



Audubon CALIFORNIA

Conservation of *Aechmophorus* Grebe Colonies at Four Northern California Lakes

Project ##2008-0073-035

Summary report for 2012 breeding season

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Summary

The three Audubon chapters coordinating outreach, monitoring, and protection efforts for nesting grebes on their respective lakes have been highly productive during the 2012 breeding season. Over 22,000 adult grebes were observed on six lakes, Lake Almanor, Eagle Lake, Clear Lake, Thermalito Afterbay, Lake Davis, and Antelope Lake. The reproductive success on these lakes was mixed with several of the smaller lakes being highly productive, but contrasting those with Eagle Lake that had a complete failure of the grebe population to breed due to extremely low water levels. Overall, the average reproductive rate, measured by the ratio of adults to juveniles, was .133. The lack of reproductive success, especially at Clear Lake and Eagle Lake, can be explained by high rates of predation by American Crows, California Gulls, and otters, a low abundance of or lack of access to forage fish as well as 2012 being a low water year. The number of adults, however, is up 50% from 2010 totaling 15,169 in 2012 estimated from lake transect surveys.

Despite the frustrating reproductive rates, the chapters were highly successful in their outreach efforts. In 2012, the chapters have forged working relationships with lake advisory committees, the Department of Water Resources, PG&E, watershed management committees, and numerous school systems throughout the lake regions. Overall, the three chapters have presented at 38 events and interacted with an estimated 1,000 students from local schools and over 7,000 local residents through October 2012.

This August Plumas Audubon hosted the annual Grebe conference in Chester, CA where members of the Luckenbach Council, Audubon California, Plumas Audubon, Altacal Audubon, Redbud Audubon, Department of Fish and Game, and Department of Water Resources came together to discuss grebe research and education occurring on the four focal lakes in northern California. Some of the major themes of the meeting included ensuring consistent methods of monitoring and surveying of grebe colonies to allow comparisons between lakes and between years, using both active and passive outreach in the form of presentations to local community groups in addition to education signs placed at strategic locations such as boat launches and community parks on the lake. The conference also gave the organizations involved a chance to network and connect around the paralleling efforts on education and outreach and conservation. The conference increased the cohesiveness of the group and also gave the chapters an opportunity to highlight the immense amount of work that has been accomplished in the last year. Each of the chapters as well as Audubon California are highly motivated to build on the success and lessons learned during the first three years of the project and continue to positively impact grebe colonies nesting on their local lakes for the last year of the contract and beyond. Extension of the project for an additional two years has been discussed and all chapters and Audubon California are invested and interested in coming to build our success.

Results

The three chapters have many accomplishments for the third of four breeding seasons. Audubon California has helped support the chapters by providing technical assistance with messaging, outreach, and data collection. Additionally, Audubon California staff has been responsible for budget tracking assistance, reporting, and requesting funds to the National Fish and Wildlife Foundation. Since much of

the work completed this year was been accomplished by the Audubon chapters, we have highlighted some of their significant work with community outreach, conservation projects, and surveying and monitoring breeding colonies.

Outreach

Plumas Audubon

In May, Plumas Audubon spent a lot of their time engaging with local community students at several schools about grebe conservation and protection at Eagle Lake and Lake Almanor. Fifty-five students at Quincy Jr. High School and another 175 students at Lassen High school learned about the *Aechmophorus* grebes that nest in the region. Also they presented to approximately 80 students at Chester Jr. High School on the grebes that nest on Lake Almanor.

Nils Lunder presented to the Almanor Basin Watershed Advisory Committee at their State of the Lake Forum in June where the colony monitoring and student outreach efforts were highlighted.

This summer, Plumas developed a Summer Youth Outing Program for their region in Northeastern California that brought over 100 local youths on day trips to learn about and observe grebes on Lake Almanor, Eagle Lake, Lake Davis, and Antelope Lake. This program has served the communities of Loyalton in Sierra County; Portola, Quincy, Greenville and Chester in Plumas County; and Westwood and Susanville in Lassen County. Also they presented at campgrounds located on the grebe nesting lakes and connected with over 100 campers with their grebe talks. These campers were typically boating, kayaking, or using the lakes during the day and learning about grebes at night. Campground presentations have been an effective outreach strategy for Plumas for the past two years.

Presenting to local community groups such as the Chester and Susanville Rotary, and the Lake Almanor West board of directors has informed groups involved with potential management and development changes at the lake. During the summer of 2012 approximately 220 people have been introduced to grebe natural history and conservation at Lake Almanor and Eagle Lake.

Redbud Audubon

In April, Marilyn Waits made a presentation and report about the grebe conservation project to the Clear Lake Advisory Committee, the official committee appointed by the Board of Supervisors to deal with all issues regarding Clear Lake. Redbud has continued to engage with the advisory committee to make grebe colonies on Clear Lake a topic of discussion and priority for the lake communities.

During the breeding season, a video was produced by Floyd Hayes with the assistance of Redbud Audubon members documenting the Grebe conservation project at Clear Lake as well as describing the natural history of *Aechmophorus* grebes, and ways the public can help avoid disturbing colonies. This will be a valuable asset for the chapters to incorporate into their school and community presentations. Redbud Audubon plans to use it in upcoming school presentation later this winter.

Redbud Audubon also continues to push incorporating video streaming into their outreach model by, again this year, setting up the Grebecam that streamed the activities at a Clear Lake grebe nest live on the internet. Audubon California and local news outlets highlighted the story encouraging people to view the grebe nest from the Redbud Audubon website where they developed educational material on the various spring rituals that can be seen in a grebe colony on Clear Lake. The chapter received numerous emails from Lake County residents that viewed the camera and wanted to connect with the Grebe team. The webcam nest remained active for one week and then was abandoned. Redbud plans on attempting another webcam effort next year with the help of newly trained chapter members to help manage the camera and website.

Outreach efforts at local community festivals has also been highly productive for Redbud and this summer the chapter attended the Pear Festival in Kelseyville, a Clear Lake community, that had 5,000 attendees. The main messages of avoiding colonies in the lake, and grebe natural history were well received. The chapter is planning on using their educational messaging in the classroom this coming winter and spring to engage with local students as well.

Altacal Audubon

In the spring, Altacal continued to build on relationships with local school systems with presentations and booths informing students about grebe behavior and natural history, the history of the Thermalito Afterbay, and avoidance measures to help the grebes. The number of students exposed to Altacal's education efforts totaled over 500 students.

In addition to their school program, Altacal has also set up an educational booth at the busiest boat launches around the Afterbay on spring and summer weekends for boaters to receive information on the grebes prior to going out on the lake. This was a highly successful way of getting information directly to those using the lake and the chapter estimated that over 200 boating groups were reached just this year.

Conservation and Protection

Plumas Audubon

Plumas Audubon worked with PG&E, Collins Pine Company, Eagle Lake Ranger District of Lassen National Forest, Lassen County, and the Five Dot Cattle Company to install signs alerting the public and workers of nesting grebes in specified areas of Eagle Lake and Lake Almanor. So far, a total of 10 signs have been installed on the lakes: 4 on Lake Almanor (Figure 2) and 6 on Eagle Lake (Figure 3). They have more signs to install and completed this process in early August.

This fall they will also be installing four interpretive signs on the two lakes at major access points to prominently display grebe natural history and conservation information to boaters, fishermen, and families going out on the lakes. This sign production effort has been coordinated with the two other Audubon chapters so the signs installed at each of the four lakes will be the same, conveying the same message and information.

Redbud Audubon

For the breeding season of 2012, it was necessary to place warning buoys around several Clear Lake colonies. Several of the largest colonies established in high boat traffic areas thus requiring the deployment of all 20 buoys that Redbud had purchased. Several 5 mph warning signs were also produced and placed prominently on the north side of the lake, particularly Rodman Slough, where over half of the nesting grebes were located this year. These signs were mentioned to alert boaters to the large colonies and get them to slow down. From the disturbance monitoring done on these colonies, only three of the 65 recorded disturbance events were caused by motorboats. The majority of disturbance events were caused by American crows and gulls (76.9%) that were typically seen preying on grebe nests.

Redbud also coordinated their efforts with Plumas and Altacal Audubon to purchase four interpretive signs which will be installed this fall at four prominent community parks and boat launches around Clear Lake in several different towns.

Altacal Audubon

The chapter has spent the summer transitioning their project leadership from Scott Huber over to Bill Haas who has coordinated with other Altacal members to purchase a boat equipped for monitoring Thermalito Afterbay Grebe colonies in extremely shallow water. The boat has been identified and arrangements with the local Department of Water Resources and Department of Fish and Game have been made to have their biologists, who have been monitoring grebe colonies on the afterbay for the last seven years, to use the boat. Having the proper monitoring boat on the lake will significantly increase the capacity and ease of monitoring the colonies with less disturbance. Additionally, the boat will play an important part in colony disturbance experiments being developed by Altacal that will take place next breeding season.

Surveying and Monitoring Grebe Colonies

Results of the 2012 breeding season have been summarized for the four lakes identified in the original grant as well as two other lakes near Lake Almanor, Lake Davis and Antelope Lake (Table 1). The 2012 results have been consolidated with the survey results from 2010 and 2011. Overall, the number of grebes seen on the four focal lakes has been increasing (Figure 1) although reproductive success continues to be irregular depending on local conditions including food availability, access to nesting substrate, and water levels (Figure 2). Overall, there have been over 75 surveys on the six lakes monitoring the number of nests, young produced and the amount of disturbances the grebes are facing at their nests from predators like crows, raccoons, and gulls as well as unsuspecting boaters and jet skiers.

There are several major factors contributing to reproductive success this year that should be mentioned. First, Eagle Lake had a complete collapse of nesting colonies due to the extremely low water levels in the lake. Despite having record numbers of grebes at the lake none had access to nesting substrate. The low water levels have prompted Audubon California and Plumas Audubon to begin developing floating nest platforms that can be installed during extreme water years to avoid this situation in the future. Also, Clear Lake, despite having a large population of grebes on the lake and an increase in the number of active nests, the level of predation by crows and gulls was higher this year than in the past two years leading to low reproductive success. To illustrate the potentially devastating effects of predation on Clear Lake, Redbud surveyors observed 27 nests with eggs preyed upon by American Crows during 5 hours of observation, for an average of 5.4 nests per hour, on 10 and 19 July. Given this rate of predation, a potential 75.6 nests with eggs could be preyed upon by crows during a 14-hour day in a single colony. Although the number of nests preyed upon each day was presumably much fewer because the predators would have been satiated with fewer eggs, a more conservative estimate of 30 nests preyed upon each day over a 30-day period in two colonies would result in 1,800 nests destroyed by predation. More data on rates of predation would be useful to fully understand the potential impact of predation on limiting grebe productivity.

The estimated reproductive rate was .133 for all six lakes. If Eagle Lake is excluded from the calculation, the reproductive rate for the five lakes with active nests is .339. The number of young produced for the five active lakes is lower than 2011 and is likely negatively influenced by the factors described above. More research will need to focus on factors limiting nesting success and identify potential strategies to improve nesting conditions and nesting success. Despite lower reproductive success, the number of grebes coming to the four focal lakes has increased over 50% since 2010 (Figure 3). It is difficult to determine if this increase implies an overall population increase, but it may suggest that habitat conditions at these lakes have improved since the start of the Grebe Conservation Project.

The long-term impacts of the Grebe Conservation Project on increasing the number of Western and Clark's Grebes are difficult to discern; however, the work of the three Audubon chapters has significantly increased our understanding of the potential factors limiting the success of the nesting colonies on the focal lakes. It will be important to build on this information, as well as the goodwill being developed within the lake communities, to ultimately and positively affect changes to lake management and lake use that results in more grebes and more successful nests.

Table 1. Summary of Grebe Breeding Season Survey Estimates 2010-2012

Location	2010 Adults	2010 Active Nests	2010 Young	2010 Reproductive Rate (young/adult)	2011 Adults	2011 Active Nests	2011 Young	2011 Reproductive Rate (young/adult)	2012 Adults	2012 Active Nests	2012 Young	2012 Reproductive Rate (young/adult)
Lake Almanor	3,000	400	67	0.022	2,532	550	1,088	0.430	4,364	926	577	0.190
Eagle Lake	1,700	200	134	0.079	4,056	1,400	1,320	0.325	6,552	0	0	0.000
Thermalito Afterbay	506	275	260	0.514	520	130	182	0.350	425		132	0.311
Clear Lake	2,694	1,322	121	0.045	2,245	1,248	10	0.004	3,828	2,266	125	0.033
Antelope Lake									82	13	49	0.598
Lake Davis									112	30	63	0.563
Total	7,900	2,197	582	0.165	9,353	3,328	2,600	0.277	15,169	3,235	946	0.133

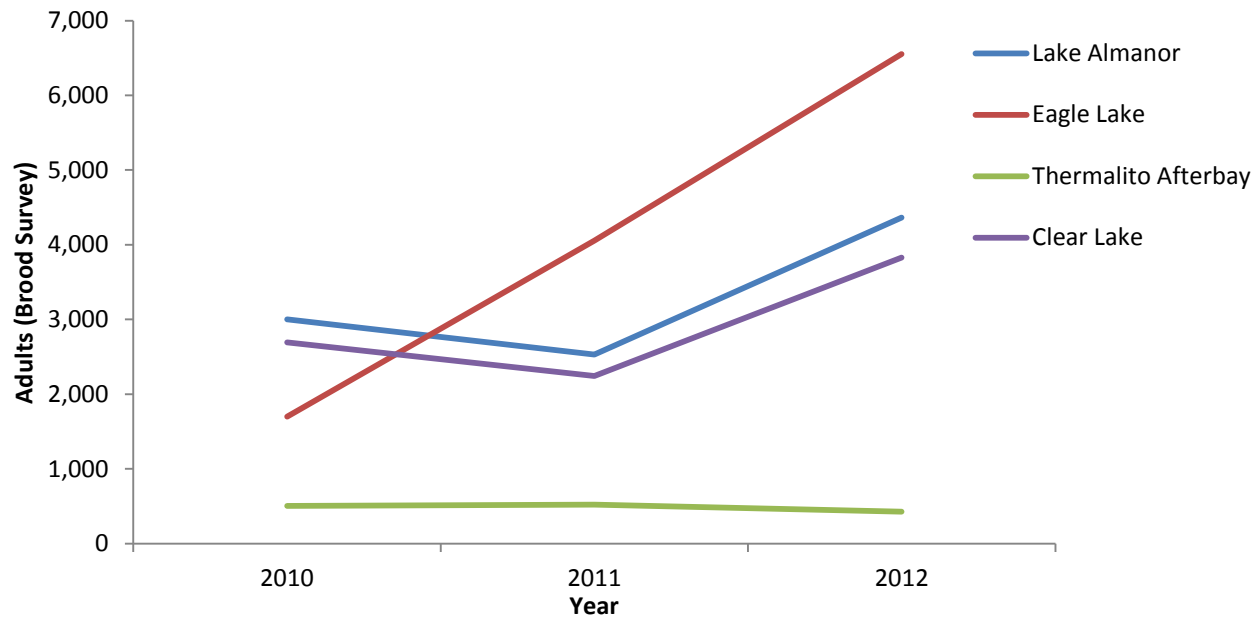


Figure 1. Number of adults estimated on Lake Almanor, Eagle Lake, Thermalito Afterbay and Clear Lake for 2010-2012.

The adult grebe estimates are derived from transect surveys conducted by boat. 7,233 additional adults were detected on Clear Lake outside of the transect survey bringing the total number of grebes at Clear to 11,061. The additional birds are not included in this graph to allow for comparisons between years.

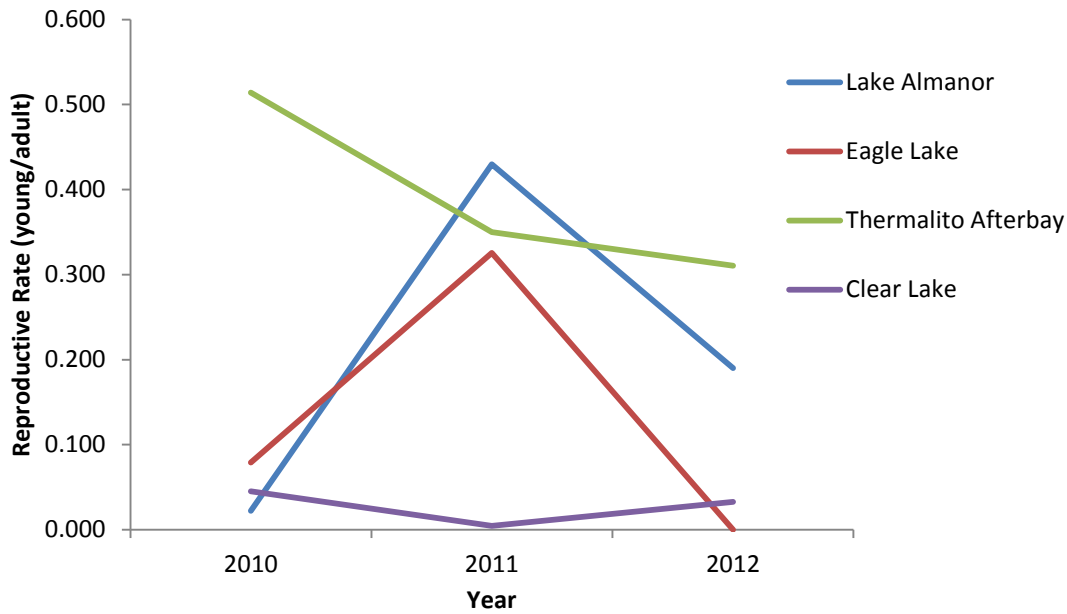


Figure 2. Summary of reproductive rates for the four focal lakes from 2010-2012. Reproductive rates may underestimate the productivity of active nests since some adults on each of the lakes are non-breeding individuals. Overall productivity at each of the lakes seems to be dependent on water levels, food availability, and predation pressure.

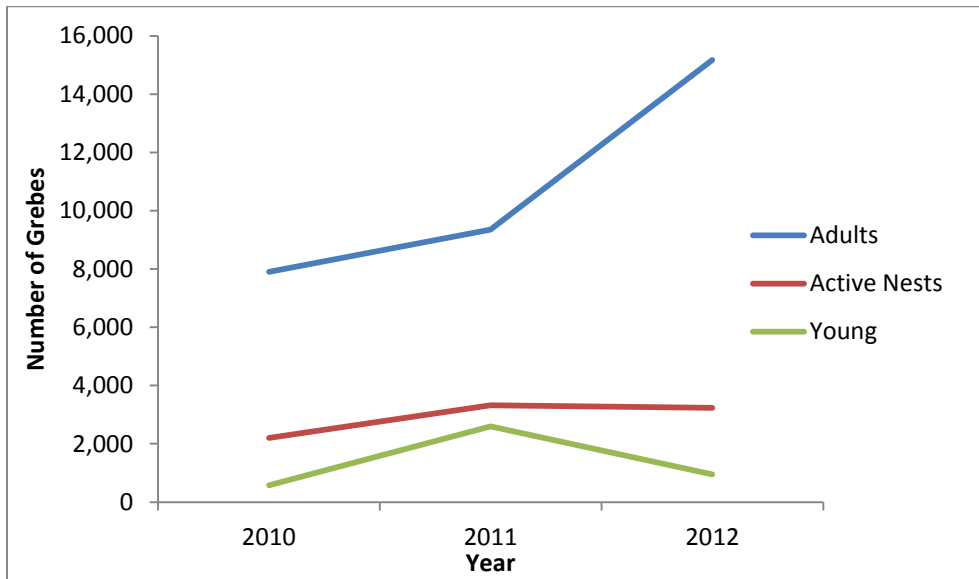


Figure 3. Number of adults, young, and active nests on the four focal lakes are summarized for 2010-2012. Despite more adult grebes coming to these lakes, productivity continues to lag.