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2014 WILLOW FLYCATCHER SURVEYS IN EAST-SIDE MEADOWS ON THE TAHOE NATIONAL FOREST

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Above: Willow Flycatcher (inset) and recently restored habitat at Little Truckee 1 & 2

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INTRODUCTION

During summer 2014 The Institute for Bird Populations (IBP) surveyed for Willow Flycatchers using the Bombay et al. (2003) protocol at 15 meadow systems on the east side of the Tahoe National Forest. The purpose of these surveys was to establish presence or absence and approximate territory numbers for Willow Flycatchers at sites known to have been previously occupied. These surveys were completed in compliance with USFS Region 5 Forest Plan Amendments requiring surveys on a 4 year schedule (Powell and Blackwell 2003). The most recent surveys prior to our efforts were completed in 2010 as part of a demographic monitoring effort (Mathewson et al. 2011, 2012). These surveys require 5-minute broadcast of Willow Flycatcher song at stations spaced approximately 50 m apart in appropriate habitat.

METHODS

Survey stations were first delineated in GIS using ArcMap 10.1 and 2012 Natural color NAIP imagery (ESRI 2011). In most cases it was possible to determine approximate locations of willow or other riparian shrubs on the NAIP imagery, allowing for relatively accurate estimates of survey station requirements at each site prior to the field season. During the training period and on the first survey visit we field-verified these site maps and determined if station coverage was adequately covering all suitable habitat, or if any areas where stations were delineated were in fact devoid of any willow cover, or were outside of the meadow plant community (e.g., in upland sagebrush). The field crew located each survey station in the field using a combination of techniques including pre-delineated GPS coordinates, 50-m pacing along a pre-established transect, or use of aerial photo imagery. All 3 techniques were used depending on satellite availability, and to maximize survey effort and minimize time spent orienteering to predetermined coordinates.

During the training period (May 27 – June 31) the project manager and crew leader trained the field crew in basic broadcast survey techniques, implementation of the Willow Flycatcher survey protocol specifically, *Empidonax spp.* identification, general Sierra bird identification, and field safety and orienteering. The Willow Flycatcher survey protocol requires 2 survey visits spread across 3 different survey periods, with one always occurring during the June 15 to June 25 period when singing is most frequent and presence of passage migrants is least likely (Bombay et al. 2003). Due to the drought conditions in 2014 we chose to survey 10 sites during the first survey period and 4 sites during the 3rd survey period (and all 14 sites during the 2nd period). This was in anticipation that birds might settle and start breeding slightly sooner this

year when compared to years when snow is sometimes still on the ground and willows have not yet leafed out in early June. Similarly we were concerned that some individuals might elect not to breed because of dry conditions, or fail early and not be singing during the later 3rd survey period. These factors made frontloading surveys in the first period preferable to waiting until survey period 3.

All surveys were completed between first light and 10:00 am. During surveys, if a Willow Flycatcher was detected, the bird was assigned an alpha code (a, b, c) and the approximate distance and bearing of the bird from the survey station were recorded. If a Willow Flycatcher occurred in an area that closely overlapped survey points that had not yet been surveyed those stations were skipped (for that visit only). Stations were skipped based on the assumption that other nearby Willow Flycatchers were already likely to respond to the singing Willow Flycatcher, and that further broadcasting of territorial song in the location would harass the individual and could be considered “take” by the California Department of Fish and Wildlife. Observers moved to the next station, at least 50 m past the singing bird, before resuming broadcasting in accordance with the protocol. Many sites were large enough to require multiple surveyors, multiple days of survey, or both, to adequately cover all areas of available habitat. Our preference was to survey the entire site in a single day, but in some cases using multiple surveyors could create confusion because the broadcast songs of one surveyor could be confused with actual singing flycatchers by another surveyor. Therefore both tactics were used to complete surveys efficiently without degrading survey results.

If Willow Flycatchers were detected during surveys, surveyors returned to the detection locations after the remaining broadcast stations were completed, and spent 0.5 to 1.5 hours mapping territory boundaries and looking for color bands, as time permitted. These visits usually occurred the same day as broadcast surveys, but in some cases they were completed the following day. We used this time to collect as many GPS locations for each Willow Flycatcher as possible. These GPS locations were also categorized by type of location: song perches, foraging perches, or other locations. These observations of territory (or more accurately, use area) boundaries also served to discern whether double-counting of a single individual might have occurred during broadcast surveys. Additionally, these visits provided yet another opportunity to discover additional nearby Willow Flycatchers that may have been silent during surveys. Although we intended to compare approximate “territory” locations found during the 1997-2010 demographic survey with those mapped during our 2014 surveys, it is important to note that only approximate use areas were mapped in 2014 based on only one or two visit to a territory. For this reason it is inappropriate to make comparison about exact use area boundaries between these study efforts or make assumptions about territory/use area

size between years. We also made an attempt to identify whether or not any color-banded Willow Flycatchers remained from the demography study.

Having crew members with strong bird identification skills improves Willow Flycatcher survey results. This is because surveyors who are familiar with other bird sounds can more quickly and accurately rule out other calls and songs as not being from Willow Flycatchers, and are better able to avoid confusion and remain focused on Willow Flycatcher sounds. Although we did not conduct multi-species point counts at each station (as this could reduce focus on the target species) we did attempt to document all species seen or heard during survey visits.

General vegetation and habitat descriptions of the overall meadow were completed per protocol requirements (Bombay et al. 2003). One additional measure was added at the survey station spatial scale and collected during broadcast surveys. At each station the surveyor recorded an ocular estimate of the amount of ground within 10 m of each station that was covered by standing or running water. We collected this measurement to test a simple method of documenting overall wetness across a site using the sample points already established for surveys (and already stratified across all potential Willow Flycatcher habitat within a meadow). This measure could potentially be used to assess change during the season at large sites with adequate sample size (however this will require rigid attention to repeating exact broadcast station locations between visits). We felt this measure was relatively easy and quick to collect at each station, and not easily obtained in any other way. Because willow cover can be calculated from recent NAIP imagery and does not change discernibly on an annual basis, we did not estimate willow cover at individual stations.

RESULTS

Willow Flycatchers detected

During summer 2014 IBP completed Willow Flycatcher surveys to protocol at 15 meadows delineated as “occupied” or “historically occupied” on the east slope of the Tahoe National Forest. All 15 sites received a visit during the mandatory survey period 2 (Bombay et al. 2003). The other survey visit occurred during either the 1st or 3rd survey periods. Due to the drought conditions in 2014 we chose to complete the additional visit during the 1st survey period 10 sites and during the 3rd survey period at 5 sites (Table 1). A total of 902 survey stations were visited. The site with the most stations was Little Truckee 1&2 and the site with the least was Donner Picnic Area (Appendices A, B).

Table 1. Willow Flycatcher survey sites, visit dates, and summary survey results.

Site	Visit 1	Visit 2	Meadow size (ha)	No. stations	Occupied?
Carman Knuthson	6/10/2014	6/25/2014	262	49	N
Cottonwood Creek	6/1/2014	6/15/2014	18	63	Y
Donner Picnic Area	6/1/2014	6/23/2014	42	29	Y
Independence Lake	6/19/2014	7/4/2014		36	Y
Lacey Valley	6/18/2014	7/2/2014	162	66	Y
Lewis Mill	6/6/2014	6/19/2014	30	33	N
Little Perazzo	6/11/2014	6/16/2014	30	40	N
Little Truckee 3	6/9/2014	6/24/2014	30	54	N
Little Truckee Boyington Mill	6/5/2014	6/20/2014	117	101	N
Little Truckee 1&2	6/7/2014	6/21/2014	105	162	Y
Milton Reservoir	6/23/2014	7/4/2014	14	24	Y
Perazzo	6/17/2014	7/1/2014	108	116	Y
Saddle meadow	6/9/2014	6/22/2014	30	28	N
Sagehen Creek	6/2/2014	6/22/2014	42	71	N
Stampede - Little Truckee arm	6/17/2014	7/6/2014		30	Y

We detected singing Willow Flycatchers at 8 of the 15 survey sites in 2014 (Table 1). All but one of these sites had Willow Flycatcher detections during both survey visits (Table 2, Appendix C). Independence Lake was the exception - neither of 2 territories there were detected during the first visit. At Little Truckee 1&2 detections of territories increased from 4 to 7 between the visits, while at Perazzo the detections of territories decreased from 8 to 6 between visits. Similarly, the number of territories detected at Lacey Valley decreased from 2 to 1. These changes in numbers between visits should be viewed cautiously, as newly arriving birds are sometimes migrants that move on to new locations, and some birds become very quiet and difficult to detect after incubation is initiated (Bombay et al. 2003). Weekly or bi-weekly visits to sites over a number of weeks are usually necessary to determine an accurate count of breeding territories. For the three sites with changes between visits we are assuming that Little Truckee 1&2 had 7 territories, Perazzo had 7 territories, and Lacey Valley had 2 territories.

Table 2. Detailed survey results for 15 Willow Flycatcher survey sites; all surveys were conducted in 2014.

	<u>Pre survey season detections</u>		<u>Survey Period 1</u>		<u>Survey Period 2</u>		<u>Survey Period 3</u>	
Site name	Date	No. WIFL territories	Date	No. WIFL territories	Date	No. WIFL territories	Date	No. WIFL territories
Carman Knuthson			6/10	0	6/25	0		
Cottonwood Creek	5/29	1	6/1	1	6/15	1		
Donner Picnic Area	5/28	1	6/1	1	6/23	1		
Independence Lake					6/19	0	7/4	2
Lacey Valley					6/18	2	7/2	1
Lewis Mill	5/30	0	6/6	0	6/19	0		
Little Perazzo			6/11	0	6/16	0		
Little Truckee 1&2			6/7	4	6/21	7		
Little Truckee 3			6/9	0	6/24	0		
Little Truckee Boyington Mill			6/5	0	6/20	0		
Milton Reservoir	5/28	1			6/23	2	7/4	2
Perazzo	5/28	3+			6/17	8	7/1	6
Saddle Meadow			6/9	0	6/22	0		
Sagehen Creek			6/2	0	6/22	0		
Stampede - Little Truckee arm					6/17	3	7/6	3

Although 2014 territory numbers are only estimates, we can still compare these values with site averages from the most recent survey results prior to 2014 with some confidence. Based on the timing of survey visits, locations of territories between visits, and other behavioral observations, we estimate a total of 25 defended territories across the 8 occupied sites (Table 3, Appendix C). When compared to the most recent 6 years of demographic monitoring (2005 – 2010), our 2014 site-specific territory numbers fell below average annual values in all cases except Stampede Reservoir (Table 3). Site-by-site survey results for 2005 through 2010 and 2014 are provided in Table 3 and described in more detail in the discussion section below.

Our attempts at color-band resighting were largely unsuccessful. We only observed banded Willow Flycatchers at Perazzo and Independence Lake, and color combinations could not be discerned. Without a concerted effort to visit territories frequently for the sole purpose of band resighting, useful results can be difficult to attain. In addition, anodized color bands fade

with time, and after 5 years since the last bird was banded during the demography study, few banded individuals may persist within the local population.

Table 3. Comparison of 2014 survey results in comparison to the most recent demographic results (2005-2010) (Mathewson et al. 2011).

	Year							2005-2010 averages	
Site name	2005	2006	2007	2008	2009	2010	2014 ^a	Mean	SE
Carman Knuthson	0	0	1	0	0	0	0	0.2	0.447
Cottonwood Creek	2	5	3	2	2	1	1	2.5	1.378
Donner Picnic Area				1	0	0	1	0.33	0.577
Independence Lake	2	3	2	2			2	2.25	0.5
Lacey Valley	5	5	6	3	4		2	4.6	1.402
Lewis Mill	0						0	0	0
Little Perazzo	2	1	1	1	1	1	0	1.17	0.408
Little Truckee 1&2	11	9	8	6	8	6	7	8	1.897
Little Truckee 3	3	4	3	1	2	2	0	2.5	1.049
Little Truckee Boyington Mill							0		
Milton Reservoir	6	6	4	4	4	2	2	4.34	1.506
Perazzo	4	11	8	8	8	8	7	7.83	2.229
Saddle Meadow	0	0	0	0	0	0	0	0	0
Sagehen Creek	0		0				0	0	0
Stampede - Little Truckee arm	0	1	0	1	1	1	3	0.67	0.516

Other species detected

A total of 113 bird species were detected incidentally during 2014 Willow Flycatcher surveys (Appendix D). Thirteen of these were designated as meadow focal species by Loffland et al. (2011) and occurred at 1 to 15 of the sites (Table 3). The wet meadows we visited almost all had ponded water or lake margin, so we also detected 11 species of waterfowl and 11 species of wading/shorebirds.

Table 3. Number of sites with meadow focal species detections.

Species	No. of sites with detections
Virginia Rail	3
Sora	2
Wilson's Snipe	5
Wilson's Phalarope	1
Warbling Vireo	11
Red-breasted Sapsucker	14
Swainson's Thrush	1
Wilson's Warbler	9
Yellow Warbler	14
MacGillivray's Warbler	5
Lincoln's Sparrow	4
Song Sparrow	15
White-crowned Sparrow	8

Habitat Description

The 15 sites surveyed were largely dominated by willow and herbaceous cover (primarily sedges) with high values for water cover and saturated soils (Appendix E and F). Water cover at the broadcast station spatial scale provided a valuable addition to overall site condition measures and is promising as a measure of seasonal change in water cover over the course of the summer (Table 3). Most sites appeared to become drier between visits 1 and 2, as expected. Donner Picnic area had water cover double between visits but this site is highly variable due to a very active beaver colony creating extensive dams and ponds. The 2 restored sites, Perazzo and Little Truckee 1 & 2, were by far the wettest sites with average water cover of 35.1% and 30.9%, respectively.

Table 3. Average percent water cover within 10 m of survey stations.

Site name	Visit 1 Average	Visit 2 Average	Seasonal Average
Carman Knuthson	8.7	9.0	8.8
Cottonwood Creek	4.3	3.2	3.8
Donner Picnic Area	16.2	28.5	21.8
Independence Lake	11.5	8.3	10.1
Lacey Valley	17.4	12.2	14.6
Lewis Mill	4.9	2.8	3.9
Little Perazzo	4.9	1.9	3.5
Little Truckee 1&2	43.8	20.2	30.9
Little Truckee 3	8.9	7.2	8.1
Little Truckee Boyington Mill	13.0	8.8	11.0
Milton Reservoir	20.9	8.7	14.0
Perazzo	48.1	21.7	35.1
Saddle Meadow	20.0	13.5	16.9
Sagehen Creek	18.5	15.5	17.1
Stampede LT arm	4.0	1.9	2.9
<i>Site Average</i>	<i>20.4</i>	<i>12.6</i>	<i>16.6</i>

DISCUSSION

Overall, territory numbers at the survey sites seem to have declined slightly since they were last visited during the demography study in 2010. Given the unusual drought conditions in 2014 and only a single year's survey effort, we should be cautious about drawing conclusions about this possible trend. Nonetheless, it appears that Perazzo Meadow, Little Truckee 1 & 2, and Stampede Reservoir may be retaining similar numbers to previous years. It is especially promising that the restored meadows seem to be retaining Willow Flycatchers and even supporting them in portions of the meadows not recently used. Ideally, though, we would have seen increased numbers at these sites when compared to pre-restoration values. It is possible that restoration effects are still in the process of creating more and better habitat through willow recruitment and that there is a time lag in Willow Flycatcher response. It is also possible that the population is simply not reproducing or surviving at rates capable of filling the additional habitat. Numbers seem noticeably down at Milton Reservoir, and especially Lacey Valley. Given that Lacey supported double digit numbers only 14 years ago, having only 2 territories currently is an alarming development. The following section discusses site by site conditions for the 15 survey sites. Demographic study results for comparison are found in Mathewson et al. 2011.

Carman Knuthson

Although large parts of the Carman Knuthson site are quite wet at the southeast end of the meadow, this area doesn't support much willow cover. Habitat for Willow Flycatcher is primarily occurring in the western portion of the meadow near the mature willow stands and restored ponds. Although Willow Flycatchers are known to use this site in migration (both east and west areas; unpublished MAPS data, Mathewson et al. 2011) the species was not detected in 2014.

Cottonwood Creek

This site supports dense willow and areas of saturated soils and ponds. Most meadow wetness comes from a series of springs that surface in the meadow. We detected only one Willow Flycatcher during surveys, and incidentally this same location supported a Willow Flycatcher during early migration when we visited for training purposes in late May (5/29). Birds arriving early tend to be older, so it is possible that this individual is remaining from the demography study, but no bands were detected. The numbers of territories have declined from a high of 5 in 2006. During the entire demography study the mean number of territories was 2.4 (SE=0.04) and during the final 6 years the mean was 2.5 (SE=1.378). It is possible that with the drought and continued regrowth of conifers and brush in the surrounding post-fire plantation, meadow wetness is considerably less than it was during the years when Willow Flycatchers were most abundant.

Donner Picnic Area

This site has only been reported to support a single territory in 2008. Surveys since that time have not detected breeding Willow Flycatchers. In 2014, a singing Willow Flycatcher was detected at the site during pre-survey training (5/28) as well on both survey visits. Beaver activity at the site keep it extremely wet, and ponded water occurs across most of the site despite drought conditions.

Independence Lake

This site supported a single territory in 2014 although, interestingly, none was detected during the first visit which occurred in mid-June during survey period 2. This territory was only detected during survey period 3 on July 4. At that time an additional banded non-singing Willow Flycatcher (presumably female) was seen in the same territory, but band combinations could not be determined. This site typically supported 2 to 3 territories during 1998- 2010 (mean=2.3, SE=0.2), and 2.25 (SE=0.5) during the final 6 years of the demography study.

Lacey Valley

Results at Lacey Valley were surprising. Only 2 singing Willow Flycatchers were ever detected at the site during 2014, and both were in the same general locations. These 2 birds were in a frequently occupied location on the only large willow-lined flooded oxbow in the meadow. What is difficult to explain is the lack of Willow Flycatchers downstream of the road crossing, especially at the mouth of the stream where it enters the lake. In early years of the demography study this downstream portion of the meadow contained the majority of Willow Flycatchers (as many as 9 of a total of 14 territories in 1999). The most recent visits (non-protocol) in 2012 as part of meadow point counts and land transfer surveys detected only 3-4 territories, and the last 6 years of the demography study detected a mean of 4.6 territories ($SE=1.406$). All years of study combined had a mean of 8.1 territories ($SE=1.1$). Perhaps low lake levels make this site less appealing than in early years, and a lack of oxbows along the stream channel reduce standing water conditions for most of the meadow.

Lewis Mill

This meadow has considerable willow, but very little standing water. It also tends to be somewhat more closed in by adjacent forests than most sites. Occupancy history is spotty, but given habitat conditions the likelihood of occupancy might increase substantially in wetter years. The last reported detection was 2012.

Little Perazzo

No Willow Flycatchers were detected at Little Perazzo in 2014. This site has considerable habitat along the aspen border at the southeast edge and has supported as many as 2 territories (2003-2005), but averaged only 1.2 territories during the demographic study ($SE=0.2$). Only during 2000 was the site unoccupied. All standing water at the site comes from a series of springs, so the site was considerably drier after 2 years of drought relative to previous years.

Little Truckee 3

This site did not support Willow Flycatchers in 2014. The number of territories reached a maximum of 6 in 1999 (a very wet year), but during the final 6 years of study the mean declined to 2.5 ($SE=1.409$). Mean number of territories across all years of study was 3.4 ($SE=0.4$). Point counts in 2012 detected one territory at the south end of the meadow between the Henness Pass road and the river. This site continues to be quite dry away from the entrenched main channel. Due to very low snowpack in 2014 the old oxbows didn't hold water. Sagebrush is encroaching into many of the willow stands on the north side of the river.

Little Truckee 1&2

Of the 7 territories detected in 2014, only 4 were detected during the first visit on June 7, with 3 additional males arriving by the June 21 visit. Territories were largely detected in similar locations as during the demography study. Notable differences were the lack of any territories at the far east end of the meadow, and the occupancy of areas along the north side of the river, that were rarely, if ever, used during the demography study. Total number of territories during the demographic study at this site were as high as 13 in 1998, but had declined to 8 ($SE=1.897$) the last 4 years of study. Mean number across all years of study was 9.1 territories ($SE=0.4$). The numbers detected during our surveys in 2014 suggest that territory use has remained relatively steady since restoration occurred in 2010. Since restoration, the entire meadow is significantly wetter from edge to edge, possibly making these previously dry northern parts of the stream bank more appealing to Willow Flycatchers. Even with drought conditions in 2014, measurement of standing water cover was triple that of similar un-restored sites.

Perazzo

Like the other restored site, Perazzo contained a substantial number of Willow Flycatchers detected during surveys in 2014. We detected 8 territories on the first visit on 6/17 and 6 territories on the second visit on 7/1. It appeared that some additional birds arrived to new locations after our first visit, while others may have been migrants or were being secretive. This site had more variation in numbers than most others during the demography study, ranging from 12 in 1997 to 2 in 2002, and back up to 11 in 2006. In the years leading up to restoration, the population held steady at 8 territories (mean=7.83, $SE=2.229$). In general, Willow Flycatchers still seem to be occupying the same locations as during the demography study, but some additional areas are being used along the new ponded restored areas north of the forested knoll that had not been occupied since 1996. As willow vegetation around the constructed ponds matures and more emergent vegetation within the ponds develops, the site is likely to become more appealing to Willow Flycatchers.

Saddle Meadow

Saddle meadow did not support Willow Flycatcher in 2014. This site has only been occupied in one year (1998). Willow at the site is restricted to a linear strip along the stream channel, and the water source is relatively small.

Sagehen Creek

No Willow Flycatchers were detected at Sagehen Creek in 2014. This site was only occupied one year near an active beaver pond 2/3rd of the way upstream from the highway 89 crossing. The majority of the meadow is either relatively dry, or has sparse willow due to shading from the adjacent forest. Habitat around beaver ponds remains good however.

Stampede – Little Truckee arm

During 2014 this site supported 3 territories, which is greater than the number usually detected for this site (mean=0.9, SE=0.2). Because of the varying lake level between years and across the season, the amount of available habitat varies. Low reservoir levels resulted in high values for bare ground and gravel at the meadow in 2014 and relatively low water cover values (Appendix F). It is hard to explain the greater than average number of territories given this information.

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Appendix A. Survey station coordinates (NAD 83)

Site	Station	Longitude	Latitude
Carman Knuthson	1	-120.456446	39.696881
Carman Knuthson	2	-120.455727	39.696954
Carman Knuthson	3	-120.455022	39.697025
Carman Knuthson	4	-120.454301	39.697098
Carman Knuthson	5	-120.453581	39.697171
Carman Knuthson	6	-120.452812	39.697249
Carman Knuthson	8	-120.458388	39.697558
Carman Knuthson	9	-120.457601	39.697639
Carman Knuthson	10	-120.456754	39.697726
Carman Knuthson	11	-120.451503	39.698266
Carman Knuthson	12	-120.450819	39.698336
Carman Knuthson	13	-120.450058	39.698415
Carman Knuthson	14	-120.449314	39.698491
Carman Knuthson	15	-120.448579	39.698567
Carman Knuthson	17	-120.447084	39.698349
Carman Knuthson	22	-120.456013	39.697707
Carman Knuthson	23	-120.455225	39.697772
Carman Knuthson	24	-120.454551	39.697844
Carman Knuthson	25	-120.453812	39.697948
Carman Knuthson	26	-120.453032	39.697994
Carman Knuthson	27	-120.452246	39.698092
Carman Knuthson	28	-120.455347	39.698458
Carman Knuthson	29	-120.454648	39.698598
Carman Knuthson	30	-120.453922	39.69873
Carman Knuthson	31	-120.453238	39.698853
Carman Knuthson	33	-120.451906	39.699094
Carman Knuthson	34	-120.451148	39.699231
Carman Knuthson	37	-120.449629	39.700315
Carman Knuthson	39	-120.448254	39.699754
Carman Knuthson	44	-120.444997	39.698682
Carman Knuthson	45	-120.444341	39.698543
Carman Knuthson	48	-120.442354	39.697557
Carman Knuthson	49	-120.441673	39.697418
Carman Knuthson	51	-120.440397	39.696637
Carman Knuthson	54	-120.438965	39.695513
Carman Knuthson	55	-120.438576	39.695027
Carman Knuthson	57	-120.437654	39.694077
Carman Knuthson	58	-120.436917	39.694087
Carman Knuthson	59	-120.436192	39.694012

Site	Station	Longitude	Latitude
Carman Knuthson	60	-120.435582	39.693776
Carman Knuthson	61	-120.435115	39.693341
Carman Knuthson	62	-120.434472	39.693104
Carman Knuthson	63	-120.433673	39.692943
Carman Knuthson	64	-120.432643	39.692861
Carman Knuthson	65	-120.431658	39.693166
Carman Knuthson	66	-120.439985	39.697479
Carman Knuthson	67	-120.439086	39.697282
Carman Knuthson	68	-120.438448	39.697124
Carman Knuthson	70	-120.438159	39.69668
Cottonwood Creek	1	-120.258752	39.537029
Cottonwood Creek	2	-120.259304	39.537172
Cottonwood Creek	3	-120.259787	39.537297
Cottonwood Creek	3	-120.260311	39.537433
Cottonwood Creek	4	-120.260899	39.537585
Cottonwood Creek	5	-120.261445	39.537727
Cottonwood Creek	6	-120.261964	39.537861
Cottonwood Creek	7	-120.262489	39.537997
Cottonwood Creek	8	-120.263008	39.538132
Cottonwood Creek	9	-120.263552	39.538273
Cottonwood Creek	10	-120.264083	39.53841
Cottonwood Creek	11	-120.264681	39.538407
Cottonwood Creek	12	-120.265198	39.538302
Cottonwood Creek	13	-120.26572	39.538196
Cottonwood Creek	14	-120.266268	39.538164
Cottonwood Creek	15	-120.266788	39.538356
Cottonwood Creek	16	-120.267292	39.538541
Cottonwood Creek	17	-120.267889	39.538504
Cottonwood Creek	18	-120.268536	39.538441
Cottonwood Creek	19	-120.269128	39.538384
Cottonwood Creek	20	-120.269664	39.538214
Cottonwood Creek	21	-120.27012	39.537944
Cottonwood Creek	22	-120.270623	39.537647
Cottonwood Creek	23	-120.271064	39.537386
Cottonwood Creek	24	-120.271513	39.537121
Cottonwood Creek	25	-120.271925	39.536877
Cottonwood Creek	26	-120.272385	39.536605
Cottonwood Creek	27	-120.272887	39.536308
Cottonwood Creek	28	-120.273326	39.536048

Site	Station	Longitude	Latitude
Cottonwood Creek	29	-120.273831	39.535968
Cottonwood Creek	30	-120.274391	39.535963
Cottonwood Creek	31	-120.274988	39.535958
Cottonwood Creek	32	-120.275541	39.535953
Cottonwood Creek	33	-120.276057	39.536053
Cottonwood Creek	34	-120.276428	39.536356
Cottonwood Creek	35	-120.276778	39.536643
Cottonwood Creek	36	-120.277145	39.536944
Cottonwood Creek	37	-120.27751	39.537243
Cottonwood Creek	39	-120.278293	39.537884
Cottonwood Creek	40	-120.278661	39.538185
Cottonwood Creek	41	-120.279032	39.538489
Cottonwood Creek	42	-120.279571	39.538477
Cottonwood Creek	43	-120.280154	39.538463
Cottonwood Creek	44	-120.280692	39.538451
Cottonwood Creek	45	-120.281259	39.538438
Cottonwood Creek	46	-120.281833	39.538479
Cottonwood Creek	47	-120.282381	39.538554
Cottonwood Creek	48	-120.28299	39.538638
Cottonwood Creek	49	-120.283101	39.539007
Cottonwood Creek	50	-120.283214	39.539382
Cottonwood Creek	51	-120.283342	39.539806
Cottonwood Creek	52	-120.28346	39.540198
Cottonwood Creek	53	-120.283583	39.540606
Cottonwood Creek	54	-120.283702	39.541001
Cottonwood Creek	55	-120.284241	39.541107
Cottonwood Creek	56	-120.284849	39.541226
Cottonwood Creek	57	-120.285258	39.54149
Cottonwood Creek	58	-120.285633	39.541814
Cottonwood Creek	59	-120.286029	39.542156
Cottonwood Creek	60	-120.286448	39.542439
Cottonwood Creek	61	-120.272817	39.536979
Cottonwood Creek	62	-120.272971	39.537468
Cottonwood Creek	65	-120.273407	39.538845
Donner Picnic Area	1	-120.181184	39.370192
Donner Picnic Area	2	-120.180759	39.370596
Donner Picnic Area	3	-120.180336	39.370997
Donner Picnic Area	4	-120.179906	39.371406
Donner Picnic Area	5	-120.179501	39.37179

Site	Station	Longitude	Latitude
Donner Picnic Area	6	-120.179094	39.372177
Donner Picnic Area	8	-120.178299	39.372871
Donner Picnic Area	9	-120.177883	39.373205
Donner Picnic Area	10	-120.177422	39.373576
Donner Picnic Area	11	-120.176944	39.37396
Donner Picnic Area	12	-120.176471	39.37426
Donner Picnic Area	13	-120.175798	39.374398
Donner Picnic Area	15	-120.174515	39.374588
Donner Picnic Area	17	-120.173665	39.375127
Donner Picnic Area	20	-120.180538	39.371949
Donner Picnic Area	21	-120.18012	39.372336
Donner Picnic Area	22	-120.179755	39.372674
Donner Picnic Area	23	-120.17935	39.373048
Donner Picnic Area	24	-120.178926	39.37344
Donner Picnic Area	25	-120.178394	39.373794
Donner Picnic Area	26	-120.177974	39.374117
Donner Picnic Area	27	-120.177568	39.374477
Donner Picnic Area	28	-120.177223	39.374838
Donner Picnic Area	29	-120.17695	39.375275
Donner Picnic Area	30	-120.176559	39.375704
Donner Picnic Area	31	-120.179711	39.376113
Donner Picnic Area	32	-120.179135	39.376219
Donner Picnic Area	33	-120.178411	39.376352
Donner Picnic Area	34	-120.177874	39.376452
Independence Lake	1	-120.331192	39.42736
Independence Lake	2	-120.331145	39.427883
Independence Lake	3	-120.331098	39.428399
Independence Lake	4	-120.331053	39.428892
Independence Lake	5	-120.331006	39.429417
Independence Lake	6	-120.329912	39.429446
Independence Lake	7	-120.32997	39.428899
Independence Lake	8	-120.328983	39.428781
Independence Lake	9	-120.328929	39.429386
Independence Lake	10	-120.328884	39.429887
Independence Lake	11	-120.328838	39.430405
Independence Lake	12	-120.328792	39.43092
Independence Lake	13	-120.32875	39.43139
Independence Lake	14	-120.328712	39.431825
Independence Lake	15	-120.327876	39.430606

Site	Station	Longitude	Latitude
Independence Lake	16	-120.327946	39.430085
Independence Lake	17	-120.328019	39.429547
Independence Lake	18	-120.328099	39.428957
Independence Lake	19	-120.327202	39.428611
Independence Lake	20	-120.327114	39.429046
Independence Lake	21	-120.326996	39.429636
Independence Lake	22	-120.326898	39.430123
Independence Lake	23	-120.325488	39.430147
Independence Lake	24	-120.328944	39.433
Independence Lake	25	-120.329389	39.432621
Independence Lake	26	-120.329839	39.432267
Independence Lake	27	-120.330687	39.431045
Independence Lake	28	-120.331062	39.430624
Independence Lake	29	-120.331562	39.430251
Independence Lake	30	-120.331742	39.429862
Independence Lake	31	-120.332138	39.429418
Independence Lake	32	-120.332492	39.429021
Independence Lake	33	-120.332869	39.428599
Independence Lake	34	-120.333255	39.428166
Independence Lake	35	-120.333396	39.427668
Independence Lake	36	-120.333239	39.427248
Lacey Valley	1	-120.411242	39.48147
Lacey Valley	2	-120.411579	39.481088
Lacey Valley	3	-120.411905	39.480706
Lacey Valley	4	-120.412339	39.480283
Lacey Valley	5	-120.412734	39.479845
Lacey Valley	6	-120.413105	39.479445
Lacey Valley	7	-120.413523	39.478995
Lacey Valley	8	-120.413912	39.478576
Lacey Valley	9	-120.414275	39.478185
Lacey Valley	10	-120.414179	39.477132
Lacey Valley	11	-120.414593	39.476748
Lacey Valley	14	-120.416996	39.475609
Lacey Valley	15	-120.4177	39.47569
Lacey Valley	16	-120.418236	39.475614
Lacey Valley	18	-120.418695	39.475163
Lacey Valley	19	-120.419654	39.474631
Lacey Valley	21	-120.420987	39.474332
Lacey Valley	22	-120.421571	39.474161

Site	Station	Longitude	Latitude
Lacey Valley	23	-120.421925	39.473894
Lacey Valley	24	-120.422432	39.473658
Lacey Valley	25	-120.422912	39.473434
Lacey Valley	27	-120.423944	39.472952
Lacey Valley	28	-120.424563	39.472664
Lacey Valley	29	-120.425076	39.472425
Lacey Valley	30	-120.425622	39.47217
Lacey Valley	31	-120.426034	39.471764
Lacey Valley	32	-120.426176	39.471242
Lacey Valley	33	-120.42619	39.470873
Lacey Valley	34	-120.426352	39.470442
Lacey Valley	35	-120.426447	39.469943
Lacey Valley	36	-120.426626	39.469465
Lacey Valley	37	-120.426831	39.468909
Lacey Valley	38	-120.427064	39.468443
Lacey Valley	39	-120.427349	39.467997
Lacey Valley	40	-120.427614	39.467484
Lacey Valley	41	-120.427884	39.467043
Lacey Valley	42	-120.428278	39.466581
Lacey Valley	43	-120.428769	39.466293
Lacey Valley	44	-120.429281	39.46601
Lacey Valley	45	-120.429859	39.46569
Lacey Valley	46	-120.430333	39.465428
Lacey Valley	47	-120.43088	39.465125
Lacey Valley	48	-120.43145	39.464792
Lacey Valley	49	-120.430353	39.466377
Lacey Valley	50	-120.428759	39.467921
Lacey Valley	51	-120.426935	39.465676
Lacey Valley	52	-120.426776	39.466154
Lacey Valley	53	-120.426586	39.466668
Lacey Valley	54	-120.426411	39.46714
Lacey Valley	55	-120.426237	39.467613
Lacey Valley	56	-120.426061	39.468089
Lacey Valley	57	-120.425881	39.468575
Lacey Valley	58	-120.425704	39.469053
Lacey Valley	59	-120.425523	39.469544
Lacey Valley	60	-120.425336	39.47005
Lacey Valley	62	-120.424968	39.471044
Lacey Valley	63	-120.424695	39.471591

Site	Station	Longitude	Latitude
Lacey Valley	64	-120.425239	39.467479
Lacey Valley	65	-120.422271	39.467896
Lacey Valley	66	-120.415027	39.478612
Lacey Valley	67	-120.414675	39.479003
Lacey Valley	68	-120.413667	39.480123
Lacey Valley	69	-120.413328	39.4805
Lacey Valley	70	-120.413007	39.480857
Lacey Valley	72	-120.414788	39.479941
Lacey Valley	74	-120.41513	39.479418
Lewis Mill	1	-120.152138	39.564683
Lewis Mill	2	-120.152657	39.564785
Lewis Mill	3	-120.153151	39.564958
Lewis Mill	4	-120.153692	39.565078
Lewis Mill	5	-120.153692	39.565078
Lewis Mill	6	-120.153709	39.565055
Lewis Mill	7	-120.154091	39.565321
Lewis Mill	8	-120.154487	39.565616
Lewis Mill	9	-120.154838	39.565863
Lewis Mill	10	-120.155181	39.566152
Lewis Mill	11	-120.155421	39.566485
Lewis Mill	12	-120.155652	39.566855
Lewis Mill	13	-120.155799	39.567222
Lewis Mill	14	-120.155898	39.567617
Lewis Mill	15	-120.155974	39.568024
Lewis Mill	16	-120.156027	39.568431
Lewis Mill	17	-120.156135	39.568797
Lewis Mill	18	-120.156211	39.569192
Lewis Mill	19	-120.156402	39.569608
Lewis Mill	20	-120.156712	39.569937
Lewis Mill	21	-120.15699	39.570284
Lewis Mill	22	-120.157245	39.570653
Lewis Mill	23	-120.157607	39.571014
Lewis Mill	24	-120.157501	39.571357
Lewis Mill	25	-120.157619	39.571664
Lewis Mill	26	-120.157736	39.572012
Lewis Mill	27	-120.157467	39.572363
Lewis Mill	28	-120.157183	39.57272
Lewis Mill	29	-120.157007	39.573079
Lewis Mill	31	-120.157518	39.573759

Site	Station	Longitude	Latitude
Lewis Mill	32	-120.157869	39.574035
Lewis Mill	33	-120.158111	39.574327
Lewis Mill	34	-120.158274	39.574659
Little Perazzo	1	-120.360358	39.481646
Little Perazzo	3	-120.361689	39.481593
Little Perazzo	4	-120.362359	39.481562
Little Perazzo	5	-120.363031	39.481539
Little Perazzo	6	-120.363657	39.481513
Little Perazzo	7	-120.364336	39.481486
Little Perazzo	10	-120.366282	39.481408
Little Perazzo	11	-120.36966	39.480563
Little Perazzo	13	-120.368246	39.480616
Little Perazzo	14	-120.367616	39.48064
Little Perazzo	15	-120.366936	39.480665
Little Perazzo	16	-120.366266	39.480691
Little Perazzo	17	-120.365581	39.480716
Little Perazzo	18	-120.364884	39.480743
Little Perazzo	19	-120.364192	39.480769
Little Perazzo	20	-120.363488	39.480795
Little Perazzo	21	-120.362835	39.48082
Little Perazzo	22	-120.362143	39.48084
Little Perazzo	23	-120.361495	39.48087
Little Perazzo	24	-120.360853	39.480895
Little Perazzo	25	-120.360202	39.480919
Little Perazzo	26	-120.359578	39.480943
Little Perazzo	27	-120.36062	39.480166
Little Perazzo	28	-120.36123	39.480148
Little Perazzo	29	-120.361898	39.480129
Little Perazzo	30	-120.362605	39.480109
Little Perazzo	31	-120.363279	39.48009
Little Perazzo	32	-120.36393	39.480071
Little Perazzo	33	-120.364598	39.480052
Little Perazzo	34	-120.365257	39.480034
Little Perazzo	35	-120.36643	39.48
Little Perazzo	36	-120.368477	39.479941
Little Perazzo	37	-120.369142	39.479922
Little Perazzo	38	-120.362056	39.479594
Little Perazzo	39	-120.362771	39.479592
Little Perazzo	40	-120.363356	39.479533

Site	Station	Longitude	Latitude
Little Perazzo	41	-120.364118	39.479552
Little Perazzo	42	-120.364658	39.47951
Little Perazzo	43	-120.361395	39.479581
Little Perazzo	44	-120.366111	39.481956
Little Truckee 3	1	-120.32112	39.492914
Little Truckee 3	2	-120.321364	39.49331
Little Truckee 3	3	-120.321601	39.493698
Little Truckee 3	4	-120.321842	39.49409
Little Truckee 3	5	-120.322078	39.494475
Little Truckee 3	6	-120.322322	39.494872
Little Truckee 3	7	-120.322677	39.495186
Little Truckee 3	8	-120.323069	39.495353
Little Truckee 3	9	-120.3235	39.495536
Little Truckee 3	10	-120.323992	39.495744
Little Truckee 3	11	-120.324459	39.495942
Little Truckee 3	12	-120.324926	39.49614
Little Truckee 3	14	-120.326004	39.496352
Little Truckee 3	16	-120.327047	39.496345
Little Truckee 3	17	-120.327577	39.49613
Little Truckee 3	18	-120.328154	39.496049
Little Truckee 3	19	-120.328683	39.495908
Little Truckee 3	20	-120.329153	39.495782
Little Truckee 3	21	-120.329655	39.495647
Little Truckee 3	22	-120.330142	39.495517
Little Truckee 3	23	-120.330681	39.495373
Little Truckee 3	24	-120.331159	39.495245
Little Truckee 3	25	-120.331681	39.495105
Little Truckee 3	27	-120.322012	39.492942
Little Truckee 3	29	-120.322527	39.493742
Little Truckee 3	30	-120.322876	39.494285
Little Truckee 3	31	-120.323123	39.494669
Little Truckee 3	32	-120.323462	39.494943
Little Truckee 3	33	-120.323918	39.495125
Little Truckee 3	34	-120.324404	39.49532
Little Truckee 3	35	-120.32481	39.495679
Little Truckee 3	36	-120.325493	39.495756
Little Truckee 3	37	-120.326007	39.495962
Little Truckee 3	38	-120.326545	39.49592
Little Truckee 3	39	-120.32696	39.495764

Site	Station	Longitude	Latitude
Little Truckee 3	40	-120.3275	39.495708
Little Truckee 3	41	-120.328032	39.49559
Little Truckee 3	42	-120.328491	39.495489
Little Truckee 3	43	-120.329031	39.495369
Little Truckee 3	44	-120.329536	39.495257
Little Truckee 3	45	-120.330594	39.494864
Little Truckee 3	46	-120.330117	39.495023
Little Truckee 3	50	-120.323292	39.493601
Little Truckee 3	51	-120.323526	39.493956
Little Truckee 3	52	-120.323739	39.494278
Little Truckee 3	53	-120.324097	39.494681
Little Truckee 3	54	-120.324608	39.494895
Little Truckee 3	55	-120.3252	39.495139
Little Truckee 3	56	-120.32573	39.49534
Little Truckee 3	57	-120.326271	39.495545
Little Truckee 3	58	-120.326812	39.495421
Little Truckee 3	59	-120.327279	39.495277
Little Truckee 3	60	-120.32877	39.494962
Little Truckee 3	61	-120.329304	39.494817
LT Boyington Mill	1	-120.093344	39.439246
LT Boyington Mill	2	-120.09397	39.439345
LT Boyington Mill	3	-120.094641	39.439463
LT Boyington Mill	4	-120.095199	39.43971
LT Boyington Mill	5	-120.095366	39.439207
LT Boyington Mill	6	-120.093534	39.439841
LT Boyington Mill	7	-120.096306	39.440262
LT Boyington Mill	8	-120.098185	39.440547
LT Boyington Mill	9	-120.098632	39.440892
LT Boyington Mill	10	-120.099086	39.441243
LT Boyington Mill	11	-120.099466	39.441717
LT Boyington Mill	14	-120.099829	39.44296
LT Boyington Mill	15	-120.099962	39.443463
LT Boyington Mill	16	-120.100102	39.443967
LT Boyington Mill	17	-120.100281	39.444484
LT Boyington Mill	18	-120.100764	39.444872
LT Boyington Mill	19	-120.101261	39.445128
LT Boyington Mill	20	-120.100508	39.4453
LT Boyington Mill	22	-120.100685	39.446228
LT Boyington Mill	24	-120.102147	39.44748

Site	Station	Longitude	Latitude
LT Boyington Mill	26	-120.102709	39.44837
LT Boyington Mill	27	-120.103068	39.448796
LT Boyington Mill	29	-120.103676	39.449717
LT Boyington Mill	30	-120.103066	39.45146
LT Boyington Mill	31	-120.102939	39.45191
LT Boyington Mill	32	-120.102797	39.452371
LT Boyington Mill	33	-120.102504	39.452959
LT Boyington Mill	34	-120.102162	39.453422
LT Boyington Mill	35	-120.101843	39.453873
LT Boyington Mill	36	-120.101596	39.456321
LT Boyington Mill	37	-120.101941	39.456693
LT Boyington Mill	38	-120.102362	39.457121
LT Boyington Mill	39	-120.102767	39.457542
LT Boyington Mill	40	-120.10297	39.458036
LT Boyington Mill	43	-120.103088	39.459439
LT Boyington Mill	44	-120.103305	39.459957
LT Boyington Mill	46	-120.103685	39.460991
LT Boyington Mill	47	-120.10383	39.461394
LT Boyington Mill	48	-120.103992	39.461917
LT Boyington Mill	50	-120.105577	39.462069
LT Boyington Mill	51	-120.105788	39.462545
LT Boyington Mill	52	-120.105743	39.463081
LT Boyington Mill	53	-120.105284	39.463391
LT Boyington Mill	54	-120.10535	39.463833
LT Boyington Mill	55	-120.105496	39.464403
LT Boyington Mill	56	-120.105496	39.464951
LT Boyington Mill	57	-120.105367	39.461486
LT Boyington Mill	58	-120.104794	39.461031
LT Boyington Mill	59	-120.104595	39.460645
LT Boyington Mill	60	-120.105543	39.460764
LT Boyington Mill	61	-120.104485	39.460135
LT Boyington Mill	62	-120.104375	39.459644
LT Boyington Mill	63	-120.104144	39.459096
LT Boyington Mill	64	-120.103947	39.458644
LT Boyington Mill	65	-120.103893	39.458113
LT Boyington Mill	66	-120.103737	39.457608
LT Boyington Mill	67	-120.104563	39.4577
LT Boyington Mill	68	-120.102998	39.456702
LT Boyington Mill	69	-120.105673	39.450405

Site	Station	Longitude	Latitude
LT Boyington Mill	70	-120.105734	39.449852
LT Boyington Mill	71	-120.105654	39.449379
LT Boyington Mill	72	-120.105587	39.448937
LT Boyington Mill	73	-120.104585	39.449013
LT Boyington Mill	74	-120.104202	39.445643
LT Boyington Mill	75	-120.103728	39.44541
LT Boyington Mill	76	-120.103191	39.44501
LT Boyington Mill	77	-120.10291	39.44455
LT Boyington Mill	78	-120.102068	39.443355
LT Boyington Mill	79	-120.101569	39.442598
LT Boyington Mill	80	-120.100664	39.441824
LT Boyington Mill	81	-120.093581	39.437327
LT Boyington Mill	82	-120.09401	39.437719
LT Boyington Mill	83	-120.09437	39.438122
LT Boyington Mill	84	-120.0948	39.438496
LT Boyington Mill	85	-120.093492	39.438165
LT Boyington Mill	86	-120.094002	39.438482
LT Boyington Mill	87	-120.096359	39.439077
LT Boyington Mill	88	-120.097031	39.438999
LT Boyington Mill	90	-120.098086	39.439514
LT Boyington Mill	91	-120.098675	39.439749
LT Boyington Mill	92	-120.096767	39.439427
LT Boyington Mill	93	-120.097347	39.439716
LT Boyington Mill	94	-120.098104	39.439061
LT Boyington Mill	95	-120.099243	39.440138
LT Boyington Mill	96	-120.099617	39.440571
LT Boyington Mill	97	-120.1004	39.440048
LT Boyington Mill	98	-120.10103	39.440172
LT Boyington Mill	99	-120.10109	39.440625
LT Boyington Mill	100	-120.100994	39.441088
LT Boyington Mill	101	-120.10051	39.441266
LT Boyington Mill	102	-120.105198	39.446103
LT Boyington Mill	103	-120.105267	39.446492
LT Boyington Mill	104	-120.105378	39.446953
LT Boyington Mill	105	-120.105404	39.447425
LT Boyington Mill	107	-120.10565	39.448294
LT Boyington Mill	108	-120.105886	39.450821
LT Boyington Mill	109	-120.105462	39.451228
LT Boyington Mill	110	-120.1051	39.451612

Site	Station	Longitude	Latitude
LT Boyington Mill	111	-120.10462	39.451874
LT Boyington Mill	114	-120.103221	39.452429
LT Boyington Mill	115	-120.103103	39.452885
LT1&2	1	-120.336611	39.494662
LT1&2	2	-120.337122	39.494605
LT1&2	3	-120.33765	39.494559
LT1&2	5	-120.338732	39.494424
LT1&2	6	-120.339312	39.494372
LT1&2	7	-120.339896	39.494387
LT1&2	8	-120.340487	39.494402
LT1&2	9	-120.341064	39.494416
LT1&2	10	-120.341656	39.494431
LT1&2	11	-120.342147	39.494444
LT1&2	12	-120.342688	39.494372
LT1&2	13	-120.343284	39.494292
LT1&2	15	-120.344483	39.494148
LT1&2	16	-120.345119	39.494081
LT1&2	17	-120.345657	39.493973
LT1&2	18	-120.346149	39.49376
LT1&2	19	-120.34672	39.493653
LT1&2	20	-120.347285	39.493499
LT1&2	21	-120.347828	39.49335
LT1&2	22	-120.348315	39.493223
LT1&2	23	-120.348902	39.493079
LT1&2	24	-120.349465	39.49294
LT1&2	25	-120.350028	39.492802
LT1&2	26	-120.350468	39.492596
LT1&2	27	-120.350949	39.492357
LT1&2	28	-120.351391	39.492139
LT1&2	29	-120.351882	39.491902
LT1&2	30	-120.352372	39.491699
LT1&2	31	-120.352873	39.491491
LT1&2	32	-120.353353	39.491293
LT1&2	33	-120.353859	39.491083
LT1&2	34	-120.354342	39.490883
LT1&2	35	-120.354849	39.490673
LT1&2	36	-120.355389	39.49045
LT1&2	37	-120.35589	39.490235
LT1&2	38	-120.356413	39.48998

Site	Station	Longitude	Latitude
LT1&2	39	-120.356975	39.489706
LT1&2	40	-120.357483	39.489458
LT1&2	41	-120.358019	39.489197
LT1&2	42	-120.358523	39.488951
LT1&2	43	-120.35897	39.488733
LT1&2	44	-120.35943	39.488509
LT1&2	45	-120.359909	39.488275
LT1&2	46	-120.36037	39.48805
LT1&2	47	-120.360845	39.487819
LT1&2	48	-120.361406	39.487944
LT1&2	49	-120.36185	39.488132
LT1&2	50	-120.362387	39.48836
LT1&2	51	-120.36328	39.488738
LT1&2	52	-120.364853	39.489224
LT1&2	54	-120.363735	39.48933
LT1&2	55	-120.363231	39.489177
LT1&2	56	-120.362715	39.48902
LT1&2	57	-120.362207	39.488865
LT1&2	58	-120.361636	39.488762
LT1&2	59	-120.36106	39.488516
LT1&2	60	-120.360569	39.488686
LT1&2	61	-120.360114	39.488951
LT1&2	62	-120.359691	39.489192
LT1&2	63	-120.360866	39.488381
LT1&2	64	-120.359081	39.489483
LT1&2	65	-120.358598	39.489704
LT1&2	66	-120.3581	39.489932
LT1&2	67	-120.357652	39.490137
LT1&2	68	-120.356971	39.490449
LT1&2	69	-120.356457	39.490685
LT1&2	70	-120.355986	39.4909
LT1&2	71	-120.355472	39.491136
LT1&2	72	-120.355029	39.491339
LT1&2	73	-120.354526	39.49156
LT1&2	74	-120.354033	39.491778
LT1&2	75	-120.353548	39.491992
LT1&2	76	-120.353087	39.492196
LT1&2	77	-120.352595	39.492413
LT1&2	78	-120.352108	39.492628

Site	Station	Longitude	Latitude
LT1&2	79	-120.35161	39.492848
LT1&2	80	-120.351085	39.493078
LT1&2	81	-120.350571	39.493301
LT1&2	82	-120.350024	39.493478
LT1&2	83	-120.349458	39.493618
LT1&2	84	-120.34819	39.493931
LT1&2	85	-120.346378	39.494378
LT1&2	86	-120.3458	39.49452
LT1&2	87	-120.345211	39.494665
LT1&2	88	-120.344605	39.494767
LT1&2	89	-120.344025	39.494843
LT1&2	90	-120.343402	39.494924
LT1&2	91	-120.342834	39.494998
LT1&2	92	-120.342239	39.495051
LT1&2	93	-120.341663	39.495047
LT1&2	94	-120.341047	39.495044
LT1&2	95	-120.340455	39.49504
LT1&2	96	-120.339855	39.495037
LT1&2	97	-120.339247	39.495033
LT1&2	98	-120.338603	39.495029
LT1&2	99	-120.338042	39.495026
LT1&2	100	-120.337412	39.495022
LT1&2	102	-120.336224	39.495015
LT1&2	104	-120.340169	39.495688
LT1&2	105	-120.340845	39.495709
LT1&2	106	-120.34139	39.495726
LT1&2	107	-120.342028	39.495746
LT1&2	108	-120.342574	39.495709
LT1&2	109	-120.343156	39.495639
LT1&2	112	-120.344867	39.495432
LT1&2	113	-120.345434	39.495364
LT1&2	114	-120.346057	39.49528
LT1&2	115	-120.346769	39.49508
LT1&2	116	-120.350856	39.493933
LT1&2	117	-120.351404	39.493679
LT1&2	118	-120.35191	39.493446
LT1&2	119	-120.352385	39.493201
LT1&2	120	-120.352956	39.492963
LT1&2	121	-120.353467	39.492727

Site	Station	Longitude	Latitude
LT1&2	122	-120.35395	39.492504
LT1&2	123	-120.354436	39.49228
LT1&2	124	-120.354952	39.492042
LT1&2	125	-120.355502	39.491788
LT1&2	126	-120.355967	39.491573
LT1&2	127	-120.356433	39.491358
LT1&2	128	-120.356872	39.491085
LT1&2	129	-120.358341	39.490478
LT1&2	130	-120.358869	39.490226
LT1&2	131	-120.359385	39.489976
LT1&2	132	-120.359936	39.489709
LT1&2	133	-120.36045	39.48946
LT1&2	134	-120.361129	39.489144
LT1&2	135	-120.360527	39.49003
LT1&2	136	-120.359656	39.487563
LT1&2	137	-120.359135	39.487822
LT1&2	138	-120.358621	39.488078
LT1&2	139	-120.358108	39.488334
LT1&2	140	-120.357614	39.48858
LT1&2	141	-120.357122	39.488825
LT1&2	142	-120.356618	39.48907
LT1&2	143	-120.356173	39.48931
LT1&2	144	-120.352569	39.490987
LT1&2	145	-120.349984	39.492043
LT1&2	146	-120.349446	39.492215
LT1&2	147	-120.348948	39.492382
LT1&2	148	-120.348434	39.492543
LT1&2	149	-120.347822	39.492593
LT1&2	150	-120.347258	39.492731
LT1&2	151	-120.346684	39.492872
LT1&2	152	-120.346143	39.493004
LT1&2	153	-120.345568	39.493145
LT1&2	154	-120.344987	39.493376
LT1&2	156	-120.341555	39.49384
LT1&2	157	-120.34054	39.493823
LT1&2	158	-120.339478	39.493756
LT1&2	159	-120.338929	39.493806
LT1&2	160	-120.338395	39.493854
LT1&2	161	-120.337808	39.493933

Site	Station	Longitude	Latitude
LT1&2	162	-120.344776	39.492597
LT1&2	163	-120.345432	39.492497
LT1&2	164	-120.34597	39.492385
LT1&2	165	-120.346513	39.492273
LT1&2	166	-120.347056	39.49216
LT1&2	167	-120.347525	39.491961
LT1&2	168	-120.348099	39.491717
LT1&2	169	-120.348612	39.491499
LT1&2	170	-120.347823	39.491212
Martis Valley	1	-120.144825	39.295765
Martis Valley	2	-120.144058	39.295753
Martis Valley	3	-120.14324	39.295632
Martis Valley	4	-120.142608	39.295525
Martis Valley	5	-120.141962	39.295416
Martis Valley	6	-120.14133	39.295525
Martis Valley	7	-120.140301	39.295134
Martis Valley	8	-120.139718	39.295035
Martis Valley	9	-120.139098	39.29493
Martis Valley	10	-120.138413	39.295018
Martis Valley	11	-120.137857	39.295211
Martis Valley	12	-120.137549	39.295562
Martis Valley	13	-120.137154	39.296012
Martis Valley	14	-120.137065	39.296474
Martis Valley	15	-120.136767	39.296831
Martis Valley	16	-120.136429	39.29721
Martis Valley	17	-120.136029	39.297617
Martis Valley	18	-120.135666	39.298061
Martis Valley	19	-120.135412	39.298472
Martis Valley	20	-120.134964	39.298741
Martis Valley	21	-120.134437	39.299061
Martis Valley	22	-120.133965	39.299342
Martis Valley	23	-120.133456	39.299597
Martis Valley	24	-120.133034	39.29998
Martis Valley	25	-120.132583	39.300315
Martis Valley	26	-120.13197	39.300306
Martis Valley	27	-120.131483	39.300598
Martis Valley	28	-120.130863	39.300564
Martis Valley	29	-120.130189	39.300536
Martis Valley	30	-120.129586	39.300462

Site	Station	Longitude	Latitude
Martis Valley	31	-120.129019	39.300462
Martis Valley	32	-120.128457	39.300462
Martis Valley	33	-120.128106	39.30083
Martis Valley	34	-120.127637	39.301051
Martis Valley	35	-120.127035	39.30113
Martis Valley	36	-120.126428	39.300991
Martis Valley	37	-120.125994	39.301278
Martis Valley	38	-120.125475	39.301593
Martis Valley	39	-120.124771	39.301558
Martis Valley	40	-120.124104	39.301357
Martis Valley	41	-120.123435	39.301394
Martis Valley	42	-120.124725	39.30117
Martis Valley	43	-120.122839	39.30154
Martis Valley	44	-120.122295	39.301515
Martis Valley	45	-120.12168	39.301738
Martis Valley	46	-120.121026	39.301805
Martis Valley	47	-120.120483	39.301559
Martis Valley	48	-120.120009	39.301254
Martis Valley	49	-120.119357	39.301244
Martis Valley	50	-120.11868	39.301483
Martis Valley	51	-120.118141	39.301738
Martis Valley	52	-120.117477	39.301841
Martis Valley	53	-120.116735	39.301798
Martis Valley	54	-120.116054	39.301752
Martis Valley	55	-120.115377	39.30161
Martis Valley	56	-120.114832	39.301447
Martis Valley	57	-120.114248	39.301105
Martis Valley	58	-120.116835	39.301789
Martis Valley	59	-120.11875	39.296795
Martis Valley	60	-120.119325	39.296976
Martis Valley	61	-120.119989	39.297252
Martis Valley	62	-120.120177	39.297706
Martis Valley	63	-120.120032	39.298078
Martis Valley	64	-120.120349	39.298378
Martis Valley	65	-120.12078	39.298716
Martis Valley	66	-120.133738	39.293715
Martis Valley	67	-120.133507	39.294133
Martis Valley	68	-120.133132	39.294487
Martis Valley	69	-120.132692	39.294935

Site	Station	Longitude	Latitude
Martis Valley	70	-120.14078	39.295285
Martis Valley	71	-120.140595	39.295761
Milton Reservoir	1	-120.57001	39.519376
Milton Reservoir	2	-120.570342	39.519861
Milton Reservoir	3	-120.570964	39.520124
Milton Reservoir	4	-120.571451	39.520498
Milton Reservoir	5	-120.572054	39.520427
Milton Reservoir	6	-120.572774	39.520502
Milton Reservoir	7	-120.573307	39.520686
Milton Reservoir	8	-120.573935	39.520967
Milton Reservoir	9	-120.574534	39.521224
Milton Reservoir	10	-120.57515	39.521451
Milton Reservoir	11	-120.575518	39.520589
Milton Reservoir	12	-120.574899	39.520469
Milton Reservoir	13	-120.574333	39.52038
Milton Reservoir	14	-120.573781	39.520094
Milton Reservoir	15	-120.573076	39.520008
Milton Reservoir	16	-120.573182	39.51939
Milton Reservoir	17	-120.573932	39.519525
Milton Reservoir	18	-120.574479	39.519709
Milton Reservoir	19	-120.575081	39.519883
Milton Reservoir	20	-120.575777	39.520005
Milton Reservoir	21	-120.576184	39.519418
Milton Reservoir	22	-120.575477	39.519337
Milton Reservoir	23	-120.574797	39.519203
Milton Reservoir	25	-120.572899	39.518908
Perazzo	1	-120.376585	39.480969
Perazzo	2	-120.377148	39.480709
Perazzo	3	-120.377723	39.480445
Perazzo	4	-120.378331	39.480166
Perazzo	5	-120.378935	39.479888
Perazzo	6	-120.379488	39.479634
Perazzo	7	-120.380077	39.479363
Perazzo	8	-120.380688	39.479082
Perazzo	9	-120.381257	39.47882
Perazzo	10	-120.381858	39.478544
Perazzo	11	-120.382491	39.478253
Perazzo	14	-120.384174	39.477478
Perazzo	15	-120.384783	39.477198

Site	Station	Longitude	Latitude
Perazzo	16	-120.385339	39.476942
Perazzo	17	-120.385901	39.476684
Perazzo	18	-120.386367	39.475722
Perazzo	19	-120.385777	39.475994
Perazzo	20	-120.385225	39.476249
Perazzo	21	-120.38465	39.476514
Perazzo	22	-120.384111	39.476763
Perazzo	23	-120.38356	39.477018
Perazzo	24	-120.38298	39.477285
Perazzo	25	-120.382396	39.477555
Perazzo	26	-120.381822	39.47782
Perazzo	27	-120.381276	39.478072
Perazzo	28	-120.380659	39.478356
Perazzo	29	-120.380108	39.478611
Perazzo	30	-120.37956	39.478864
Perazzo	31	-120.378974	39.479085
Perazzo	32	-120.378465	39.479369
Perazzo	33	-120.377864	39.479647
Perazzo	34	-120.377272	39.47992
Perazzo	35	-120.376671	39.480197
Perazzo	37	-120.37559	39.480696
Perazzo	38	-120.375006	39.480965
Perazzo	39	-120.374292	39.480601
Perazzo	41	-120.37606	39.479757
Perazzo	42	-120.376596	39.479501
Perazzo	43	-120.377227	39.4792
Perazzo	44	-120.377837	39.478909
Perazzo	45	-120.378438	39.478622
Perazzo	46	-120.378972	39.478367
Perazzo	47	-120.379572	39.47808
Perazzo	48	-120.380082	39.477837
Perazzo	49	-120.380714	39.477535
Perazzo	50	-120.381304	39.477254
Perazzo	51	-120.381903	39.476968
Perazzo	52	-120.384422	39.475765
Perazzo	53	-120.384979	39.475499
Perazzo	54	-120.385513	39.475244
Perazzo	55	-120.386053	39.474986
Perazzo	56	-120.386671	39.474691

Site	Station	Longitude	Latitude
Perazzo	57	-120.386456	39.473911
Perazzo	58	-120.385874	39.474202
Perazzo	59	-120.385345	39.474466
Perazzo	60	-120.384772	39.474753
Perazzo	61	-120.384218	39.475029
Perazzo	62	-120.382428	39.475923
Perazzo	63	-120.381806	39.476234
Perazzo	64	-120.381246	39.476514
Perazzo	65	-120.380591	39.47684
Perazzo	66	-120.379971	39.47715
Perazzo	67	-120.379403	39.477434
Perazzo	68	-120.378878	39.477696
Perazzo	69	-120.378356	39.477957
Perazzo	70	-120.376711	39.478771
Perazzo	71	-120.376138	39.479031
Perazzo	72	-120.375499	39.479321
Perazzo	73	-120.374378	39.47983
Perazzo	75	-120.373702	39.480138
Perazzo	76	-120.371514	39.480535
Perazzo	77	-120.372147	39.480211
Perazzo	78	-120.37262	39.47997
Perazzo	79	-120.373187	39.479679
Perazzo	80	-120.373722	39.479406
Perazzo	81	-120.374306	39.479107
Perazzo	82	-120.383287	39.474513
Perazzo	83	-120.383804	39.474248
Perazzo	84	-120.384367	39.47396
Perazzo	85	-120.384938	39.473668
Perazzo	86	-120.385465	39.473398
Perazzo	87	-120.386006	39.473121
Perazzo	88	-120.38516	39.472601
Perazzo	89	-120.384561	39.472904
Perazzo	90	-120.384001	39.473188
Perazzo	91	-120.383441	39.473472
Perazzo	92	-120.382879	39.473757
Perazzo	93	-120.371789	39.479376
Perazzo	94	-120.371232	39.479657
Perazzo	95	-120.370626	39.47998
Perazzo	96	-120.376743	39.475671

Site	Station	Longitude	Latitude
Perazzo	97	-120.377347	39.475372
Perazzo	99	-120.383466	39.472346
Perazzo	100	-120.384009	39.472078
Perazzo	101	-120.384582	39.471794
Perazzo	102	-120.385019	39.471501
Perazzo	103	-120.385684	39.471249
Perazzo	104	-120.385779	39.470122
Perazzo	105	-120.38523	39.470386
Perazzo	106	-120.384648	39.470665
Perazzo	107	-120.384078	39.470938
Perazzo	108	-120.3835	39.471215
Perazzo	109	-120.384518	39.469602
Perazzo	110	-120.38512	39.469302
Perazzo	111	-120.385665	39.468955
Perazzo	112	-120.386267	39.468731
Perazzo	113	-120.385155	39.46791
Perazzo	114	-120.384612	39.468217
Perazzo	115	-120.384113	39.4685
Perazzo	116	-120.383516	39.468792
Perazzo	117	-120.383002	39.469121
Perazzo	118	-120.382747	39.468468
Perazzo	119	-120.383263	39.468225
Perazzo	120	-120.384012	39.467784
Perazzo	121	-120.384743	39.46736
Perazzo	121	-120.38293	39.478853
Prosser	37	-120.256957	39.388118
Prosser	38	-120.257281	39.388902
Prosser	39	-120.25757	39.389603
Prosser	40	-120.257859	39.390301
Prosser	41	-120.257593	39.390996
Prosser	42	-120.258128	39.391537
Prosser	43	-120.258583	39.392132
Prosser	44	-120.259469	39.392306
Prosser	45	-120.260551	39.392645
Prosser	46	-120.261352	39.392855
Prosser	47	-120.262307	39.392848
Prosser	48	-120.263223	39.392841
Prosser	49	-120.263516	39.393378
Prosser	50	-120.263695	39.39407

Site	Station	Longitude	Latitude
Prosser	51	-120.264612	39.394384
Prosser	52	-120.26545	39.394671
Prosser	53	-120.265421	39.395393
Prosser	54	-120.265393	39.396127
Prosser	55	-120.26624	39.395752
Prosser	56	-120.266938	39.395466
Prosser	57	-120.266797	39.394822
Prosser	58	-120.266797	39.394174
Prosser	59	-120.267658	39.394546
Prosser	60	-120.268543	39.394873
Prosser	61	-120.26951	39.394906
Prosser	62	-120.270291	39.39535
Prosser	63	-120.270193	39.396153
Prosser	64	-120.271058	39.396248
Prosser	65	-120.271852	39.396031
Prosser	66	-120.272956	39.396042
Prosser	67	-120.273894	39.396247
Prosser	68	-120.274841	39.396608
Prosser	69	-120.275747	39.396954
Prosser	70	-120.2765	39.397377
Prosser	71	-120.277435	39.397748
Prosser	72	-120.278268	39.398234
Prosser	73	-120.279189	39.398578
Prosser	74	-120.279842	39.399097
Prosser	75	-120.280075	39.399913
Prosser	76	-120.278955	39.399809
Prosser	77	-120.278056	39.399725
Prosser	78	-120.277282	39.399347
Prosser	79	-120.276522	39.39874
Prosser	80	-120.275837	39.398118
Prosser	81	-120.275022	39.397616
Prosser	82	-120.274132	39.397239
Prosser	83	-120.273226	39.396963
Prosser	84	-120.272304	39.396786
Prosser	85	-120.271432	39.396848
Prosser	86	-120.270418	39.396924
Prosser	87	-120.269491	39.396903
Prosser	88	-120.2691	39.396331
Prosser	89	-120.268928	39.395667

Site	Station	Longitude	Latitude
Prosser	90	-120.267968	39.395563
Prosser	91	-120.26737	39.396142
Prosser	92	-120.266468	39.396348
Prosser	93	-120.265507	39.396581
Prosser	94	-120.264552	39.396367
Prosser	95	-120.264198	39.395619
Prosser	96	-120.263799	39.395001
Prosser	97	-120.263026	39.394516
Prosser	98	-120.262601	39.393882
Prosser	99	-120.262673	39.393363
Prosser	100	-120.261972	39.393375
Prosser	101	-120.261087	39.39339
Prosser	102	-120.260138	39.393153
Prosser	103	-120.259233	39.39296
Prosser	104	-120.258319	39.39276
Saddle Meadow	1	-120.302487	39.489218
Saddle Meadow	2	-120.303041	39.489201
Saddle Meadow	3	-120.303586	39.489041
Saddle Meadow	4	-120.304099	39.488903
Saddle Meadow	5	-120.30465	39.488773
Saddle Meadow	6	-120.305152	39.488695
Saddle Meadow	7	-120.305666	39.488535
Saddle Meadow	8	-120.306153	39.488468
Saddle Meadow	9	-120.306672	39.488588
Saddle Meadow	10	-120.307137	39.488676
Saddle Meadow	12	-120.308221	39.488892
Saddle Meadow	13	-120.308717	39.488993
Saddle Meadow	16	-120.309979	39.488182
Saddle Meadow	17	-120.310046	39.487826
Saddle Meadow	18	-120.310044	39.48748
Saddle Meadow	19	-120.304732	39.490819
Saddle Meadow	20	-120.30428	39.490582
Saddle Meadow	21	-120.303848	39.490411
Saddle Meadow	22	-120.303325	39.490202
Saddle Meadow	23	-120.302849	39.490007
Saddle Meadow	24	-120.302402	39.489829
Saddle Meadow	25	-120.30188	39.489609
Saddle Meadow	26	-120.30127	39.489463
Saddle Meadow	27	-120.30071	39.489635

Site	Station	Longitude	Latitude
Saddle Meadow	28	-120.300217	39.489838
Saddle Meadow	29	-120.29978	39.490019
Saddle Meadow	30	-120.299696	39.490386
Saddle Meadow	31	-120.299597	39.490771
Sagehen Creek	1	-120.236978	39.431539
Sagehen Creek	2	-120.236468	39.431628
Sagehen Creek	3	-120.236011	39.431897
Sagehen Creek	4	-120.235624	39.432168
Sagehen Creek	5	-120.235305	39.432458
Sagehen Creek	8	-120.234796	39.433483
Sagehen Creek	9	-120.234544	39.43384
Sagehen Creek	10	-120.23403	39.434013
Sagehen Creek	11	-120.233569	39.434205
Sagehen Creek	12	-120.233267	39.43446
Sagehen Creek	13	-120.233077	39.434795
Sagehen Creek	14	-120.232756	39.435133
Sagehen Creek	15	-120.232596	39.435492
Sagehen Creek	16	-120.232307	39.435795
Sagehen Creek	17	-120.232025	39.436122
Sagehen Creek	18	-120.231707	39.436407
Sagehen Creek	19	-120.231282	39.436653
Sagehen Creek	20	-120.230858	39.436875
Sagehen Creek	21	-120.230319	39.437107
Sagehen Creek	22	-120.229829	39.437256
Sagehen Creek	23	-120.229139	39.437215
Sagehen Creek	24	-120.228614	39.437453
Sagehen Creek	25	-120.228176	39.437651
Sagehen Creek	26	-120.227728	39.437915
Sagehen Creek	27	-120.227229	39.438094
Sagehen Creek	28	-120.226752	39.438291
Sagehen Creek	29	-120.226314	39.438483
Sagehen Creek	30	-120.225858	39.438746
Sagehen Creek	31	-120.22545	39.438963
Sagehen Creek	32	-120.225018	39.439191
Sagehen Creek	33	-120.224617	39.439414
Sagehen Creek	34	-120.224139	39.439658
Sagehen Creek	35	-120.223724	39.439845
Sagehen Creek	36	-120.223183	39.440124
Sagehen Creek	37	-120.222766	39.44037

Site	Station	Longitude	Latitude
Sagehen Creek	38	-120.222288	39.440591
Sagehen Creek	39	-120.221704	39.440601
Sagehen Creek	40	-120.221202	39.440452
Sagehen Creek	41	-120.220619	39.440629
Sagehen Creek	42	-120.220157	39.440833
Sagehen Creek	43	-120.219554	39.440931
Sagehen Creek	44	-120.219106	39.440992
Sagehen Creek	45	-120.218571	39.441104
Sagehen Creek	46	-120.218046	39.441175
Sagehen Creek	47	-120.21758	39.441283
Sagehen Creek	48	-120.217057	39.441503
Sagehen Creek	49	-120.216499	39.441418
Sagehen Creek	50	-120.215906	39.441446
Sagehen Creek	51	-120.214874	39.441314
Sagehen Creek	53	-120.214192	39.440684
Sagehen Creek	54	-120.213844	39.440348
Sagehen Creek	55	-120.213451	39.439993
Sagehen Creek	56	-120.213163	39.439694
Sagehen Creek	57	-120.212869	39.439371
Sagehen Creek	58	-120.21256	39.439024
Sagehen Creek	59	-120.212163	39.438764
Sagehen Creek	60	-120.211745	39.438444
Sagehen Creek	61	-120.211365	39.438161
Sagehen Creek	62	-120.210992	39.437866
Sagehen Creek	63	-120.210431	39.437674
Sagehen Creek	64	-120.209622	39.437148
Sagehen Creek	65	-120.209235	39.436847
Sagehen Creek	66	-120.208797	39.436645
Sagehen Creek	67	-120.208323	39.436402
Sagehen Creek	68	-120.207895	39.436153
Sagehen Creek	69	-120.207459	39.43591
Sagehen Creek	70	-120.207118	39.435586
Sagehen Creek	71	-120.206682	39.435349
Sagehen Creek	72	-120.206325	39.435054
Sagehen Creek	73	-120.205992	39.434737
Sagehen Creek	74	-120.205724	39.434331
stampede LT arm	1	-120.187775	39.461683
stampede LT arm	2	-120.188503	39.461502
stampede LT arm	3	-120.189272	39.461311

Site	Station	Longitude	Latitude
stampede LT arm	4	-120.190052	39.461117
stampede LT arm	7	-120.191282	39.461627
stampede LT arm	8	-120.190469	39.461802
stampede LT arm	9	-120.189745	39.461959
stampede LT arm	10	-120.188987	39.462122
stampede LT arm	11	-120.188187	39.462295
stampede LT arm	12	-120.187462	39.462452
stampede LT arm	17	-120.187132	39.463253
stampede LT arm	18	-120.18789	39.463094
stampede LT arm	19	-120.188628	39.462939
stampede LT arm	20	-120.189401	39.462777
stampede LT arm	21	-120.190187	39.462612
stampede LT arm	22	-120.190955	39.462451
stampede LT arm	23	-120.191702	39.462294
stampede LT arm	24	-120.192452	39.462136
stampede LT arm	25	-120.193239	39.461971
stampede LT arm	26	-120.193991	39.461813
stampede LT arm	27	-120.194793	39.461645
stampede LT arm	28	-120.193399	39.462729
stampede LT arm	29	-120.192519	39.462898
stampede LT arm	30	-120.191853	39.463026
stampede LT arm	31	-120.191024	39.463184
stampede LT arm	32	-120.190206	39.463341
stampede LT arm	33	-120.189439	39.463488
stampede LT arm	34	-120.188647	39.463639
stampede LT arm	35	-120.187913	39.46378
stampede LT arm	37	-120.192047	39.463594
Stampede Sagehen Arm	1	-120.204344	39.433553
Stampede Sagehen Arm	2	-120.203968	39.433324
Stampede Sagehen Arm	3	-120.203547	39.433122
Stampede Sagehen Arm	4	-120.203135	39.432881
Stampede Sagehen Arm	5	-120.202708	39.432628
Stampede Sagehen Arm	6	-120.202247	39.432352
Stampede Sagehen Arm	7	-120.201892	39.432129
Stampede Sagehen Arm	8	-120.201369	39.431936
Stampede Sagehen Arm	9	-120.200907	39.431835
Stampede Sagehen Arm	10	-120.200393	39.431794
Stampede Sagehen Arm	11	-120.199943	39.431953
Stampede Sagehen Arm	12	-120.199494	39.432088

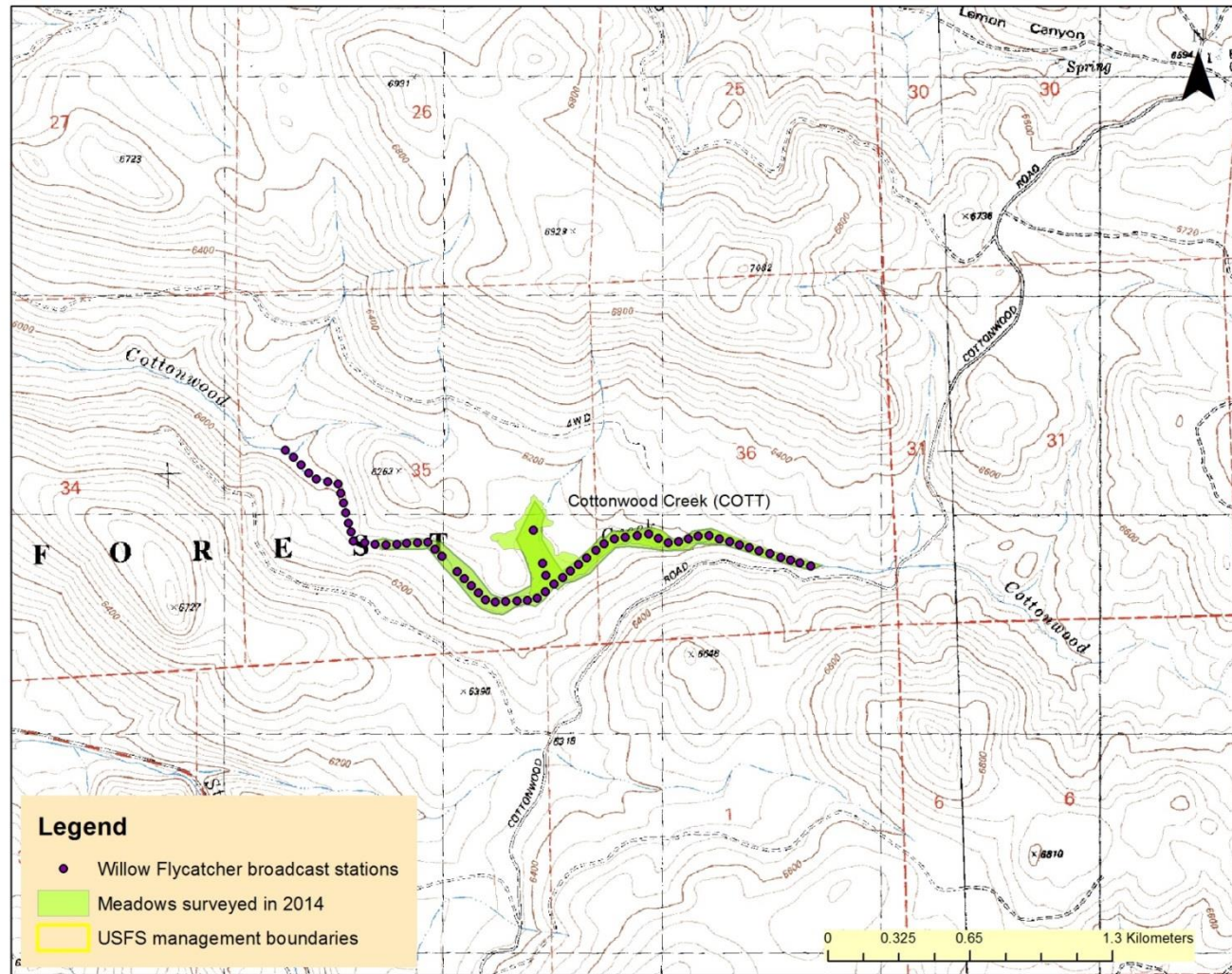
Site	Station	Longitude	Latitude
Stampede Sagehen Arm	13	-120.199057	39.432275
Stampede Sagehen Arm	14	-120.198791	39.432556
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Stampede Sagehen Arm	16	-120.198116	39.43307
Stampede Sagehen Arm	17	-120.197804	39.433407
Stampede Sagehen Arm	18	-120.197645	39.433747
Stampede Sagehen Arm	19	-120.197537	39.434094
Stampede Sagehen Arm	20	-120.197404	39.434491
Stampede Sagehen Arm	21	-120.197266	39.434866
Stampede Sagehen Arm	22	-120.197149	39.435247
Stampede Sagehen Arm	23	-120.196968	39.435569
Stampede Sagehen Arm	24	-120.196722	39.435919
Stampede Sagehen Arm	25	-120.196489	39.436315
Stampede Sagehen Arm	26	-120.196214	39.436666
Stampede Sagehen Arm	27	-120.195984	39.437047
Stampede Sagehen Arm	28	-120.195776	39.437442
Stampede Sagehen Arm	29	-120.195469	39.437798
Stampede Sagehen Arm	30	-120.195175	39.438047
Stampede Sagehen Arm	31	-120.194908	39.438392
Stampede Sagehen Arm	32	-120.194557	39.438693
Stampede Sagehen Arm	33	-120.194109	39.438957
Stampede Sagehen Arm	34	-120.193729	39.439228
Stampede Sagehen Arm	35	-120.193501	39.439556
Stampede Sagehen Arm	36	-120.193247	39.439943
Stampede Sagehen Arm	37	-120.192745	39.440199
Stampede Sagehen Arm	38	-120.192508	39.440557
Stampede Sagehen Arm	39	-120.192209	39.440901
Stampede Sagehen Arm	40	-120.191833	39.441077
Stampede Sagehen Arm	41	-120.191409	39.441317
Stampede Sagehen Arm	42	-120.190946	39.44155
Stampede Sagehen Arm	43	-120.190643	39.441823
Stampede Sagehen Arm	44	-120.19028	39.442064
Stampede Sagehen Arm	45	-120.189862	39.442328
Stampede Sagehen Arm	46	-120.189348	39.442494
Stampede Sagehen Arm	47	-120.188967	39.442789
Stampede Sagehen Arm	48	-120.188664	39.443062
Stampede Sagehen Arm	49	-120.188329	39.443381
Stampede Sagehen Arm	50	-120.187963	39.443671
Stampede Sagehen Arm	51	-120.187751	39.443975

Site	Station	Longitude	Latitude
Stampede Sagehen Arm	52	-120.18746	39.444326
Stampede Sagehen Arm	53	-120.187145	39.444723
Stampede Sagehen Arm	54	-120.186878	39.445045
Stampede Sagehen Arm	55	-120.186618	39.44539
Stampede Sagehen Arm	56	-120.186388	39.44576
Stampede Sagehen Arm	57	-120.186105	39.446122
Stampede Sagehen Arm	58	-120.185759	39.446501
Stampede Sagehen Arm	59	-120.185477	39.44681
Stampede Sagehen Arm	60	-120.185188	39.447131
Stampede Sagehen Arm	61	-120.184989	39.447496

Site	Station	Longitude	Latitude
Stampede Sagehen Arm	62	-120.184628	39.447868
Stampede Sagehen Arm	63	-120.182012	39.450212
Stampede Sagehen Arm	64	-120.181805	39.450583
Stampede Sagehen Arm	65	-120.181461	39.450914
Stampede Sagehen Arm	66	-120.181097	39.451173
Stampede Sagehen Arm	67	-120.180838	39.451501
Stampede Sagehen Arm	68	-120.180434	39.451801
Stampede Sagehen Arm	69	-120.180067	39.452137
Stampede Sagehen Arm	70	-120.179543	39.452363

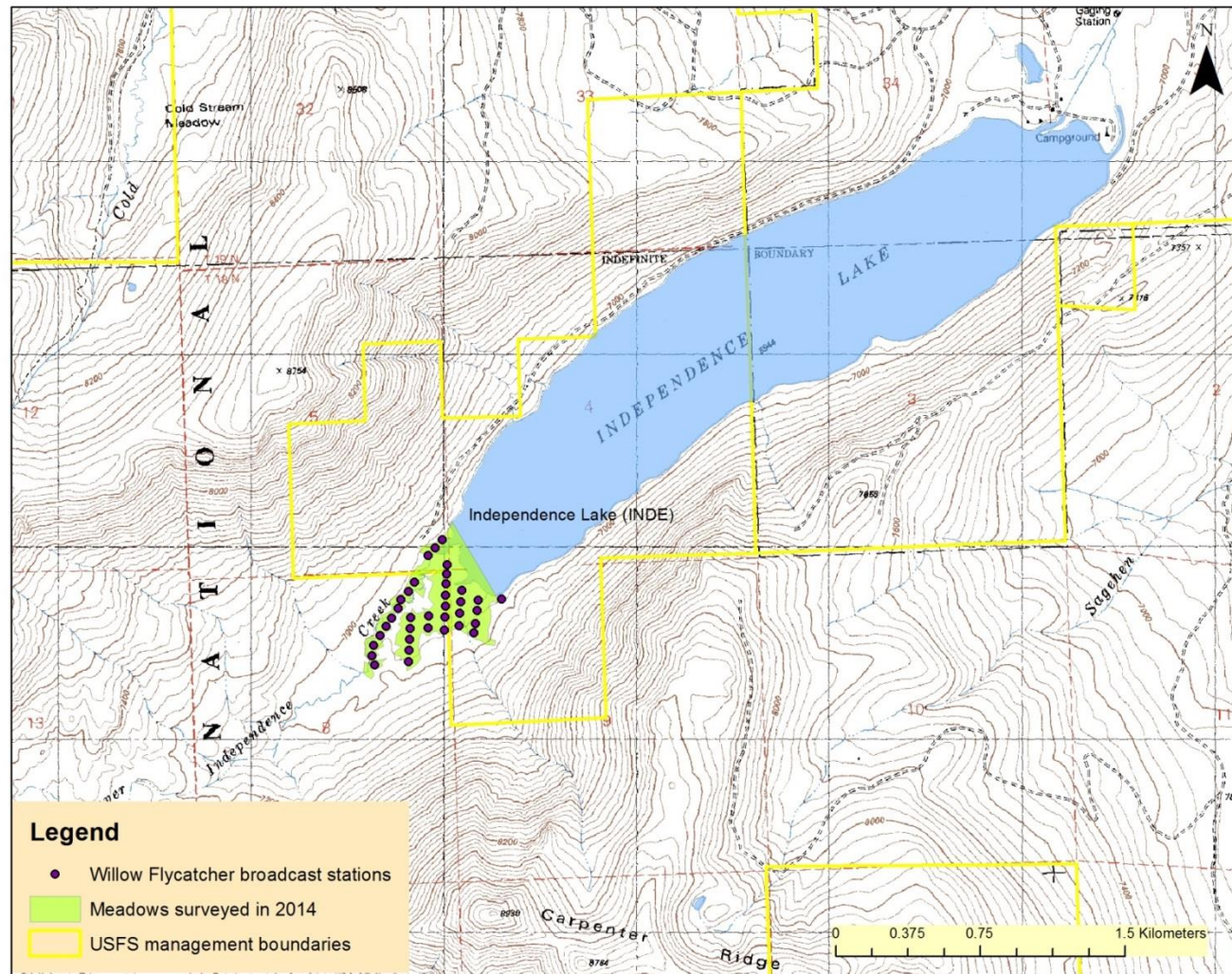
Carman Knuthson



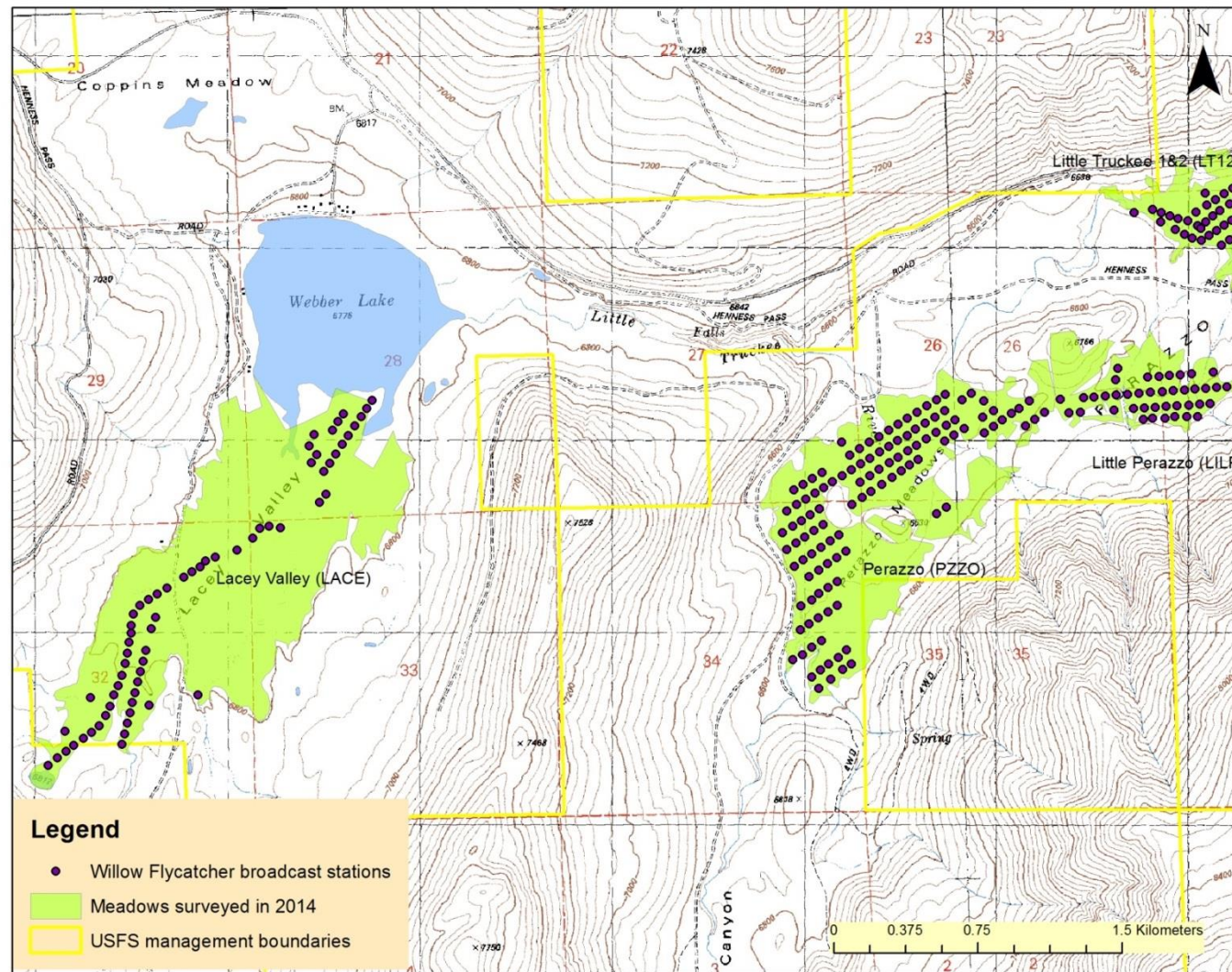


Cottowood Creek

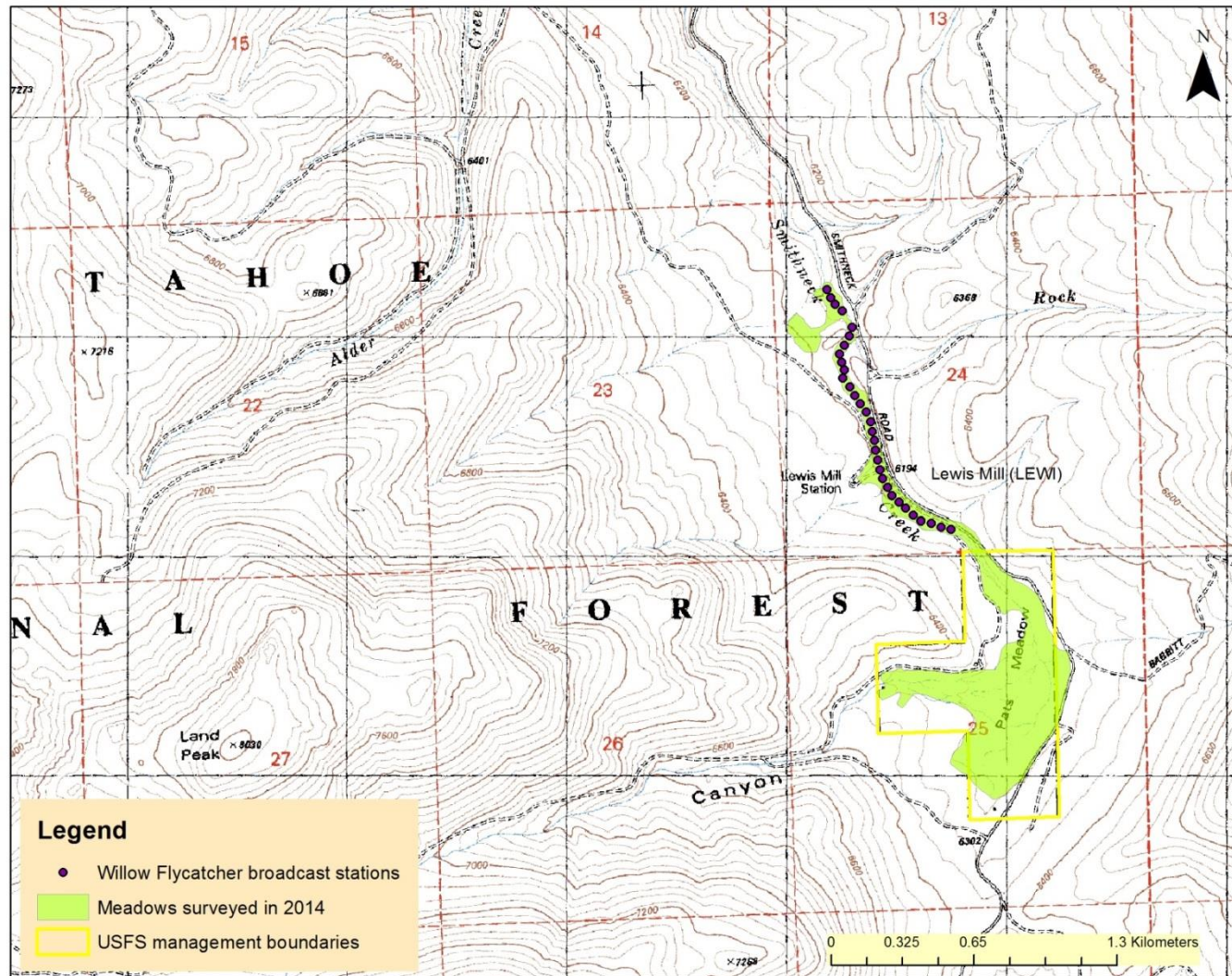




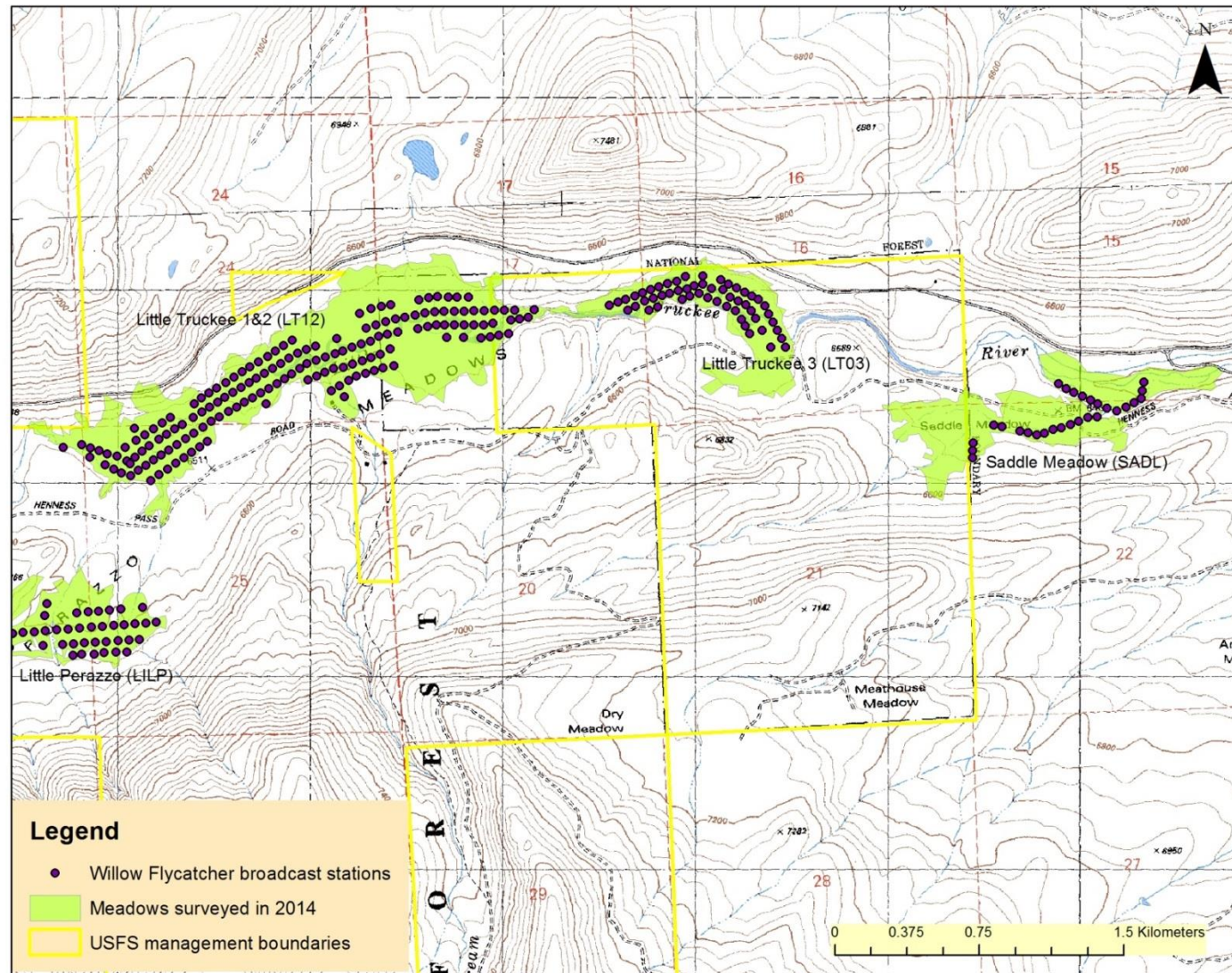
Independence Lake



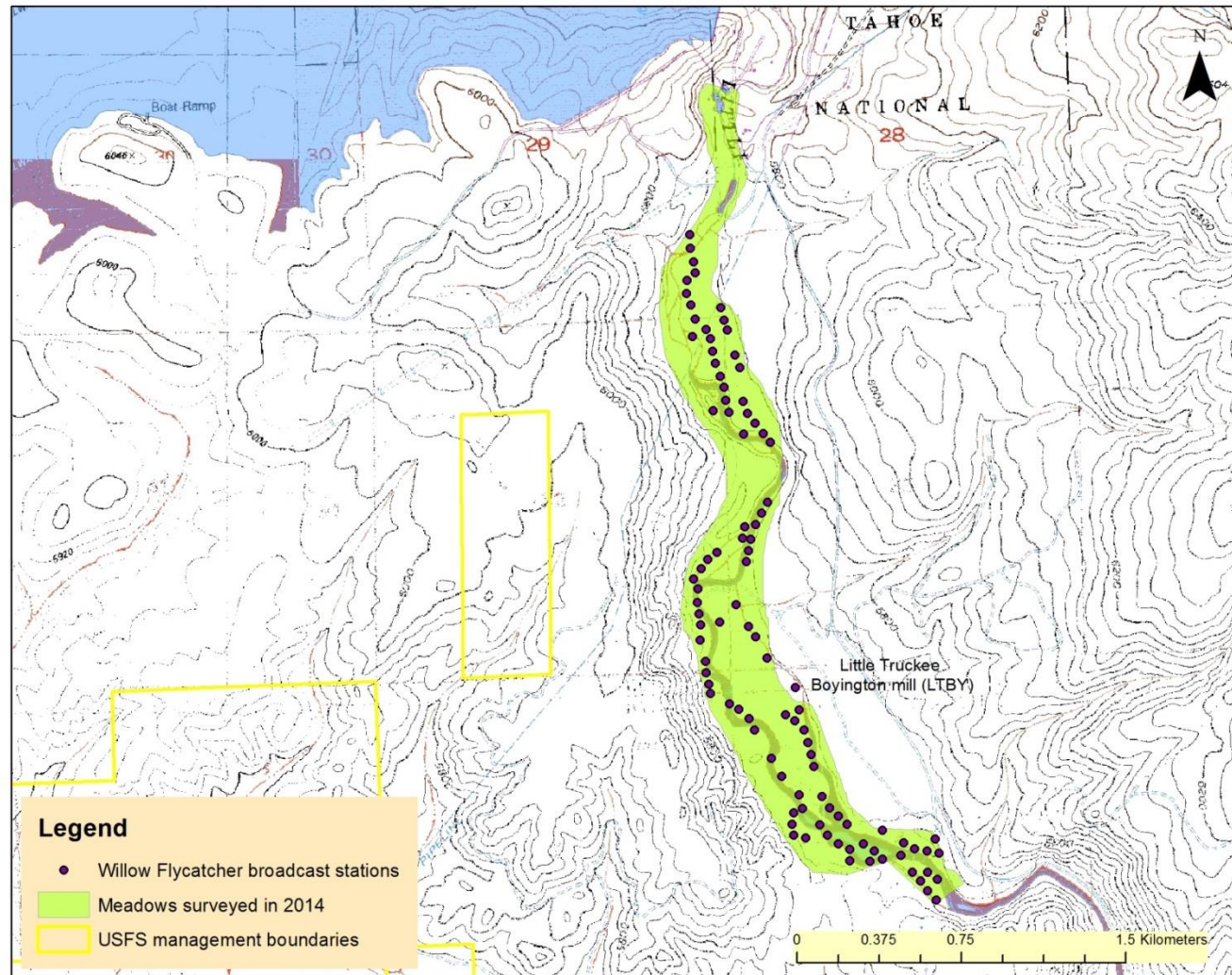
Lacey Valley, Perazzo, Little Perazzo



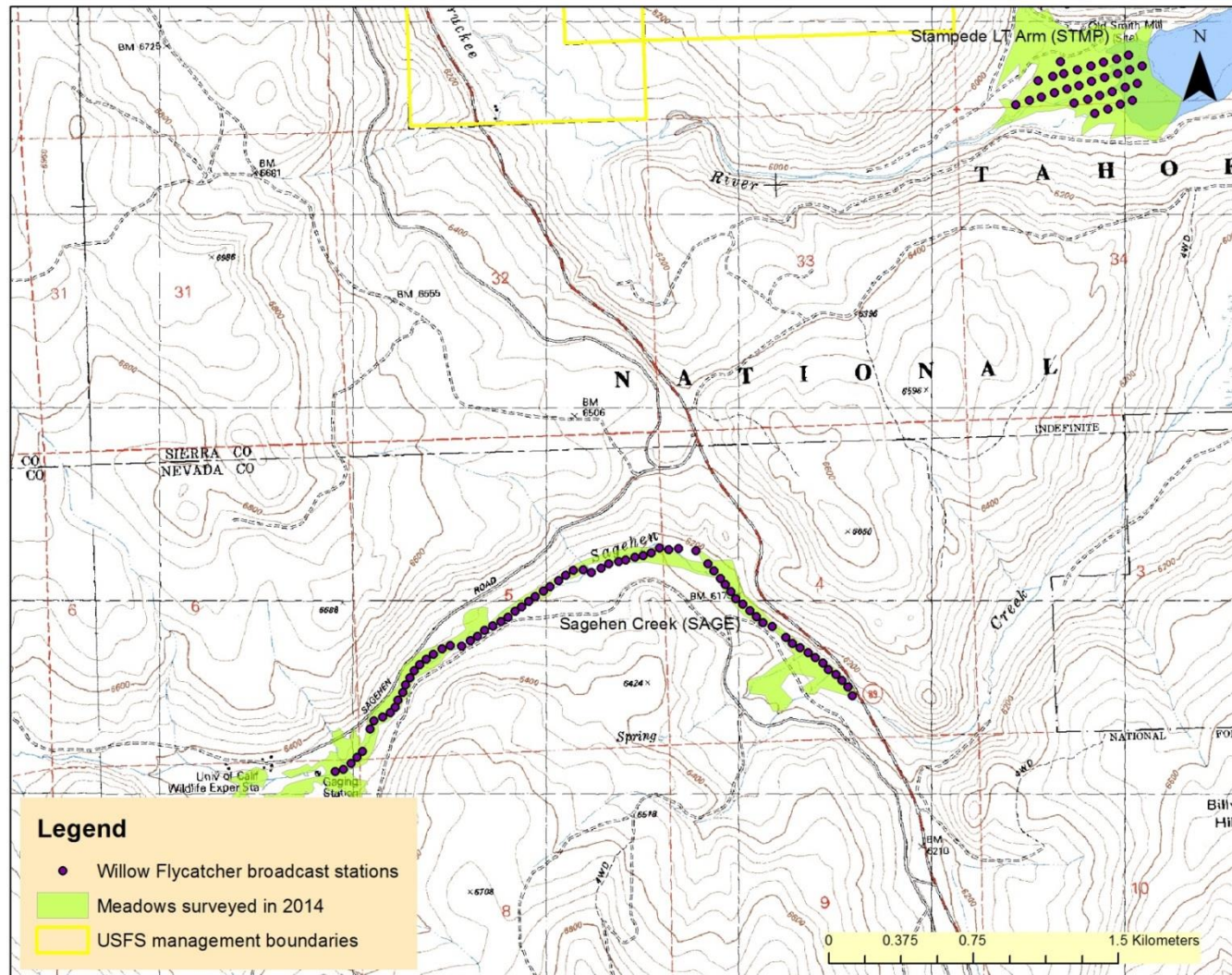
Lewis Mill



Little Truckee 1&2, Little Truckee 3, Saddle Meadow

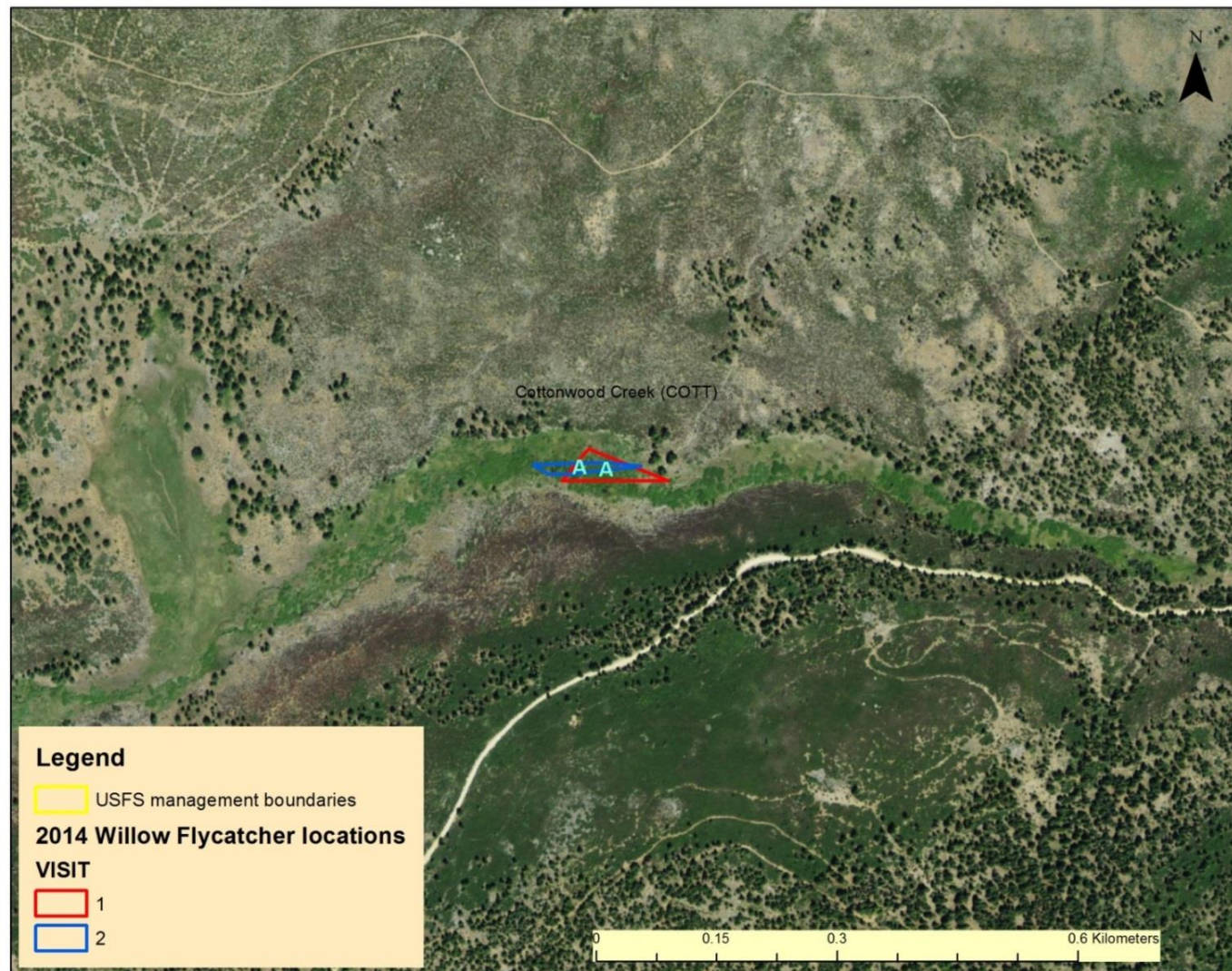


Little Truckee Boyington Mill

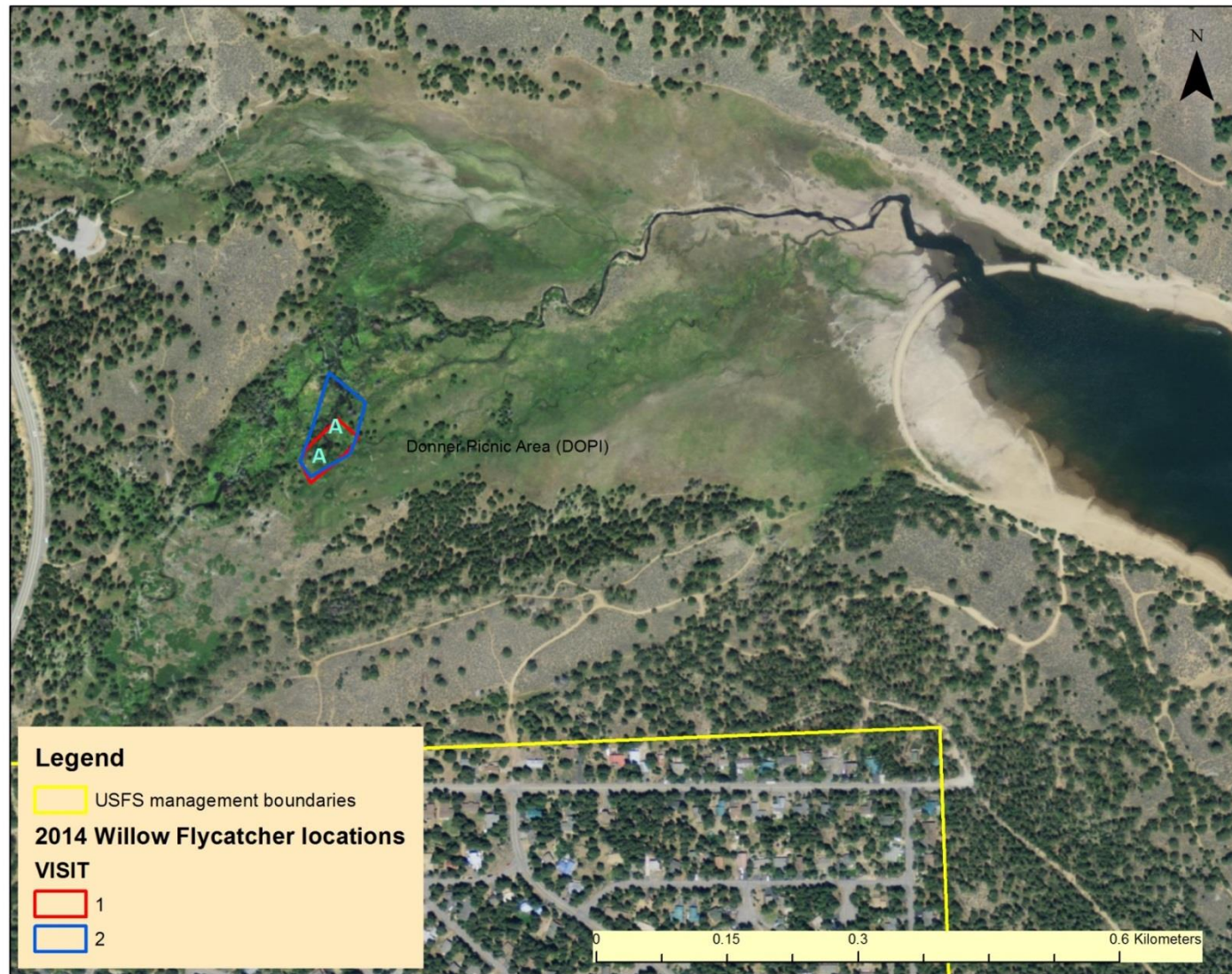


Sagehen Creek, Stampede Little Truckee Boyington Mill

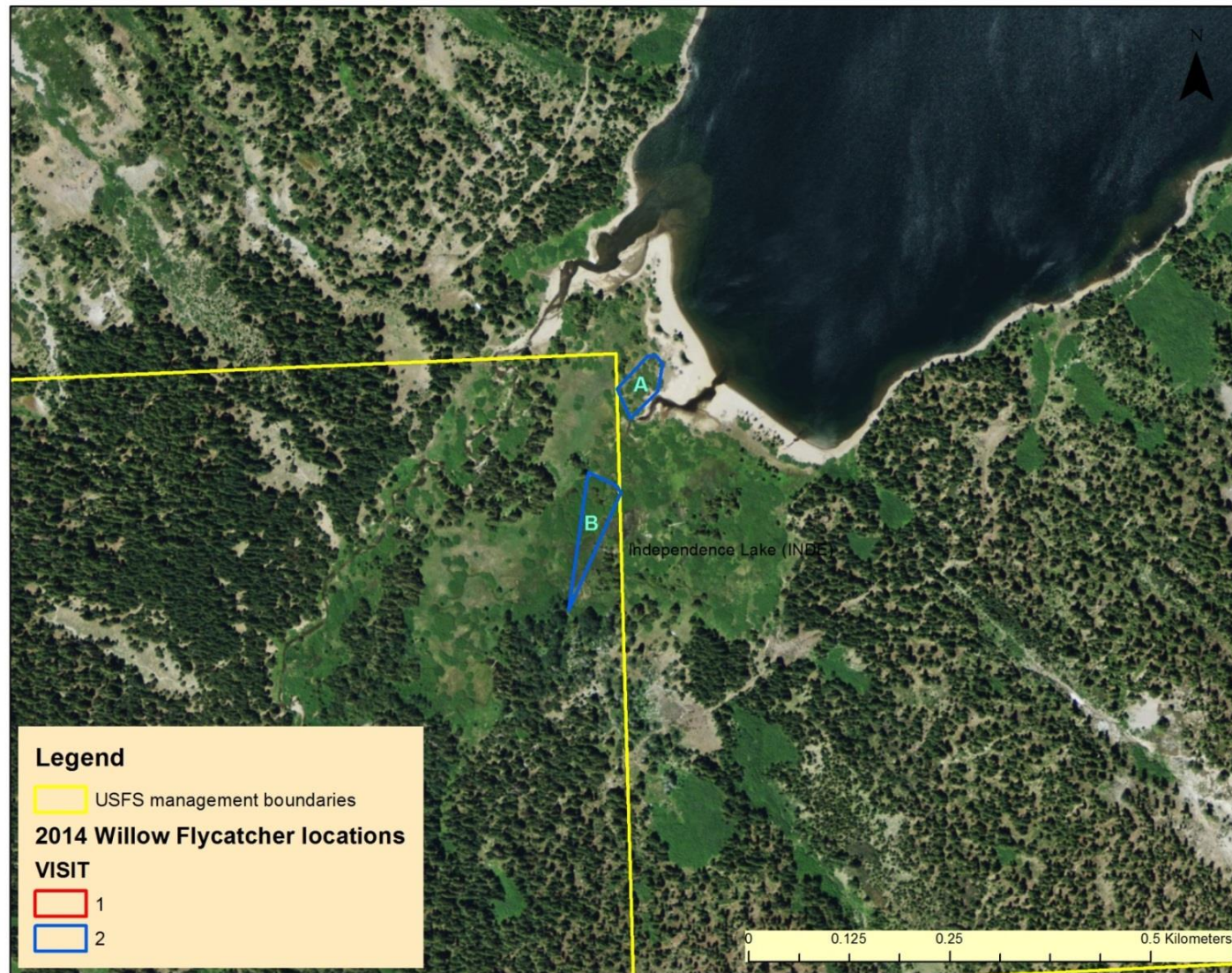
Appendix C -2014 Willow Flycatcher locations



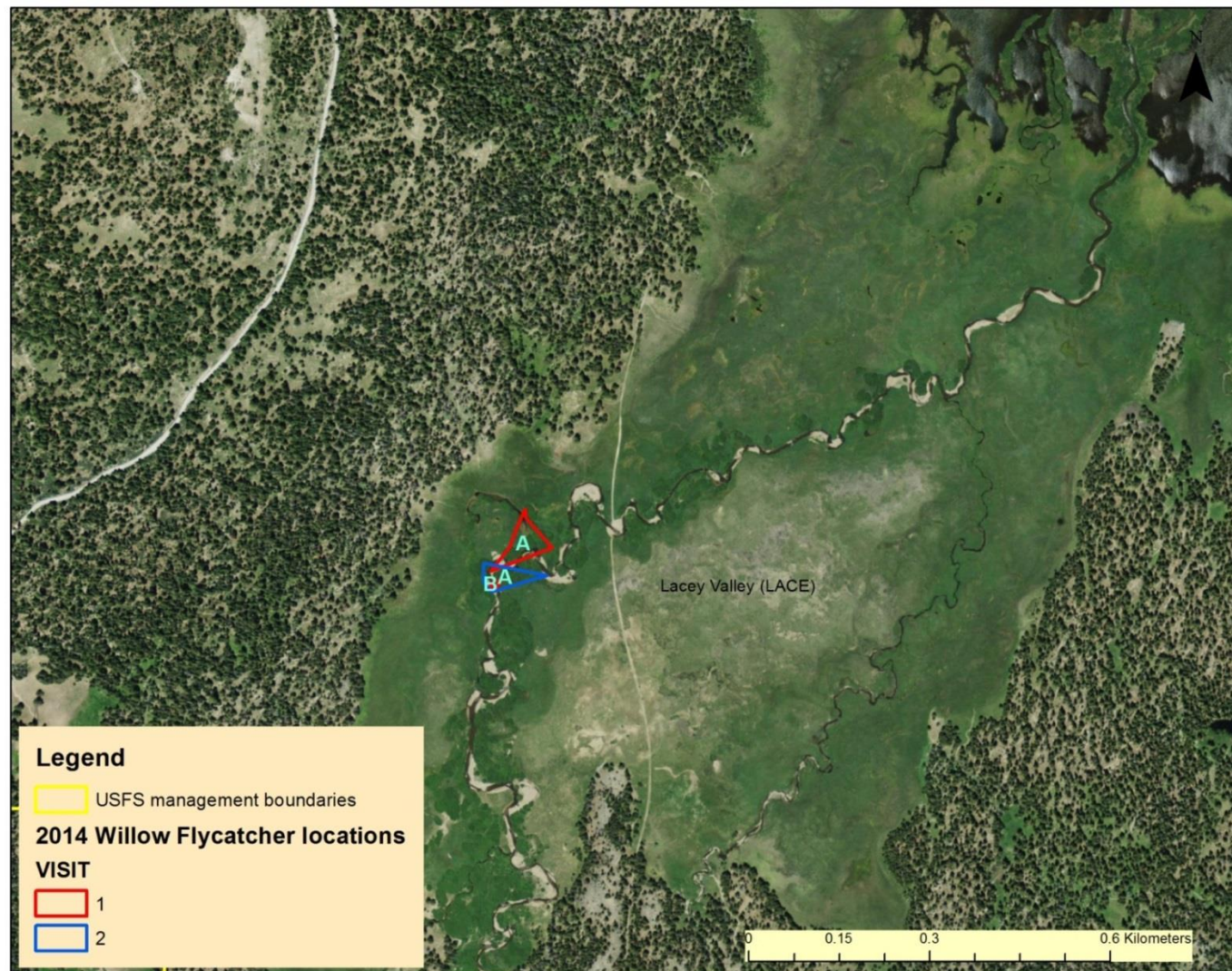
Cottonwood Creek



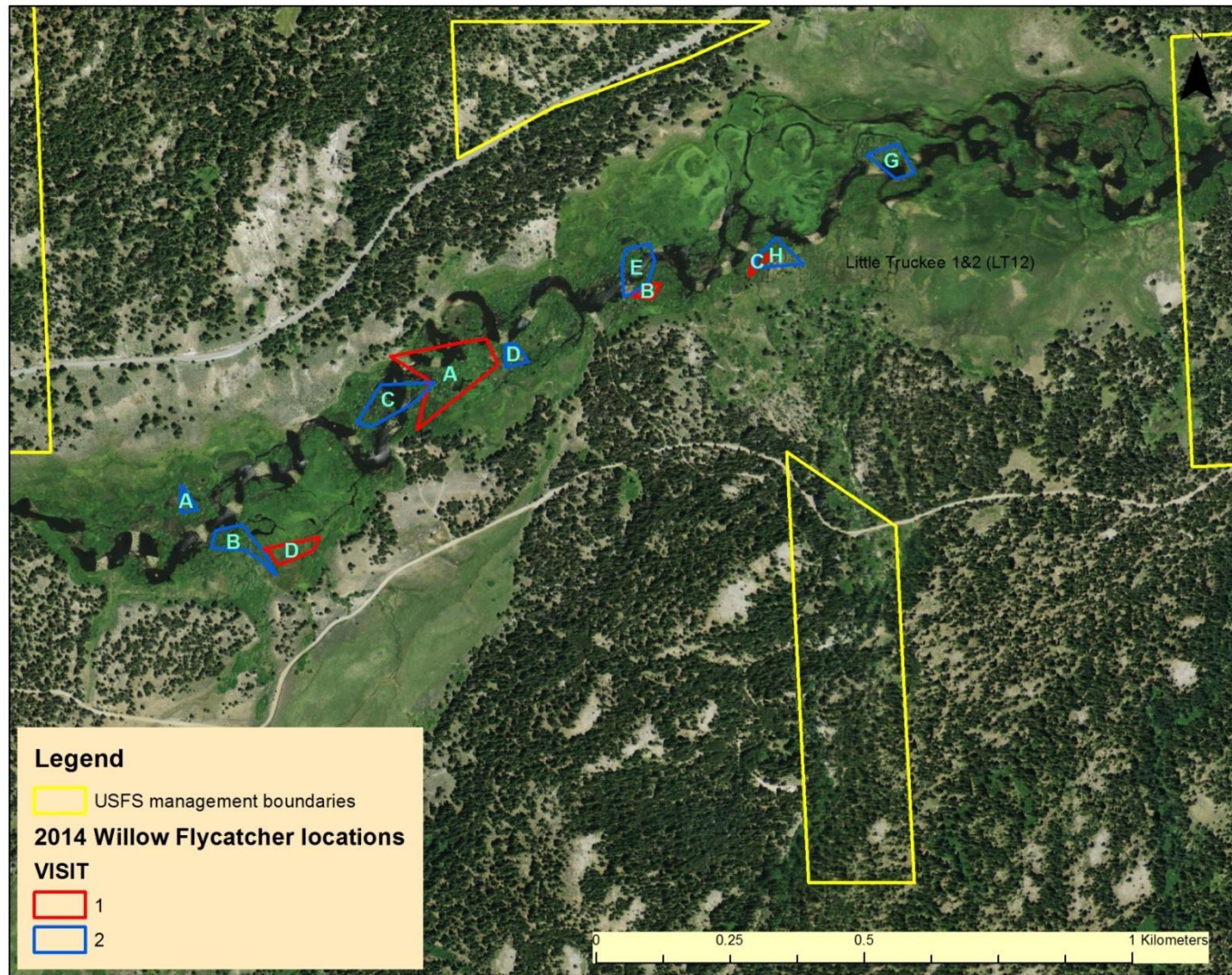
Donner Picnic Area



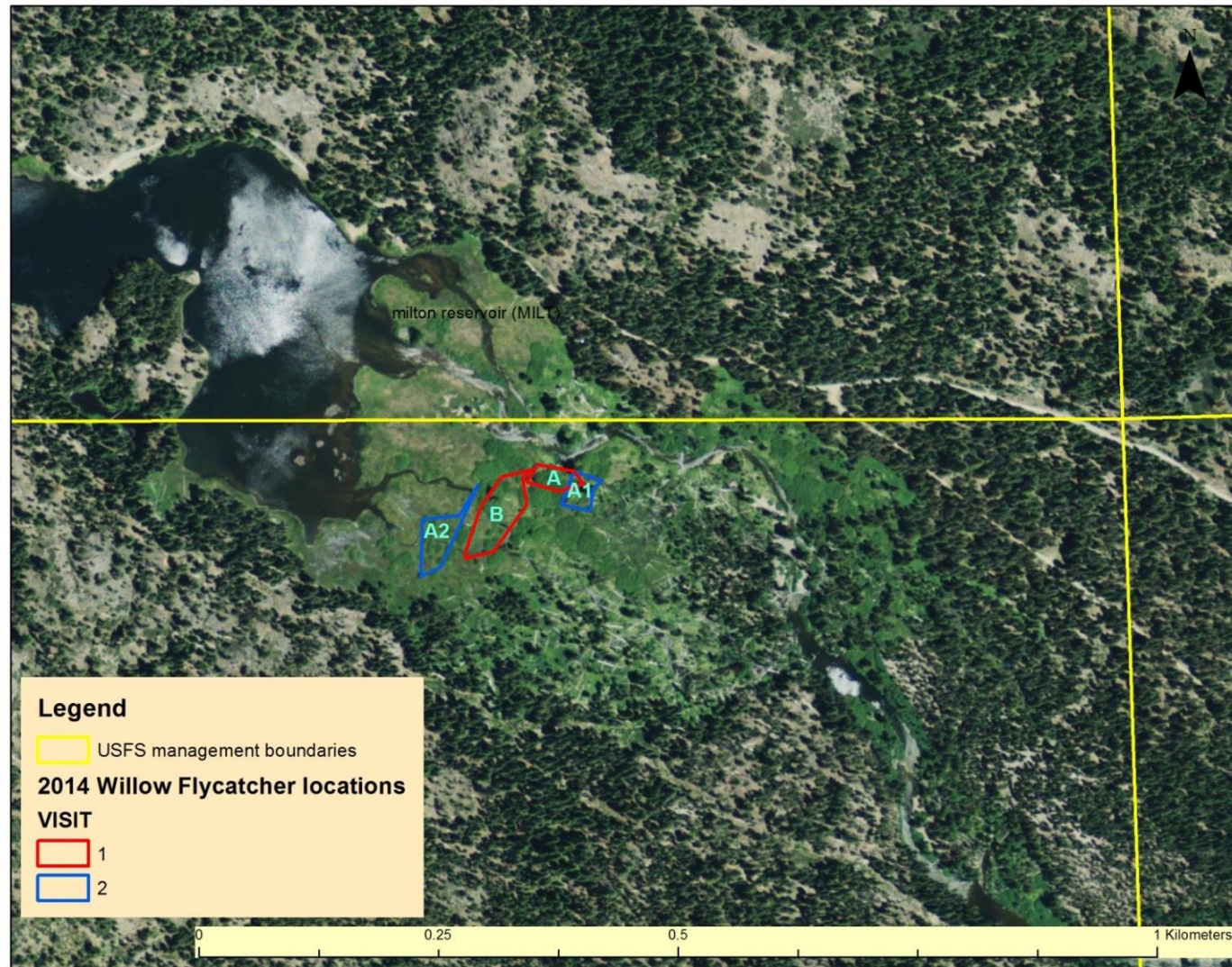
Independence Lake



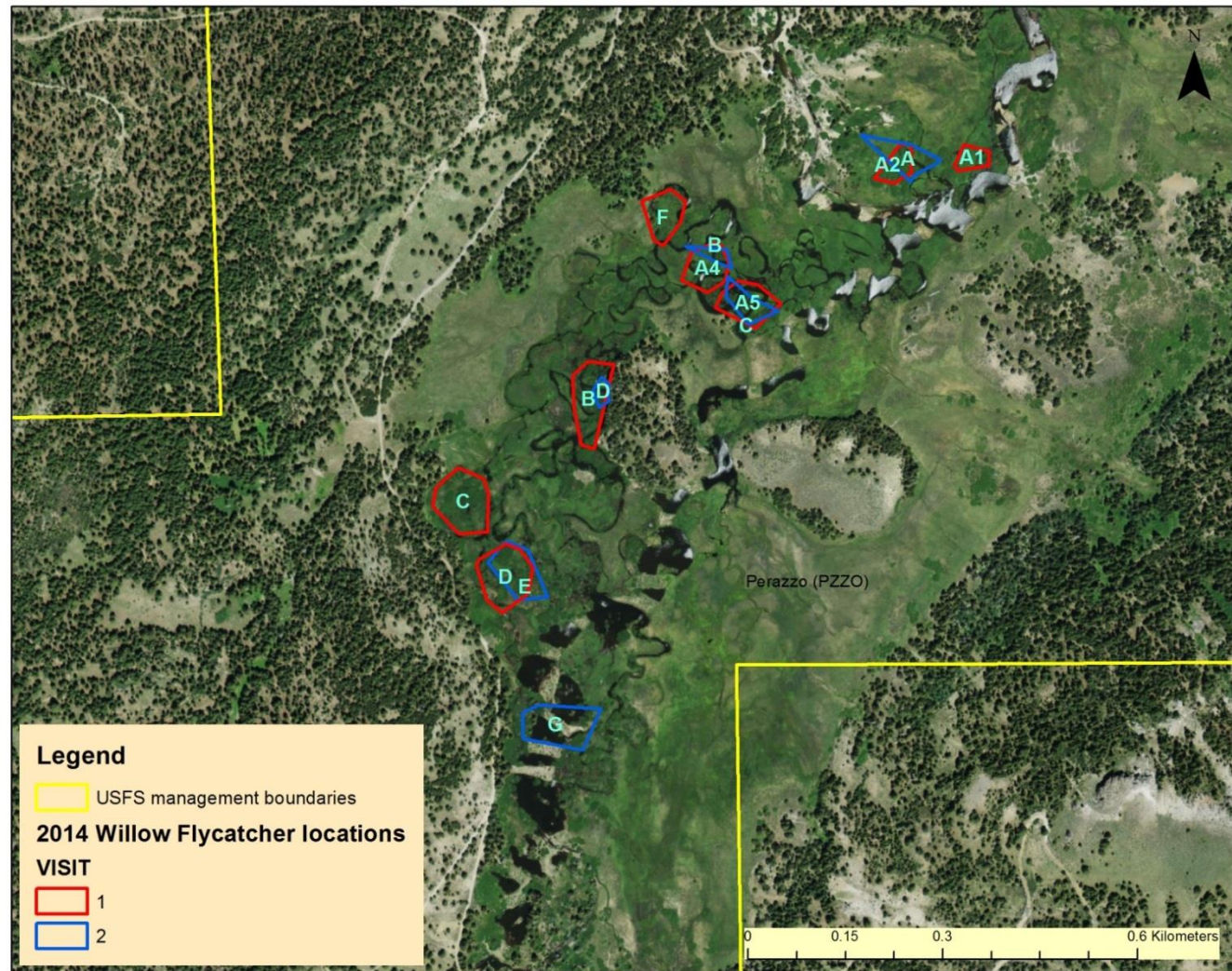
Lacey Valley



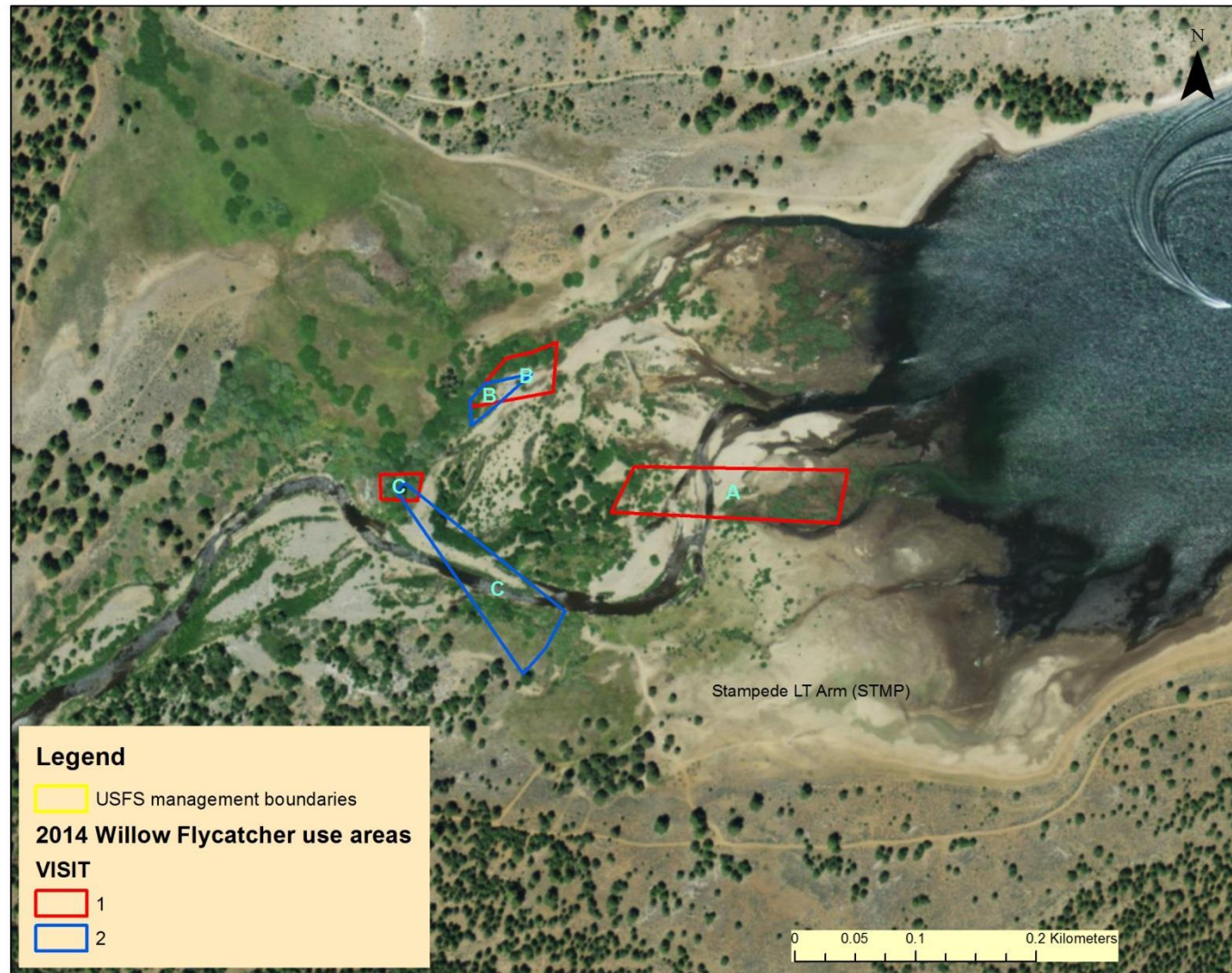
Little Truckee 1&2



Milton Reservoir



Perazzo Meadow



Stampede Reservoir – Little Truckee Arm

Appendix D. Bird species detected at each Willow Flycatcher survey sites during 2014.

Species	Carman Knuthson	Cottonwood Creek	Donner Picnic Area	Independence Lake	Lacey Valley	Lewis Mill	Little Perazzo	Little Truckee 3	Little Truckee Boyington Mill	Little Truckee 1&2	Milton Reservoir	Perazzo	Saddle Meadow	Sagehen Creek	Stampede Little Truckee Arm	Grand Total
Canada Goose				X	X			X		X	X	X			X	7
Wood Duck	X															X
Gadwall												X				1
Mallard	X				X			X	X	X	X	X				7
Cinnamon Teal															X	1
Green-winged Teal	X				X					X		X				4
Redhead												X				1
Ring-necked Duck												X				1
Lesser Scaup										X						1
Bufflehead				X	X					X		X				4
Common Merganser				X	X			X	X	X	X	X		X	X	9
Mountain Quail	X	X		X			X	X	X					X		7
California Quail	X								X						X	3
Pied-billed Grebe					X											1
American White Pelican					X											1
Great Blue Heron			X												X	2
Black-crowned Night-Heron					X					X						2
Osprey									X			X				2
White-tailed Kite							X									1
Bald Eagle												X				1
Northern Harrier								X								1

Species	Carman Knuthson	Cottonwood Creek	Donner Picnic Area	Independence Lake	Lacey Valley	Lewis Mill	Little Perazzo	Little Truckee 3	Little Truckee Boyington Mill	Little Truckee 1&2	Milton Reservoir	Perazzo	Saddle Meadow	Sagehen Creek	Stamped Little Truckee Arm	Grand Total
Northern Goshawk										X						1
Red-tailed Hawk	X	X					X							X	X	5
Virginia Rail			X							X		X				3
Sora			X							X						2
Sandhill Crane	X			X	X		X			X					X	6
Killdeer	X				X											2
Spotted Sandpiper				X	X			X	X	X	X	X			X	8
Greater Yellowlegs					X											1
Wilson's Snipe			X		X					X		X			X	5
Wilson's Phalarope					X											1
Eurasian Collared-Dove	X															1
Mourning Dove	X		X		X										X	4
Common Nighthawk	X														X	2
Anna's Hummingbird	X	X				X				X						4
Costa's Hummingbird		X		X	X		X	X				X				6
Calliope Hummingbird	X	X			X	X	X	X		X	X	X	X	X	X	12
Belted Kingfisher			X					X		X		X		X	X	6
Williamson's Sapsucker										X				X		2
Red-breasted Sapsucker	X		X	X	X	X	X	X	X	X	X	X	X	X	X	14
Unidentified Sapsucker										X						1
Hairy Woodpecker		X	X				X	X		X	X	X		X	X	9
White-headed Woodpecker	X	X				X	X									4
Black-backed Woodpecker														X		1

Species	Carman Knuthson	Cottonwood Creek	Donner Picnic Area	Independence Lake	Lacey Valley	Lewis Mill	Little Perazzo	Little Truckee 3	Little Truckee Boyington Mill	Little Truckee 1&2	Milton Reservoir	Perazzo	Saddle Meadow	Sagehen Creek	Stampede Little Truckee Arm	Grand Total
Northern Flicker	X	X	X	X		X	X	X	X	X	X	X	X	X	X	14
Pileated Woodpecker				X				X								2
Unidentified Woodpecker	X															1
Olive-sided Flycatcher									X				X			2
Western Wood-Pewee	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Willow Flycatcher		X								X						2
Hammond's Flycatcher														X		1
Gray Flycatcher	X															1
Dusky Flycatcher	X	X		X	X	X	X	X		X	X	X	X	X	X	13
Cassin's Vireo														X		1
Warbling Vireo	X	X	X	X		X	X	X	X	X		X		X		11
Steller's Jay	X		X	X			X	X		X			X	X	X	9
Clark's Nutcracker	X	X					X	X		X	X	X	X	X	X	10
Common Raven	X				X			X		X	X				X	6
Tree Swallow	X		X	X	X					X	X	X			X	8
Violet-green Swallow	X										X					2
Northern Rough-winged Swallow												X				1
Barn Swallow	X															1
Mountain Chickadee	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Bushtit	X															1
Red-breasted Nuthatch	X	X				X	X	X		X	X			X	X	9
White-breasted Nuthatch															X	1
Pygmy Nuthatch			X			X								X		3

Species	Carman Knuthson	Cottonwood Creek	Donner Picnic Area	Independence Lake	Lacey Valley	Lewis Mill	Little Perazzo	Little Truckee 3	Little Truckee Boyington Mill	Little Truckee 1&2	Milton Reservoir	Perazzo	Saddle Meadow	Sagehen Creek	Stamped Little Truckee Arm	Grand Total
Brown Creeper								X		X				X		3
House Wren		X	X			X				X				X	X	6
Marsh Wren										X						1
Golden-crowned Kinglet								X						X		2
Western Bluebird					X											1
Mountain Bluebird		X				X		X								3
Swainson's Thrush	X															1
Hermit Thrush				X												1
American Robin	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
European Starling												X				1
Orange-crowned Warbler								X		X						2
Nashville Warbler								X		X				X		3
MacGillivray's Warbler	X							X		X		X		X		5
Yellow Warbler	X	X	X	X	X		X	X	X	X	X	X	X	X	X	14
Yellow-rumped Warbler					X			X		X	X	X		X		6
Wilson's Warbler			X	X	X		X	X		X		X		X	X	9
Green-tailed Towhee		X	X				X		X	X		X		X	X	8
Spotted Towhee			X													1
Cassin's Sparrow												X				1
Chipping Sparrow										X						1
Brewer's Sparrow			X							X						2
Vesper Sparrow	X					X		X				X		X	X	6
Savannah Sparrow										X		X				2

Species	Carman Knuthson	Cottonwood Creek	Donner Picnic Area	Independence Lake	Lacey Valley	Lewis Mill	Little Perazzo	Little Truckee 3	Little Truckee Boyington Mill	Little Truckee 1&2	Milton Reservoir	Perazzo	Saddle Meadow	Sagehen Creek	Stampede Little Truckee Arm	Grand Total
Fox Sparrow	X	X	X	X	X	X	X	X	X	X	X	X		X	X	14
Song Sparrow	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lincoln's Sparrow								X		X		X		X		4
White-crowned Sparrow				X	X			X	X	X		X	X		X	8
Dark-eyed Junco	X	X						X		X		X	X	X		7
Oregon Junco	X	X			X	X	X	X		X	X	X		X	X	1X
Western Tanager	X		X					X		X	X	X		X		7
Black-headed Grosbeak	X						X									2
Blue Grosbeak												X				1
Lazuli Bunting					X											1
Red-winged Blackbird	X		X		X			X	X	X	X	X	X			9
Western Meadowlark	X		X													2
Brewer's Blackbird	X	X	X		X		X	X	X	X	X	X	X			11
Brown-headed Cowbird	X	X	X				X	X				X		X		7
Pine Grosbeak								X								1
House Finch				X												1
Purple Finch							X									1
Cassin's Finch	X									X	X	X				4
Pine Siskin										X		X		X		3
Lesser Goldfinch						X										1
American Goldfinch						X										1
Evening Grosbeak										X		X		X		3
Grand Total	46	26	29	24	35	20	28	43	20	57	26	51	16	40	35	496

Appendix E. Vegetation cover at each site

Site name	date	Elev.	Percent RDS by taxa		RDS Height (m)	Percent ground cover						Average Foliar Density	Evidence of Beaver Activity
			Willow	Alder		Sedge	Grass	Rush	Forb	Bare Soil	Gravel or Sand		
Carman Knuthson	6/10/2014	4984	100	0	>2m	50	20	5	15	10	0	>50%	yes
Cottonwood Creek	6/1/2014	6229	100	0	>2m	70	10	5	10	10	0	>50%	no
Donner Picnic Area	5/31/2014	5795	100	0	>2m	70	7	18	2	2	1	>50%	Yes
Independence Lake	6/19/2014	6976	90	10	>2m	45	40	5	5	0	5	>50%	yes
Lacey Valley	6/18/2014	6781	100	0	>2m	60	15	10	10	0	5	>50%	no
Lewis Mill	6/6/2014	6231	95	5	>2m	15	80	0	5	0	0	>50%	no
Little Perazzo	6/11/2014	6588	100	0	>2m	30	50	10	10	0	0	>50%	no
Little Truckee 1&2	6/7/2014	6470	100	0	1 - 2m	90	0	0	10	0	0	>50%	yes
Little Truckee 3	6/9/2014	6452	100	0	1 - 2m	50	20	0	10	15	5	>50%	yes
Little Truckee Boyington Mill	6/5/2014	5645	100	0	>2m	70	0	0	0	15	10	<50%	no
Milton Reservoir	6/23/2014	5702	85	15	>2m	85	2	10	0	0	3	>50%	no
Perazzo	7/1/2014	6540	100	0	>2m	60	30	5	5	0	0	>50%	yes
Saddle Meadow	6/9/2014	6457	100	0	>2m	50	50	0	0	0	0	<50%	no
Sagehen Creek	6/2/2014	6328	100	0	>2m	80	5	0	5	5	5	<50%	yes
Stampede Little Truckee Arm	6/17/2014	5949	100	0	>2m	30	10	5	5	40	10	>50%	yes

Appendix F. Sources of standing water at each site

Site name	Start date	Average width of stream(s)	Average depth of streambank	Source of standing water on site					Percent of site with surface water or saturated soils
				In-channel pools	Oxbows	Spring-fed ponds	Lake margin	Seep / snowmelt	
Carman Knuthson	6/10/2014	>2m	0			x			25
Cottonwood Creek	6/1/2014	<0.5m	1			x			10
Donner Picnic Area	5/31/2014	0.5-1m	2	x					40
Independence Lake	6/19/2014	0.5-1m	1		x		x		15
Lacey Valley	6/18/2014	>2m	1		x		x		10
Lewis Mill	6/6/2014	0.5-1m	1		x				5
Little Truckee 1&2	6/7/2014	>2m	0	x	x				75
Little Truckee 3	6/9/2014	>2m	2		x				10
Little Perazzo	6/11/2014	<0.5m	1			x			5
Little Truckee Boyington Mill	6/5/2014	>2m	0		x				10
Milton Reservoir	6/23/2014	0.5-1m	1		x		x		25
Perazzo	7/1/2014	>2m	0	x	x				70
Saddle Meadow	6/9/2014	0.5-1m	0	x					40
Sagehen Creek	6/2/2014	1-2m	2	x					25
Stampede Little Truckee Arm	6/17/2014	1-2m	2		x		x		12