Audubon CALIFORNIA

Conservation of *Aechmophorus* Grebe Colonies at Six Northern California Lakes
Interim Report for Year Four
Submitted to the National Fish and Wildlife Foundation
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Grebe Painting by Sally Posner

Submitted by:
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Summary of Accomplishments
April 2018 – October 2018

Audubon California, Redbud, Plumas and Altacal Audubon chapters continue to engage the public in wide-reaching and successful grebe conservation efforts in Northern California with generous support from the Luckenbach Council, National Fish and Wildlife Foundation (NFWF), and National Oceanic and Atmospheric Administration (NOAA). Year Four of our grebe conservation effort continues to focus on public outreach and education with our signature event being the Grebe Festival organized for the third year by Plumas Audubon and supported by Audubon California. Additional activities completed between April 2018 and October 2018 are detailed below.

Project Activities & Outcomes

Project Management

Audubon California

Activities

- Ariana Rickard provided administrative support to chapters, sending reminders and regarding grant reports and reviewing invoices for compliance with budgets prior to submitting for processing.

Outcomes

- Supporters and members of Audubon California were able to read about the Grebe Project and learn about efforts to conserve the species through information on our website.

Public Outreach and Education

Redbud Audubon Society – Clear Lake

Activities

- Redbud Audubon staffed a grebe exhibit at a Science Fair for Lake County children, at the Senior Center in the City of Clearlake, a community that serves a number of low-income and minority children.
- Redbud's Heron Days lasted four days in May 2018 and included boat tours of Clear Lake, where Audubon guides provided information to visitors about grebe behavior and the conservation work of the grebe project.
- The grebe exhibit booth at the September Pear Festival was staffed with knowledgeable chapter members for the entire seven hours of the event. Over 3,000 people attended the festival.
- A major front-page article about the current grebe breeding season and the Audubon grebe project appeared in local news media this summer:
    - "***Grebe protection project enters ninth year,***" by Aidan Freeman***, Lake County Record-Bee*** newspaper July 26, News section, pages 1-2. The article covered the purpose and history of the project, the late nesting season this year, and Redbud's partnership with the County of Lake Water Resources Department to place speed

buoys at locations on the lake identified by Dr. Floyd Hayes' monitoring as needing the protection of warning buoys for boats to respect the floating colonies.
    - This article from the Record-Bee was reprinted in full in the September 2018 issue of Redbud's chapter newsletter, ***The Western Grebe.***
- Redbud Audubon maintains 22 fishing line recycle bins around the 19-miles of shoreline on Clear Lake to protect grebes and other wildlife from injury or death caused by discarded fishing line. The latest was added at the Kono Tyhee lakeshore subdivision during this time period. The bins now cover most of the primary dock and ramp areas used by local and visiting fishermen and women.
- Redbud volunteers Rob Patton currently handles all the maintenance of the recycle bins, visiting each one to remove the fishing line (and, unfortunately, trash that people put in the bins), and sends it to an Iowa recycling manufacturer.

Outcomes

- The grebe exhibit at the Clearlake Science Fair used photos of grebe courtship, nesting, and parenting behaviors to engage the children in learning about Clear Lake's grebes.
- The Clear Lake 90-minute pontoon tours provide views of colonies of tree-top nesting herons and egrets and Western and Clark's grebes in the early stages of springtime courtship and nest building. Guests could also visit the grebe exhibit booth to ask questions about the grebe project and learn more about grebes.
- The Grebe Project Booth at the Pear Festival allowed chapter members to talk with the public and provide handouts and information about the county's most beloved bird species.
- Project manager Rob Patton reported that he has mailed to the recycled products manufacturer over 33.08 pounds of fishing line retrieved from the 22 recycle bins in the past four years.
- This is significant evidence of the number of fishermen who are cooperating with the effort to protect the grebes and other wildlife from the discarded plastic line.

<u>Plumas Audubon Society – Lake Almanor, Davis, Antelope, Eagle</u>

Activities

- The third annual Grebe Festival reached a large and focused audience with a grebe conservation message. This year's festival included some new activities: a boat tour on Eagle Lake, a watercolor painting workshop, and a wildlife stamp-carving workshop.
- Plumas Audubon Society (PAS) staff, interns, and volunteers, conducted a variety of outreach and education efforts in 2018 including tabling at numerous events, giving school classroom presentations, and leading youth field trips.
- Thirty students from Chester Elementary School 5th graders joined Plumas Audubon for a fieldtrip which included a bird walk on a newly created nature trail, a presentation on Western and Clark's Grebes which highlighted their climate endangered status, and then played a few grebe games (grebe race and ring-toss games). The group then traveled to Lake Almanor where they saw grebes and had a close sighting of a Bald Eagle.
- In May, Plumas Audubon Society once again tabled at the Children's Fair, which attracts hundreds of children and their families from across the county.

- In June and July, a crew of six local youth from around Plumas County join Plumas Audubon in meadow restoration on the Plumas National Forest for six weeks. These six interns learned about the ecology of Western and Clark's Grebes and how to identify them.
- In September, PAS's table at the Sierra Valley Art+Ag event was visited by about 250 people.
- In April through October, Plumas Audubon sponsored and tabled (PAS is the sole tabler) at nine small outdoor concerts hosted by the local native plant nursery, California Sister Nursery, with 25-100 attendees at each event.

Outcomes

- There were approximately 150 participants at this year's festival (lower turnout than 2016 and 2017 at around 200 participants each), with around two fifths of our guests returning after having attended either or both of the previous festivals.
- Altogether the Grebe Festival offered 35 different activities, fieldtrips, bird walks, and workshops that invited participants to learn about the ecology and conservation of *Aechmophorus* grebes and to experience the great wildlife viewing on and around the Almanor basin and beyond.
- Boat tours at the festival took 81 people out to see grebes and other birds up close on Lake Almanor.

Altacal Audubon Society – Thermalito Afterbay

Activities

- The chapter tabled at the 24th Annual Salmon Festival at the Feather River Fish Hatchery in Oroville in September.

Outcomes

- Exhibit at the Salmon Festival educated festival attendees about the natural history, habits, and life cycle of the Grebes.

Monitoring and Evaluation

Redbud Audubon Society – Clear Lake

Activities

- Formal surveys of grebe nesting began on April 29 and continued through September 23. Most surveys were conducted by canoe; some were conducted from land or a motorboat. Because of limited funds, searches were conducted during only seven days. All surveys were conducted by two or more observers.
- A brood survey was conducted at the end of the breeding season, on September 23, to evaluate reproductive success.
- Disturbance index counts were conducted from July 3 to August 10 at colonies with eggs.

Outcomes

- Nesting began much later than in the previous eight breeding seasons, probably in June. The first nests and eggs were found on 22 June 22.

- We estimated a total of 4,022 nests in 14 colonies, of which 76.7% were attended by Western Grebes and 23.3% by Clark's Grebes. Given the paucity of days spent searching for nests the actual number of nesting attempts was undoubtedly higher. Thousands of active nests were seen on August 10 but a thorough search of the lake's perimeter by motorboat on September 23 failed to find any nests.
- The vast majority of nests were attached to submergent vegetation in open water, placed up to 450 m from shore (95.1%; n = 3,826); the remaining were attached to emergent vegetation along the shore (4.9%; n= 196).
- A brood survey by motorboat at the end of the breeding season, on September 23, recorded 3,703 adult grebes, of which 84.2% were Western Grebes, 15.8% were Clark's Grebes and 2,011 were unidentified. We counted only one juvenile, a Clark's Grebe, within the transect area, for an extremely low ratio of 0.0006 juveniles per adult (0 for Western Grebes, 0.003 for Clark's Grebes), which was our lowest since our study began in 2010, well below the ratio of 0.003 juveniles per adult in 2015, when only 888 nesting attempts were recorded. Extrapolating the ratio of juveniles to adults within the transect area to the total number of adult grebes counted, we estimate a total number of two juveniles for the lake.
- We recorded only six disturbances during only 5.5 hours of observation, for an average of1.1 disturbances per hour. Birds accounted for all of the disturbances. We observed two instances of egg predation by the American Crow (*Corvus brachyrhynchos*) entering a colony. We did not observe any mammals or humans disturb nesting grebes.
- The breeding season began later than usual, with the first eggs found on July 3 (some were probably present in late June). The number of nests were our fourth highest but the number of juveniles was the lowest during nine breeding seasons.
- It is difficult to explain why the nesting success was so low. One possible explanation is the proximity of the Mendocino Complex Fire, the largest fire complex in the history of California, which burned within a few km of the shores of the lake and generated an enormous amount of smoke over the lake from July 27 to September 18. The River Fire burned within 3 km of the northwestern shore of the lake during the last few days of July and the Ranch Fire burned within 3 km of the northeastern shore of the lake during the first week of August. On August 10, while the smoke was still thick over Clear Lake, we counted 2,665 nests, mostly at the north end of the lake and its largest tributary; many of the nests were active, with the grebes participating in nest construction, copulation, and incubation. Our observations indicate that the grebes apparently did not stop nesting during the fires.

<u>Plumas Audubon Society – Lake Almanor, Davis, Antelope, Eagle</u>

Activities

- Plumas Audubon Society (PAS) continued monitoring at Lake Almanor and observed the loss of almost an entire generation of *Aechmophorus* grebes on the lake.
- PAS also monitored grebes at Antelope Lake and Eagle Lake.

Outcomes

Table 1. Summary of adult counts, nests, and young on each lake.

Lake	Peak # nests	Ave. adult census	Peak ratio juv:adults	Est. # young
Almanor	1205	3485	0.002	9
Antelope	3*	103	0.18	19
Eagle	-	-	-	-

*Peak nesting not observed at Antelope Lake. Thirteen broods observed the same date as the three active nests reported.
NOTE: Eagle Lake census scheduled for Oct 18, 2018. No complete census surveys were conducted on Lake Davis in 2018.

- In 2018 *Aechmophorus* grebes were found breeding at Eagle Lake for a second consecutive year after a five year breeding hiatus. The great amount of precipitation that Northern California received the past two years brought Eagle Lake's water level back up to where tules could successfully grow and once again provide suitable nesting habitat for the grebes. This breeding season on Eagle Lake has not yet been evaluated due to issues coordinating a census (census scheduled for Oct 18, 2018).
- The total number of adults on Lake Almanor (Table 1) was lower than the past six previous years (4,293 average adult census, averaged across 2012-17). Peak nest numbers were similar to the previous two years, but less than half of what the numbers were in 2013-2015.
- The number of adults and nests at Lake Almanor seem to somewhat correlate with whether there is nesting at Eagle Lake (Figure 1). The number of adult grebes and nests at Lake Almanor shot up from previous numbers during the same timeframe that Eagle Lake had zero nesting (2012-2016). Since then, in the last two years with Eagle Lake once again providing breeding habitat, numbers of adults and nests on Lake Almanor have dropped from those observed during previous peak years (2013-2015).

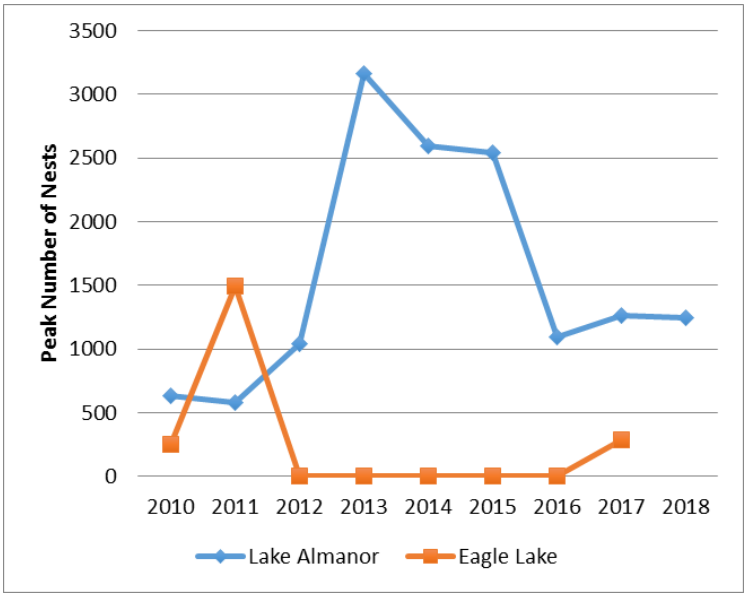

Figure 1. Peak nest counts at Eagle Lake and Lake Almanor, 2010-2018.

- Lake Davis surveys were not done due to the imbalance of survey effort to data produced. With a dwindling budget it was decided that Lake Almanor should be prioritized.
- Antelope Lake had more adult grebes but produced fewer young than average of the previous reproductive years during this study (Table 1).
- Peak nesting on Lake Almanor occurred around August 3 at which point 1,205 active nests were observed in the colony. Ten days later the colony was found to have been almost entirely abandoned with many nests stranded on land and extensive egg depredation was evident. By August 20, no active nests were observed and a lake-wide census survey on that date recorded 3,485 adult *Aechmophorus* grebes and only 3 young (informal observations from subsequent boat tours during the Grebe Festival, Aug. 24-26, estimated 15 young on the lake). During peak nesting the water level drop rate was -1.44 in/day.
- *Aechmophorus* grebe reproduction was almost a complete failure at Lake Almanor this year with the loss of almost an entire generation of *Aechmophorus* grebes on the lake. The lowest reproductive success (0.002) and the highest water level drop rates (average of -1.08 in/day, June 25 – Sept 30) of the study were observed this nesting season.
- PG&E finds the strategy of keeping water level drop rates below the initial recommendation of -0.72 in/day nearly impossible with energy supply obligations and other operational constraints and complexities. To make water management changes more feasible, PAS subsequently recommended an interim goal of water level drop rates of no faster than 0.84 in/day from July 1 through August 31. This updated interim recommendation has not been followed in the years since (2017 and 2018).
- While PAS continues to maintain the recommendation of maximum water level drop rate during peak breeding season, regular water holding events (eg. at 3-5 week intervals for periods of 3-5 days) between June 25 and September 15 may be a more feasible management strategy for PG&E to implement to benefit grebe conservation efforts at such an important breeding ground as is Lake Almanor.

<u>Altacal Audubon Society – Thermalito Afterbay</u>

Activities

- Nine grebe colony surveys were conducted at the Thermalito Afterbay from May 24, 2018 to September 13, 2018. Seven of the surveys covered the entire Afterbay or full surveys.
- Boat surveys have been conducted for numerous years with a representative from the California Department of Fish & Wildlife, representatives from the California Department of Water Resources, and a representative from Altacal Audubon.
- The surveys count Western Grebes and Clark Grebes, number of nest, eggs and young of year (YY). Water elevations and current conditions of vegetation and weather conditions are also recorded.

Outcomes

- The number of Grebes counted this survey period was high: 486 compared to 202 in 2017.
- There was an abundance of nest attempts this year compared to last year: 20—2017, and 149—2018. It seems the Grebes returned to nesting in the pondweed at the southern end of the Afterbay this year. Last year all nesting took place at the extreme north end of the Afterbay near Saddle Dam Cove.
- Young of Year estimate = 20

- The Productivity rate, comparing YY (young of year) to AD (adult) was slightly lower than last year: compare 0.07--2017 to .005--2018. However, both years could be considered as having a good success rate.
- There was minimal fluctuations in the water level this year; it never dropped below 133'.

Conclusion

Audubon California, Redbud, Plumas and Altacal Audubon chapters are midway through the fourth year of Grebe Conservation Project's Phase II work. Our team has led grebe conservation and colony protection efforts in Northern California using a multi-layered approach that includes community engagement, community science, and cross-organization collaboration. The Grebe Team and the many communities we connect with thank our funders for their support and confidence in this project.