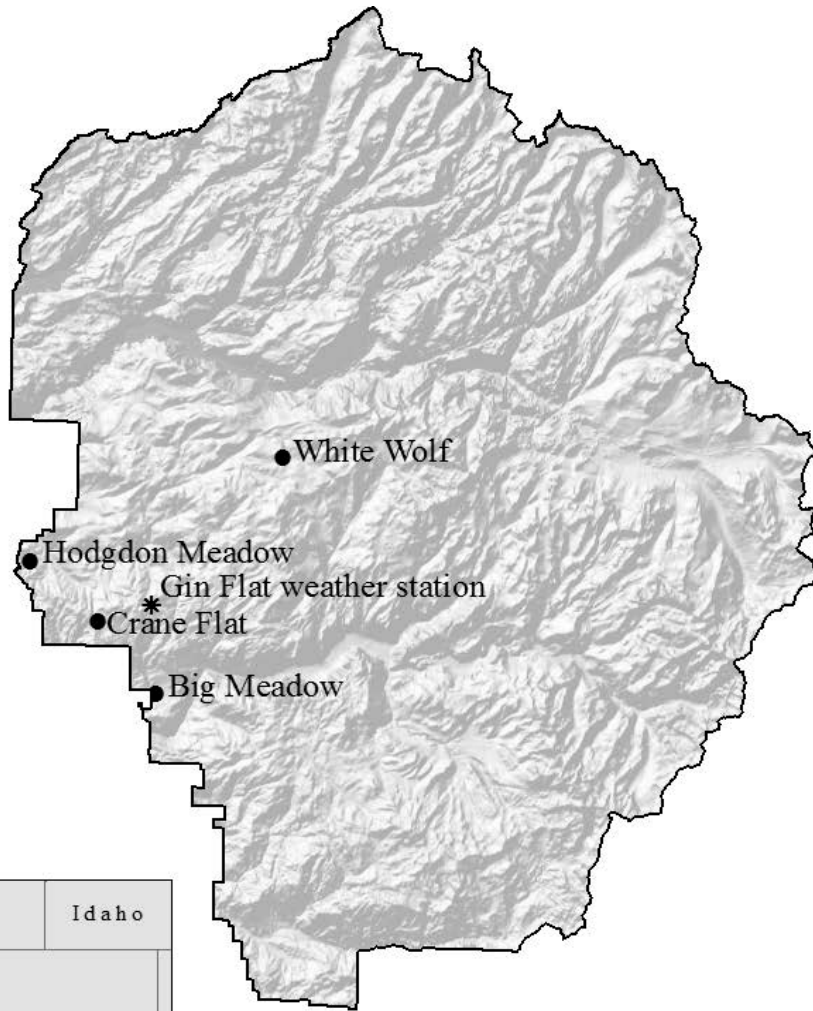
## Life History:

- Insectivores
- Nesting Strategy
- Wintering Country



# Annual variation in spring snowpack and landbird productivity in Yosemite NP

Saracco et al. (In Review).



0 5 10 20 Kilometers



- 18 yrs; 20,000 captures
- 24 montane species
- 83% showed correlation between productivity and snowpack

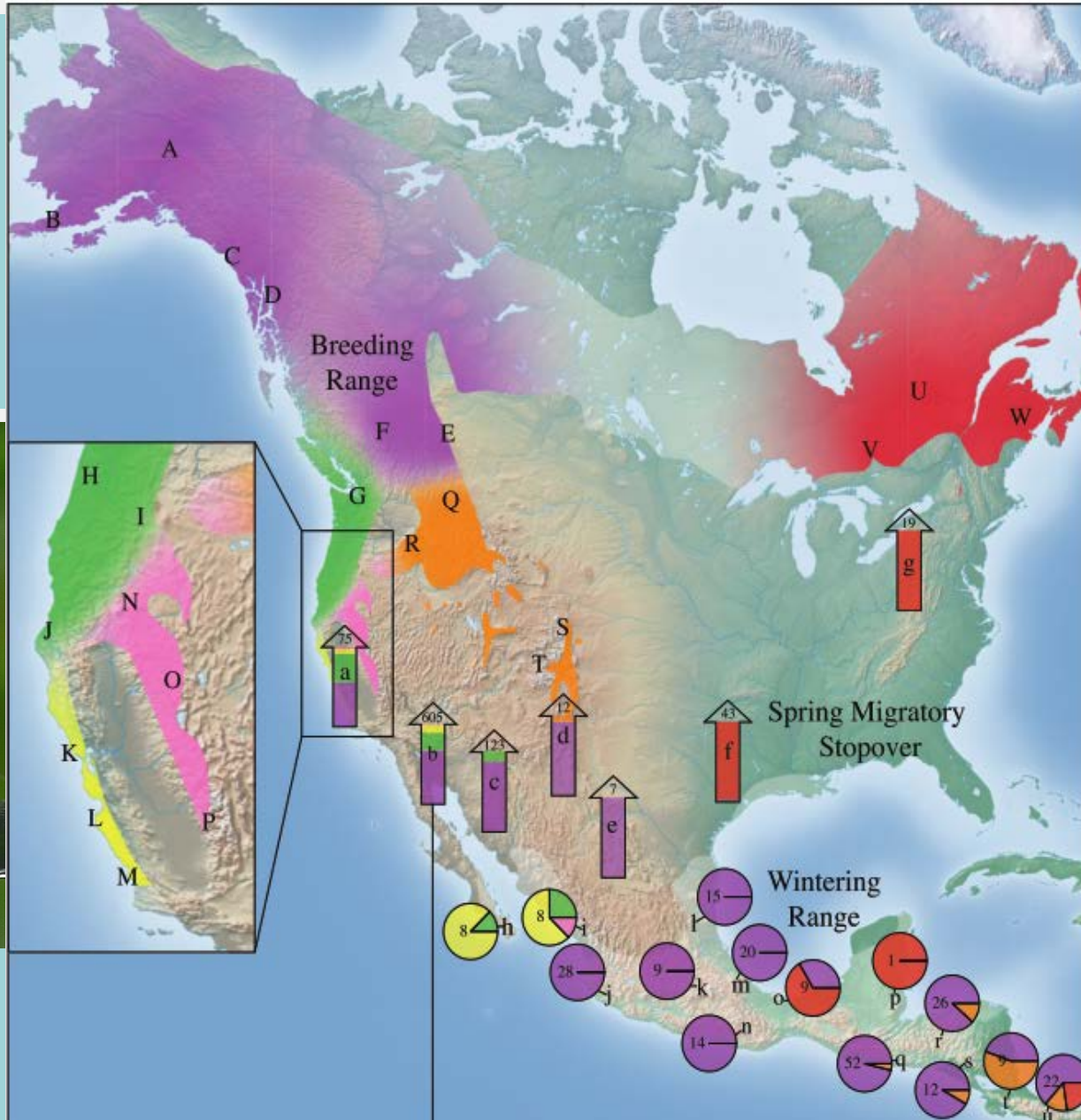


# Mapping migration in a songbird using high-resolution genetic tags

Ruegg et al. 2014  
Molecular Ecology



- 1648 samples, 68 MAPS, MoSI, LAMNA sites
- 96 genetic markers



# MoSI in Mexico – Next Steps

IBP and CONABIO will work together to:

Development of an institutional framework for a sustainable, coordinated, and integrated operation and promotion of the MoSI Program in Mexico

