

Field Monitoring, Spring 2014

This is a simple summary of weekly monitoring in streams in the Clear Lake basin, during spring, 2014, to observe presence or absence of fish and of available habitat for them. Locations were selected because Clear Lake hitch, *Lavinia exilicauda chi*, a species petitioned for listing under the CESA and ESA, have been seen there within the past five or fewer years, and because available habitat for this species, other species, other aquatic organisms, wildlife, and riparian vegetation is growing scarce, especially in a year of drought.

Fish counts were noted from observations that happened consistently around midday, on the same day once per week, per location, and that included field notes and digital images. Observations usually lasted about ten minutes per site although monitoring was not specifically organized with strictly timed observations in mind. Summaries of information from each location offered a sense of perspective during a drought year. Water flowed in northshore creeks a month or more past the time when other creeks in the Clear Lake basin had dried. Lake levels were insufficient this year for water allocations to out-of-county interests (ref. <http://www.lakeconews.com>, 6.23.2014).

Temperatures were monitored because a small study from spring 2012 indicated that larval hitch are susceptible to variations in water temperatures, appearing to do well in an environment above 15°C but below 25°C. During that study, as they grew they appeared better able to handle extremes (ref. “Observations of Larval Development of Clear Lake Hitch, *Lavinia exilicauda chi*, with Regard to Differences in Temperature...”, 2012).

Monitoring occurred from 7.March.2014 to 20.June.2014. When a location was dry or no longer had viable fish passage, monitoring was discontinued.

This year, only juvenile Sacramento suckers, *Catostomus occidentalis*, and at the Scotts Creek location a few unknown juveniles, possibly Sacramento blackfish, *Orthodon microlepidotus*, or possibly catfish (order Siluriformes), were sighted during monitoring at the locations chosen. These juveniles ranged in length from estimated 1.5 to 2 cm. mid-way through monitoring to 4 or 5 cm. toward the conclusion of, monitoring.

Equipment used were an Olympus digital camera, a DeLorme Earthmate PN-60, and a Cooper handheld air/water digital thermometer, and resources consulted were Google Earth 7.1.2.2041 and a Jepson manual, University of California Press, ©1993.

Locations monitored

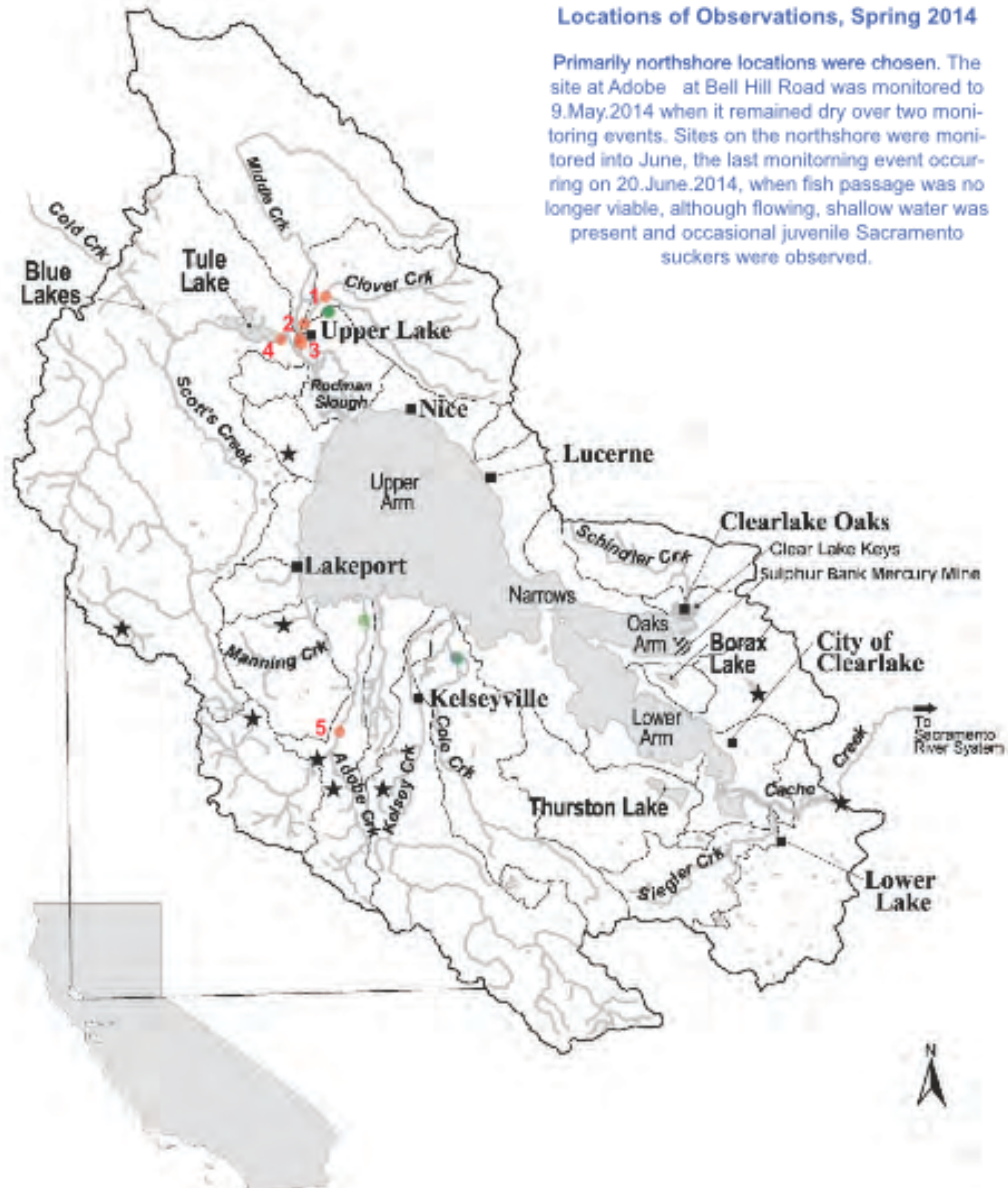
- Adobe Creek at Bell Hill Road
- Clover Bypass at Elk Mountain Road
- Middle Creek at Bridge Arbor Drive (a)
- Middle Creek at Bridge Arbor Drive (b)
- Middle Creek north of Highway 20
- Scotts Creek below Tulelake Dam

Locations checked once, not monitored

- Cole Creek at Clark Drive
- Adobe Creek at Soda Bay Road
- Clover Creek at Bridge Arbor

Locations of Observations, Spring 2014

Primarily northshore locations were chosen. The site at Adobe at Bell Hill Road was monitored to 9 May 2014 when it remained dry over two monitoring events. Sites on the northshore were monitored into June, the last monitoring event occurring on 20 June 2014, when fish passage was no longer viable, although flowing, shallow water was present and occasional juvenile Sacramento suckers were observed.



1. Clover Bypass at Elk Mountain Road
2. Middle Creek north of Hwy 20
3. Middle Creek south of Hwy 20, on Bridge Arbor Drive (a)
4. Middle Creek south of Hwy 20, on Bridge Arbor Drive (b)
5. Scotts Creek below Tulelake Dam
6. Adobe Creek at Bell Hill Road

● Locations checked but not monitored

Map, ref. Suchanek et al "Evaluating and Managing a Multiply-Stressed Ecosystem at Clear Lake, California: A Holistic Ecosystem Approach". pg. 3, 2002, online at www.des.ucdavis.edu/faculty/Richerson/Clear%20Lake%20overview.pdf (Figure 121.1, Map of Clear Lake and surrounding watershed, with locations of dams)

Vegetation and wildlife noted

Vegetative cover in most sites included willows, *Salix sp.*, oak *Quercus sp.*, cottonwood, *Populus sp.* primarily *fremonti*, Himalayan blackberries, *Rubus armeniacus*, various ruderal grasses, herbaceous growth indigenous and invasive, and orchards and rice paddies generally within 50 to 60 m.

As water warmed from April into May and June, various algae grew in clumps and strands, often forming mats toward the conclusion of monitoring.

Wildlife seen and heard included various passerines including white crowned sparrow, *Zonotrichia leucophrys*, golden crowned sparrow, *Zonotrichia atricapilla*, American and lesser goldfinches, *Carduelis tristis* and *Carduelis psaltria*, American cliff swallows, *Petrochelidon pyrrhonota*, red-winged blackbirds, *Agelaius phoeniceus*, Brewer's blackbirds, *Euphagus cyanocephalus*; accipiters and falcons including red-shouldered hawk, *Buteo lineatus*, red-tailed hawk, *Buteo jamaicensis*, Cooper's hawk, *Accipiter cooperii*, sharp-shinned hawk, *Accipiter striatus*, American kestrel, *Falco sparverius*, osprey, *Pandion haliaetus*, and a juvenile golden eagle, *Aquila chrysaetos*; a male belted kingfisher, *Ceryle alcyon*, ringed turtle-dove, *Streptopelia risoria*, mourning dove, *Zenaida macroura*, quail, *Callipepla californica*, Northern mockingbird, *Mimus polyglottos*, acorn woodpecker, *Melanerpes formicivorus*, Nuttall's woodpecker, *Picoides nuttallii*, scrub jay, *Aphelocoma coerulescens*, black phoebe, *Sayornis nigricans*, American crow, *Corvus brachyrhynchos*, turkey vulture *Cathartes aura*; and waterfowl and herons including common merganser, *Mergus merganser*, mallard, *Anas platyrhynchos*, great white egret, *Casmerodius albus*, snowy egret, *Egretta thula*, green-backed heron, *Butorides striatus*, pelagic cormorant, *Phalacrocorax pelagicus*, and great blue heron, *Ardea herodias*, flying and terrestrial insects, tadpoles, and California toad, *Bufo boreas*. As water temperatures increased, aquatic insects were prevalent at locations on Adobe, Scotts, and Middle Creeks, and Clover Bypass. Several ground squirrels, *Otospermophilus beecheyi*, scurried across roads near the Scotts Creek location, and raccoon, *Procyon lotor*, tracks were occasionally noted along the waterline at the Clover Bypass and Scotts Creek locations. Other predatory mammals are reported (pers.comm. and pers.sightings) to frequent several of the locations chosen, but people also find them popular as fishing, crossing, and recreational ORV areas.

Cole at Clark Drive (Kelseyville area) was checked for potential monitoring, as hitch migrated through there within the past four years, but it was completely dry.

Adobe Creek at Soda Bay Road (Big Valley area) was checked but no hitch were seen, and it is a location that is habitually checked frequently by others.

Clover Creek at Bridge Arbor Drive (Upper Lake area) was checked as hitch migrated in lower Clover Creek in 2009 and 2010, but it was dry with very few, extremely shallow, small pools; there was no continuous fish passage.

Adobe Creek at Bell Hill Road N 38°57.433', W 122°53.468' 3.7.2014 - 5.9.2014

In 2012 adult, larval and juvenile hitch were seen at this location. In 2013, juvenile Sacramento suckers were observed here. Little riparian vegetation exists upstream and especially downstream of this site, and the site itself is open and leveed to the south. Passerines, butterflies, damselflies, dragonflies, and later polliwogs were generally present, and ducks were heard on one visit. Groundcover was primarily ruderal grasses, herbs, California poppies, and thistles.

Adobe Creek was dry here on 2.May.2014, but in case water had been released from Adobe Reservoir or Highland Springs Dam, both upstream, the location was checked on 9.May and was still dry. It was not checked further.

Juvenile Sacramento suckers 1 to 1.5 cm. in length were the only fish seen, only on 18.April.2014. Water remained clear, with continually decreasing levels, increasing pooling, and increasing algal mass although fish passage was evident until the creek became dry. Substrate consisted of cobble and gravel with large boulders near culverts under Bell Hill Road. An inlet to an adjacent reservoir was filled in, and juvenile fish headed downstream.



Adobe Creek at Bell Hill Road on 7.March.2014



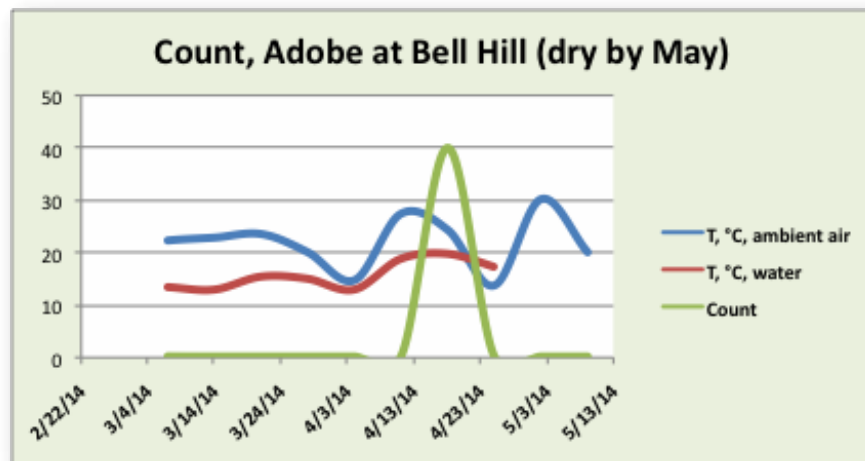
Adobe Creek at Bell Hill Road on 25.April.2014



Adobe Creek at Bell Hill Road on 2.May.2014



Juvenile, on 18.April.2014, the only day fish were observed



Clover Bypass at Elk Mountain Rd N 39°10.474', W 122°54.157' 3.7.2014-6.6.2014

A small number of hitch migrants upstream at this location in April 2009. The area is open and leveed. There are occasional stands of riparian vegetation along the streambed, and grasses and vetch cover sloping levee sides. Clover Bypass is cleaned of much vegetation that might be obstructive when it fills during events with high water runoff, because it is a controlled channel for Alley and Clover Creeks.

Crows and kestrels were initially seen, a great white egret foraged on the outer levee bank on 3.22.2014, and a pair of mallards swam in a pool about 80 feet downstream on 5.2.2014. Passerines were seen and heard, turkey vultures frequently soared overhead, red-shouldered, Cooper's, and sharp-shinned hawks were seen and heard. Frogs were also heard, by 4.18.2014 cliff swallows were nesting under the bridge, tadpoles appeared about half way through the monitoring cycle, and on 4.18.2014 juvenile Sacramento suckers were first sighted. Initially, they were about 1 to 1.5 cm. but over time those observed during monitoring events were larger, about 2 to 3 cm. They were consistently migrating downstream. Monitoring ceased on 6.6.2014 because fish passage was no longer continuous, as this location had become dry with pooling in a few places.

At first water was cloudy, carrying silt, but it cleared over time. Water levels steadily decreased, and algal mass grew. Substrate included cobble, gravel, a small percentage of sand, and slightly more silt. Willows and cottonwoods were in clumps along the levee, but vegetation consisted primarily of ruderal grasses, oats and vetch, and herbaceous plants.



Clover Bypass at Elk Mountain Road: water cleared of silt from rain runoff, 3.14.2014



Clover Bypass looking WSW, 3.21.2014



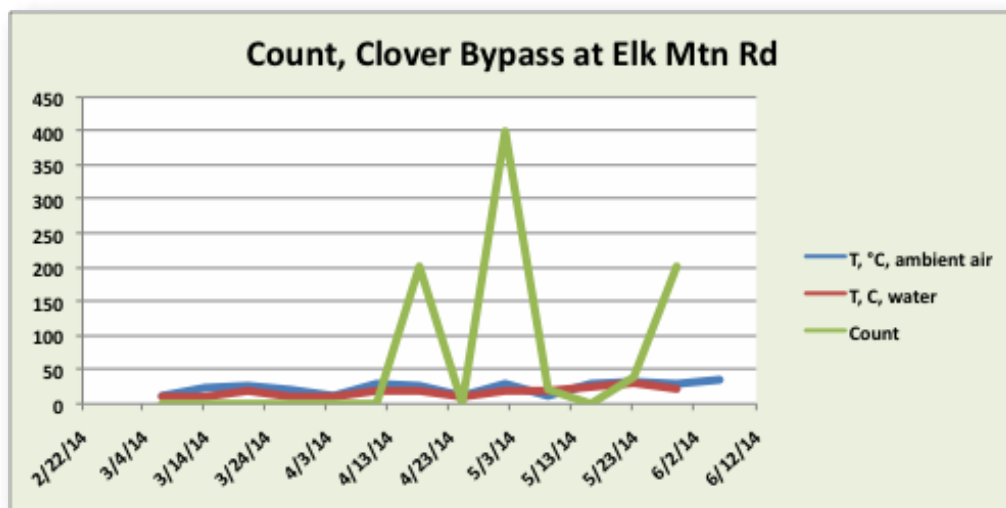
Clover Bypass looking ENE, 3.21.2014



Clover Bypass looking down at monitoring site, 6.6.2014



Clover Bypass, juveniles, 4.18.2014



Middle Creek at Bridge Arbor (a) N 39°9.425', W 122°54.822' 3.14.2014-6.13.2014

At this broad place in Middle Creek, where Clover Creek enters it, Sacramento suckers were observed spawning in 2013. In 2012, approximately 350 hitch were sighted a few hundred feet upstream. This location was monitored for any spawning activity or egg masses, but none was observed. Only ambient air temperatures were checked. Water was clear, and visibility good, with cobble, gravel, and sand substrate. Predators were neither seen nor heard here, but crows, frogs, quail, passerines, and doves were heard. Fish passage eventually deteriorated and failed, separating Middle Creek upstream from Middle Creek downstream where it meets Scotts Creek, eventually on to Clear Lake, and observations here were terminated. There was no count and therefore no graph.



Middle Creek below Highway 20 (a); Clover Creek's channel enters at the right of the image, where there is pooling but no water flowing from Clover Creek this year; 3.28.2014



Clear water, 3.14.2014



Middle Creek below Highway 20 (a): fish passage is interrupted. 6.13.2014

Middle Creek at Bridge Arbor (b) N 39°9.463', W 122°54.848' 4.25.2014-6.13.2014

Approximately 200 feet further south along Middle Creek, an excellent access to the channel was found and became the better location for monitoring on Middle Creek below Highway 20, on Bridge Arbor Drive. Numerous juveniles, all thought to be Sacramento suckers at various stages of development from about 1 to 2 cm. in length earlier in monitoring, to about 3 to 4 cm. in length later, made their way downstream. When water levels decreased enough for water to flow under cobble and gravel in parts of Middle Creek, including location (a), fish passage was no longer continuous, and when fewer juvenile fish were seen upstream at Middle Creek above Highway 20, monitoring at this location ceased. As temperatures warmed, algal mass grew rapidly, tadpoles were large and numerous, and populations of various aquatic invertebrates blossomed. Juvenile Sacramento suckers were seen browsing on vegetation caught in a slow current and shallow but clear water.

Few predators were observed: a pair of common mergansers was in the creek on 5.9.2013, and a red-shouldered hawk was heard on 5.23.2014. Passerines were always heard, on 5.16.2014 a Brewer's blackbird made its way along gravel near the waterline, and American crows were occasionally seen in flight. Killdeer were observed from time to time near the water's edge.

Riparian vegetation was similar to the two locations further upstream: poplar, willow, Himalayan blackberry, ruderal grasses, occasional vetch, oak, mugwort, and various herbaceous plants.



Middle Creek below Highway 20 (b), 4.25.2014



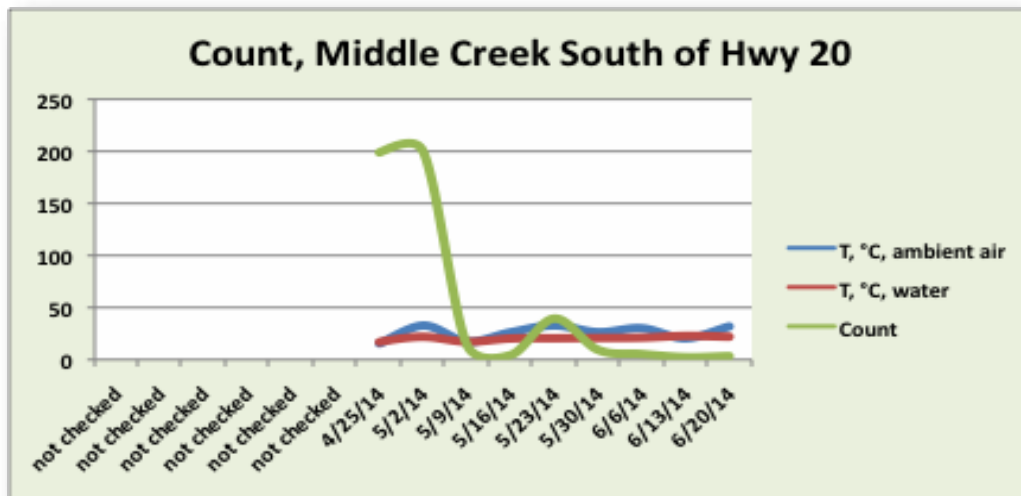
Middle Creek south of Highway 20 (b), looking upstream, 5.2.2014



Middle Creek south of highway 20 (b), looking upstream, 6.13.2014



Middle Creek south of Highway 20 (b), 5.2.2014



Middle Creek north of Hwy 20 N 39°5.839', W 122°54.968' 3.14.2014-6.20.2014

On 7.March.2014, Middle Creek was checked on the north side of Middle Creek Bridge on Highway 20, where 350 migrating adult hitch were seen in 2012. However, on 14.March.2014 a more appropriate location a short distance upstream was chosen for continued monitoring. Initially no fish were observed. On 11.April.2014, juvenile Sacramento suckers 1 to 2 cm. in length were seen, and more from 2 to 4 cm. were occasionally present during the monitoring cycle (please see count).

Water remained clear over time although levels decreased steadily, flows grew shallow, and algal mass increased. Silt infiltrated the cobble, gravel, and sand substrate that can be found in much of Middle Creek. Water was clear and fish passage was uninterrupted.

Countless tadpoles and later a small California toad, plentiful aquatic invertebrates, and numerous insects including bees, dragonflies, damselflies, and butterflies were noticed. Crows were often heard and seen in flight. On 14.March.2014 great white egrets were foraging along the creek bank to the north of this location, and on 21.March.2014 a mallard pair was making its way upstream. Swallows were often observed feeding in flight, and 2 Brewer's blackbirds were foraging at water's edge on 20.June.2014. On 13. and 20. June.2014, a green-backed heron foraged about 200 ft. upstream. Passerines were always heard and often seen in flight, especially in trees lining banks.

Riparian vegetation included poplar, willow, Himalayan blackberry, ruderal grasses, occasional vetch, oak, mugwort, and various herbaceous plants.



Middle Creek north of Highway 20, looking upstream, 3.14.2014



Middle Creek north of Highway 20, looking downstream, 4.11.2014



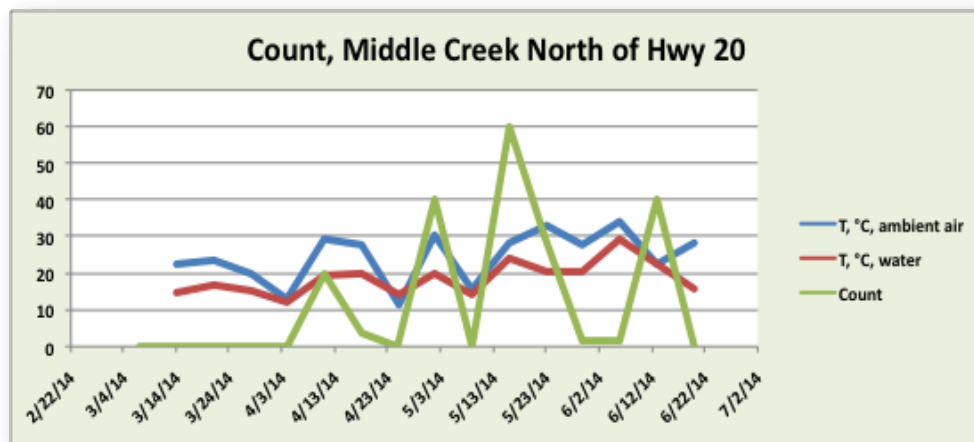
Middle Creek north of Highway 20, 5.9.2014



Middle Creek north of Highway 20, shallow fish passage to right, 6.20.2014



Middle Creek north of Highway 20, 4.11.2014





Middle Creek north of Highway 20, looking upstream, 5.9.2014

Scotts Creek below Tulelake Dam N 39°9.402', W 122°55.541' 3.7.2014-6.13.2014

Juvenile hitch were seen in Scotts Creek here in 2010. After a channelized Scotts Creek has circled the southwest length of Tulelake, it exits through a culvert, into a pool that is immediately below a small dam. Both the exit and pool were monitored as Tulelake offers extensive wetland habitat for wildlife and at its northwest tip, there is access from Scotts Creek. Early in monitoring, an adult fish, species unknown, in the pooled area jumped.

When fish are present in the pooled area, predators crowd the trees, individual species occupying individual vertical habitat. Numerous predators were seen from 4.4.2014, not before, through 4.25.2014.

On 4.4.2014 a pair of common mergansers entered the pooled area from Scotts Creek channel to the south. What was probably an immature golden eagle, identified by size, markings, and final direction of flight toward known habitat, landed in the area close to the monitoring site.

Great blue herons and black crowned night herons were in trees on banks of the pooled area and also downstream along Scotts Creek, and green-backed herons hovered in branches directly over water. Great white egrets were on banks at water's edge. Turkey vultures soared overhead, and several times a male belted kingfisher was noticed perched on a power line over a pump outlet. Red-tailed hawks, red-shouldered hawks, and osprey were heard and seen in flight. Various species of passerines and woodpeckers were observed.

On 5.2.2014, a great blue heron and a black crowned night heron were noticed. On 5.9.2014 numerous green-backed herons, clustered in trees banking the pooled area, flew for the most part as a group toward clusters of cottonwoods about 200 ft. to the north, and a great blue heron also flew away from the pooled area. A female mallard and a great blue heron were seen on 5.16.2014.

From 5.16.2014 to 6.13.2014, no predators were seen, passerines were consistently heard, aquatic invertebrates and flying insects including bees, butterflies, damselflies, and dragonflies were seen, and woodpeckers especially Nuttall's and acorn were heard. Frogs were heard on 5.16.2014.

Ground squirrels were prolific in the general area, and there were raccoon and squirrel tracks at water's edge.

Water was initially muddy with no visibility but was less turbid where Scotts Creek emptied into the pooled area. Water was at times translucent, and schools of juvenile fish, believed to be predominantly Sacramento suckers, were detected on 5.2.2014 and on 5.9.2014. Numbers decreased after that, and 11 juveniles were counted on 6.13.2014. 2 juvenile fish of another species, possibly blackfish or catfish, were also sighted on 5.16.2014.

Monitoring stopped on 6.13.2014 because the Scotts Creek culvert was dry, eliminating fish passage. Water levels varied but fell steadily from 4.11.2014 until monitoring was ended on 6.13.2014.



Scotts Creek below Tulelake Dam,
3.14.2014



Scotts Creek immediately past the culvert,
3.14.201



Scotts Creek, 6.13.2014



Scotts Creek, culvert into
pooled area, 6.13.2014



Scotts Creek continues downstream to the
right, under branches, 6.13.2014



Scotts Creek, pooled area, 5.2.2014



Scotts Creek, pooled area, 5.9.2014



An eagle flew into the pooled area and landed near the water's edge, behind the power pole. A pair of common mergansers entered the pooled area from downstream Scotts Creek.

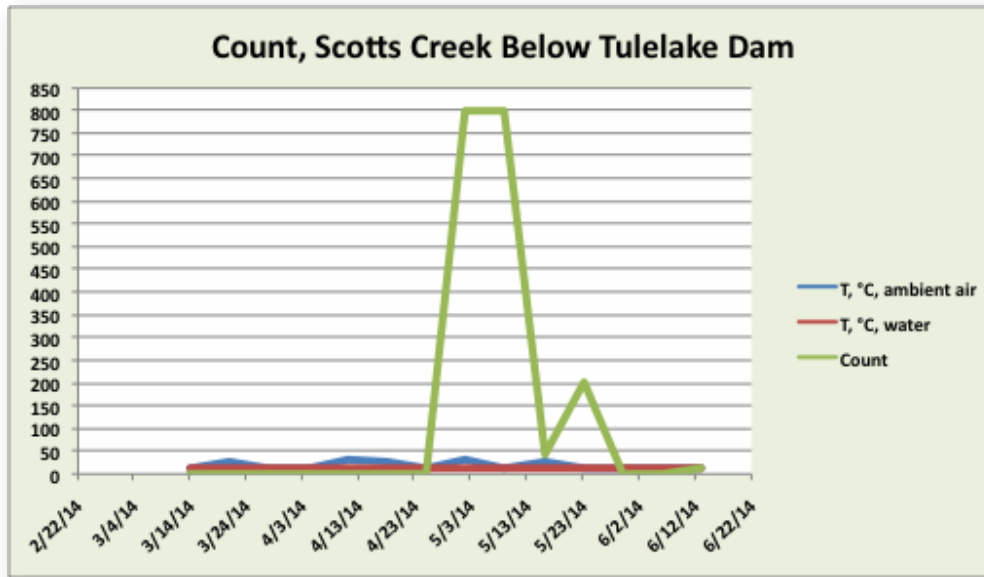
In this image, the eagle was standing on steeply sloped ground.



It took flight in the direction of the mergansers, and the pair dove a split second later.

The eagle flew into the cottonwoods in the background, creating a huge disturbance among black crowned night herons that had been seen in those trees earlier.

Shortly after, it was spotted flying WNW over Tulelake.



Review

Six locations were monitored, but not all were monitored from 3.7.2014 or 3.14.2014 until or including 6.20.2014, since at each location, monitoring was ended when fish passage was no longer viable. This happened first at Adobe Creek at Bell Hill Road, dry on 5.2.2014 and still dry when checked again on 5.9.2014.

Monitoring at Clover Bypass on Elk Mountain Road ended on 6.6.2014, when dry areas in the streambed halted fish passage. By 6.13.2014, monitoring was stopped because dry areas at Middle Creek south of Highway 20 (a) and a dry culvert at Scotts Creek below Tulelake Dam blocked fish passage. Monitoring was ended at the final two locations, Middle Creek below Highway 20 (b) and Middle Creek north of Highway 20, on 6.20.2014. Water flowed undergravel above or below the sites, consequently continuous fish passage no longer existed. Exactly at these locations flowing water was still available or pooled when monitoring ended.

Places initially checked but not monitored were a dry Cole Creek at Clark Drive near Kelseyville, Adobe Creek at Soda Bay Road that was normally checked by others and had reportedly dried and pooled early in the migration season, and Clover Creek at Bridge Arbor Drive that had only very occasional, very small pools of water.

Fish observed in five of six locations were juvenile Sacramento suckers, initially about 1.5-2 cm. and later, up to 3-5 cm. in length. Only a few individuals of another species were spotted in Scotts Creek below Tulelake Dam. No Clear Lake hitch were seen.

Cited:

Map, ref. Suchanek et al "Evaluating And Managing A Multiply-Stressed Ecosystem At Clear Lake, California: A Holistic Ecosystem Approach" pg.3, 2002, online at www.des.ucdavis.edu/faculty/Richerson/Clear%20Lake%20overview.pdf (Figure 121.1 Map of Clear Lake and surrounding watershed, with locations of dams.)

Referenced:

“Observations of Larval Development of Clear Lake Hitch, *Lavinia exilicauda chi*, with Regard to Differences in Temperature in Their Environment, an Individual Study, Spring 2012”, <http://www.rootlets.com/environment/study-spring2012.pdf> and a “Summary of Spring 2013 Field Monitoring”, <http://www.rootlets.com/environment/observations2013.pdf>

Lake County News online: “Dry year results in zero allocation for Yolo Flood; no irrigation water available from Clear Lake, Indian Valley Reservoir”, Monday, 23.June 2014 00:21
Elizabeth Larson