Greater Sandhill Crane

Ed Pandolfino

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- Recent work using electronic collision sensors and night vision optics showed that previous studies underestimated collisions by a factor 3 to 4 (2.8-3.7; Murphy et al. 2016a)

Effectiveness of bird diverters is highly variable and never 100% effective

Effectiveness of Bird Diverters varies widely

TABLE 1: Comparison of Study Results for Effectiveness of Bird Diverters on Transmission Lines

Study	Location	Effect[1] (% reduction)	Species
Barrientos et al. 2012	Spain	9.8%	Various, no cranes
Murphy et al. 2009	**Nebraska**	**50%**	**Sandhill crane**
Ventana Wild. Soc. 2009	Merced Co., CA	30-60% Varied by location	Various, **including sandhill crane**
Yee 2008	**San Joaquin Co., CA**	**60%**	Various, **including sandhill crane**
Crowder 2000	Indiana	73%	Waterfowl
Janss & Ferrer	**Spain**	**81%**	Various, **including common crane**
Brown & Drewein 1995	**Colorado**	**67% fall; 55% spring**	**Sandhill crane**
Alonzo, et al. 1994	Spain	60%	Various

[1]Reduction in collisions or mortality; if more than one device used, results for most effective device shown.

Effectiveness of bird diverters is highly variable and never 100% effective

- Results for Sandhill Crane varied from 50 to 70% effective

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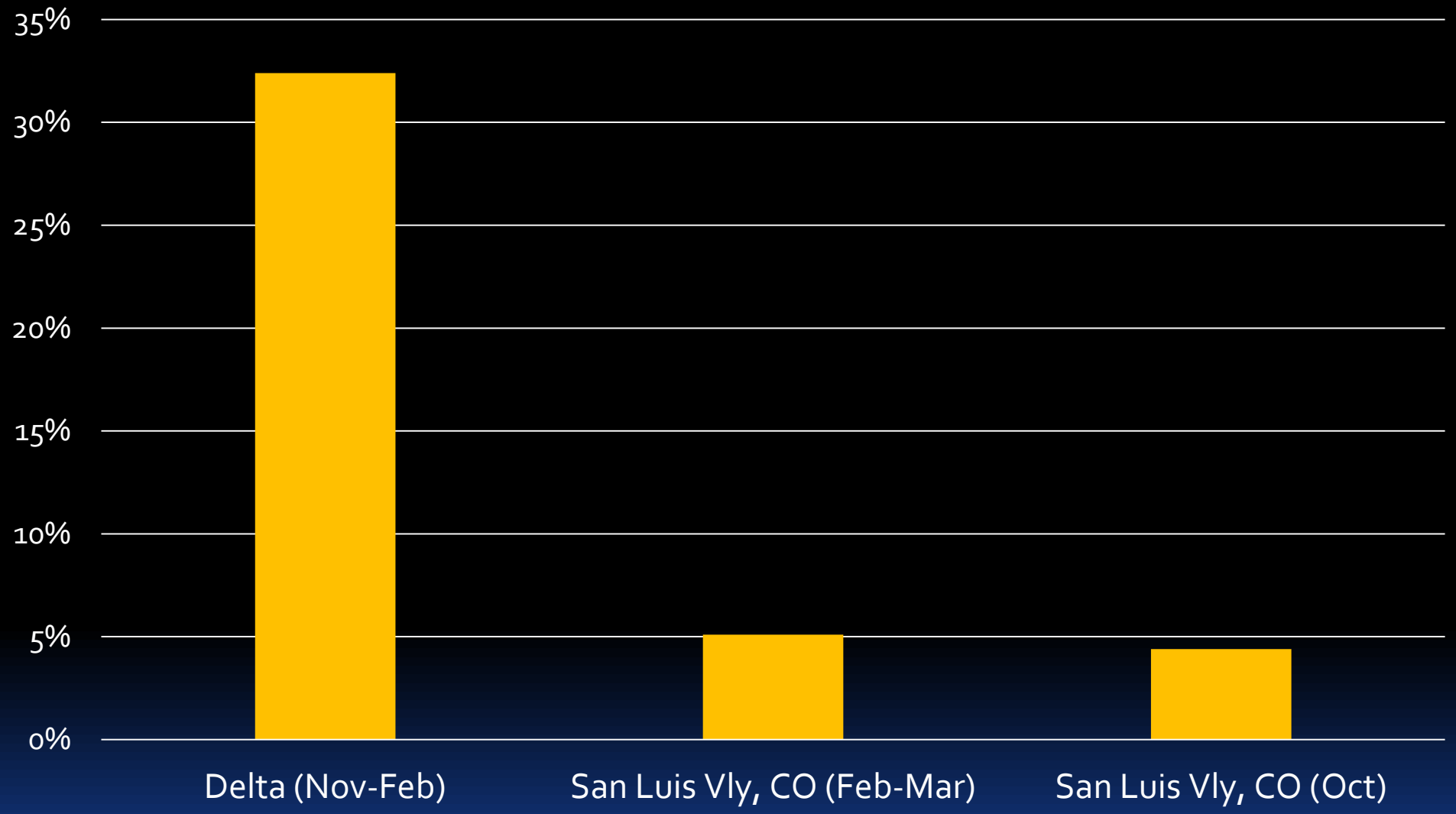
- Significant fog is more than 7 times more likely in the Delta than in the San Luis Valley, CO

% days w/significant fog



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- Significant fog is more than 7 times more likely in the Delta than in the San Luis Valley, CO
  - 32% of days are foggy in the Delta when cranes are present
  - only 4-5% of days are foggy in San Luis Valley

Increased activity in the project area may flush cranes, increasing risk from existing power lines

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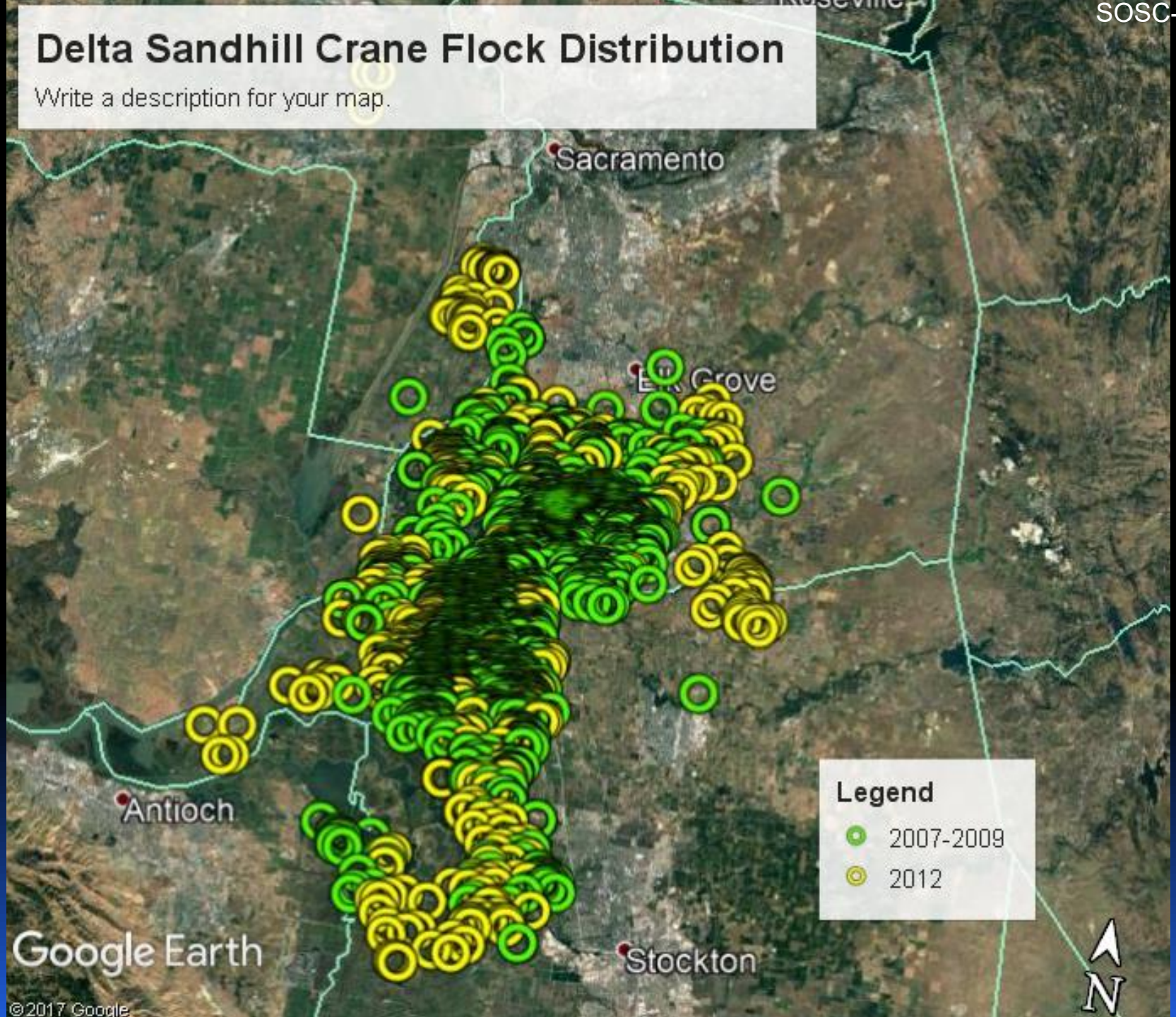
- Murphy et al. (2016a) noted that cranes were at particular risk of collision with lines when flushed

Elimination of transmission lines on Staten Island (Alt 4A) is helpful, but crane movements outside of this site significant


Delta Sandhill Crane Flock Distribution
Write a description for your map.
Sacramento
Elk Grove
Antioch
Stockton
Legend
2007-2009
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Google Earth
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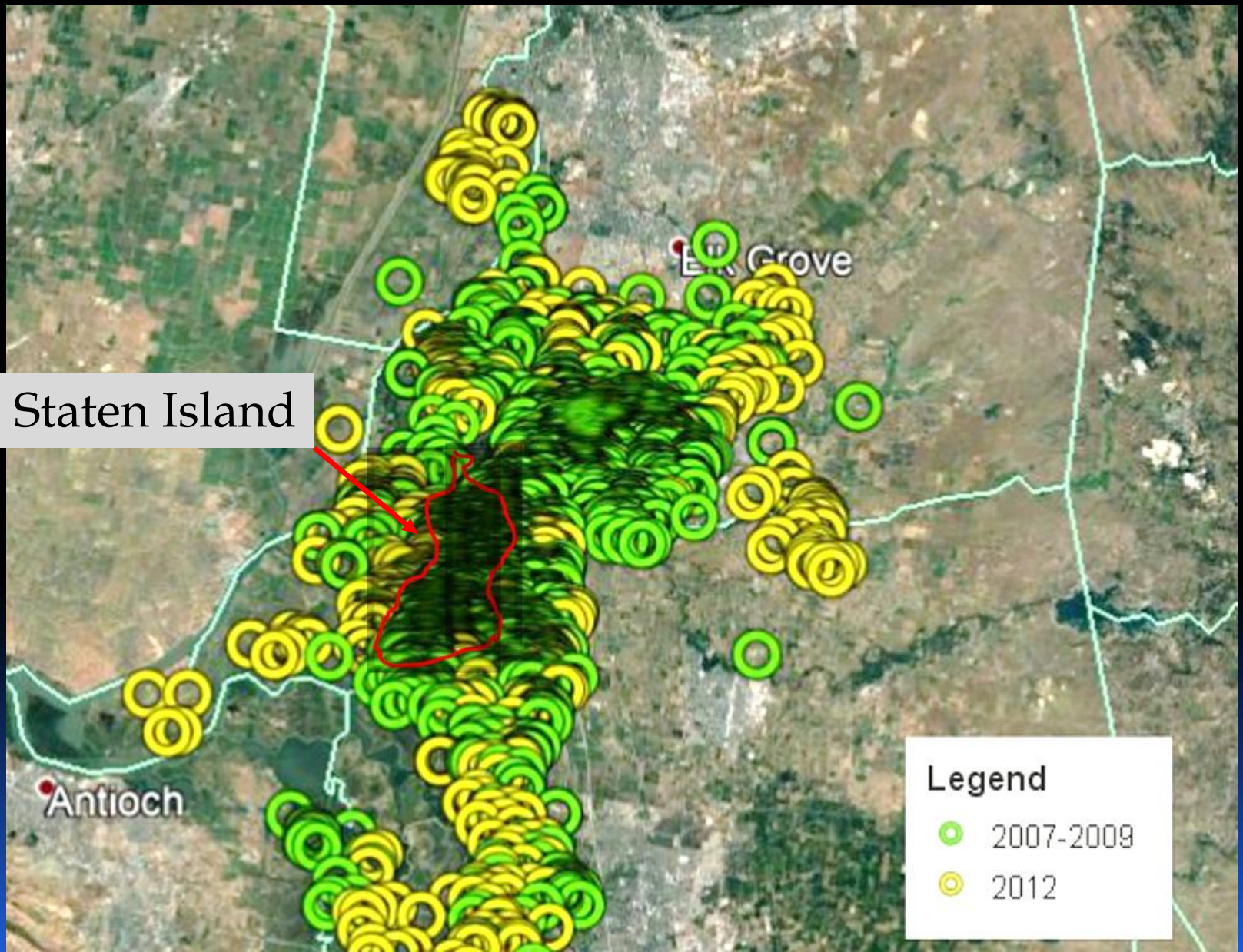
While Staten Island has the highest concentration of cranes, crane movement occurs well beyond that site



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- Because most collisions occurred at night (Murphy et al. 2016a), glow-in-the-dark or lighted diverters should be tested.
- To reduce increased risk from existing lines, those lines should also be marked with the most effective diverters.

California Black Rail

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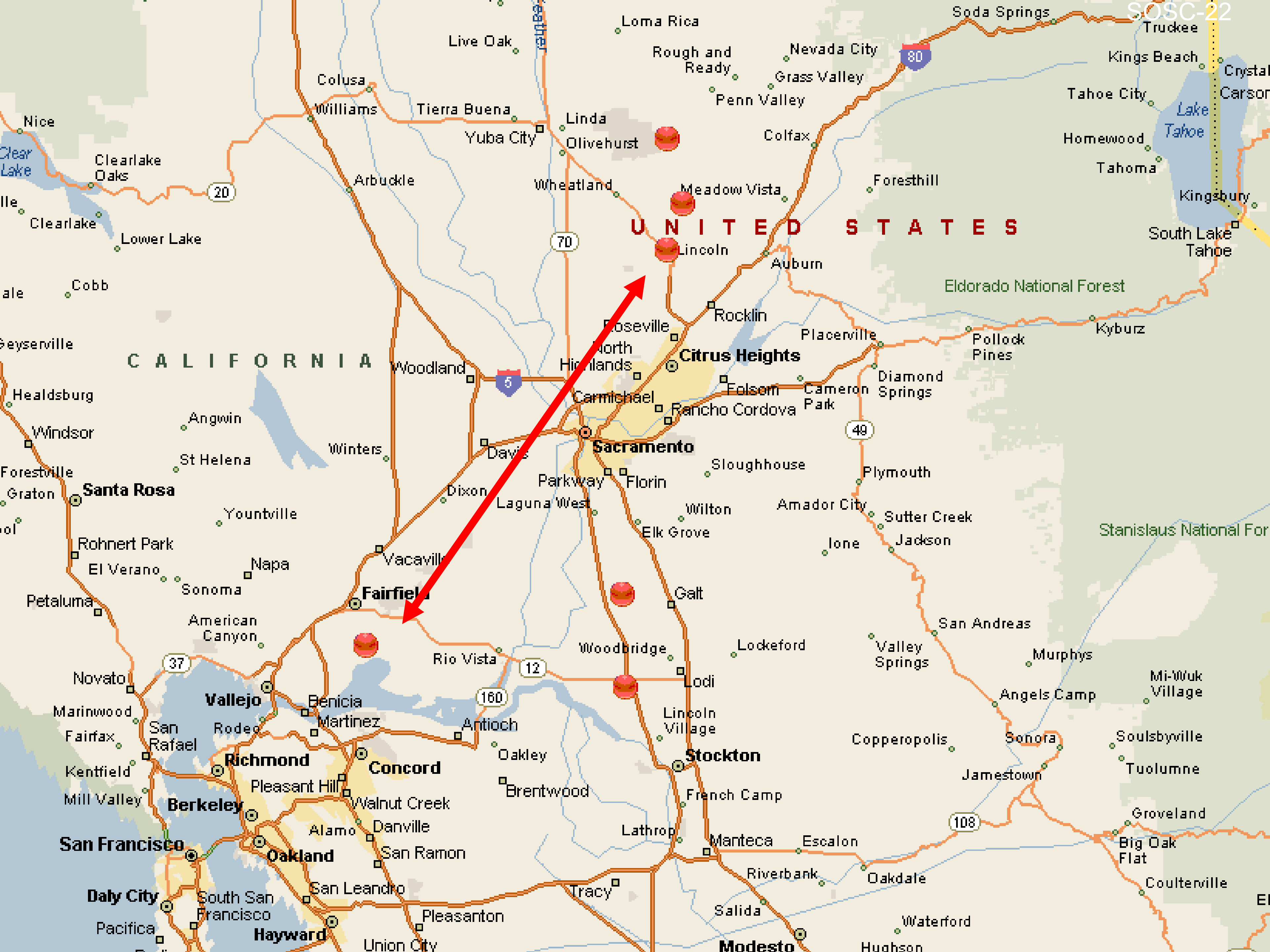
- In the 1990s a large population was discovered in the Sierra foothills (Aigner et al. 1995, Richmond et al. 2010, Girard et al. 2010).

The FEIR/S concludes that Project power lines do not pose a risk to Black Rail due to their "sedentary, non-migratory" nature

- Recent work shows that there is migration between the Bay/Delta CA Black Rail population and the Sierra Foothills population (Girard et al. 2010).



SOSC-22
UNITED STATES
CALIFORNIA
Loma Rica
Live Oak
Rough and Ready
Nevada City
Grass Valley
Penn Valley
Soda Springs
Truckee
Kings Beach
Crystal
Carson
Tahoe City
Lake Tahoe
Homewood
Tahoma
Kingsbury
South Lake Tahoe
Colusa
Williams
Tierra Buena
Yuba City
Linda
Olivehurst
Colfax
Foresthill
Nice
Clear Lake
Clearlake Oaks
Clearlake
Lower Lake
Arbuckle
Wheatland
Meadow Vista
Lincoln
Auburn
Eldorado National Forest
Cobb
Rocklin
Roseville
North Highlands
Citrus Heights
Placerville
Pollock Pines
Kyburz
Geyserville
Woodland
Carmichael
Folsom
Cameron Park
Diamond Springs
Rancho Cordova
Healdsburg
Angwin
Windsor
Winters
Davis
Sacramento
Sloughhouse
Plymouth
St Helena
Forestville
Graton
Santa Rosa
Dixon
Parkway
Florin
Laguna West
Wilton
Amador City
Sutter Creek
Yountville
Elk Grove
Ione
Jackson
Stanislaus National For
Rohnert Park
El Verano
Napa
Vacaville
Sonoma
Fairfield
Galt
Petaluma
American Canyon
San Andreas
Rio Vista
Woodbridge
Lockeford
Valley Springs
Murphys
Novato
Lodi
Mi-Wuk Village
Angels Camp
Vallejo
Benicia
Marinwood
Martinez
Antioch
Lincoln Village
San Rafael
Rodeo
Fairfax
Copperopolis
Sonora
Soulsbyville
Richmond
Concord
Oakley
Stockton
Kentfield
Tuolumne
Jamestown
Pleasant Hill
Brentwood
Mill Valley
Berkeley
Walnut Creek
French Camp
Groveland
Alamo
Danville
Lathrop
San Francisco
Manteca
Escalon
Big Oak Flat
Oakland
San Ramon
Riverbank
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- There is frequent dispersal between sites in the foothills (Richmond et al. 2010)

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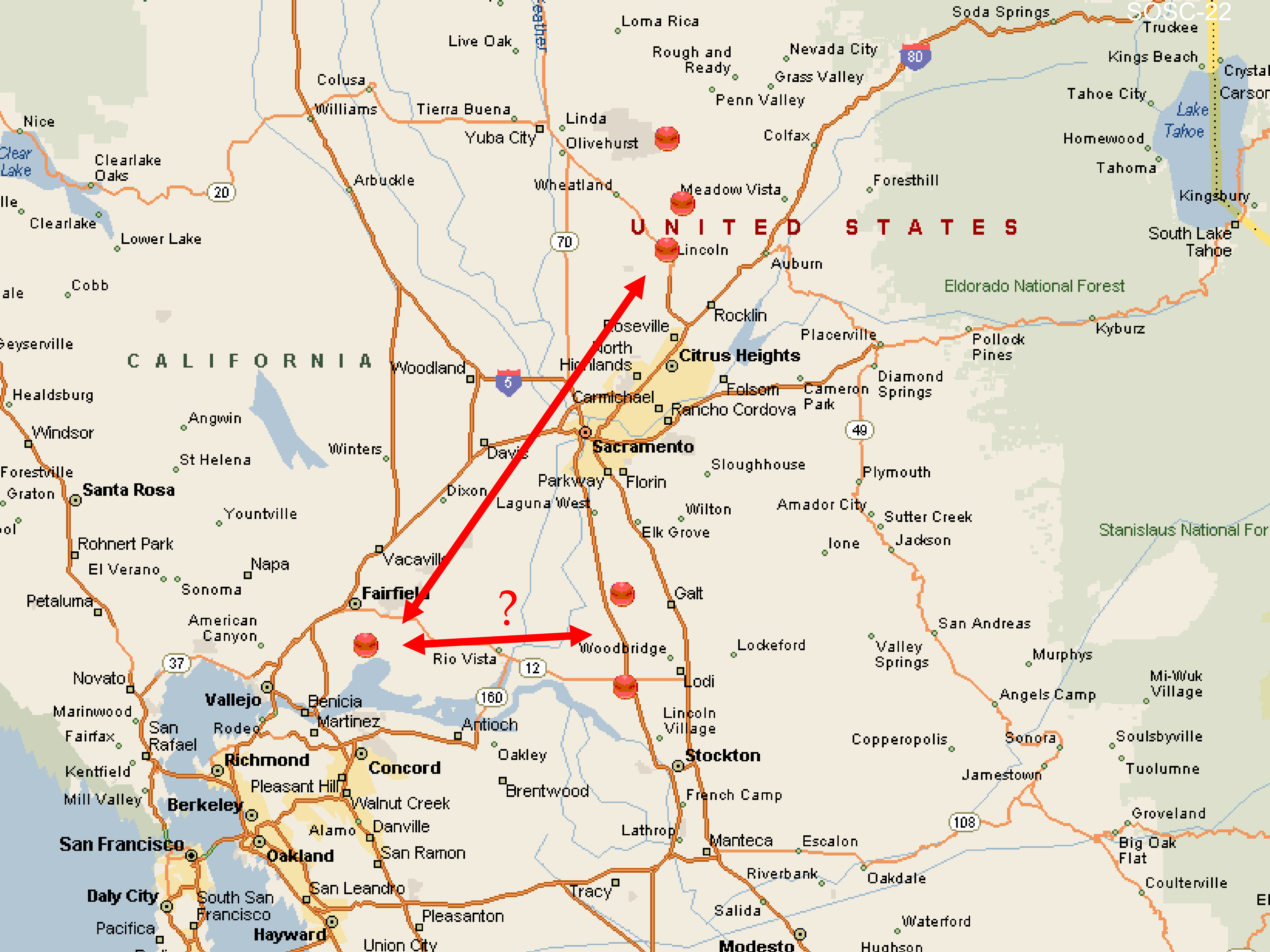

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Lake Tahoe
Homewood
Tahoma
Nice
Clear Lake
Clearlake Oaks
Arbuckle
Wheatland
Meadow Vista
Foresthill
Kingsbury
Clearlake
Lower Lake
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Auburn
South Lake Tahoe
Cobb
Eldorado National Forest
Roseville
Rocklin
Placerville
Kyburz
Geyserville
CALIFORNIA
North Highlands
Citrus Heights
Pollock Pines
Woodland
Diamond Springs
Healdsburg
Carmichael
Folsom
Cameron Park
Angwin
Rancho Cordova
Windsor
Winters
Sacramento
St Helena
Davis
Sloughhouse
Plymouth
Forestville
Parkway
Florin
Graton
Santa Rosa
Dixon
Laguna West
Wilton
Amador City
Yountville
Sutter Creek
Elk Grove
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Jackson
Stanislaus National For
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Angels Camp
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Richmond
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Kentfield
Concord
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Jamestown
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Brentwood
Mill Valley
Walnut Creek
French Camp
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- There is frequent dispersal between sites in the foothills (Richmond et al. 2010)
- Black Rails are also occur in the Central Valley floor and there may be movement between the Delta and these sites.
- Black Rails have been shown to move between the south SF Bay and north SF Bay (Trulio & Evens 2000).

Recommended Conditions of Approval

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White-tailed Kite

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  - WT Kite is relatively sedentary and needs foraging habitat near nest sites.

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- The Project must specify how ag land will be maintained as high-quality habitat long term.
- To ensure effective mitigation, habitats must be acquired BEFORE the Project begins and high-quality habitat needs to be acquired within 1 km of WT Kite nesting habitat.