

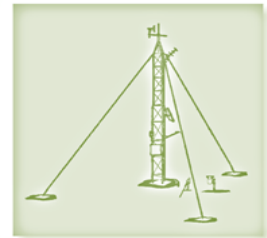
**Northern Spotted Owls
Near Weaverville and
Trinity Lake
In Trinity County**

*Within the Landscape Survey
Strategy Area
(An Interim Report)*

Sierra Pacific Industries
May 2017

Sierra Pacific Industries
Post Office Box 496014
Redding, California 96049-6014

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Sierra Pacific Industries

Forestry Division • P.O. Box 496014 • Redding, California 96049-6014
Phone (530) 378-8000 • FAX (530) 378-8139

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Introduction

In 2003, Sierra Pacific Industries (SPI) coordinated with the US Fish and Wildlife Service (Service) to design a comprehensive multi-year survey of northern spotted owls (NSO), which we called the Landscape Survey Strategy (LSS). It was designed to survey all suspected spotted owl nesting/roosting habitat within SPI lands and extending out to 0.7 miles from SPI. The total area within the LSS was 307,408 acres, of which 142,279 acres (46%) belong to SPI. Most of the neighboring lands are under the control of the Shasta-Trinity National Forest. This strategy established 474 permanent survey points (Figure 1) that were surveyed for five consecutive years from 2003 through 2007.

In years previous to the 1990 listing of the NSO under the U.S. Endangered Species Act, SPI surveyed much of their ownership in Trinity County to the north and south of Weaverville to determine how many NSO activity centers were present. Surveys were done using protocols existing at the time, but may not have been comprehensive in area coverage, and negative results were not compiled. In addition, activity centers in older California Natural Diversity Data Base records were included in the SPI database.

Thus, while we had a good general idea of the extent and numbers of sites on SPI lands, we knew that we did not have an accurate estimate of the number of NSO occupied activity centers. During the 1990s, our approximate estimate of activity centers on or near the property was 52 (Figure 2), but that estimate was subject to several sources of error, especially inclusion of older sites from over a decade earlier (some from as early as 1974). We could not estimate how many of these met the protocol definition of occupied.

In the decade following the 1990 federal listing of the NSO, the activity centers recorded prior to the listing were not surveyed systematically. Instead, most surveys during that period were project based (i.e., during THP prep for the THP area only). Through the 1990s and early 2000s, all THPs were surveyed and harvested under no-take guidance, according to the Forest Practice Rules (FPR) and to whichever agency process was in place at the time. We occasionally found occupied sites in new areas, but many older sites were not revisited over a period of several years. Birds were not marked (by banding), so we could only speculate as to movements.

Also during the early 1990s, the Service designated five sites as abandoned. Three of these ACs had been subject to more extensive timber harvest prior to the listing, and they had not been found to be occupied at any time since the listing of the NSO (Figure 3).

Results

The number of occupied activity centers found during the 2003 - 2007 surveys was 47 (Figure 3), of which nine were not previously known. Coincidentally, nine older activity centers were not occupied during this five-year survey period. Most of the new activity centers established by this LSS effort were near older, unoccupied activity centers.

In 2011, we began annual re-surveys of the LSS stations which is continuing to this day. During this survey effort, we found 60 occupied activity centers within the original LSS area, 17 of which were in new locations (Figure 4). One activity center occupied during the 2003-2007 surveys was destroyed by wildfire prior to 2011. In addition, one occupied AC has continued to make minor movements throughout the re-survey period and has since been relocated outside the LSS boundary. Due to this bird originally being located within the LSS boundary and since it was included in the baseline and 2003-2007 analysis, it was included in the density calculations for this survey period even though it now falls just outside the LSS boundary.

Again, new activity centers were usually near older activity centers now unoccupied. Despite the single AC lost to wildfire, the estimated population density seems to be increasing within the study area. The raw density of 60 occupied ACs found on the 173,316 acre survey area between 2011-2016 results in 0.2216 occupied ACs per square mile; up from 0.1736 in 2003-2007 based upon 47 occupied ACs and up from an estimated 0.1551 occupied ACs per square mile in 1989 based upon an estimated 42 occupied ACs (80% of 52 known ACs). See table below:

Year	1989	80% (Recovery)	1989 - 2003	2003 - 2007	2011 - 2016
Occupied ACs	52 (max known 1974-1989)	42	47 (max)	47	60
Crude Density ¹	Not Applicable	0.1551 ²	0.1736 ²	0.1736	0.2216
Comment	Assumed 100% occupancy since actual surveys were not conducted.	Assume the population was a fully recovered population. (80% occupancy per 2008 NSO Recovery Plan)	Max estimate. Assumed all ACs occupied. (Removed 5 abandoned sites with USFWS concurrence)	Occupancy determined at all sites	Occupancy determined at all sites

¹ Note: Crude density is based upon the 173,316 acre area within .5 mile of a survey station, since the larger area inside the general survey boundary includes the town of Weaverville and a significant area that as a result of wildfires or site quality would never be considered potential habitat. See Figure 7 for the estimated effective survey area.

² Grey highlighted numbers are the result of assumptions not actually measured/calculated.

In both of these survey periods, some ACs were determined to be unoccupied due to lack of responses and historically would have been declared abandoned by the Service. Service direction changed in this time period, and the 2012 protocol no longer included a definition for abandoning sites. Thus, ACs generated from owls that may have moved on the landscape continue to increase in number while numbers of occupied ACs and density of owls increased.

In response to the Service's revision of the survey protocol in 2011, we switched to using electronic calling machines for these surveys, and also added over 180 new calling stations, extending geographic extent of the survey effort by about 40 percent, most of which is US

Forest Service land within 1.3 miles of SPI ownership. This resulted in location of still more activity centers outside the original LSS area; these sites have not been included in the summary previously mentioned (Figure 5). Also, in 2011, we began banding all NSO on the ownership, so that in the future we will be able to ascertain whether birds in new locations are residents that have relocated, or whether they are immigrants. Since 2011, we have banded 197 NSO (122 adults/sub adults and 75 juveniles).

Reproduction

During this recent 2011- 2016 effort we were able to determine that 31 of these 60 occupied activity centers were reproductive, producing a minimum of 109 fledglings (Figure 6). This represents 68 individual successful nesting attempts as many of these AC's reproduced two to five times during this six year survey.

Summary and Conclusion

In summary, the uncertainty associated with the estimate of territories extant at the time of listing precludes precise comparison of numbers over the past 27 years. However, while we have seen some change in the location of occupied activity centers, we see no indication of a population decline in the LSS area during the period between the 2003 - 2007 LSS surveys and the surveys being conducted now. While we recognize that this is a very small portion of the California population and our work is not a demographic study; it is worth noting that the LSS area apparently is not showing a similar decline as reported from the NSO demographics studies. The Willow Creek Study area (referred to as NWC) is the nearest USFS demographic study area to the LSS and they have an estimated annual decline of 3.0%. The current range wide demographic average is an estimated annual decline of 3.8% (Dugger et al, 2016).

Compared to those values our numbers of occupied ACs and density of owls appears to be increasing. If our study area NSOs were following these rates and assuming that our original 1989 AC count of 52 (minus those the Service declared abandoned) we would have a 1989 starting estimate of 47 ACs. Then assuming 100% occupancy, applying the NWC study estimated rate of decline our study area should have a reduction to only 20.7 occupied ACs and based upon the NSO range wide estimated rate we should have only 17.5 occupied ACs today.

Since the listing, over the past 27 years, all THPs have been conducted under no-take guidance in effect at the time of harvest. The increased survey effort, improved protocols, and initiation of banding should improve our understanding of the owl population in this area in the future.

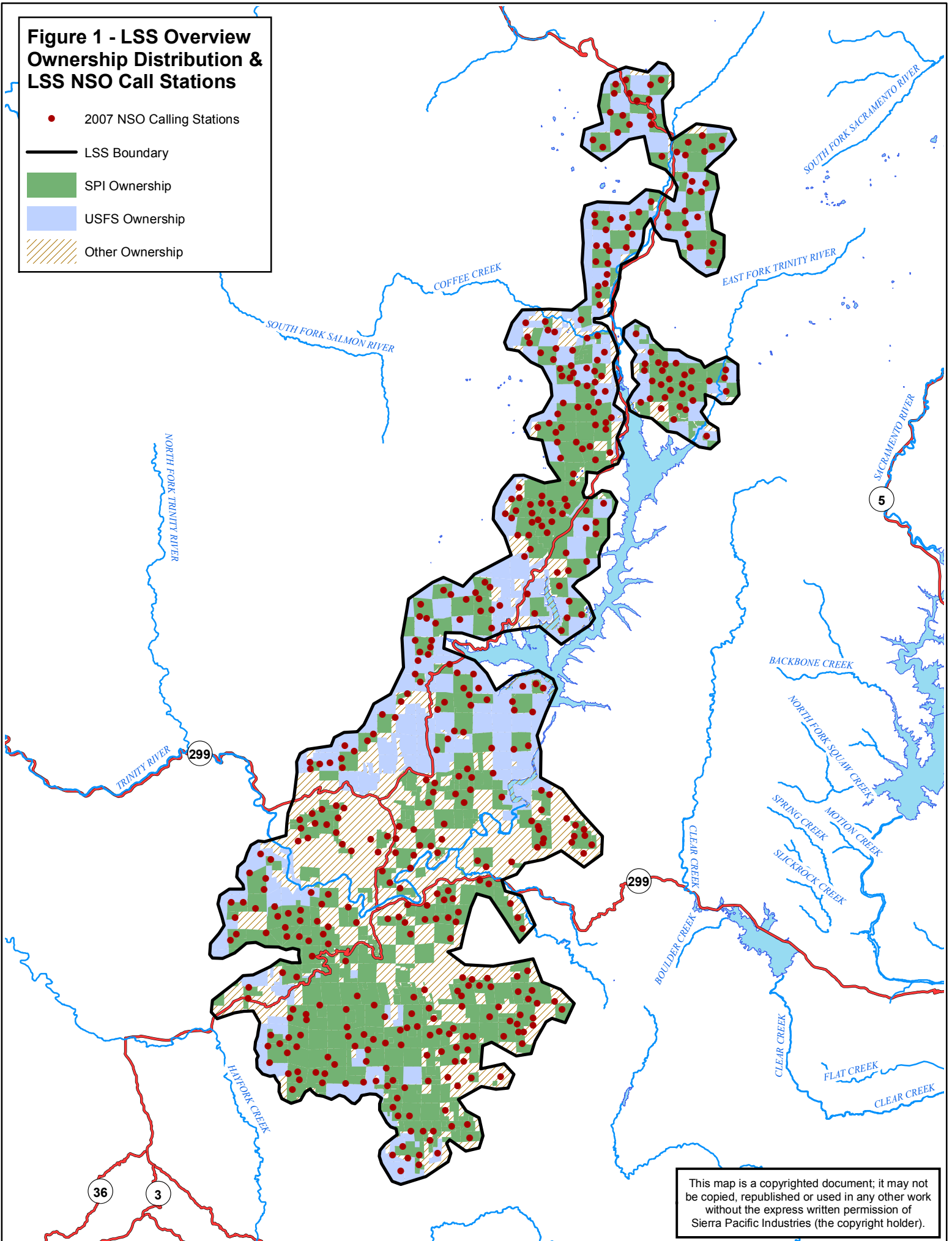
In conclusion, to our knowledge, our LSS effort to determine the number of occupied ACs on a fixed area of land is the only existing dataset upon which to assess potential impacts over time of FPR - guided management on NSO density. This study shows that for the period from 2003 through 2015, despite active timber harvest, there has been only an increase in population density for this portion of the range of the NSO. While our current efforts have demonstrated movement of owls around this landscape, as described above, this has resulted in an increase in the number of ACs and a misleading percent occupied estimate. This resultant increase in overall AC count obscures the fact that actual numbers of "occupied" ACs and the density of owls have increased substantially since the listing of the owl.

References

Katie M. Dugger, Eric D. Forsman, Alan B. Franklin, Raymond J. Davis, Gary C. White, Carl J. Schwarz, Kenneth P. Burnham, James D. Nichols, James E. Hines, Charles B. Yackulic, Doherty, Paul F. Jr., Larissa Bailey, Darren A. Clark, Steven H. Ackers, Lawrence S. Andrews, Benjamin Augustine, Brian L. Biswell, Jennifer Blakesley, Peter C. Carlson, Matthew J. Clement, Lowell V. Diller, Elizabeth M. Glenn, Adam Green, Scott A. Gremel, Dale R. Herter, J. Mark Higley, Jeremy Hobson, Rob B. Horn, Kathryn P. Huyvaert, Christopher McCafferty, Trent McDonald, Kevin McDonnell, Gail S. Olson, Janice A. Reid, Jeremy Rockweit, Viviana Ruiz, Jessica Saenz, and Stan G. Sovern (2016) The effects of habitat, climate, and Barred Owls on long-term demography of Northern Spotted Owls. *The Condor*: February 2016, Vol. 118, No. 1, pp. 57-116..

**Figure 1 - LSS Overview
Ownership Distribution &
LSS NSO Call Stations**

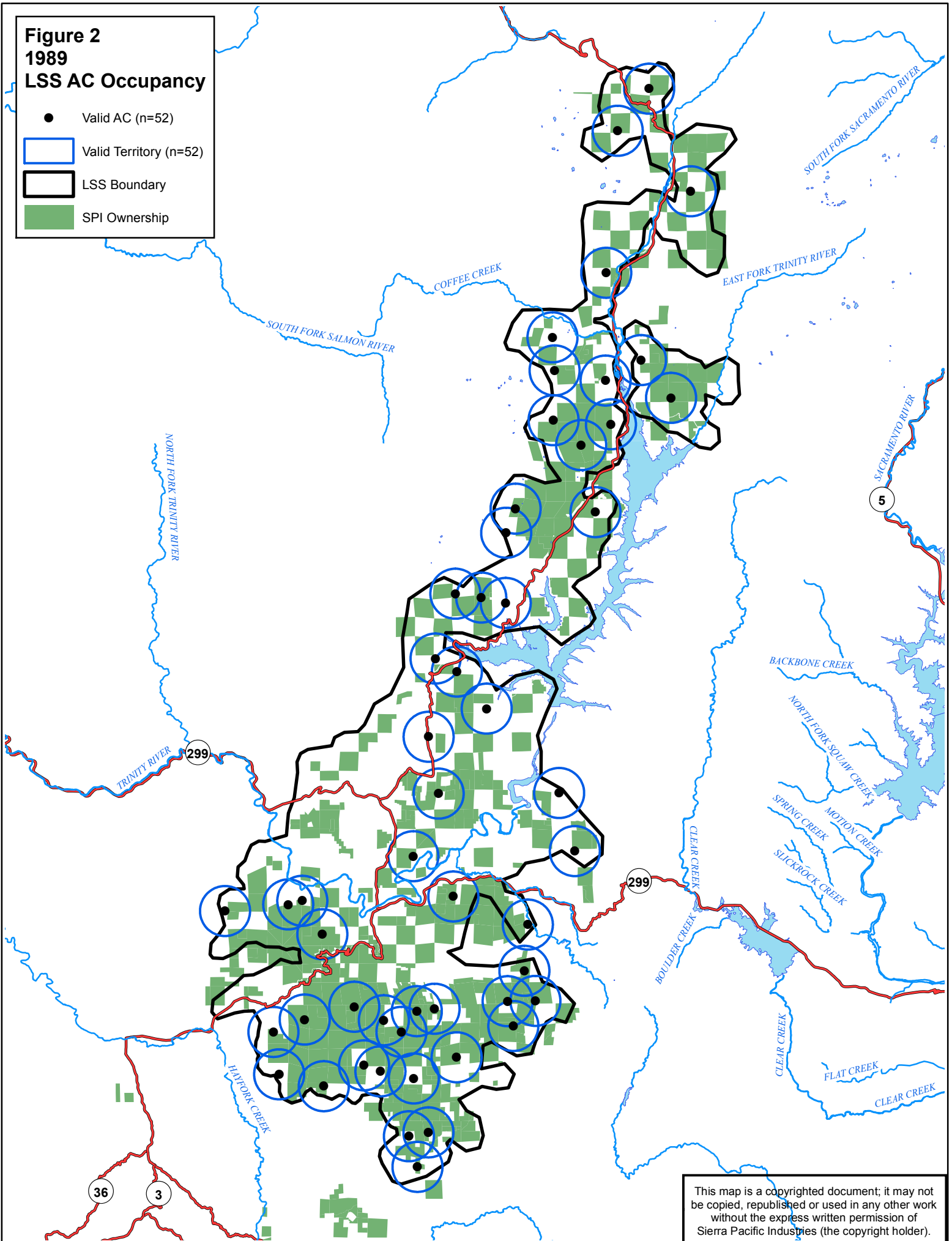
- 2007 NSO Calling Stations
- LSS Boundary
- SPI Ownership
- USFS Ownership
- ▨ Other Ownership



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Figure 2
1989
LSS AC Occupancy

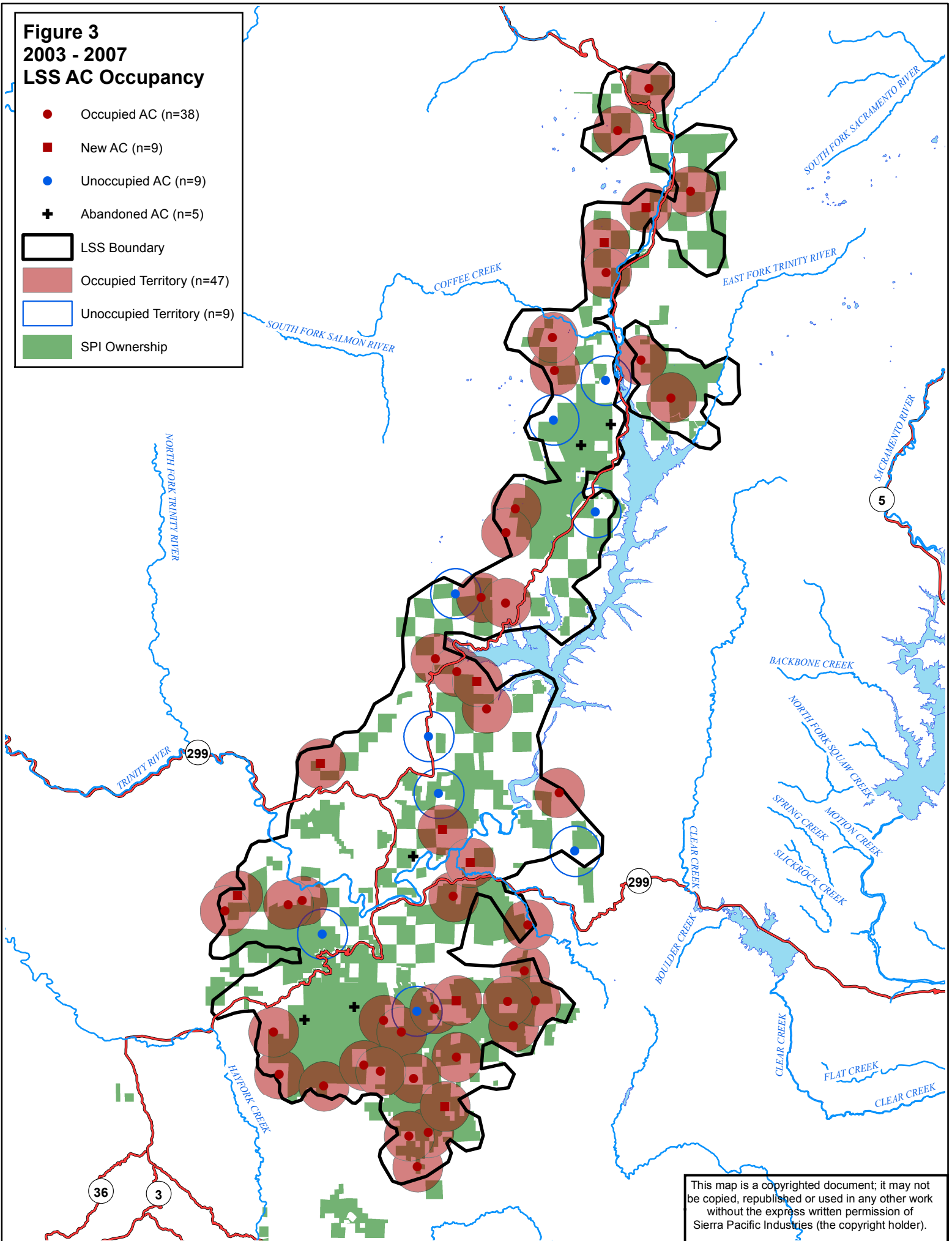
- Valid AC (n=52)
- Valid Territory (n=52)
- ▭ LSS Boundary
- SPI Ownership



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Figure 3
2003 - 2007
LSS AC Occupancy

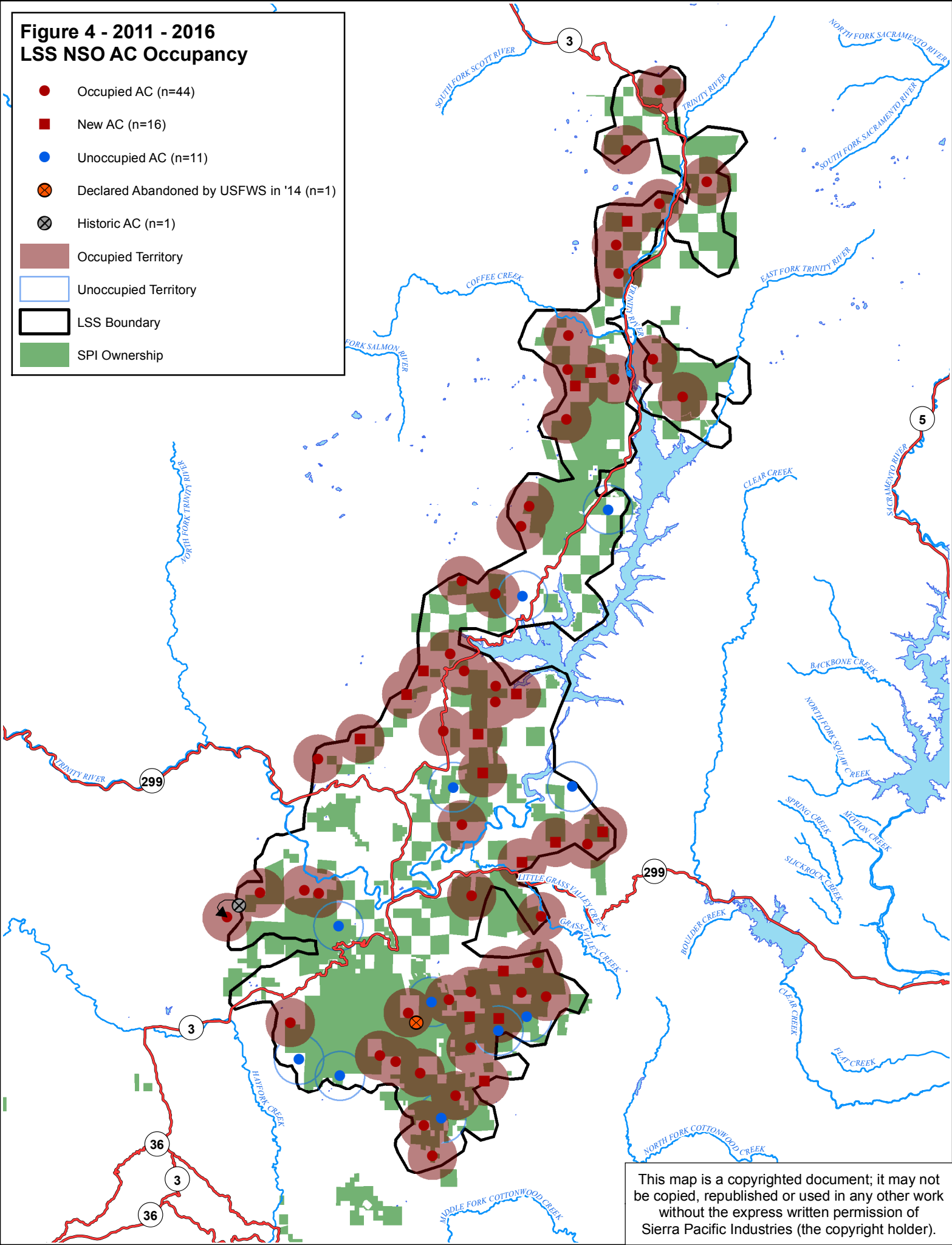
- Occupied AC (n=38)
- New AC (n=9)
- Unoccupied AC (n=9)
- ⊕ Abandoned AC (n=5)
- ▭ LSS Boundary
- Occupied Territory (n=47)
- ▭ Unoccupied Territory (n=9)
- SPI Ownership



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**Figure 4 - 2011 - 2016
LSS NSO AC Occupancy**

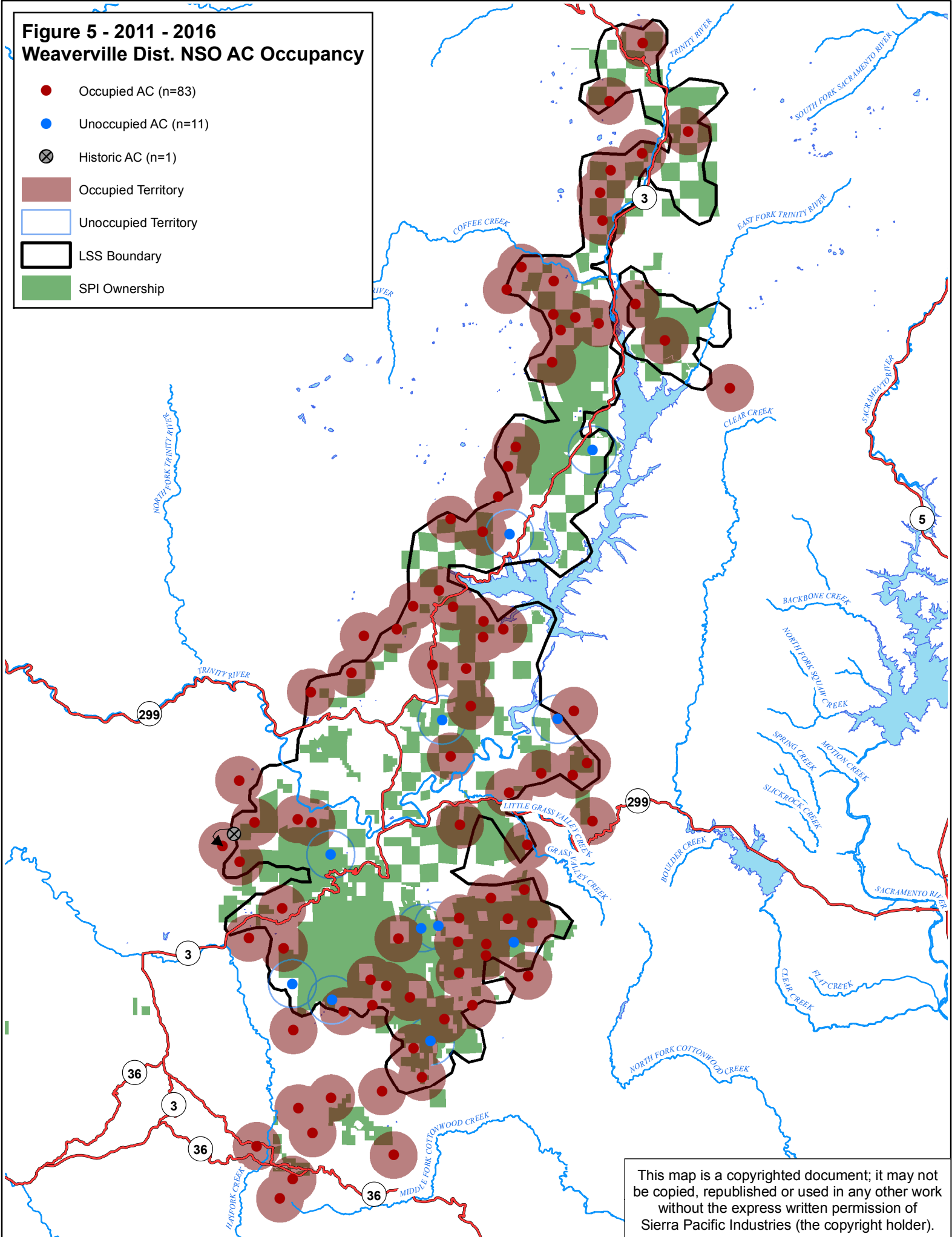
- Occupied AC (n=44)
- New AC (n=16)
- Unoccupied AC (n=11)
- ⊗ Declared Abandoned by USFWS in '14 (n=1)
- ⊗ Historic AC (n=1)
- Occupied Territory
- Unoccupied Territory
- ▭ LSS Boundary
- SPI Ownership



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**Figure 5 - 2011 - 2016
Weaverville Dist. NSO AC Occupancy**

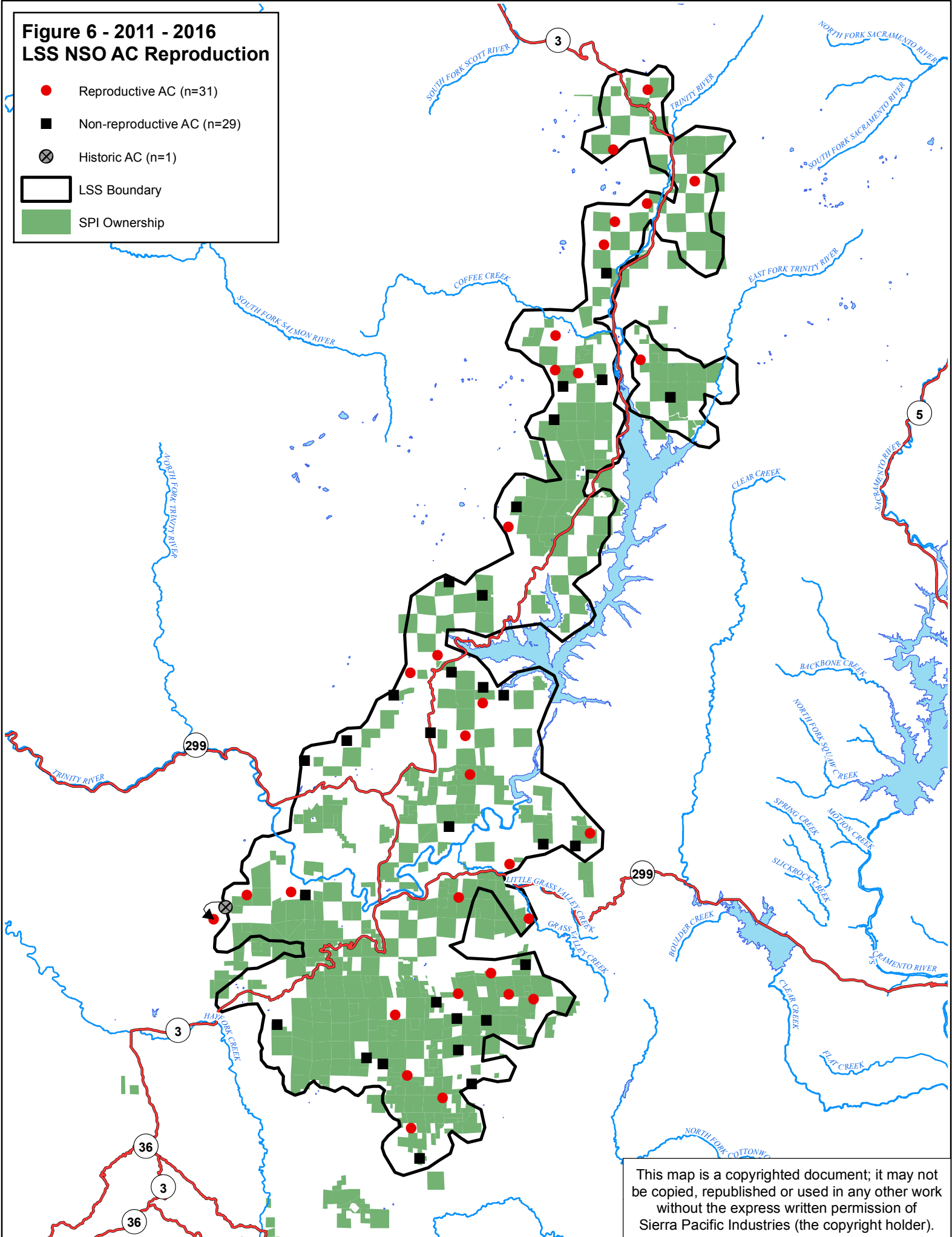
- Occupied AC (n=83)
- Unoccupied AC (n=11)
- ⊗ Historic AC (n=1)
- Occupied Territory
- Unoccupied Territory
- ▭ LSS Boundary
- SPI Ownership



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**Figure 6 - 2011 - 2016
LSS NSO AC Reproduction**

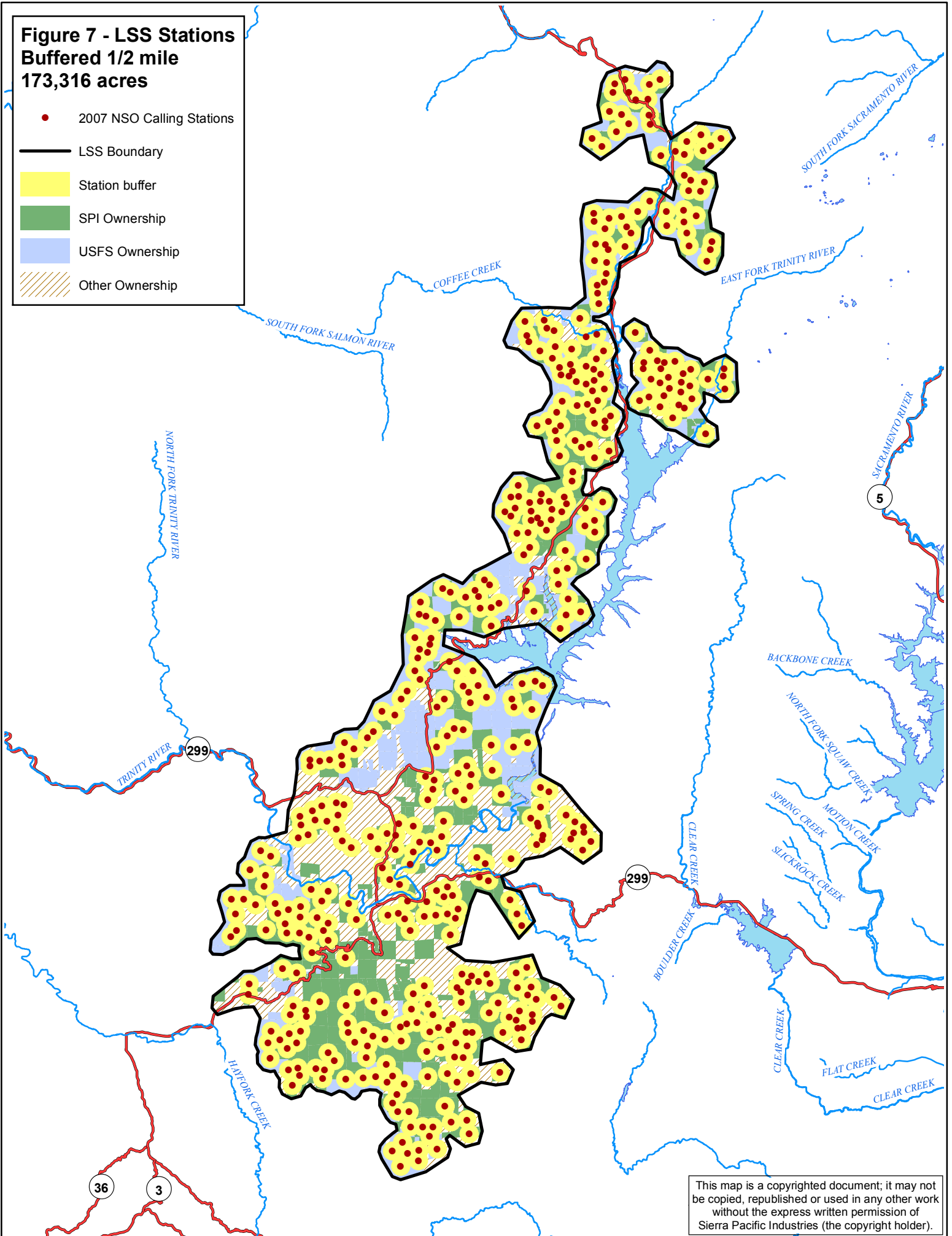
- Reproductive AC (n=31)
- Non-reproductive AC (n=29)
- ⊗ Historic AC (n=1)
- LSS Boundary
- SPI Ownership



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**Figure 7 - LSS Stations
Buffered 1/2 mile
173,316 acres**

- 2007 NSO Calling Stations
- LSS Boundary
- Station buffer
- SPI Ownership
- USFS Ownership
- Other Ownership



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