

***Aechmophorus* Grebe Conservation Project
Almanor, Eagle, Davis, and Antelope Lakes**

Final 2014 Report: Jan 1 - Oct 31, 2014

Prepared by

Plumas Audubon Society
429 Main Street
Quincy, CA 95971

Prepared for

Audubon California
765 University Avenue
Sacramento, CA 95825

Summary

We continue to learn more about factors affecting grebe reproductive success each year and this season was no exception. There were more storms and associated wind in July than we have seen in the last four years, which contributed to the failure of over 700 nests on Lake Almanor. The Almanor grebes re-nested in August with a peak of more than 2,000 nests. The large number of nests and a plateau in water level drop for much of August helped the grebes attain moderate reproductive success. The *Aechmophorus* grebes breeding at Antelope Lake had excellent success despite the lower water levels. Low water levels negatively affected grebes at Lake Davis where only one successful brood was observed. The water level at Eagle Lake continues to drop to levels lower than ever recorded over the last 140 years! Grebes did not breed at Eagle Lake for the third year in a row. In April, we completed a comprehensive monitoring report for Almanor, Eagle, Davis, and Antelope Lakes for the 2010-2013 breeding seasons. The monitoring report compiles all of the data collected for breeding *Aechmophorus* grebes at the four lakes including monitoring methods, nest colony maps, and results of nest counts, disturbance surveys, camera station nest monitoring, and brood survey results.

We also had great success with outreach and education efforts including helping the Lassen Land and Trails Trust with their Nature Camp for the fourth year in a row, leading field trips to Lake Davis, Mountain Meadows, and Lake Amanor; and leading a field trip around Antelope Lake for disadvantaged youth from the Susanville area. In 2014, David Arsenault gave several presentations including at The Wildlife Society Western Section Annual Meeting in Reno, NV on January 30, at the National Audubon Society board meeting Chapters Forum in Sacramento on January 31, at Plumas Audubon's March 13 public meeting in Quincy, at the Central Sierra Audubon Society meeting on October 15, and at the Yolo Audubon Society meeting on November 18. We also published an article in Plumas, Lassen, and Sierra County's Feather River Publishing newspapers in October and had an article in Audubon Magazine's Jan-Feb 2014 edition. In addition, we hosted eight student interns that helped with grebe surveys and outreach efforts this summer.

Surveys and monitoring

In mid-April, we completed a comprehensive monitoring report that compiled the results of our survey efforts of breeding *Aechmophorus* grebes at Almanor, Eagle, Davis and Antelope Lakes from 2010-2013. This was a major accomplishment to document our study methodology, compile our results to date, and facilitate our efforts to work with reservoir managers to improve water level management to benefit grebes. For example, our results show that water surface elevation drops slower than a rate of -0.06 (0.72 inches/day, 1 foot every 16.7 days) from July 1 through September 30 greatly improves grebe reproductive success at Lake Almanor.

Lake Almanor 2014

The adult grebe population at Lake Almanor was similar in size to last year (Table 1). More than 2,500 nests were found near the Causeway and in Goose Bay (Table 2, Figure 2). This year, the grebe colonies by the Causeway experienced two peaks in nesting, which we have not seen at Lake Almanor before. Grebes began nesting in July near the Causeway, peaking at 773 nests (Table 2). None of the nests initiated in July were successful, presumably due to storms with strong winds that occurred in July. Wildlife cameras were placed on individual nests throughout the breeding season and we were able to document some of the nests being destroyed by the storms. The population's second wave of nesting peaked in mid-August, with the greatest numbers of nests located in Goose Bay. The Goose Bay colony peaked at 1,444 nests in mid-August (Table 2). The first brood survey on Lake Almanor was conducted on August 27th. At that time, almost all of the young were less than one week old (i.e. 1/8th the size of adults), indicating that the first successful nests hatched young in the third week of August. This nest success coincides with a plateau in water level drop that occurred in August. Brood surveys estimated a peak adult:juvenile ratio of 0.30 (Table 1), which is the second best reproductive success for grebes at Lake Almanor since 2010. We counted up to 6,544 adults during lake-wide brood surveys (Table 1).

The wildlife cameras revealed that for most events where gulls preyed on eggs, grebes had already abandoned their nests. It appears that because there are always abandoned nests with eggs and the vigilance of actively nesting pairs, eggs in active nests are rarely depredated by avian predators. This was observed at three different nests, where at least 24 hours elapsed between when the grebe abandoned the nest and when gulls ate the eggs. The nests were presumably abandoned due to dropping water levels. One camera showed a Great Horned Owl attacking a group of nests and successfully capturing an adult Western Grebe (Figure 1). Disturbance surveys and trail cameras indicated that motor boats and gulls elicited little response from grebes in the colonies, whereas kayakers near the colony elicited a significant response with grebes getting off their nests, alarm calling, and even charging kayakers.

Antelope Lake 2014

The first nests of the season on Antelope Lake were documented on June 23rd. As in the last 2 years, no Clark's Grebes were observed on the lake. Grebes nested in the same colony location used in the past two years, in the cove adjacent to the Lost Cove Boat Ramp. At the peak of nesting, there were 29 nests in the colony. Lake-wide kayak surveys detected up to 68 Western

Grebes and 52 juveniles. The ratio of adults to juveniles was much higher than we have ever seen on any lake (Table 1).

Lake Davis 2014

In late June, over 200 Western and 2 Clark's Grebes were counted on Lake Davis during a lake-wide survey. By late July, however, half of the grebes had migrated and only 100 Western Grebes remained on the lake for the rest of the summer. In mid-June and mid-July, grebes attempted to nest in the open water, but were mostly unsuccessful due to wind and dropping water levels. We did not observe any additional nesting attempts, but in September, one brood was observed on the lake. In the past 2 years, grebes nested in the willows on Lake Davis, but due to the low water levels this year, the willows were completely out of the water and not suitable for grebe nesting.

Eagle Lake 2014

In early June, there was fewer than 200 *Aechmophorus* grebes on the entire lake. The water has dropped to levels lower than ever recorded on the lake in the last 140 years. The water level was almost this low in the 1930's, when an earthquake rapidly drained the lake. However, the lake filled back up and has never been recorded at the current levels. Because of the low water levels and lack of nesting habitat there was no grebe nesting on the lake for the third consecutive year! However, in early September, thousands of migrant *Aechmophorus* grebes were observed on the lake, totaling 5,335 (Table 1). These migrants appear to have been drawn to the lake because of abundance of Tui Chub and minnows this year. Another lake-wide census on October 1 revealed even more migrant grebes on Eagle Lake (Table 1).

Outreach and education

We had great success with outreach and education efforts this year. On June 21, we helped lead a field trip with the Sierra Institute for Community and Environment, located in Taylorsville, on the Birds of Lake Almanor. We discussed Audubon's Grebe Conservation Project during the tour. One highlight in July was helping the Lassen Land and Trails Trust with their Nature Camp for the fourth year in a row! The Susanville-area youth really enjoyed viewing and learning about the grebes that nest at Lake Almanor. We also lead a field trip around Antelope Lake for the Lassen Family Services CHAT program for disadvantaged youth from the Susanville area. We took two large groups from the Altacal Audubon Society and the Central Valley Birding Club, as well as several smaller groups, around Lake Davis. On these trips, we informed participants about the grebes that nest on Lake Davis and other State Water Project reservoirs, such as Lake Almanor, and how nesting grebes are affected by water level management. We also led a field trip, as part of the Lassen Land and Trails Trust Discover Lassen program, to Mountain Meadows Reservoir near Lake Almanor where there has been a small breeding grebe population in past years, but no breeding grebes this year.

In addition, David Arsenault gave several presentations in 2014 including at The Wildlife Society Western Section Annual Meeting in Reno, NV on January 30, at the National Audubon Society board meeting Chapters Forum in Sacramento on January 31, at Plumas Audubon's March 13 public meeting in Quincy, at the Central Sierra Audubon Society meeting on October

15 in Sonora, and at the Yolo Audubon Society meeting on November 18 in Davis. In early June, David attended a panel discussion with other Chapter Leaders as part of the Audubon California board meeting in Zamora, CA. David discussed Plumas Audubon's partnership with Audubon California and how it has helped build our chapter's capacity. We also published an article in Plumas, Lassen, and Sierra County's Feather River Publishing newspapers in October (Attachment A) and had an article in Audubon Magazine's Jan-Feb 2014 edition (Attachment B).

Student interns

One great success we had with our outreach and education efforts this summer was hosting 8 student interns that helped with grebe field work and outreach efforts. Josh Duey- a Humboldt student, Julia Cavali- a Berkeley student, Madelyn Ore- a Cal-Poly graduate, Emily Mickus- a student at Kalamazoo College in Michigan, Shannon- a graduate student in Chico, Kate Owens- a graduate of Lewis and Clark College, Theresa Caporale- a Quincy High School student, and Toby Woods- a Feather River College student all helped with grebe surveys and outreach.

Emily Mickus is currently analyzing the nest camera data to complete her Senior Thesis at Kalamazoo College. Her help on the project was invaluable to our understanding of reproductive success in grebes on Lake Almanor. We also tried to monitor nests with cameras on Antelope Lake, but a camera was stolen over the 4th of July weekend and we abandoned efforts there. We also tried at Lake Davis, but there were no nests to monitor.

Table 1. Summary of adults and juvenile *Aechmophorous* grebes detected during lake-wide surveys on Almanor, Antelope, Davis, and Eagle Lakes in 2014.

Lake	Date	Adult Western	Adult Clarks	Adult Aech	Total Adults	Juveniles	Adult:Juv Ratio
Almanor	8/27/2014	4,220	179	2,145	6,544	110	0.03
	9/12/2014	1,948	142	2,321	4,411	402	0.19
	9/19/2014	1,606	75	2,775	4,456	506	0.30
Antelope	8/12/2014	45	0	0	45	25	0.56
	8/21/2014	68	0	0	68	40	0.59
	8/25/2014	61	0	0	61	52	0.85
	9/10/2014	50	0	0	50	38	0.76
Davis	6/23/2014	205	2	0	207	0	0.00
	7/12/2014	163	0	0	163	0	0.00
	7/17/2014	101	0	0	101	0	0.00
	8/13/2014	94	0	0	94	0	0.00
	8/20/2014	94	0	0	94	0	0.00
Eagle	6/8/2014	83	0	60	143	0	0.00
	9/3/2014	2,031	81	3,223	5,335	0	0.00
	10/1/2014	1,849	141	5,389	7,379	0	0.00

Table 2. Number of active nests in *Aechmophorus* grebe colonies at Lake Almanor, Antelope Lake, and Lake Davis in 2014.

Almanor	1-Jul	10-Jul	15-Jul	22-Jul	24-Jul	29-Jul	11-Aug	18-Aug	26-Aug	8-Sep	26-Sep	Peak
Causeway	30	505	131	24	-	200	503	260	225	40	0	505
East Island	0	0	642	91	-	0	78	63	23	0	0	642
Meadows	0	7	0	0	-	0	0	0	0	0	0	7
Goose Bay	0	0	0	0	180	706	1,444	1,025	465	160	0	1,444
Total	30	512	773	115	180	906	2,025	1,348	713	200	0	2,598

Antelope	23-Jun	26-Jun	11-Jul	14-Jul	30-Jul	12-Aug	21-Aug	10-Sep	Peak
Lost Cr Cove	11	13	28	29	23	11	8	0	29

Davis	10-Jun	18-Jun	30-Jun	12-Jul	17-Jul	31-Jul	Peak
Cow Creek	-	0	1	14	6	0	14

Figure 1. A Great Horned Owl detected by a nest monitoring camera as it attacked nesting grebes on Lake Almanor.



Figure 2. *Aechmophorus* grebe nesting colony locations on Lake Almanor in 2014.



Figure 3. Colin Dillingham, a USFS biologist that hosted several Plumas Audubon interns at his house for over three months this summer and fall, on a Lake Almanor grebe survey with interns Madelyn Ore, Emily Mickus, and Theresa Caporale.



Figure 4. Former Audubon California Grebe Conservation Project Manager Karen Velas with grebe survey volunteer Colin Dillingham and intern Madelyn Ore.



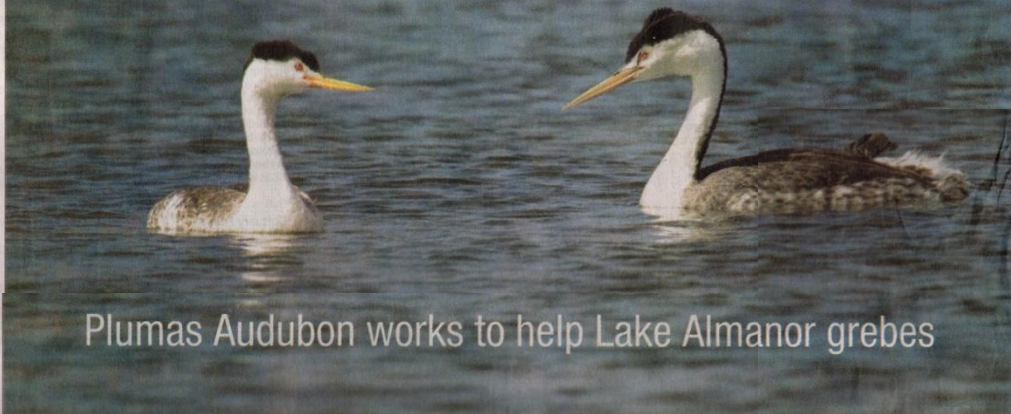
Attachment A

Feather River Publishing Article October 8, 2014

REGIONAL

INSIDE SECTION B: EDITORIAL • OPINIONS • UPCOMING EVENTS

Delicate relationship



Plumas Audubon works to help Lake Almanor grebes

A pair of Clark's grebes enjoy their summer on Lake Almanor. Photo by Willie Hall

Miriam S. Cody
Staff Writer
mcody@plumasnews.com

For the last five years, Plumas Audubon Society has been tracking grebes on Lake Almanor and collecting data about their populations, migration and nesting habits.

The focus of the project is to help the grebes survive on the lake by stabilizing water levels. In 2010, the water surface elevation dropped more rapidly than in any other year and grebes had the lowest reproductive success.

David Arsenault, executive director of Plumas Audubon, believes there is a direct link between water levels and the use of Lake Almanor water by Pacific Gas and Electric Co.

"Water management is the big issue," says Arsenault. Water is drawn for use in creating hydroelectric energy at irregular intervals, causing the water to drop drastically after a long plateau.

This forces the grebes to relocate, unfortunately leaving their nests of eggs behind to be eaten by predators. This affects grebe populations on the lake and makes life difficult for the birds.

Arsenault hopes to find a way to stabilize the water level throughout the grebes' nesting season, as well as smaller populations of other species of the bird, on Lake Almanor now. Although the two species are very similar and nest side by side on the lake, they have slightly different plumage and bills.

The grebes migrate here to breed and nest, and then head back to the coast for the winter. That is why maintaining a safe breeding habitat for them by working to steady water levels is so important to Plumas Audubon.

Grebes in love

Grebes have long relationships with the same partner. They strengthen their pair bond with elaborate courtship ceremonies, which include rushing, synchronized dancing, and calling to each other.

Mother and father work side by side during nesting, building and maintaining their home together. When the female grebe is incubating her eggs, the male stays near her and reconstructs the nest as it falls apart. Nests are made from pondweed, willows, cattails and other vegetation, which can't be relied on for long without maintenance.

Working together

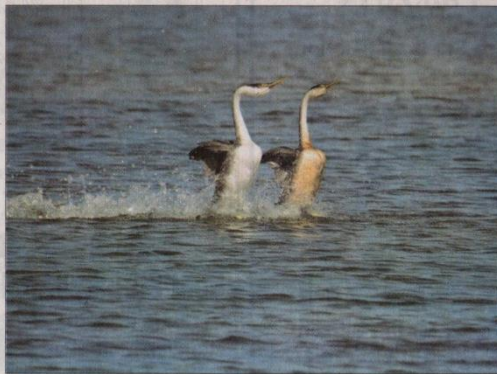
Grebe colonies also fish and hunt together, strategically herding schools of minnows into the shores and banks of the lake. They take advantage of power in numbers, although they do forage for food individually.

Arsenault says he has seen as many as 300 grebes, known for their excellent diving and swimming skills, head for the dark bottom of the lake all at once while hunting this way.

The grebes like to stay in deep water for the most part, except during nesting. While grebes are great swimmers and divers, they don't fly much. They also cannot walk, save for a few awkward steps before they fall. Their legs are too far back on their bodies, making for a great rear propeller in the water, but not



A hatching grebe takes in the new world from his nest, where mother and father have been working together to keep him safe. Photo by David Hamilton



Western grebes strengthen their pair bond with courtship rituals. "Rushing" is a form of synchronized dancing the couples do in unison, flapping their wings and running across the water. Photo by David Arsenault

so great for strutting on land.

The study

Audubon's project was inspired by the sad number of grebes affected by the SS Jacob Luckenbach, which collided with another vessel and sank off the coast of central California in 1953. This decaying tanker wasn't discovered as the source of many mysterious oil spills until 2002, at which time

the federal government created the Oil Spill Liability Trust Fund.

The Luckenbach Trustee Council funds the Lake Almanor surveys as a continued effort to repair the damage done.

The initial four-year grant has been renewed, allowing Plumas Audubon its fifth year of study in 2014.

The study involves counting grebes from boats and from the shore, counting nests and

“
Water
management
is the
big issue.
”

David Arsenault
Plumas Audubon Executive Director

watching cameras placed near nests to determine potential threats to populations.

A count of 5,000 is down from last year by a few hundred, but higher than previous years by thousands. Arsenault believes part of the reason for the grebes' success this year was a prolonged water level plateau throughout the summer.

Threats

Certain types of disturbance cause the grebes to become restless and occasionally leave the colony.

Gulls and ravens sometimes eat the eggs, but usually only after nests have been abandoned due to uninhabitable water levels. River otters and bald eagles are known to attack adult grebes.

The birds also get tangled in fishing line along the shores of the lake, and where lines repeatedly snag underwater.

Still, none of these natural or recreational disturbances seem to affect grebe populations as much as drastic changes in water surface elevation.

Audubon interns

Plumas Audubon has launched an internship program, and has had 13 interns this year. One is from Quincy High School, and two are from Feather River College. Arsenault is passionate about this program, and continues to try to strengthen it.

"It's hard to get experience in field biology, conservation and those kinds of fields, so I think it's important to help provide those opportunities for kids. And it helps us accomplish our work and do more conservation."

You can learn more about grebes, Plumas Audubon and the internship program at plumasaudubon.org, or by visiting the group's Facebook page.

Attachment B

Audubon Magazine Article Jan-Feb 2014



Children from Chicago's Little Smiles Big Dreams Kids Club take the plunge at the Bartel Grassland.

AUDUBON IN ACTION

OPENING EYES ON THE SOUTH SIDE

There *is* room to breathe in the big city.
By Daisy Yuhas

CHICAGO'S SOUTH SIDE isn't exactly known as a sanctuary. But it contains a secret wealth of wetlands, prairie, sand savannah, and woodlands. A partnership between Audubon Chicago Region, the Eden Place Nature Center, the Cook County Forest Preserve, and the U.S. Fish and Wildlife Service has led to the creation of Wild Indigo Nature Explorations, which organizes monthly field trips into the area's hidden natural spaces.

The focus is local: Participants—even the guides—come from the surrounding communities. “We didn’t want it to be like these cookie-cutter programs where a lot of academics come into the neighborhood,” says Michael Howard, executive director of Eden Place. Instead Wild Indigo Nature Explorations trains locals to organize and lead the trips. To date, these fellows have brought in veteran volunteers for tree plantings and fitted whole families with boots for trekking through marshlands. And they have inspired not only restoration activities in the Lake Calumet area—home to willow flycatchers and common moorhens—they have also helped a diverse community of kids connect to nature for the first time. “Some of these kids come from really tough environments,” says Judy Pollock, director of bird conservation for Audubon Chicago Region. The field trips help them discover that humans, too, can find refuge in the city.

Pocket Guides

Whether you're a serious birder or just a curious hiker, here are four mobile apps that will keep you connected this winter.



The Sibley eGuide to Birds App

Cost: \$19.99

More than 800 species illustrations. Search by taxonomy or alphabetically. Try before you buy; lite version offers full functionality for 30 species.



Audubon Birds: A Field Guide to North American Birds

Cost: \$2.99–\$4.99

A reference for identifying 750 species. Connects to eBird and your personal profile on AudubonGuides.com, making it easy to share your sightings online.



Night Sky 2

Cost: \$0.99

Identify stars, planets, constellations, and satellites simply by aiming at the night sky. No telescope required. This new version adds overlays of constellations on crisp illustrations.



iTrackWildlife

Cost: \$14.99

Includes multiple photographs of each animal's tracks on various surfaces, gait information, and scat pictures. A free version features eight species.

AUDUBON IN ACTION

FINDING THEIR LEVEL

Keeping grebes afloat in the Intermountain West.

By Jane Braxton Little

DAVID ARSENAULT CALLS a count from the stern of a motorboat: “55 Western. 11 Clark’s.” With the volcanic crown of Lassen Peak looming in the background, the 40-year-old biologist is surveying grebes on California’s Lake Almanor on a sweltering August afternoon. His work is part of a multiyear project to protect breeding grebes after they migrate inland from wintering waters off the state’s northern coast.

Grebes are among North America’s most elegant waterbirds, with stylish white necks they rub and bob in an elaborate courtship ritual. They make

“If electricity demands force a sudden drawdown and the water drops around their nests, the grebes are out of luck,” says David Arsenault, executive director of Plumias Audubon.

sleek porpoise-like dives, and their feet are so far back on their bodies that they can barely walk.

Lake Almanor is a critical grebe habitat, part of a network of six lakes north of Sacramento where more than 50 percent of the Intermountain West’s breeding population of Western and Clark’s grebes spend the summer.

Because their flight muscles atrophy between spring and fall migrations, they are stuck on these lakes, where they face powerboat wakes, gawking anglers, and intrusive lakeside residents.

So far the \$540,000 inland study, which involves four regional Audubon chapters, has identified a critical link between nesting success and lake levels. Grebes use pond weed to anchor their floating nest mounds: Too much water prevents the weeds from growing; too little exposes the nests to raccoons eager to prey on eggs and chicks. “They only have so much time—just 23 days to nest and hatch chicks,” says Arsenault, the Plumias Audubon executive director.

Almanor, an Audubon Important Bird Area, and two other lakes in the study are managed for hydroelectric power production and irrigation, which exacerbates natural fluctuations in water levels. “If electricity demands force a sudden drawdown and the water drops around their nests, grebes are out of luck,” Arsenault says. “Sometimes they make it, sometimes they don’t.” He hopes hydropower officials will help the species survive by managing lake levels to support successful nesting.

By fall the grebes begin rebuilding their flight muscles to fly back to the Pacific, where even less is known about the threats they face.



Scientists and four Audu-
bon chapters are working
to make safer summers
for Western (above) and
Clark's grebes.