# Assessing Willow Flycatcher population size and distribution to inform meadow restoration priorities in the Sierra Nevada and southern Cascades

**Helen Loffland**

**Rodney Siegel**

The Institute for Bird Populations

**Chris Stermer**

California Department of Fish and Wildlife

**Ryan Burnett**
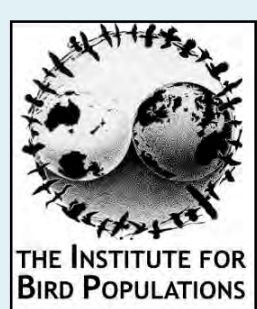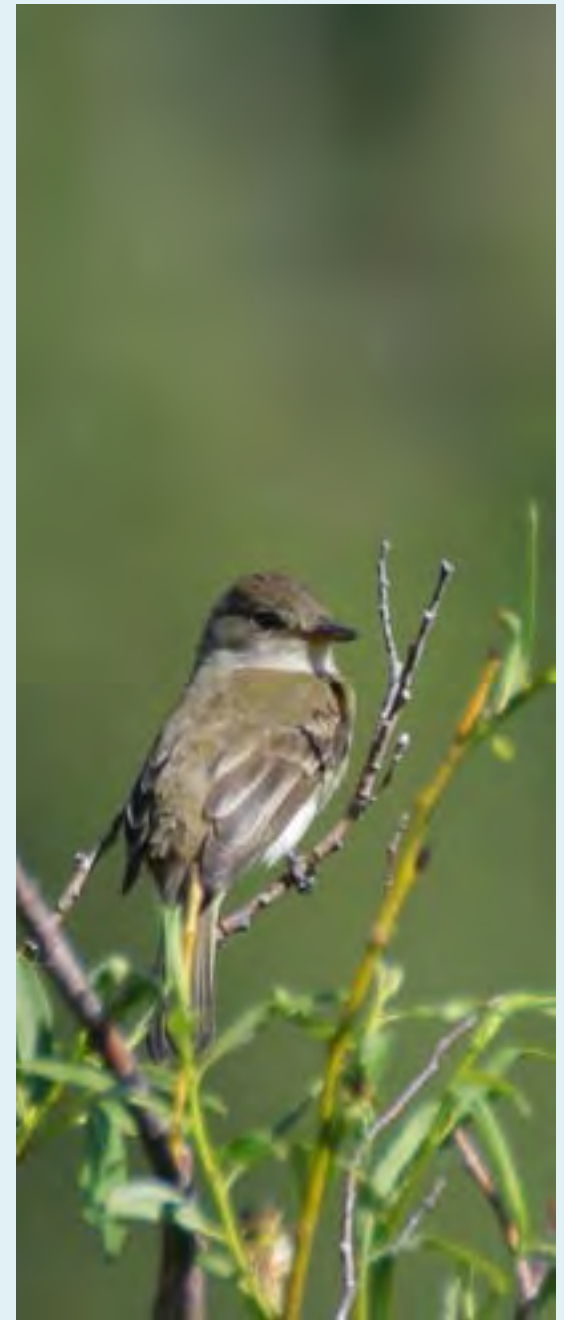
**Brent Campos**

Point Blue Conservation Science

**Tina Mark**

Tahoe National Forest

# Objectives

- Combine records from multiple sources into one GIS point layer
- Generate a "occupied meadows" GIS polygon layer
- Examine patterns in meadow occupancy by Willow Flycatchers
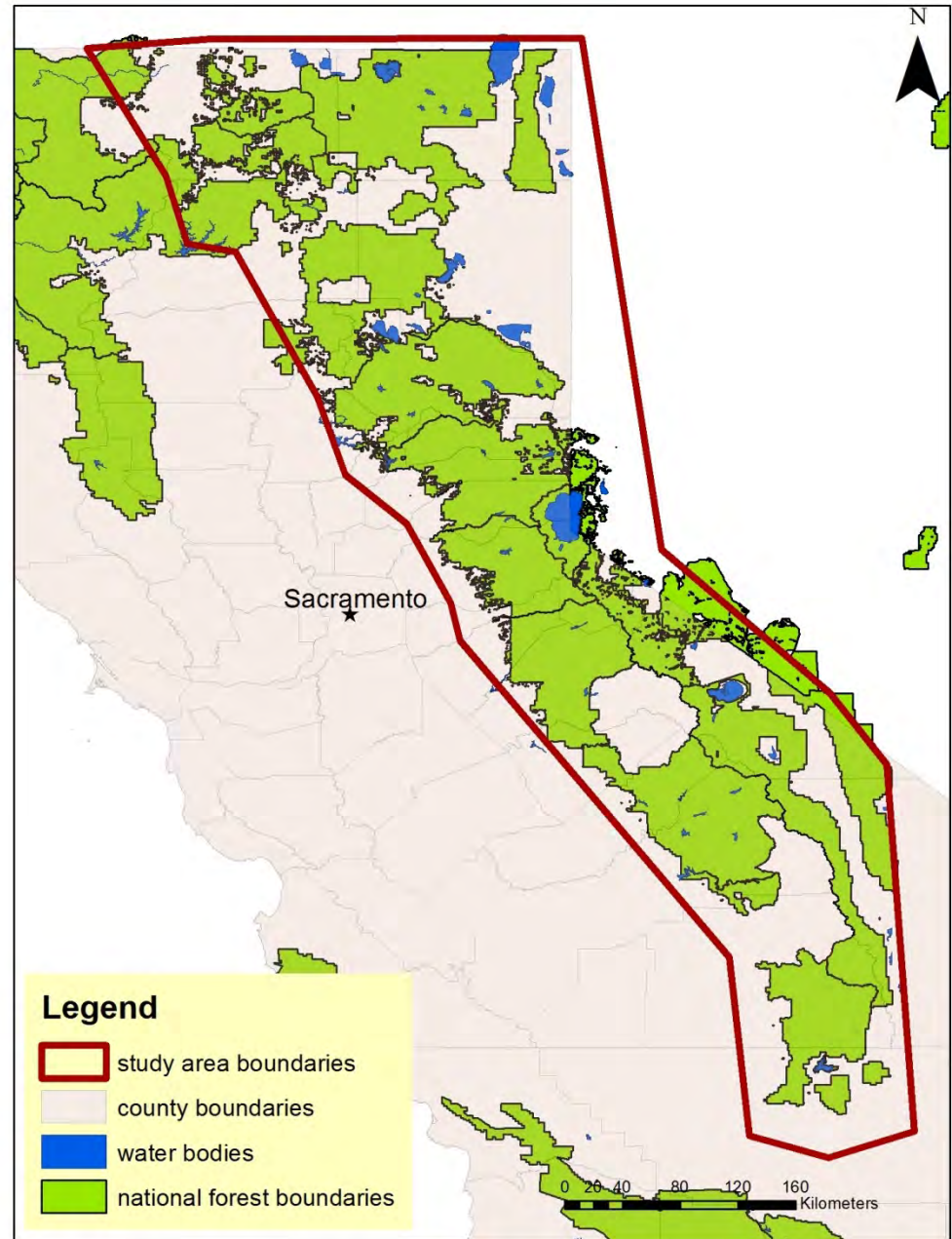- Identify priority management areas

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# Study area

Sierra Nevada and southern Cascades in California

E. t. adastus

E. t. brewsterii

E. t. extimus



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**Legend**
- study area boundaries
- county boundaries
- water bodies
- national forest boundaries

Sacramento

0 20 40 80 120 160 Kilometers

N

# Methods: compiling records

- USDA Forest Service's NRIS database
- California Department of Fish and Wildlife CNDDB database
- The Institute for Bird Populations' Monitoring Avian Productivity and Survivorship (MAPS) database
- Point Blue's MIS and meadow monitoring and flycatcher surveys on the Lassen and Plumas National Forests 2000-2014
- CDFWs Sierra-wide and McCloud River Willow Flycatcher surveys 2003-2006
- IBP's meadow restoration monitoring: 2010 - 2014
- Willow Flycatcher surveys in Yosemite N.P. 2007 - 2008
- Region 5 Forest Service 2011 site history summary tables for known Willow Flycatcher locations
- Nest and territory locations and survey results from demographic monitoring: 1997 - 2010
- Source data from the 2001 Forest Service's Sierra Nevada plan amendment
- Western Foundation of Vertebrate Zoology museum records
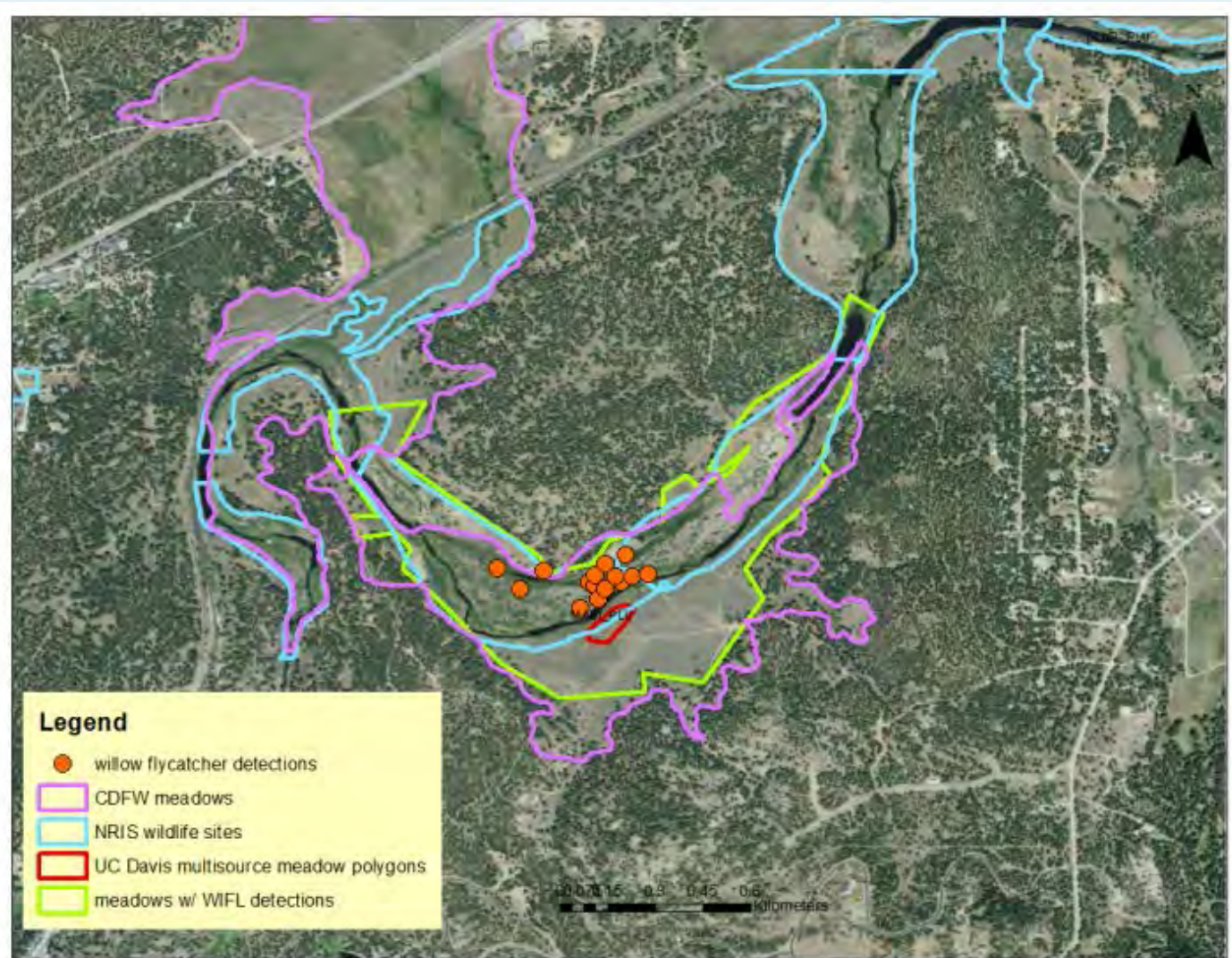
# Methods: observation data



- Created single observation table with common fields for all data sources

- Created linked tables for each individual data source

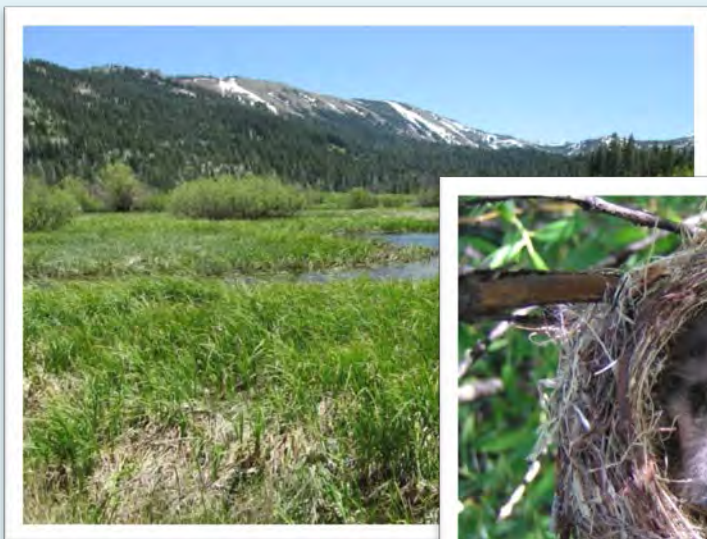# Methods: assigning observations to meadows

- Delineate "meadow" boundary

- Link observations to meadows

- Identify ownership



Legend

- willow flycatcher detections
- CDFW meadows
- NRIS wildlife sites
- UC Davis multisource meadow polygons
- meadows w/ WIFL detections

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# Methods: Determining status

| migrant | breeding | migrant |
|---------|----------|---------|
| May – June 14 | June 15 - July 31 | August 1 – October |

# Methods: Identifying priority management zones

- Applied 12km buffer to meadows



To Warner Valley 134 Km

Little Truckee River

To Milton Res. 14 Km

Webber Lake

To Stampede Res. 20 Km

Independence Lake
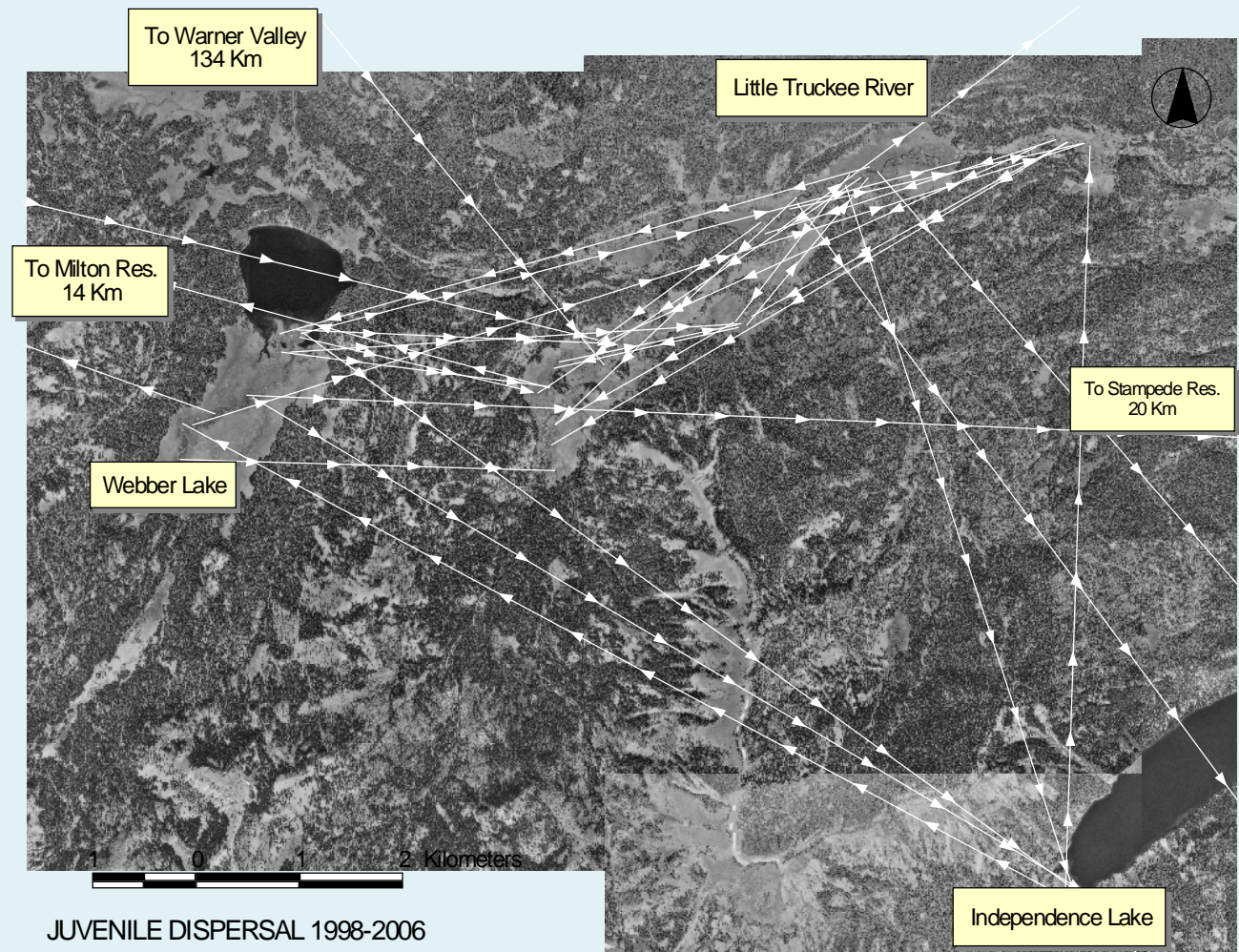
JUVENILE DISPERSAL 1998-2006

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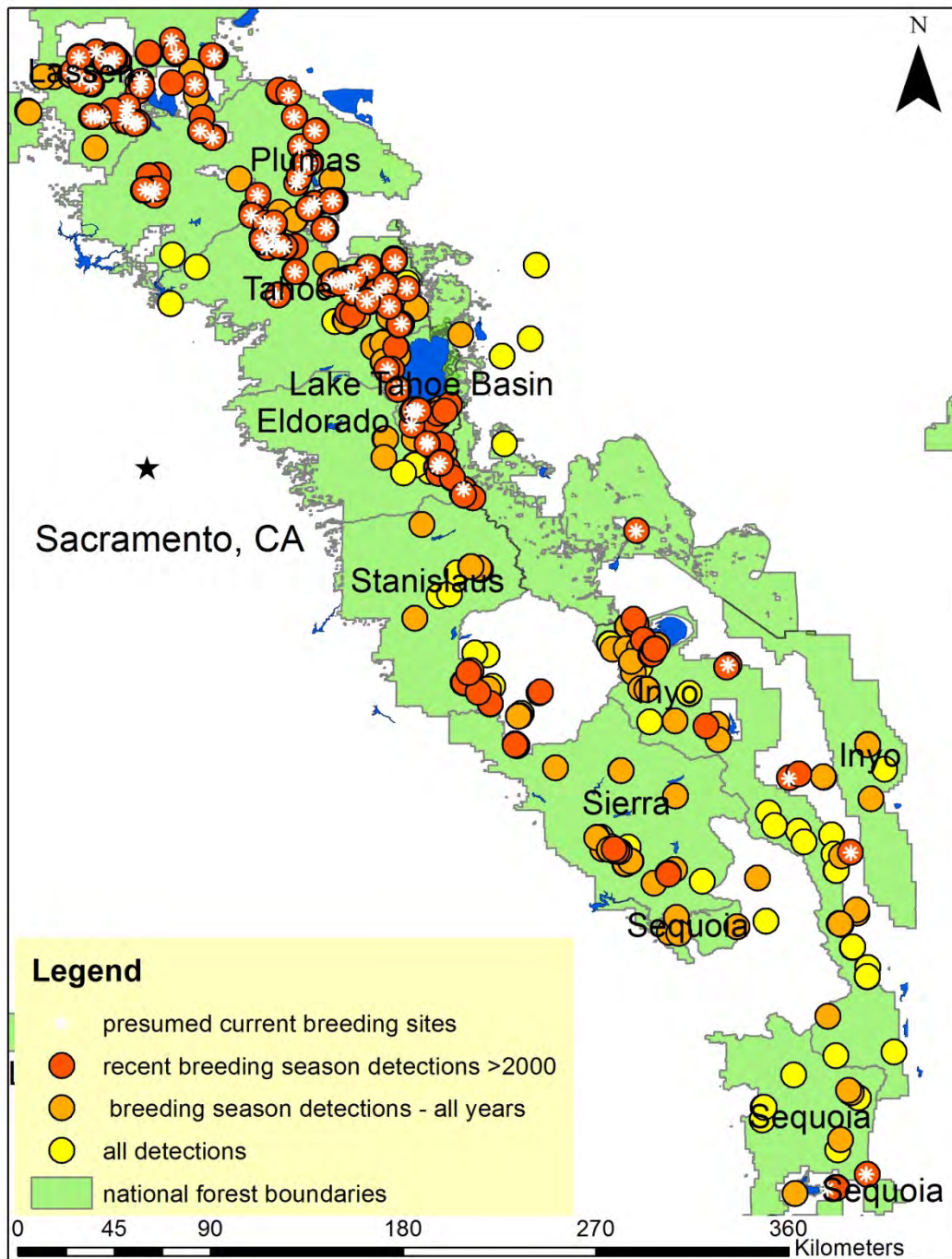
# Results

- **297** meadows with breeding season and/or migration season detections (all years)

- **225** with breeding season detections (all years)

- **142** with breeding season detections since 2000

- **94** presumed currently occupied



**Legend**

- ❄ Presumed current breeding sites
- 🔴 recent breeding season detections >2000
- 🟠 breeding season detections - all years
- 🟡 all detections
- 🟦 water bodies
- 🟩 national forest boundaries

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**Legend**

- ⚹ presumed current breeding sites
- 🔴 recent breeding season detections >2000
- 🟠 breeding season detections - all years
- 🟡 all detections
- 🟩 national forest boundaries

Lassen
Plumas
Tahoe
Lake Tahoe Basin
Eldorado
Sacramento, CA
Stanislaus
Inyo
Inyo
Sierra
Sequoia
Sequoia
Sequoia

N

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| 0 | 45 | 90 | 180 | 270 | 360 |

Kilometers

# Number of meadows with Willow Flycatcher detections

| Land manager | All detection types | Breeding season all years | Breeding season >2000 | presumed current breeding |
|---|---|---|---|---|
| Forest Service | 196 | 157 | 106 | 70 |
| National Parks | 18 | 12 | 7 | 2 |
| BLM | 3 | 1 | 0 | 0 |
| State Lands | 10 | 8 | 5 | 3 |
| Private | 70 | 47 | 24 | 19 |
| **Total** | **297** | **225** | **142** | **94** |

# Area of occupied meadows (ha)

| Land manager | All detection types | Breeding season all years | Breeding season >2000 | presumed current breeding |
|---|---|---|---|---|
| Forest Service | 7,625 | 6,752 | 5,726 | 4,108 |
| National Parks | 311 | 262 | 202 | 56 |
| BLM | 9 | 2 | 0 | 0 |
| State Lands | 879 | 809 | 631 | 607 |
| Private | 4,722 | 4,120 | 2,593 | 2,062 |
| **Total** | **13,546** | **11,945** | **9,152** | **6,833** |

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# Mean size of occupied meadows (ha)

| Land manager | All detection types | Breeding season all years | Breeding season >2000 | presumed current breeding |
|---|---|---|---|---|
| Forest Service | 39 | 43 | 54 | 59 |
| National Parks | 17 | 22 | 29 | 28 |
| BLM | 3 | 2 | 0 | 0 |
| State Lands | 88 | 101 | 126 | 202 |
| Private | 67 | 88 | 108 | 109 |
| **Mean** | **42.8** | **51.2** | **63.4** | **79.6** |

# Time since last detection vs. latitude
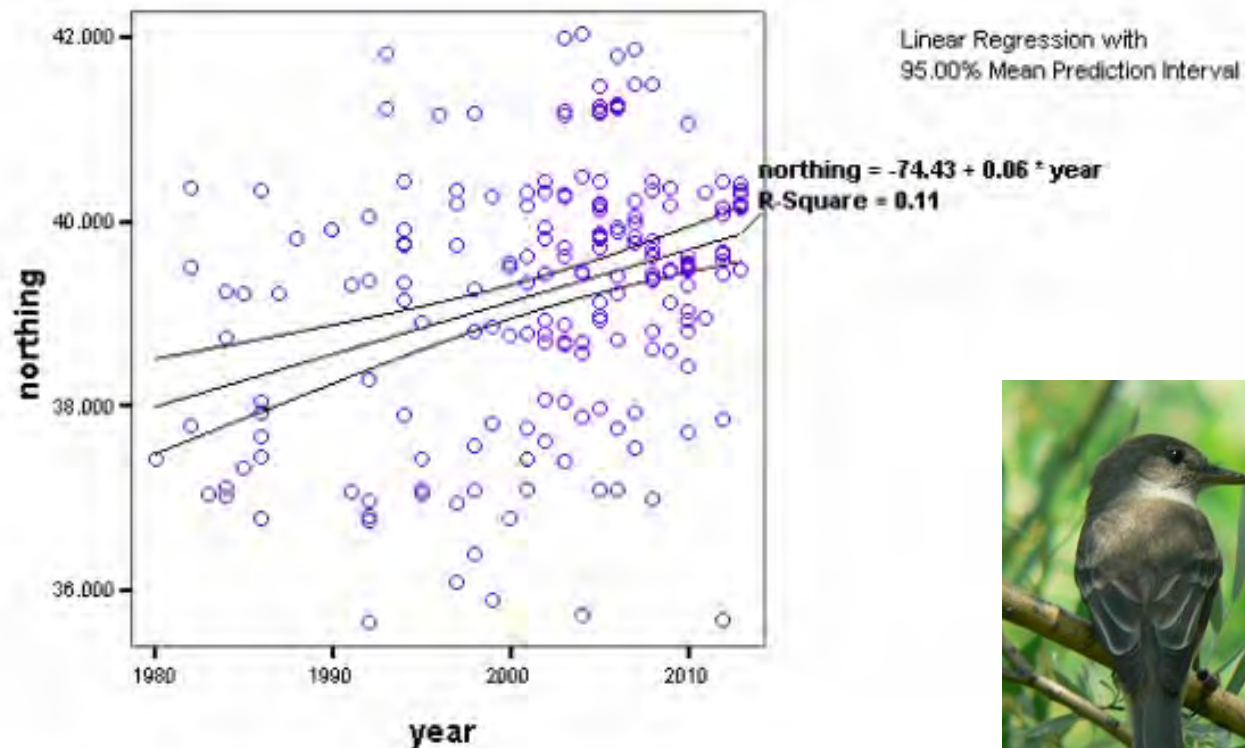
Change in no. of territories 2000-2014
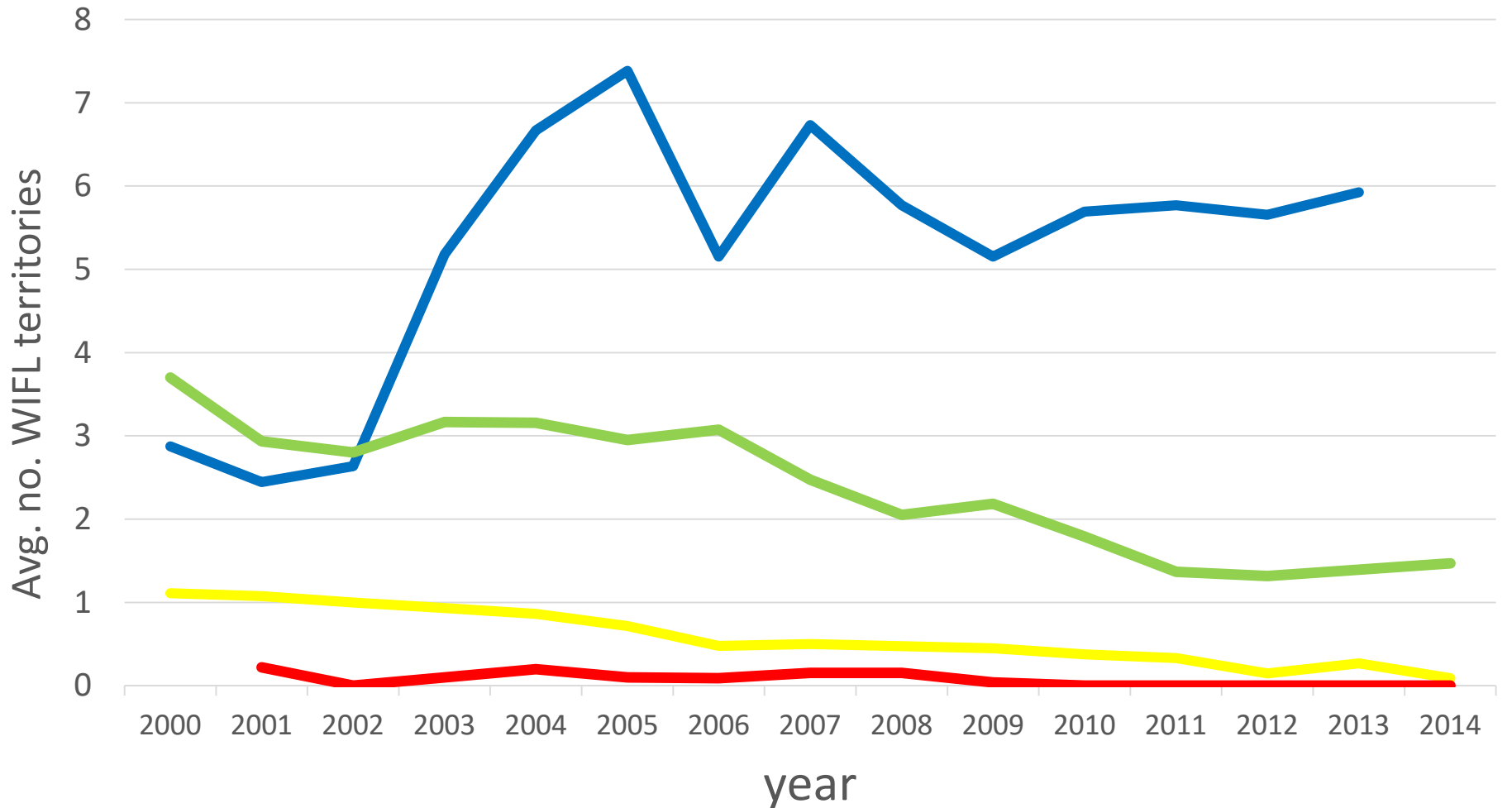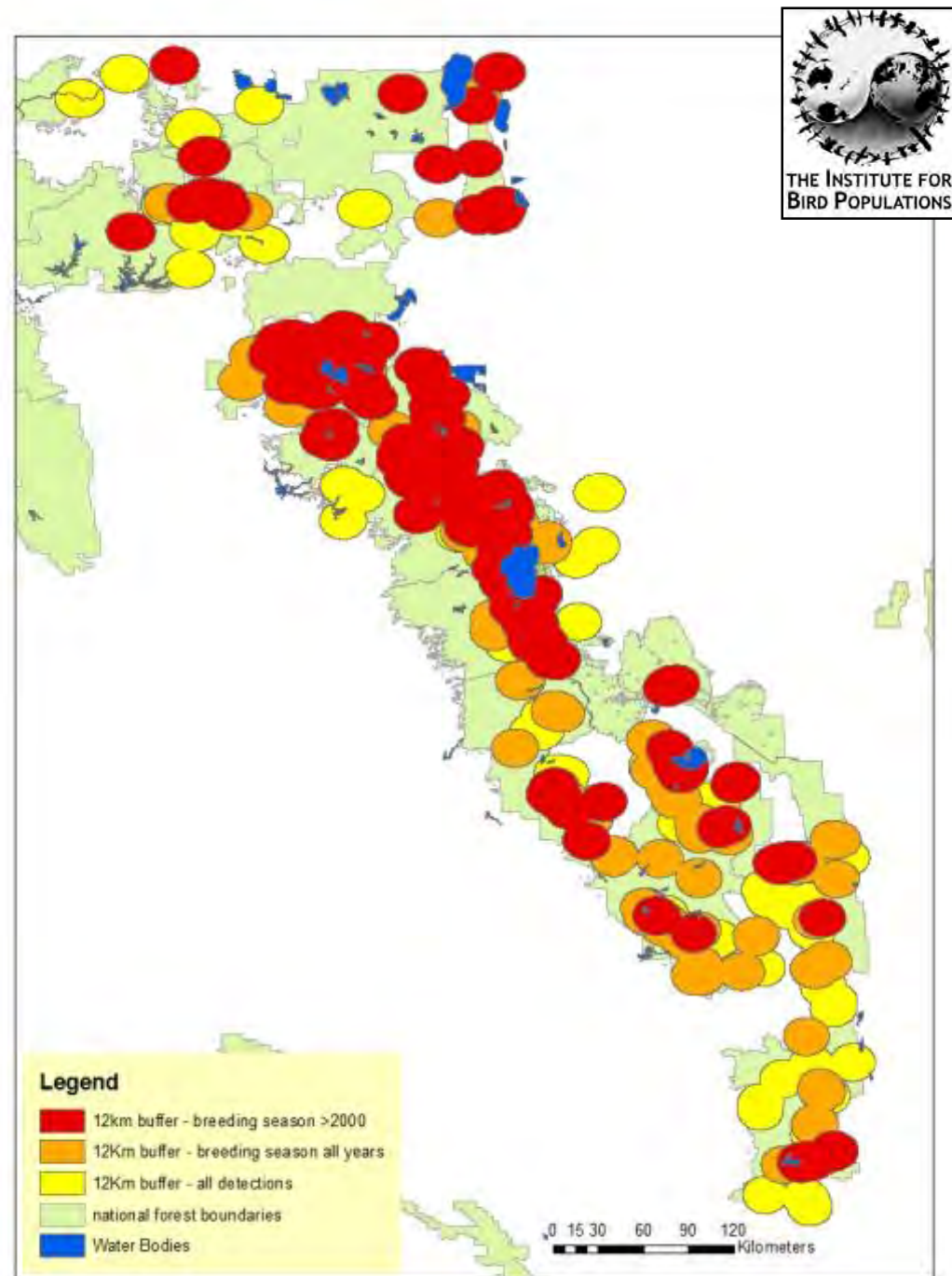
# Priority management areas
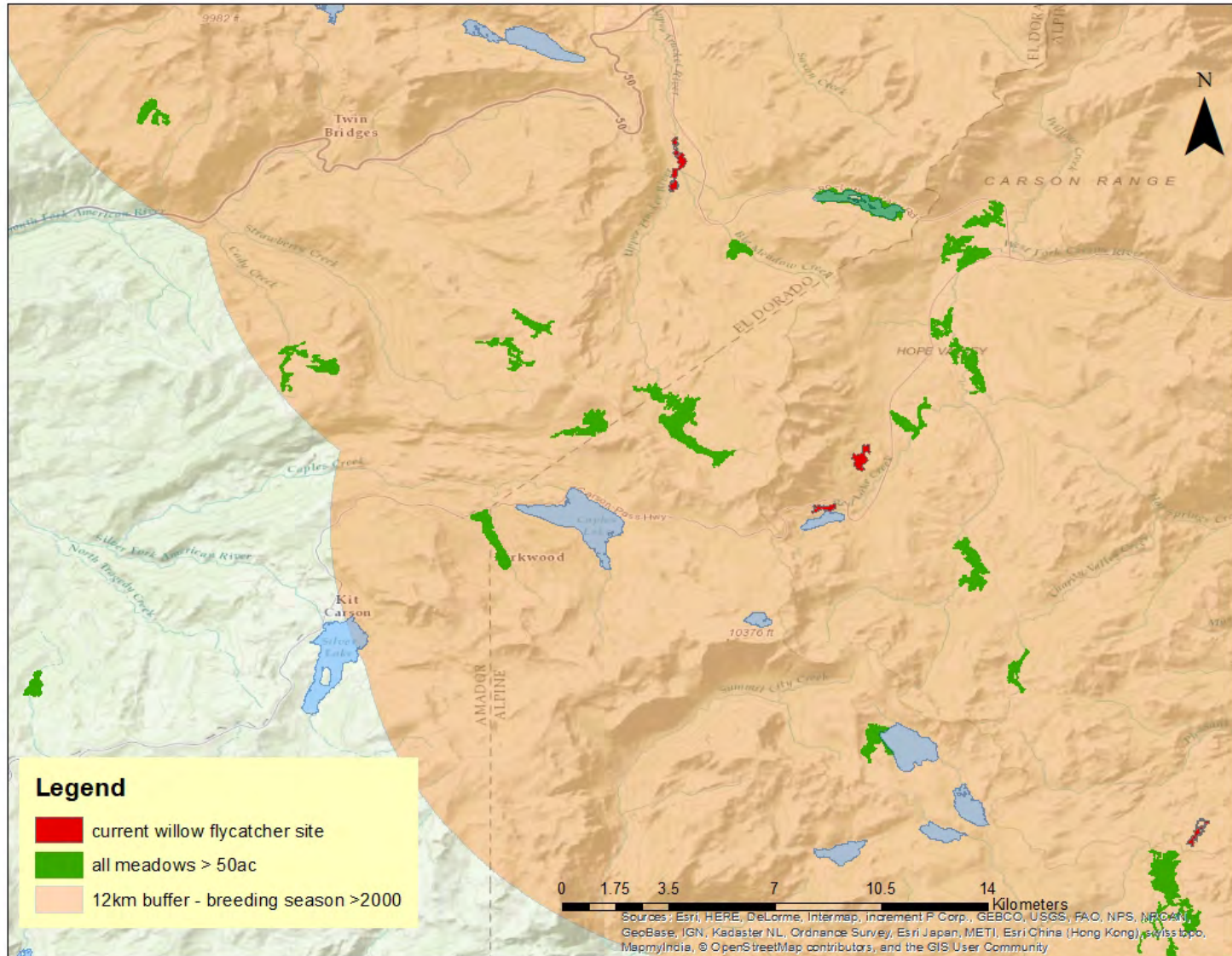
**Yellow - low priority**

**Orange – moderate priority**

**Red – high priority**
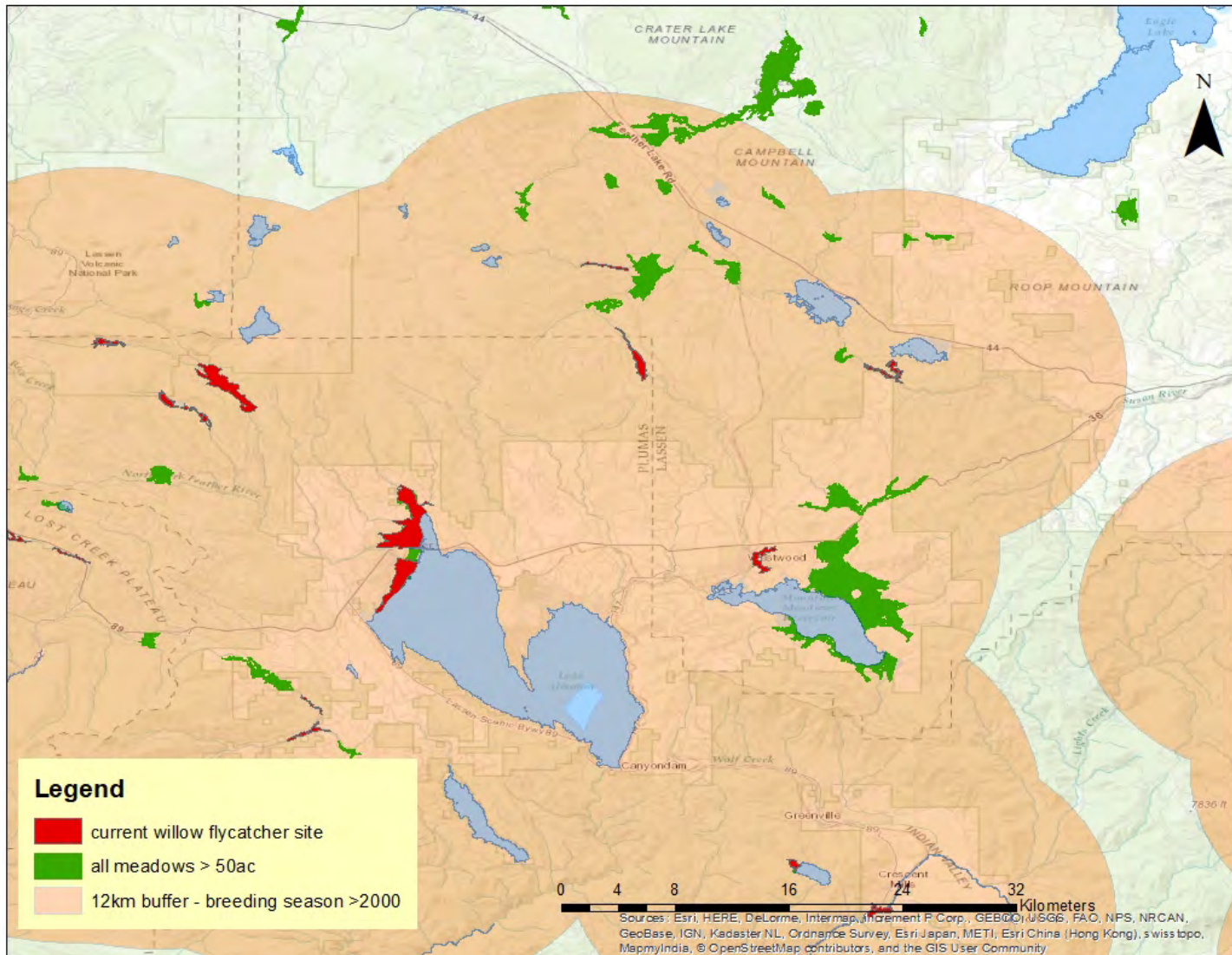
north of Lake Tahoe- greatest chance of recolonization

south of Lake Tahoe- greatest risk of permanent extirpation



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Legend

- ⬛ (red) 12km buffer - breeding season >2000
- ⬛ (orange) 12Km buffer - breeding season all years
- ⬛ (yellow) 12Km buffer - all detections
- ⬛ (green) national forest boundaries
- ⬛ (blue) Water Bodies

0  15 30    60    90    120
Kilometers

# Restoration Priorities

# Restoration Priorities

# Meadows within 12km of currently occupied meadows

| All meadows | | | large meadows > 20 ha | | |
|---|---|---|---|---|---|
| **No.** | Area | Mean size (sd) | No. | Area | Mean size (sd) |
| 4,499 | 28,782 ha | 6 ha (41) | 207 | 17,820 ha | 86 ha (173) |

# Acknowledgements

- National Fish and Wildlife Foundation
- UC Davis Sierra Nevada multi-source meadows clearinghouse: http://meadows.ucdavis.edu
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