Conspecific Attraction: A Tool For Restoring Willow Flycatchers to Riparian Meadows

Lynn Schofield, Helen Loffland, and Rodney Siegel

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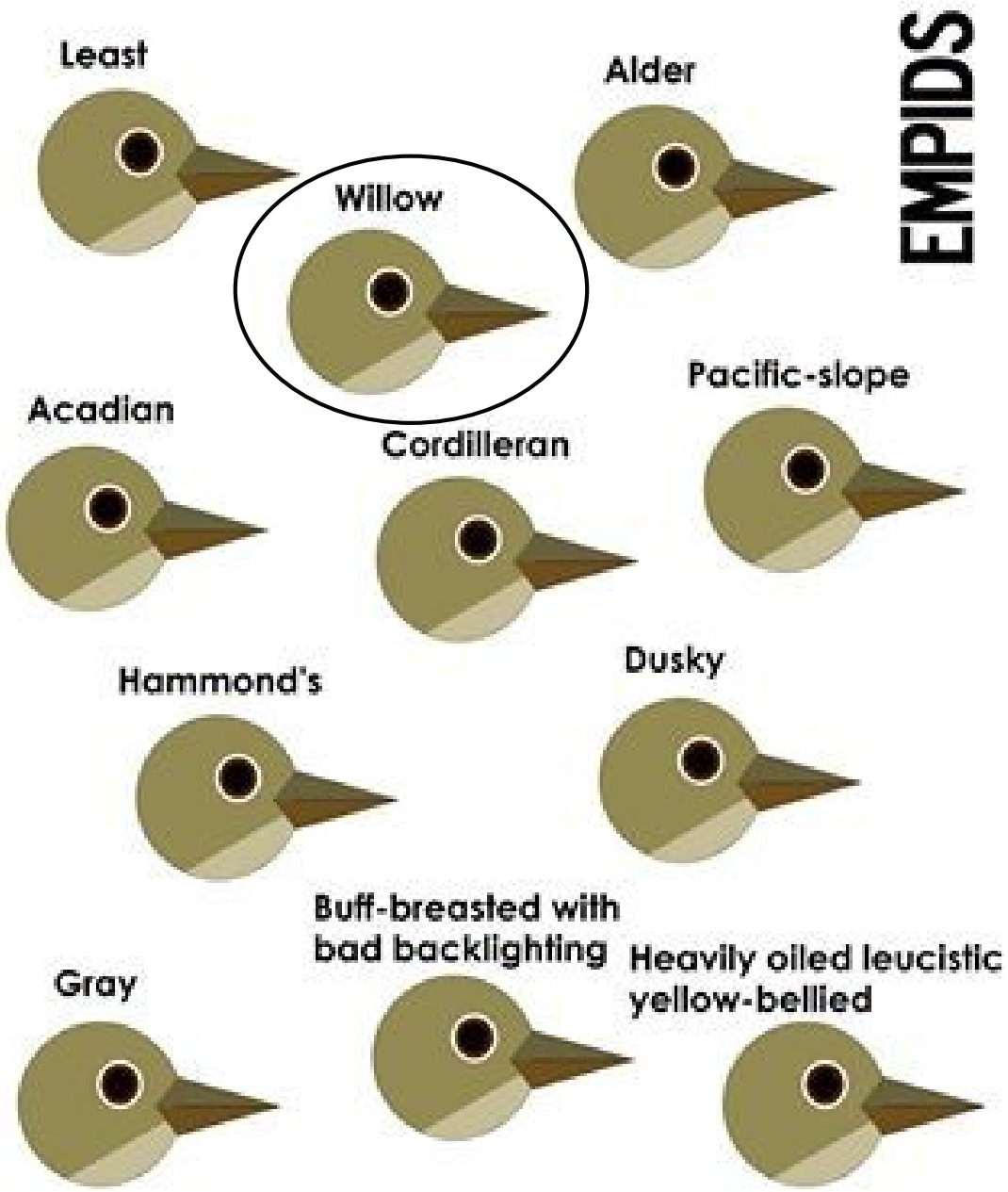
EMPIDS
Least
Alder
Willow
Acadian
Cordilleran
Pacific-slope
Hammond's
Dusky
Buff-breasted with
bad backlighting
Heavily oiled leucistic
yellow-bellied
Gray

Sierra Nevada Willow Flycatcher

- **Montane Wet-meadow Specialist**
  - **Saturated soils and/or lentic surface water**
  - **Mosaic of dense, deciduous riparian scrub**
- About 200-300 breeding pairs in the Sierra Nevada
- Continuing range contraction
- Long-term population declines
- Endangered in California

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Range Contraction - Historic Willow Flycatcher Range in California

"Roughly, entire length of State, both east and west of Sierran axis. … positively speaking, this flycatcher exists in summer time practically wherever its special habitat exists." – Grinnell and Miller, 1944

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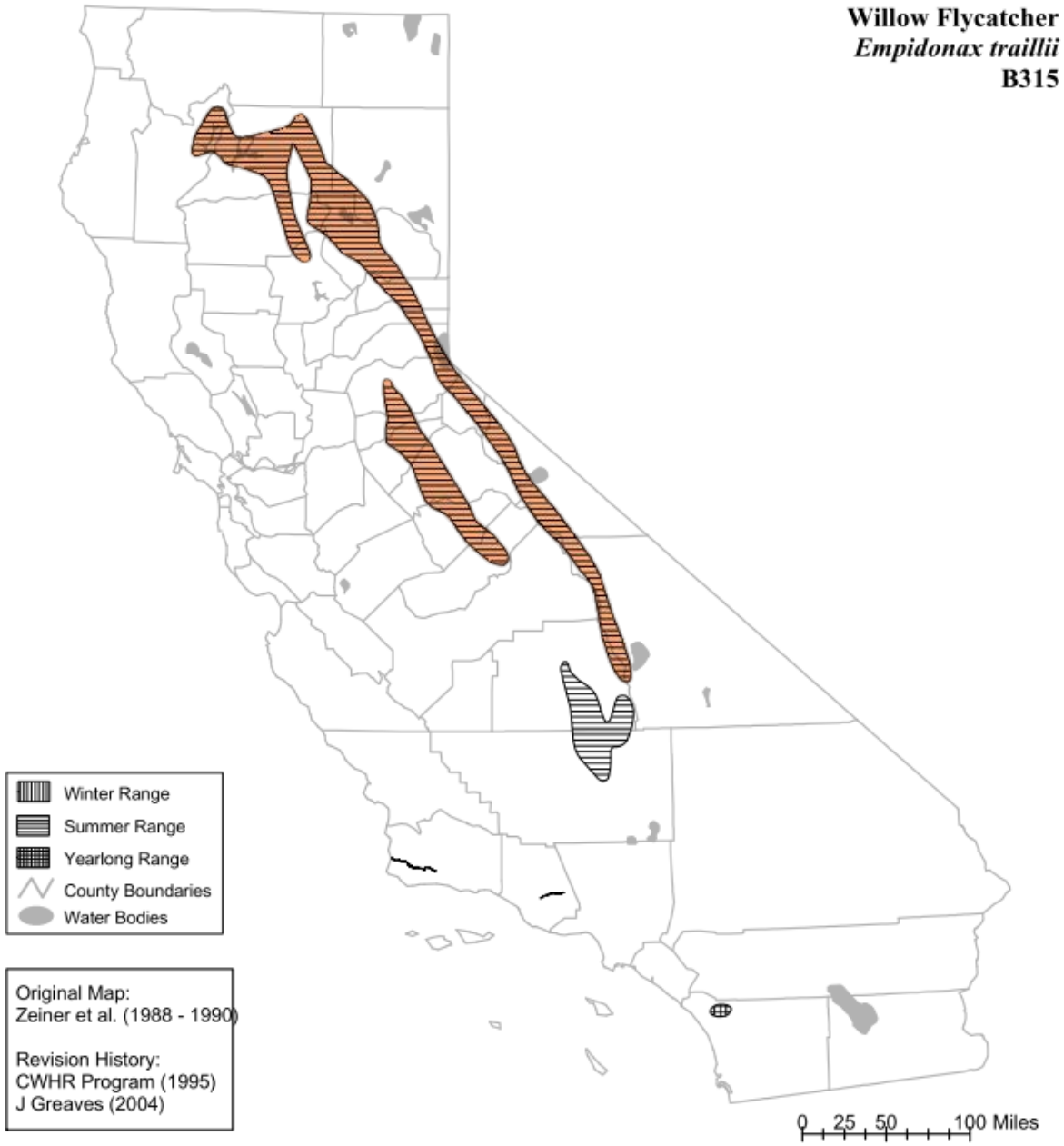
Range Contraction - Current Willow Flycatcher Range in California



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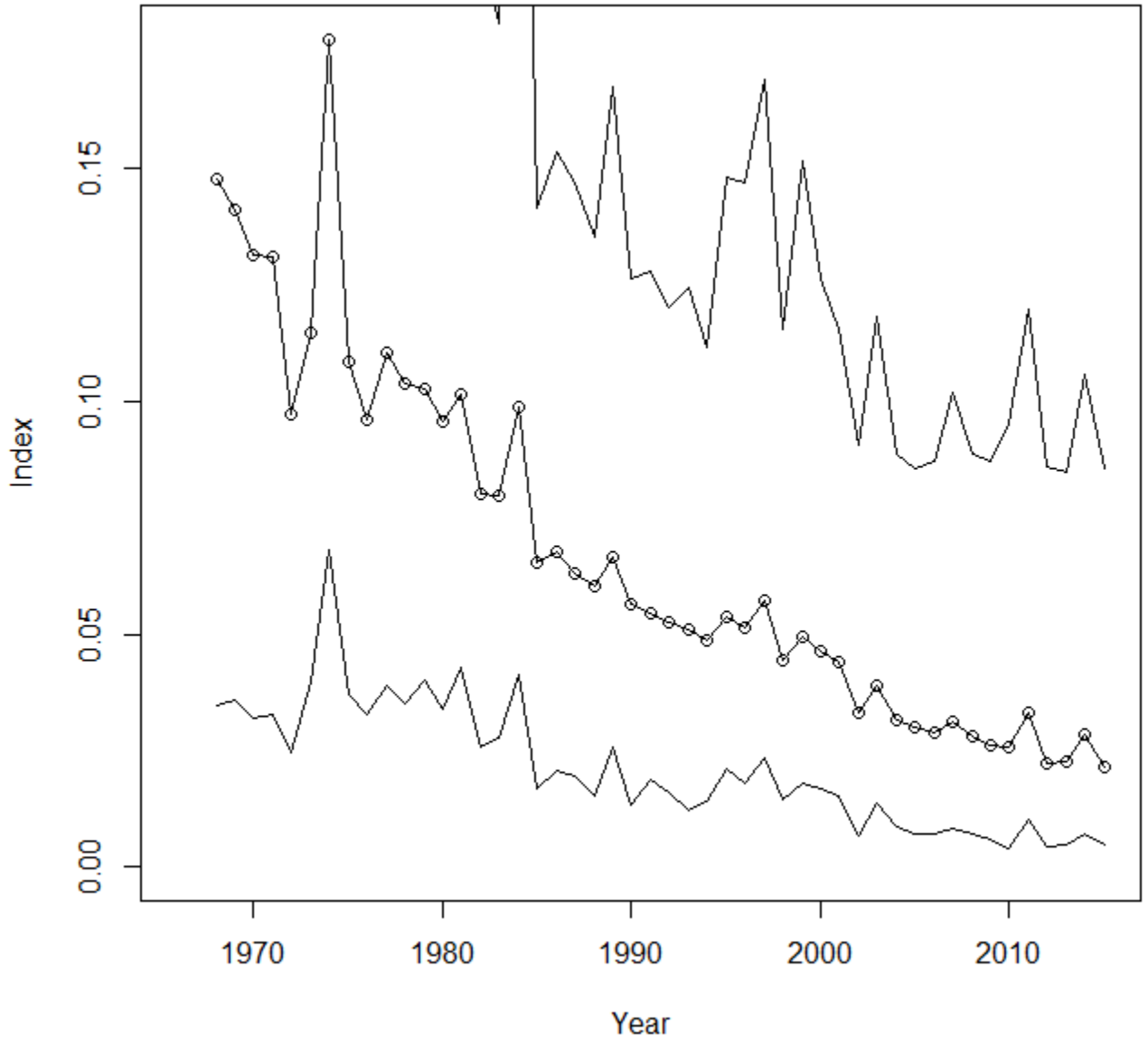
Declining Willow Flycatcher Density in the Sierra Nevada – Breeding Bird Survey



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Overall Negative Rate of Population Change in the Sierra Nevada

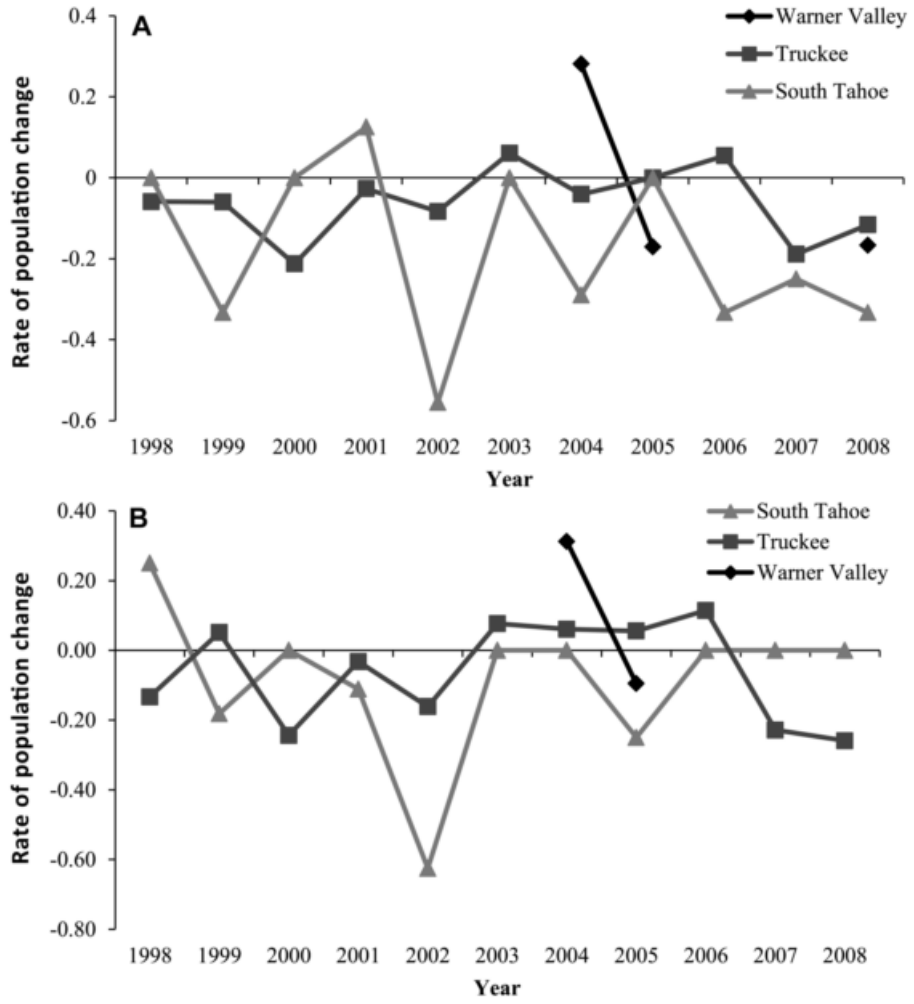

FIG. 4. Rates of population change for (A) male and (B) female Willow Flycatchers detected in the South Lake, Truckee, and Warner Valley study regions in the Sierra Nevada, California.

Mathewson et al. 2012

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Declines continue despite high annual fecundity in some of the same regions…

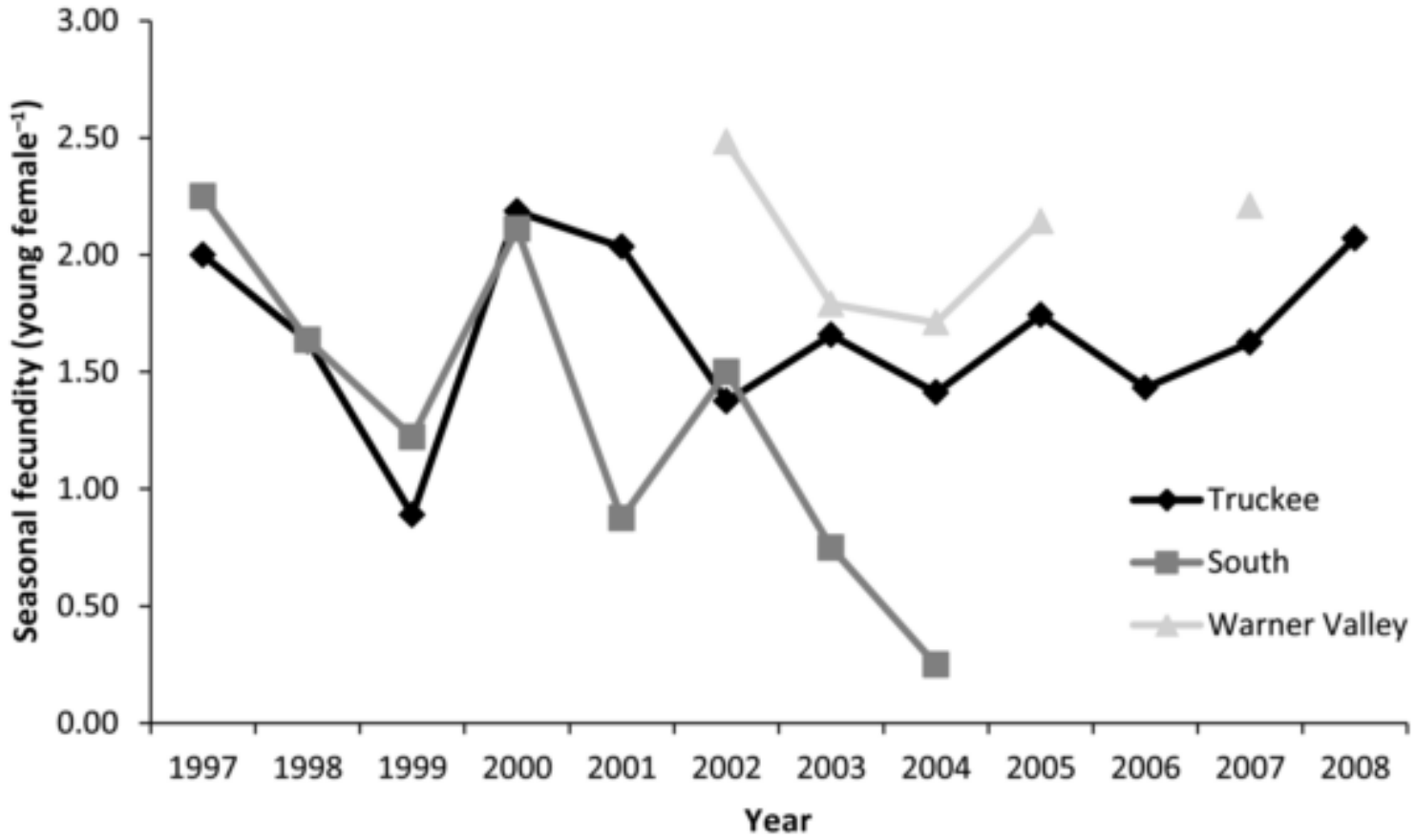

FIG. 7. Fecundity estimates for Willow Flycatchers breeding in South Tahoe, Truckee, and Warner Valley study regions in the Sierra Nevada, California.

Mathewson et al. 2012

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Declines continue despite restoration and improved management

Plumas National Forest, Red Clover-Poco: Restoration Project

Tahoe National Forest. Perazzo Meadow: Ecological Implementation and Restoration Plan

What's going wrong?

- Willow Flycatchers rarely colonize unoccupied meadows, even after conditions improve… why?

- What are dispersing and prospecting birds looking for when selecting a new territory?

  - Vegetation structure?
  - Plant communities?
  - Prey availability?
  - Presence of water?
  - Openness?

  - **…other flycatchers?**

Conspecific Attraction

"the tendency for individuals of a species to settle near one another" – Ward and Schlossberg 2004

Can we provide social cues to help prospecting flycatchers identify appropriate habitat?

Image from Project Puffin

Broadcasting conspecifics' songs has been successful in attracting:

- Pied Flycatcher (Alatalo et al. 1982)
- House Wren (Muller et al. 1997)
- **Black-capped Vireo (Ward et al. 2004)**
- Bobolink (Nocera et al. 2006)
- **Least Flycatcher (Mills et al. 2006)**
- American Redstart (Hahn and Silverman 2006)
- Baird's Sparrow (Ahlering et al. 2007)
- Black-throated Blue Warbler (Hahn and Silverman 2007)
- Grasshopper Sparrow (Andrews et al. 2015)

Images from Wikimedia commo

Willow Flycatchers – A good candidate for restoration through conspecific attraction

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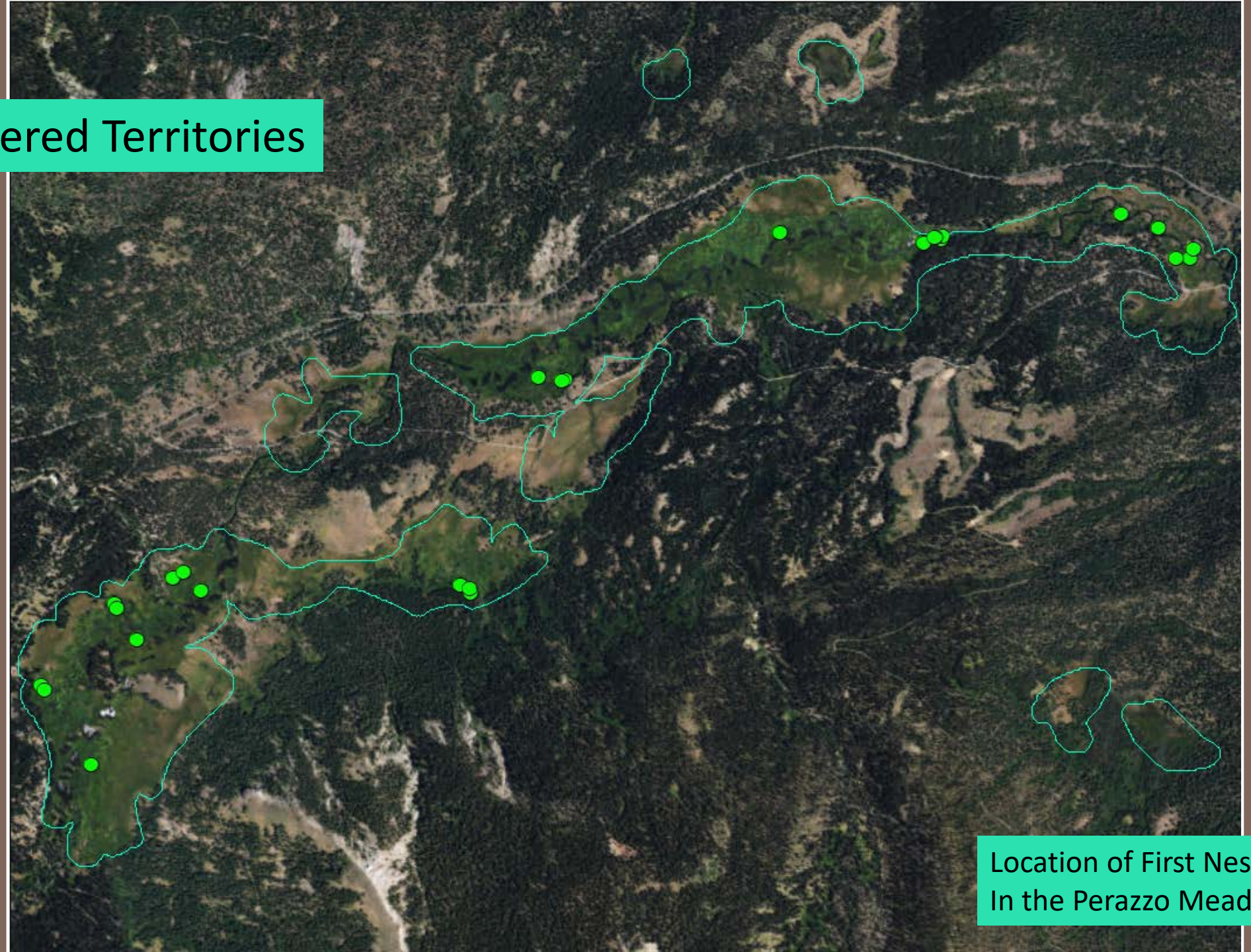
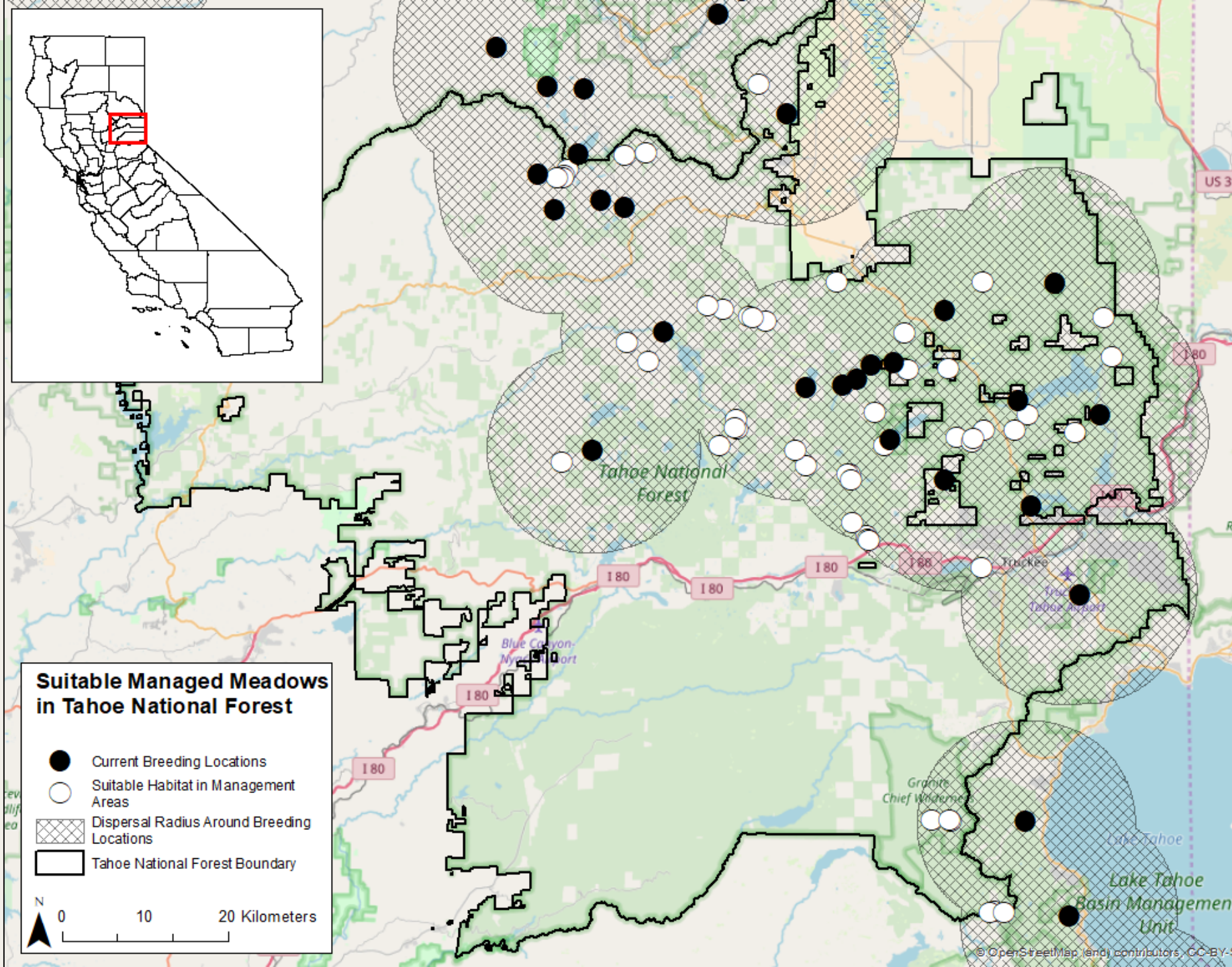
- Flycatchers often cluster their territories by conspecifics
- Suitable vacant habitat available is on the landscape
- Habitat has been restored and improved across their range

Clustered Territories



Location of First Nesting Attempts
In the Perazzo Meadow System 2007

Suitable vacant habitat available on the landscape



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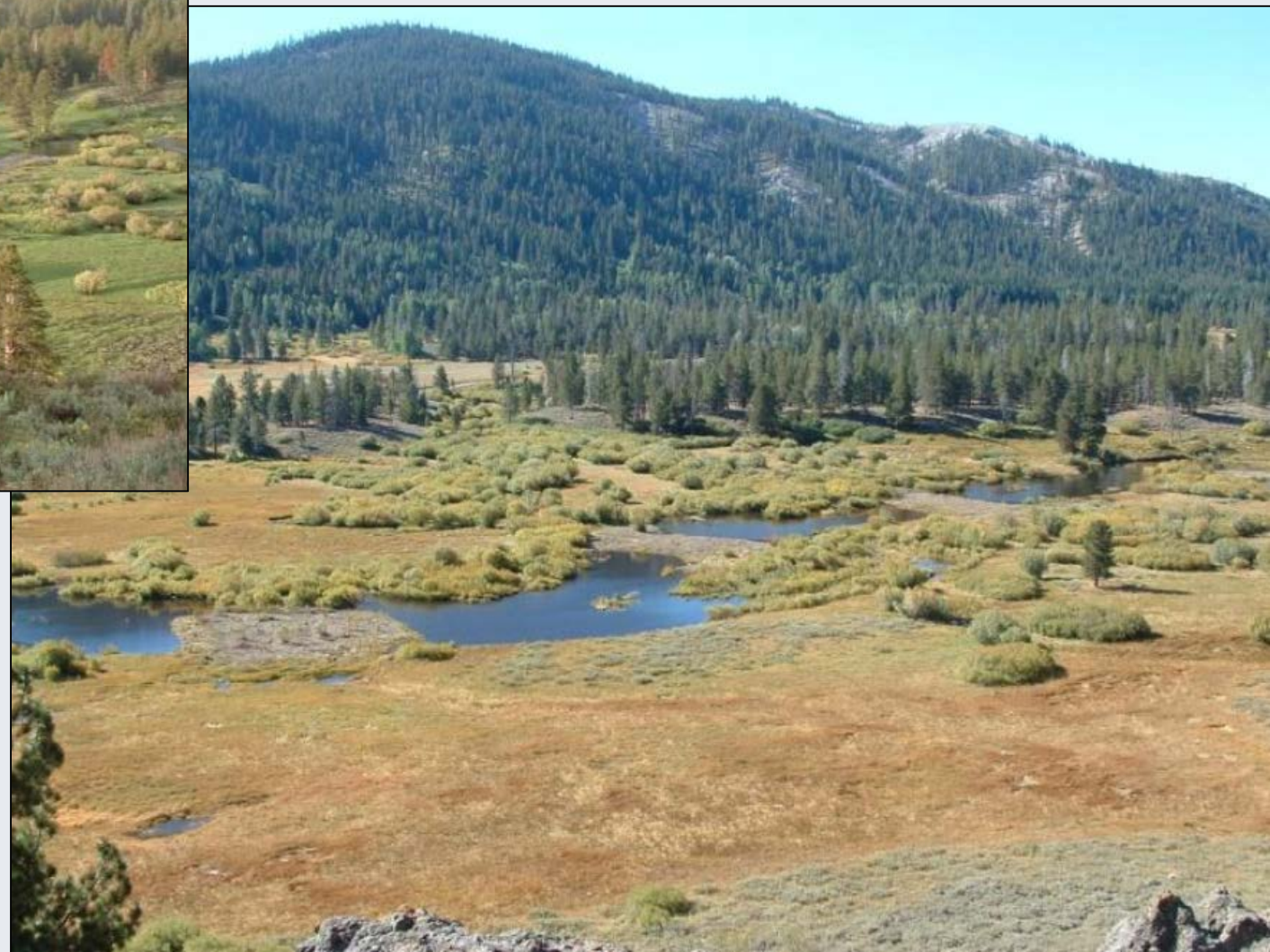
Habitat Improvements



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Project Goals

- Test the hypothesis that providing social cues (broadcasting conspecific songs) can help attract Willow Flycatchers
- Restore Willow Flycatchers to unoccupied, suitable habitat
- Target recently improved or restored habitats
- Determine if birds persist at re-colonized sites in subsequent years
- Determine which meadow characteristics help encourage colonization

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Experimental Design

Select study meadows that are:

- Suitable habitat (dense mosaics of willow, slow moving surface water/saturated soils)
- Restored either actively or passively
- Confirmed to be vacant one (or more) year immediately prior to the experiment
- Within the typical dispersal range from a source population (~12km)
- A mix of sizes, elevations, and latitudes

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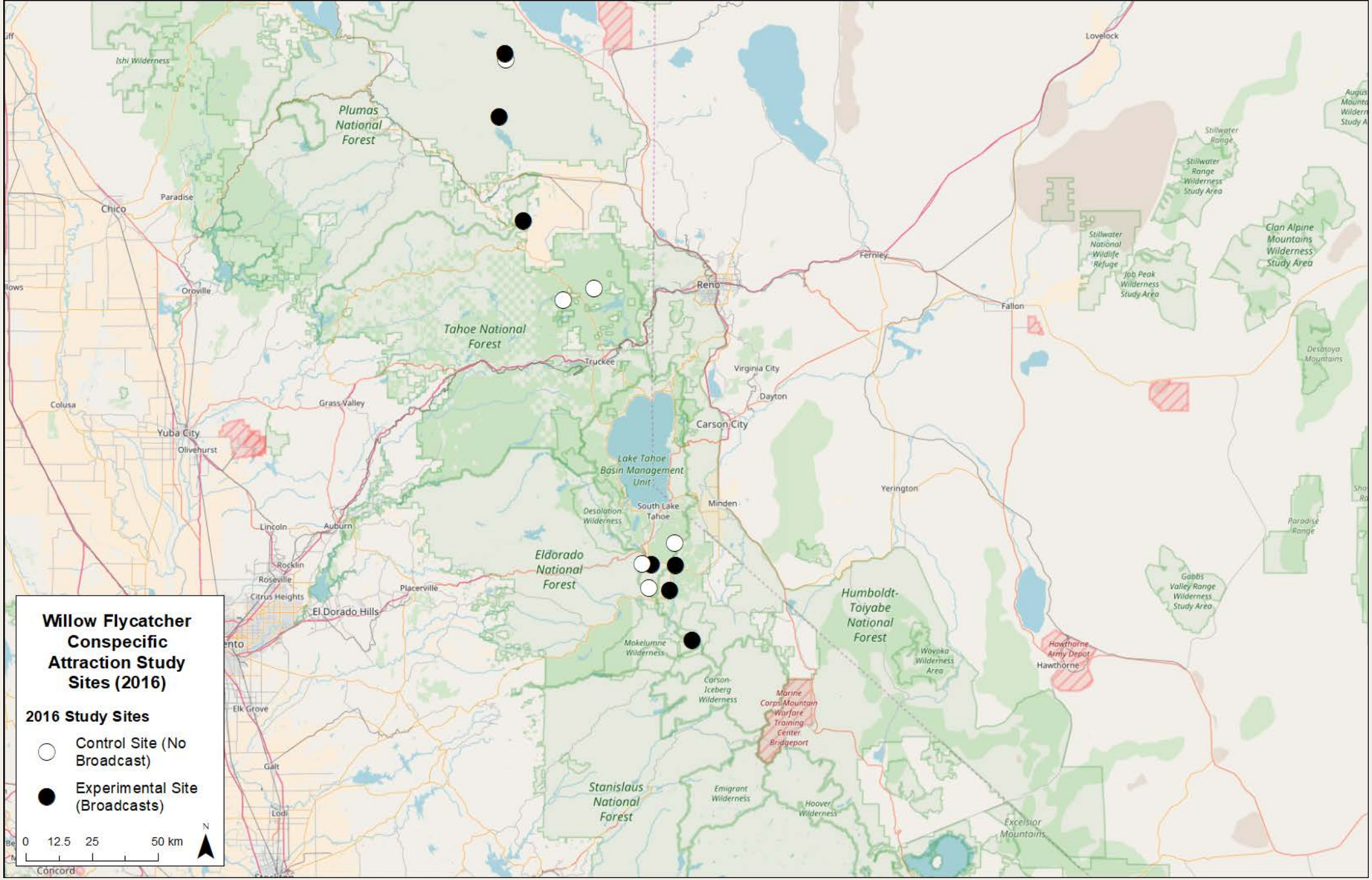

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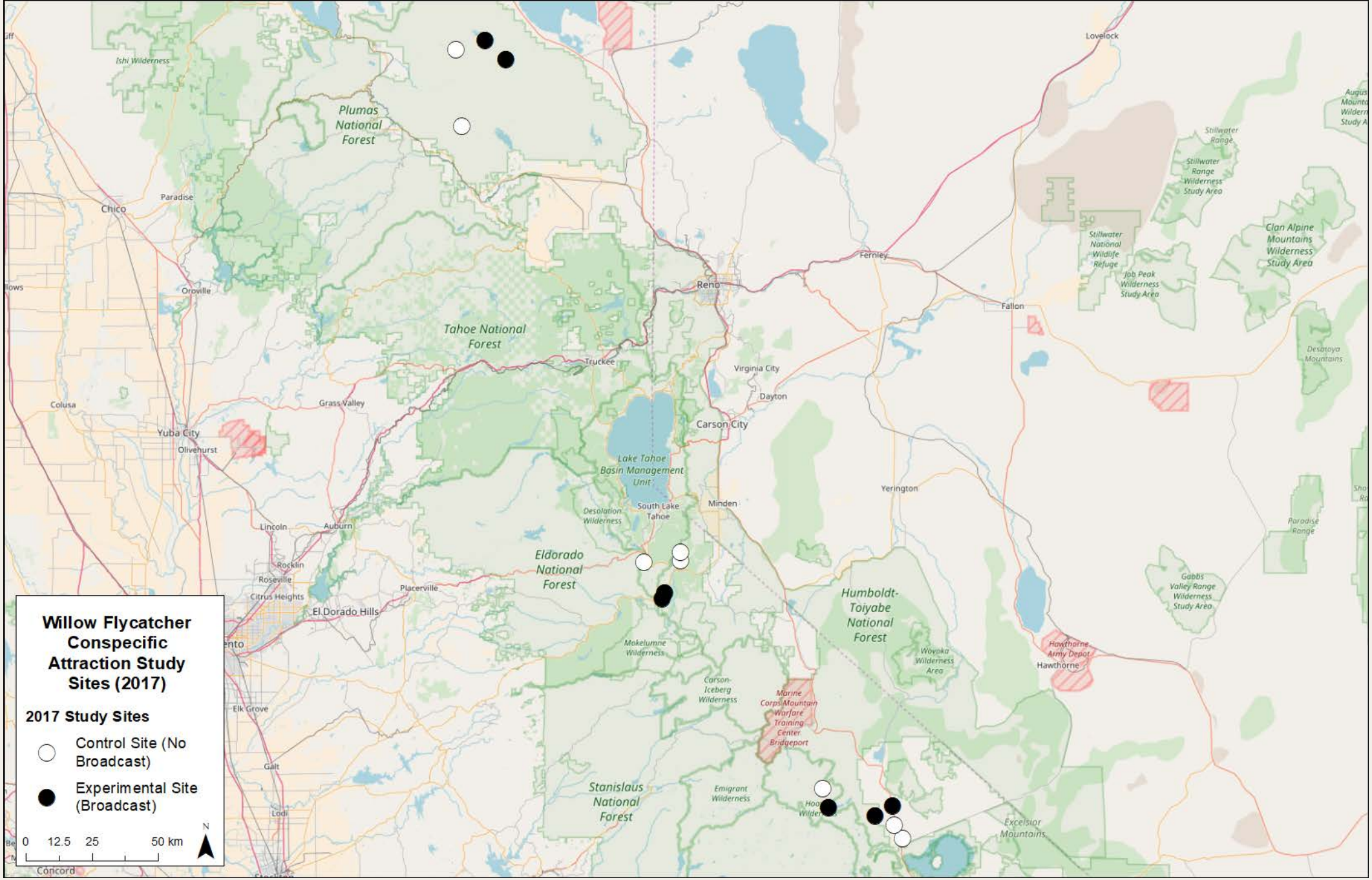

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Broadcasts and Surveys

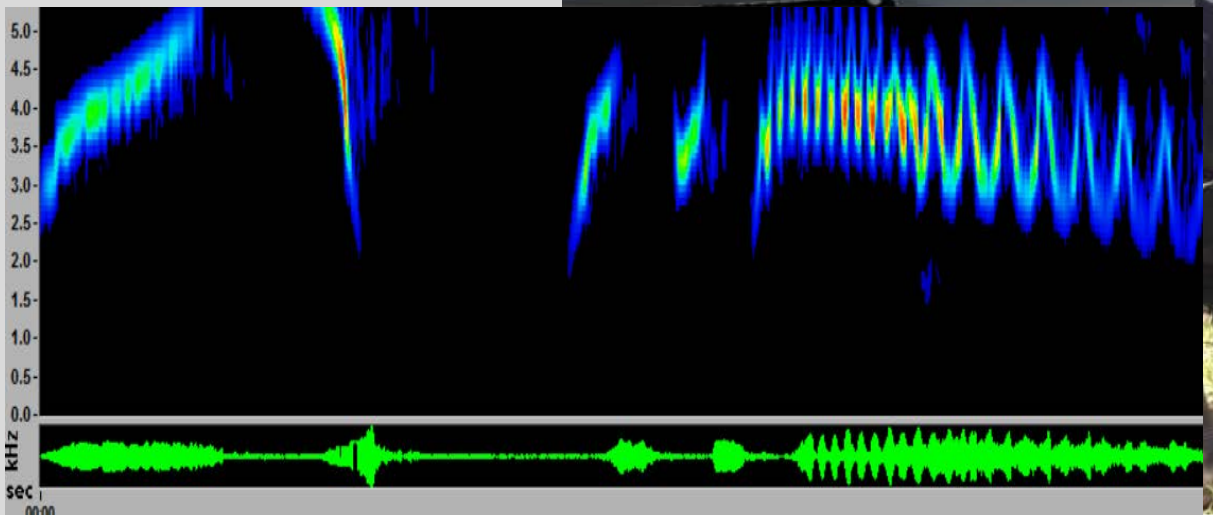
Songs played during settlement and breeding ~May 15-July 20 2016 and 2017

Experimental sites surveyed every 10-15 days 2016 and 2017

Control sites surveyed 2x 2016, every 10-15 days in 2017

All 2016 study sites all surveyed 2x in 2017

Crew collected (basic) veg and hydrology data



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Results

We considered meadows to be colonized if birds displaying territorial or nesting behaviors
were found between June 15 and July 15 (Bombay et al. 2003)

1/15 control sites colonized

5/14 experimental sites colonized

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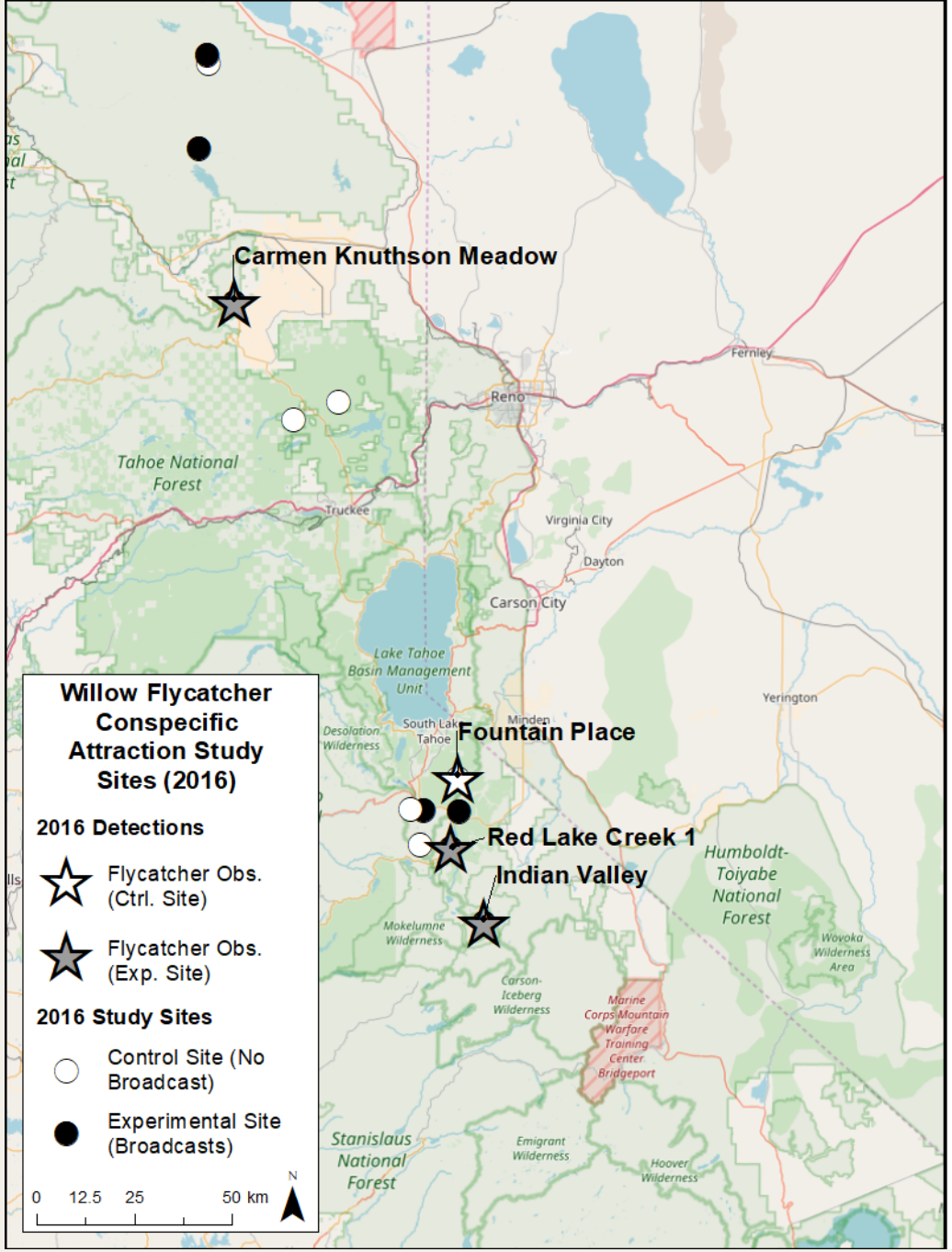

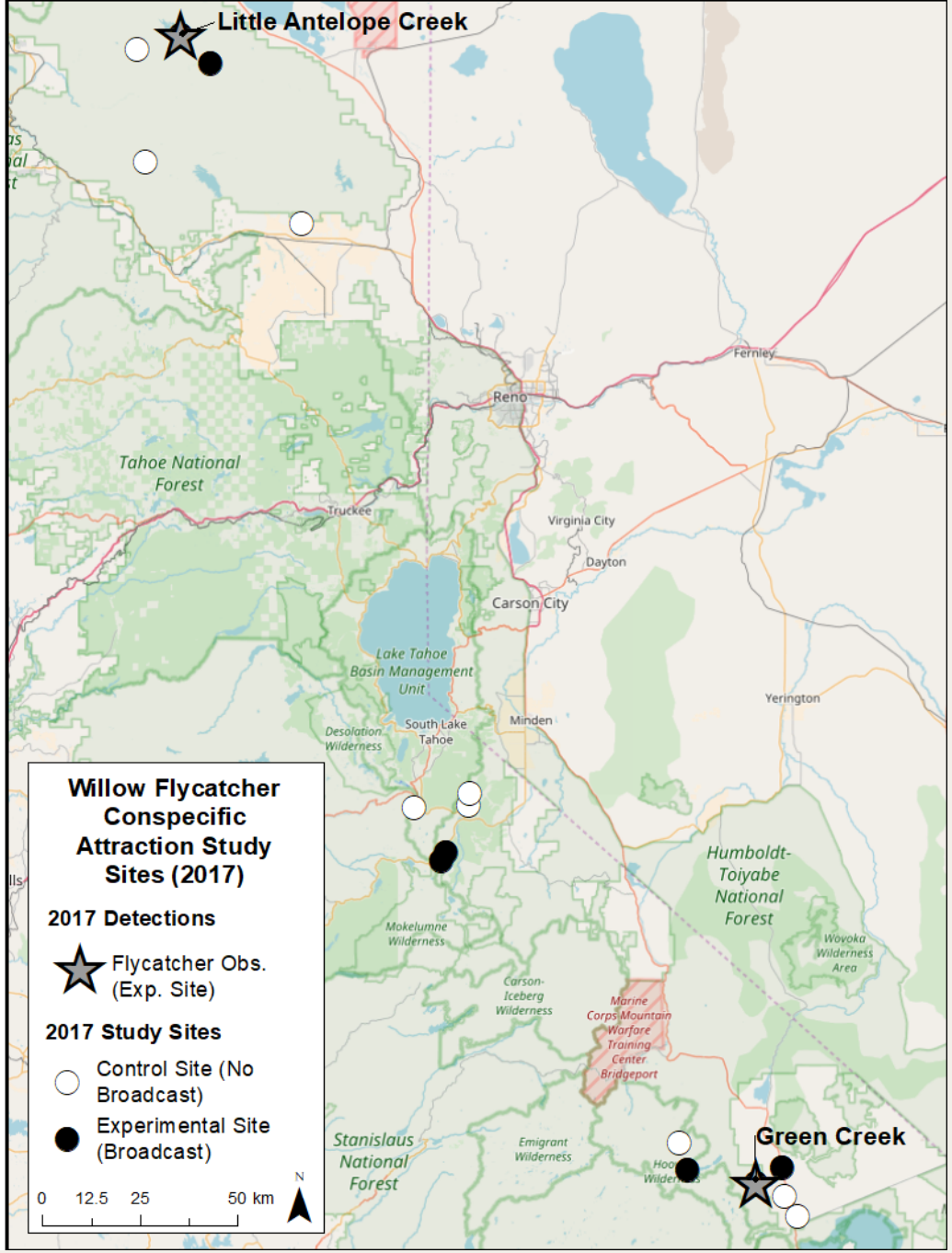

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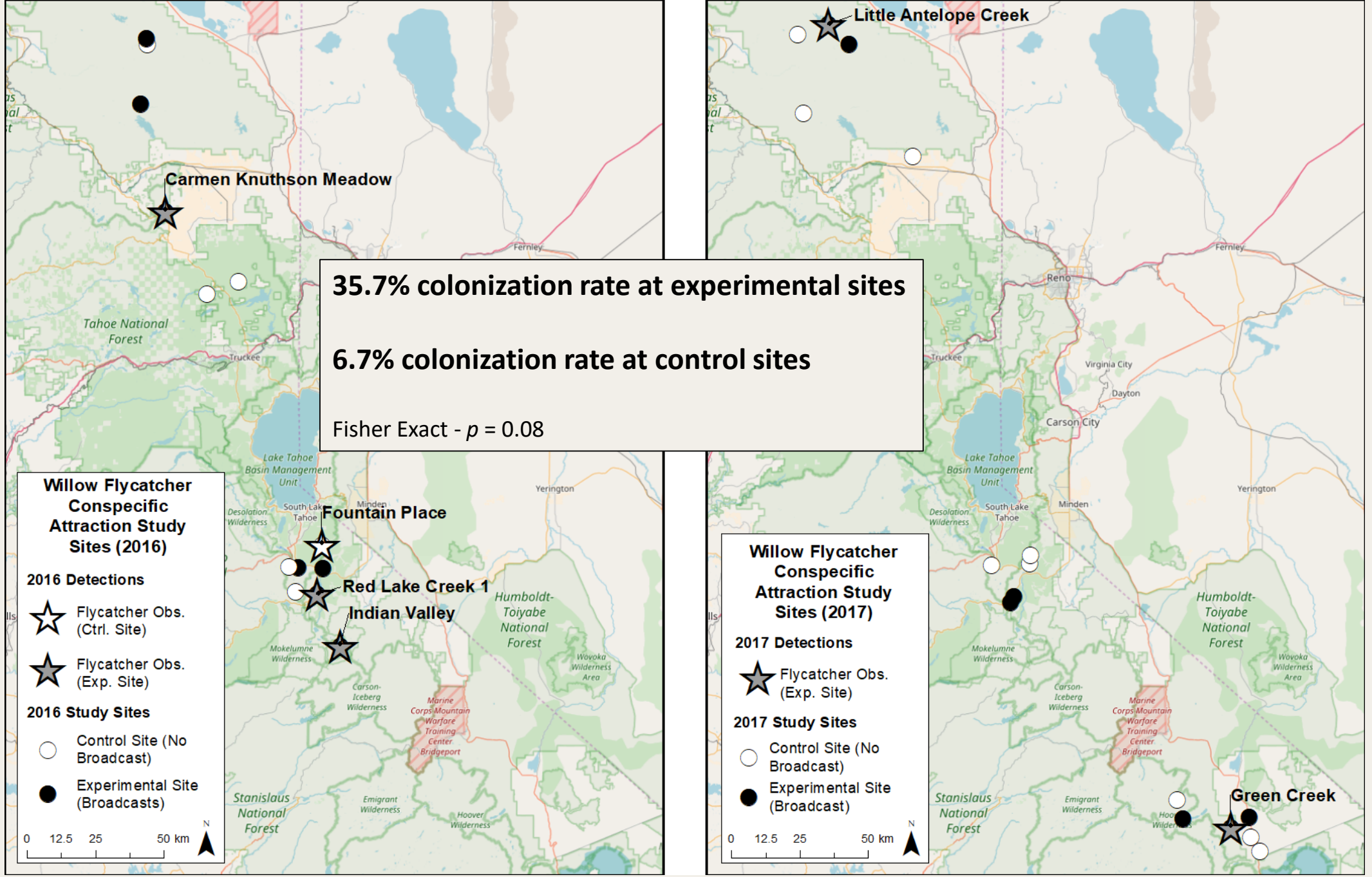

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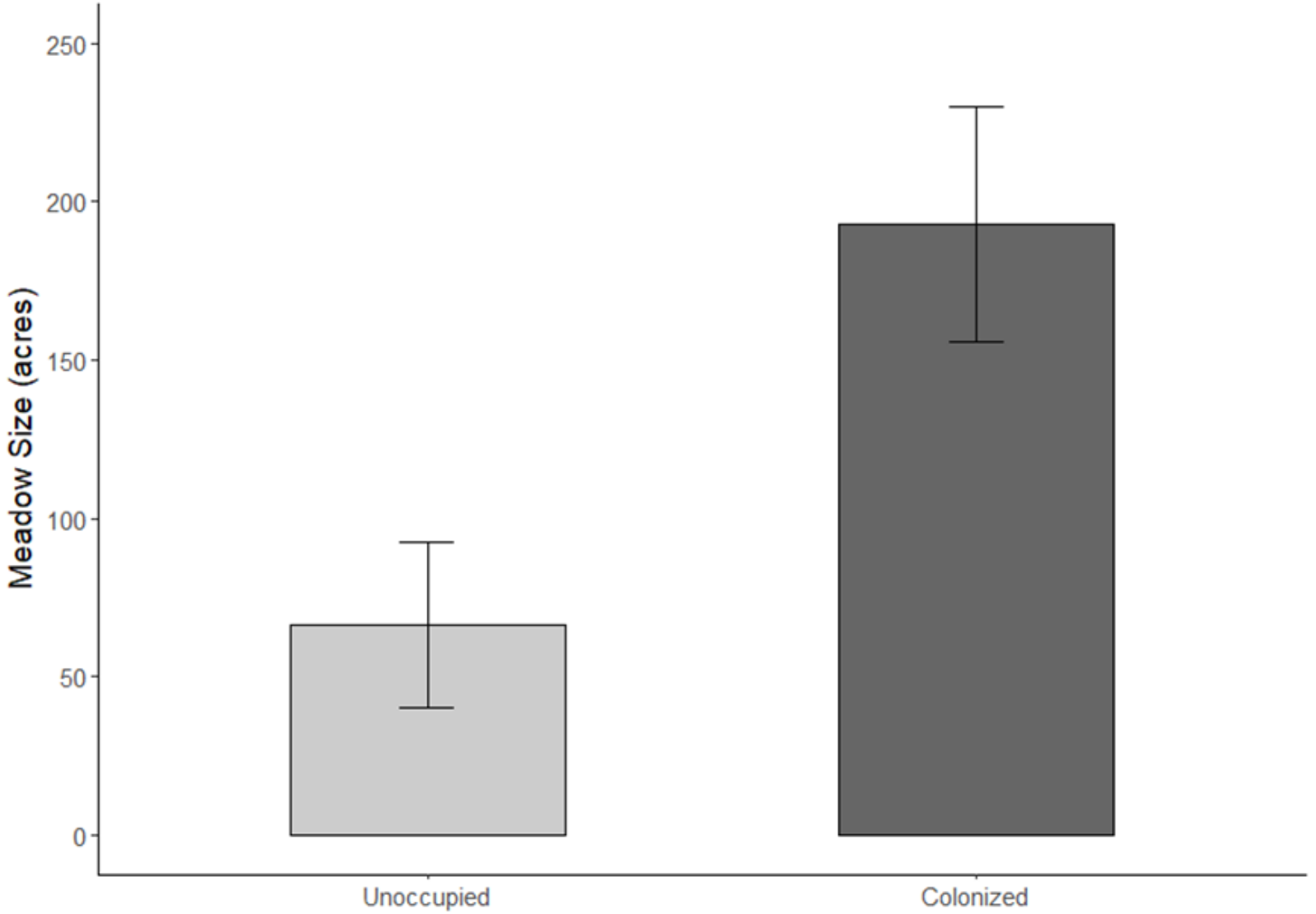
Large experimental sites were more commonly colonized



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$p = 0.0445$

However…

No birds that colonized broadcast sites in 2016 returned in 2017

Limitations of a Short-term Study

Photo taken June 24, 2017

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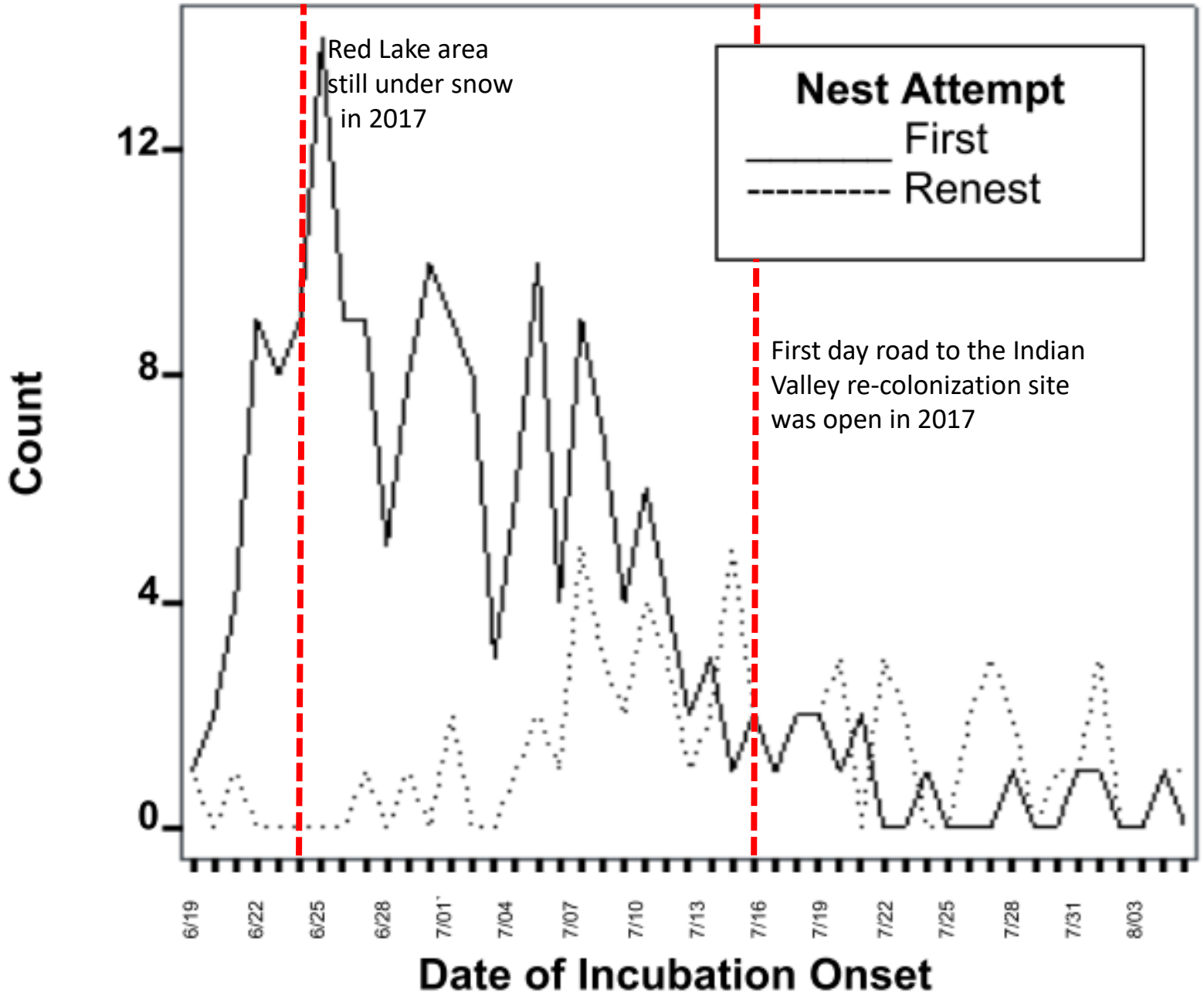

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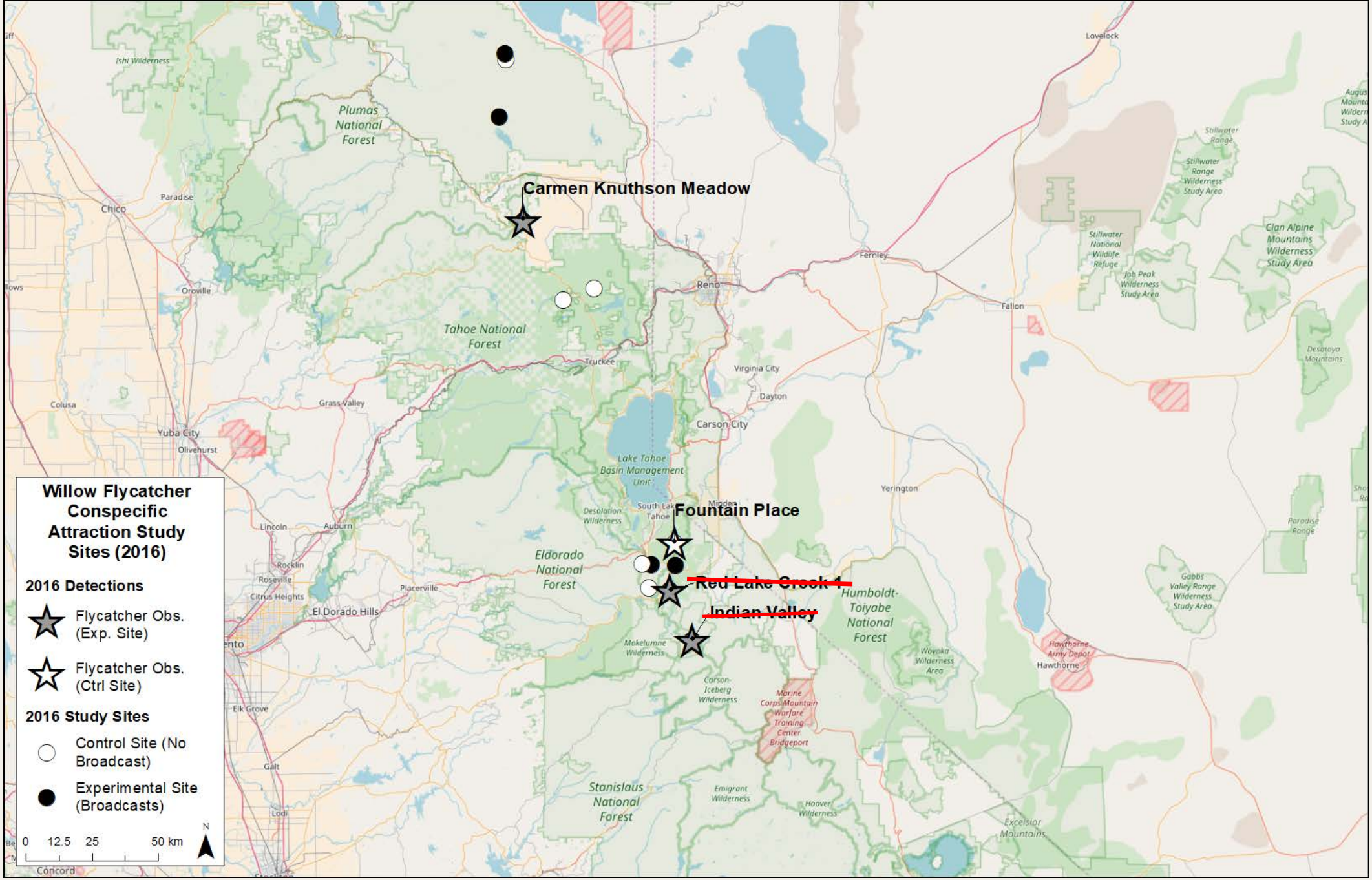
Green et al. 2003



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Conclusions

- Conspecific attraction has **great** potential to encourage Willow Flycatcher colonization
- More work needed!
- Exactly where, when, and for how long to provide behavioral cues is unknown
- How well colonists perform or how capable they are of persisting is unknown
- Large meadows should be the first to target
- The first step is to create high quality habitat

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Broadcasting conspecifics' songs has been confirmed to have resulted in successful nests in:

- **Black-capped Vireo (Ward et al. 2004)**
- **Least Flycatcher (Mills et al. 2006)**

Not because it didn't work, but because no one followed up!

Images from Wikimedia commons

Next Steps

- Follow territorial, pair and nesting status of colonists more closely
- Broadcast at more sites (larger sample size)
- Try broadcasting later season
- Broadcast over multiple years
- Further identify characteristics associated with colonization
- Try using conspecific attraction with Southwestern Willow Flycatcher
- Add other species of interest

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