

THE HISTORIC RANGE OF BEAVER IN THE NORTH COAST OF CALIFORNIA: A REVIEW OF THE EVIDENCE



Prepared for:



By:

The Occidental Arts and Ecology
Center WATER Institute

December 2013



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INSTITUTE
OCCIDENTAL ARTS &
ECOLOGY CENTER

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ACKNOWLEDGEMENTS

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The Project Team thanks the following for their participation in and support of this project:

For permission to reprint portions of previously co-authored and published work:

Charles James (Bureau of Indian Affairs)
Heidi Perryman (Worth A Dam)

For mapping, research, report review, editorial and writing assistance:

Eli Asarian (Riverbend Sciences)
Glenn Farris (California State Parks, Senior State Archaeologist, retired)
Heidi Perryman (Worth A Dam)
Kevin Swift (Swift Writing)

For all other research support:

Derek Acomb (CA Fish and Wildlife), Xanthippe Augerot (Mary's River Watershed Council), Erin Beller (San Francisco Estuary Institute), Robert Bettinger (UC Davis), Hank Birbaum (Ft. Ross Conservancy), Jack Broughton (University of UT), Peter Brown (Rocky Mountain Tree Ring Research), Teresa Brunner (San Rafael Mission Museum), Nathalie Colin (Malki Museum), Arthur Dawson (Baseline Consulting), Lisa Dietz (UC Davis), Robert Edwards (Cabrillo College), Jules Evens (Avocet Research Associates), Maureen Flannery (CA Academy of Sciences), Diane Gifford-Gonzales (UC Santa Cruz), Robin Grossinger (San Francisco Estuary Institute), Daniel Harder (Santa Cruz Museum of Natural History), William Hildebrandt (Far Western Anthropological Research Group), Humboldt County Historical Society, Gina Jorgenson (Bureau of Land Management), Terry Joslin (Central Coast Archaeological Research

Consultants), Alan Leventhal (San Jose State University), Kent Lightfoot (UC Berkeley), Dewey Livingston, Anne Lindsay, Janine Loyd (Tom Origer & Associates), David Malaher (University of Winnipeg), Malcolm Margolin (Heyday Publishing), Nathalie Colin (Malki Museum), Daniel Markwyn (Sonoma State University), Mendocino County Historical Society, Jack Meyer (Far Western Anthropological Research Group), Jack Nisbet, Jim Patton (UC Berkeley), Leisyka Parrott (Bureau of Land Management), Adrian Praetzelis (Sonoma State University), Megan Penick (CA Department of Fish and Wildlife), Robert Rubin (Santa Rosa Junior College), John Schubert, Mark Selverston (Sonoma State University), Dwight Simons (Heritage Services), Sonoma County Public Library (Local History and Genealogy Annex), Michael Stoyka (Sonoma State University), Chuck Striplen (San Francisco Estuary Institute), Susan Talcott (UC Davis), Thomas Wake (UC Los Angeles), Stephen Watrous (Sonoma State University), Robin Wellman (Ft. Ross State Park), Adrian Whitaker (Far Western Anthropological Research Group), Ellen Wohl (Colorado State University), Linda Yamane and Ron Yoshiyama (UC Davis).

Cover Images (from left to right): Sonoma Creek beaver dam by Brock Dolman (www.oaecwater.org); beaver illustration, Creative Commons Clipart (www.clipartist.net); Duflot du Mofras, Eugene, 1841. *Carte détaillée des établissements russes dans le haute Californie: et du terrain compris entre le sud du Port de la Bodega et la Baie de San Francisco. Mélanges*, v. 2:3. Map Collection, Bancroft Library, University of California, Berkeley, CA.

Recommended citation:

Lundquist, K., Dolman, B., Lanman, R.B., Pollock, M.M. and Baldwin J.R. 2013, "The historic range of beaver in the north coast of California: a review of the evidence." The Occidental Arts and Ecology Center WATER Institute's final report to The Nature Conservancy.

Download this report at: www.oaecwater.org/north-coast-beaver-historic-evidence-review-2013

EXECUTIVE SUMMARY

The North American beaver (*Castor canadensis*) provides valuable ecosystem services to many other species. Their dams have been shown to benefit fish abundance and diversity, to stabilize stream incision, and to reduce discharge of sediment and nutrients. These effects could greatly assist in the recovery of the near-extinct populations of coho salmon in California. Beaver have not been considered native to the portion of coho salmon's native range in the north coast of California that runs from the Klamath River to the Monterey Bay (including the San Francisco Bay). Current California beaver management policies appear to rest on assertions that date from the first half of the twentieth century. This study re-evaluates those long-held assumptions. Recently uncovered direct (physical) evidence of beaver remains and indirect evidence such as historical records, newspapers accounts and Native American ethnographic information found in the north coast and the San Francisco Bay suggest that beaver were in fact native to these areas. Understanding that beaver are native to the north coast and the San Francisco Bay is important to contemporary management of beaver populations and the myriad species that depend on the habitat they create, especially endangered coho salmon.

INTRODUCTION

The beaver has been identified as a keystone species—one that other species depend on for the ecosystem services they provide (Baker and Hill 2003, Müller-Schwarze 2011). Beaver-created wetlands provide much-needed habitat for the survival of many species including coho salmon (Pollock 2003). Water quality is notably improved as beaver dams trap sediments and nutrients (Naiman et al., 1988, Muskopf 2007) and temperatures decrease as a result of hyporheic flow (Pollock et al. 2012). Siltation of spawning gravels is also reduced in areas below impoundments (Macdonald et al., 1995). Deeper and more numerous ponds and associated off-channel refugia provide excellent summer and winter rearing habitat for juvenile coho salmon (Scruton et al., 1998, Leidholdt-Bruner et al. 1992). These beaver-engineered wetlands provide greater food sources for young Coho salmon, and reduce their metabolic energy expenditure during large runoff events, resulting in increased growth and survivorship (Pollock et al., 2004). These ecosystem services could benefit endangered coho salmon in California. For a more detailed discussion of the ecosystem services beaver provide and the many efforts in the west to utilize these benefits, see Appendices B and C.

Coho salmon populations in California have crashed, declining from 350,000 in the 1940's to 2,000-3,000 in 2011 (NMFS 2012b), resulting in their listing under the State and Federal Endangered Species Acts. With populations this close to extinction, it is crucial to consider innovative recovery techniques such as partnering with beaver. Recognizing this need, the National Marine Fisheries Service (NMFS) included beaver utilization in their coho salmon recovery plans for both the Southern Oregon and Northern California Coast (SONCC) and the Central California Coast (CCC) Evolutionarily Significant Units (ESUs) (NMFS 2012a and 2012b). For a summary of recommendations found in the final CCC recovery plan see Appendix D.

The currently recognized historic range of beaver in California does not overlap with the southern portion of the SONCC, and excludes nearly the entire range of the CCC. Finding evidence that beaver were in fact native within both ESUs could support the greater utilization of beaver as a tool for coho salmon recovery. For this reason, the study area for this report focuses on those portions of the historic range of coho salmon where beaver are not considered native (see Figure 1).

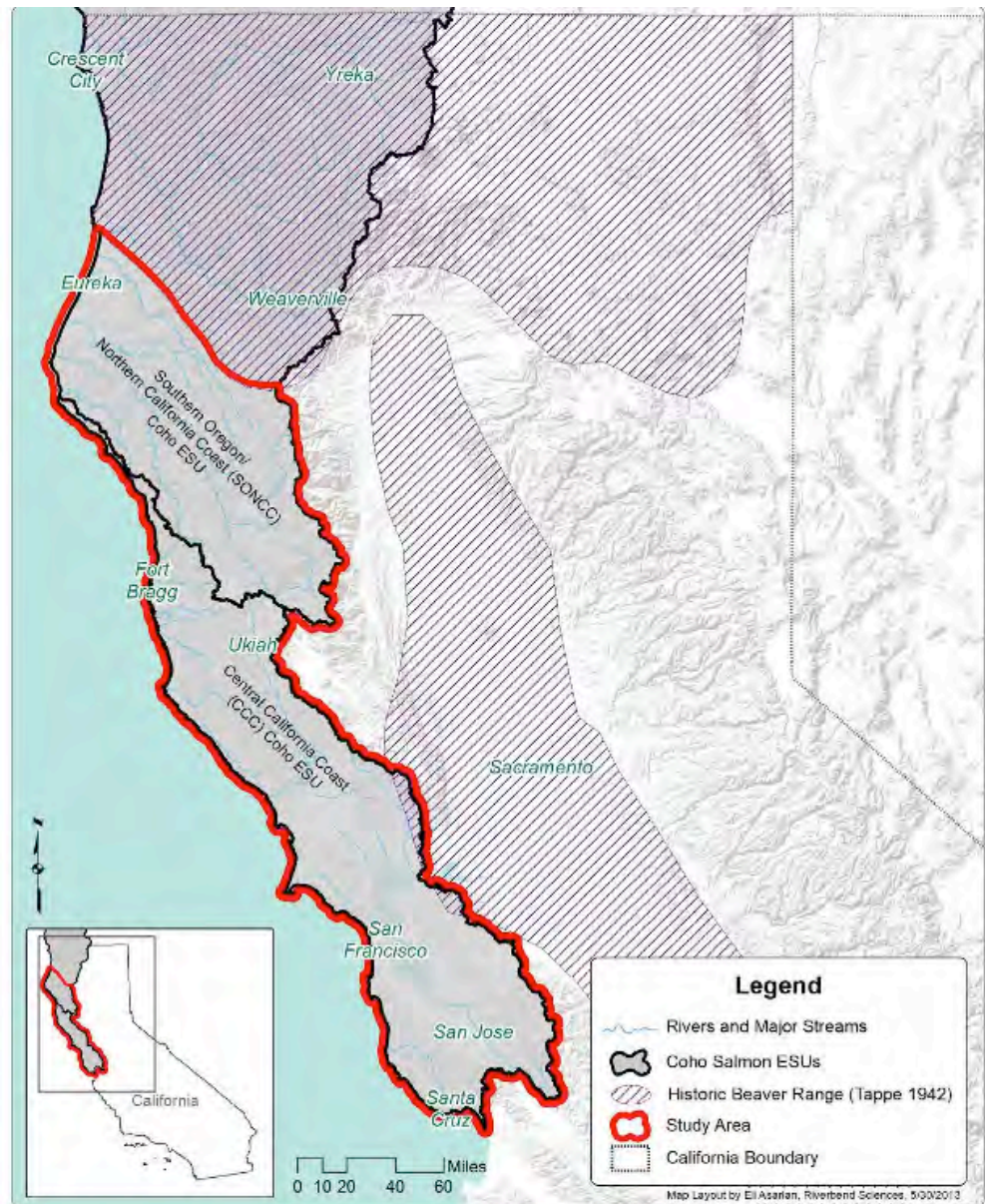


Figure 1: Study Area

The California Department of Fish and Wildlife (CDFW) considers beaver to be native only to the Central Valley, the Pit, McCloud and Klamath River drainages of far northern California and the lower Colorado River in the extreme southeastern corner of the state (Williams 1986, Zeiner et al. 1990).

As far as could be determined, this range is based on monographs by the zoologists Joseph Grinnell (Grinnell et al. 1937:636) and Donald Tappe (1942), who concluded that beaver were not historically extant to the California coast south of the Klamath River, including the San Francisco Bay. Tappe hypothesized that streams in the north coast were “rocky and steep with but little beaver food growing along them, conditions which limit their suitability for this

animal” (Tappe 1942:14). Neither Grinnell (1937) nor Tappe (1942) clarified how beaver came to be distributed in the coast north of the Klamath with its hydrologic and topographic similarity to the study area, or why they would stop at the easternmost edge of Suisun bay and not colonize the San Francisco Bay.

By the time of Tappe's monograph in 1942, he estimated only 1,300 beavers remained in California, even though state wildlife managers understood the importance of beaver, and had taken steps to conserve and significantly expand their population statewide. Near extirpation in 1911, beaver were afforded full protection (Tappe 1942) until 1925 when limited trapping again was allowed, which rapidly depleted the population to the point where full protection was again mandated in 1933.

Concerned about the low populations, the California Division of Fish and Game (now California Department of Fish and Wildlife) and US Forest Service sponsored beaver planting programs from 1923 to 1949 in an effort to "extend the range of California beavers in nonagricultural areas throughout the State, not only for the purpose of producing a valuable fur crop, but with the hope that all advantage may be taken of the water storage, erosion control and aesthetic values that may be derived from the presence of properly located beaver colonies" (Hensley 1946). As a result of these management efforts, any evidence used to support the historic presence of beavers in the north coast or the San Francisco bay area must predate 1923. For more detailed and difficult to locate information on beaver planting in California up to 1949 see Appendix F.

Current distribution maps show that populations of beaver planted as early as 1923 are still surviving in many of these waterways, which indicates at least current habitat suitability in those areas (see Figures 2 and 3 on the following two pages). For more information about current and historic distribution of beaver within the historic range of coho salmon south of the Klamath River, see Appendix E.

The objective of this review is to re-evaluate long-held assumptions that beaver did not formerly range within the historic range of coho salmon from south of the Klamath River to the Monterey Bay including the San Francisco Bay. As the following discussion indicates, archaeo-faunal and museum specimen evidence, historical records of occurrence by other reliable observers, additional indirect evidence including ethnographic information, historical newspaper accounts, and evaluations of habitat suitability has recently confirmed their historical presence in these areas. For a review of the evidence of historic distribution of beaver statewide see Lanman et al. (in review).

Distribution of Beavers in the California Portion of the SONCC Coho ESU

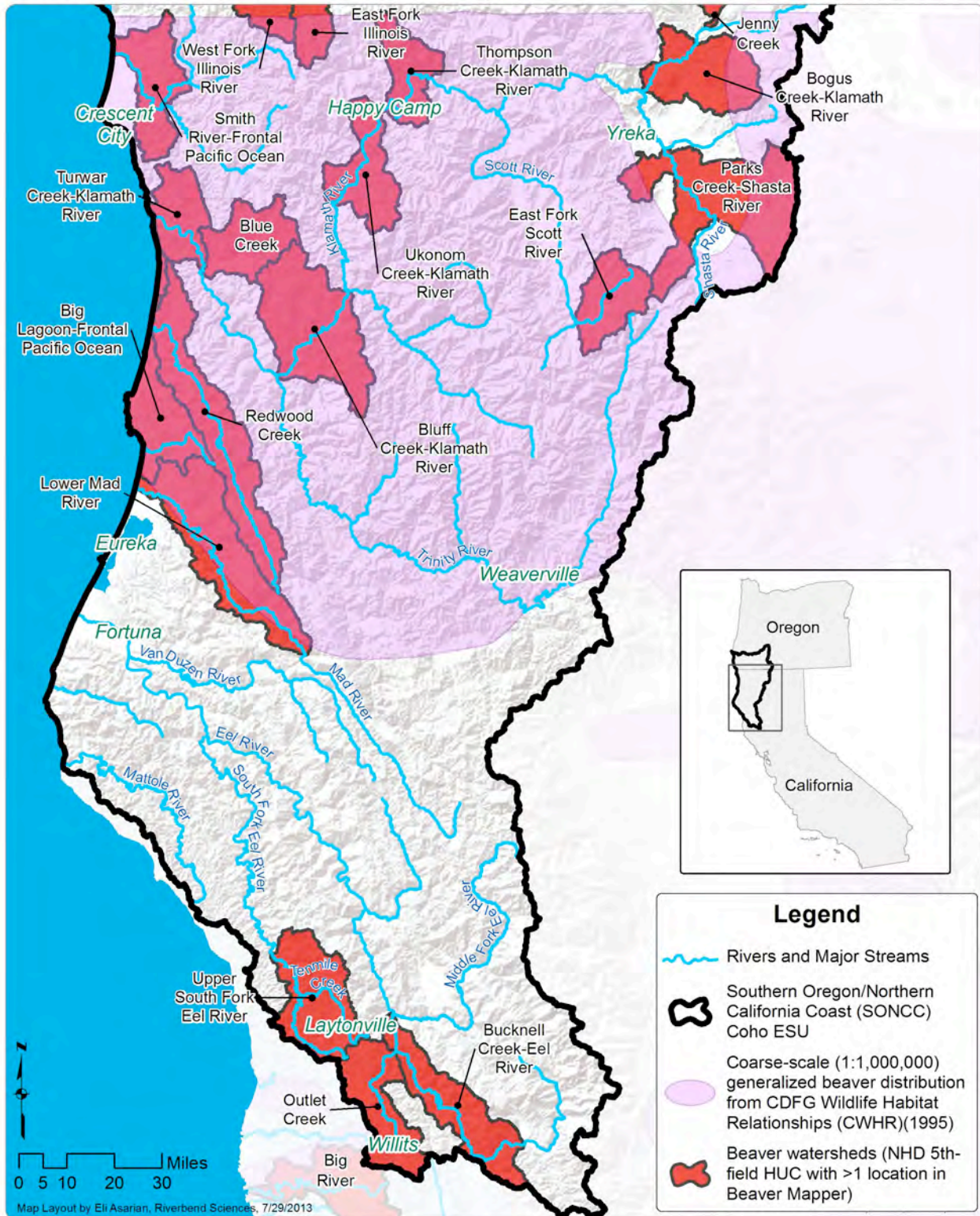


Figure 2. Current Distribution Of Beaver In The Southern Oregon Northern California Coast Evolutionarily Significant Unit (Riverbend Sciences 2013)

Distribution of Beavers in the Central California Coast (CCC) Coho ESU

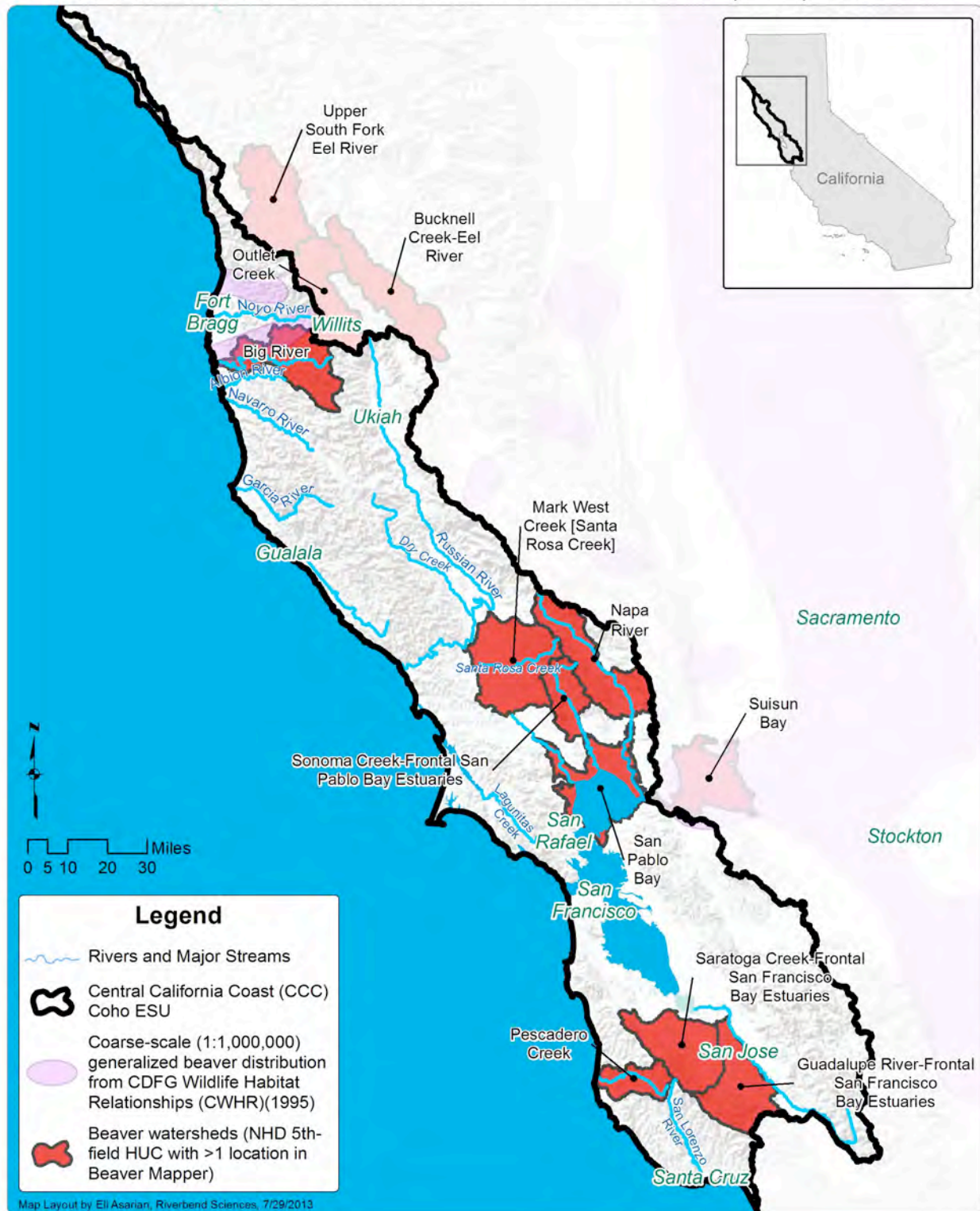


Figure 3. Current Distribution Of Beaver In The Central California Coast Evolutionarily Significant Unit (Riverbend Sciences 2013)

MATERIALS AND METHODS

For the purposes of identifying the pre-contact range of beaver in California where it is sympatric with coho salmon, we examined four types of evidence, (1) archaeological evidence, (2) museum collections containing beaver specimens, (3) written historical accounts, newspapers and place names, and (4) ethnographic evidence. To ensure the veracity of pre-contact presence, all evidence presented pre-dates the first beaver planting in 1923.

For faunal remains, we queried MIOMAP (<http://www.ucmp.berkeley.edu/miomap/>) for *C. Canadensis* remains from archaeological sites, and contacted curators at both The UC Davis Anthropology Museum and the Sonoma State University Archaeological Collections Facility. We contacted private and university-based cultural resource management firms and university professors of archaeology.

To locate physical beaver specimens obtained from our study area before 1923, we searched every museum collection in the Mammal Networked Information System and the Arctos Multi-Institution and Multi-Collection Museum Database via Boolean searches. We contacted curators at the California Academy of Sciences, Los Angeles County Museum of Natural History, Moore Laboratory of Zoology, Museum of Vertebrate Zoology, National Museum of Natural History (NMNH), San Diego Museum of Natural History, Santa Barbara Museum of Natural History, Santa Cruz Museum of Natural History, and the UCLA Dickey Collection.

Using Google, Google Scholar, J Store, and Web of Knowledge we looked for ethnographic evidence and historical fur trapper records of beaver, as well as contacting the Fort Ross Interpretive Association, Mendocino Kelley House Museum, and the San Rafael Mission. For archaeological, ethnographic and place name information we contacted thirteen university professors, six college libraries and three county historical societies. References were also identified from citations in other publications that reviewed the historic range of other California mammals (Schmidt 1991, Bockstoe 2005:61-71).

We searched for historical newspaper accounts at the California Digital Newspaper Collection (1847 -present) (<http://cdnc.ucr.edu/cdnc>), NewspaperArchive (1847-present) (<http://newspaperarchive.com/>), and Library of Congress digitized "Historic American Newspapers" (1836-1922) (<http://clironiclingarnerica.loc.gov/>).

We researched geographic place names using the Geographic Names Information System (GNIS) and toponomastic references (Gudde and Bright 2004, Durham 1998).

RESULTS

Zoo-archaeological evidence

Archaeologists conducting a study in the Kings Range on the southern coast of Humboldt County found a beaver molar at CA-HUM-277 (Levulett 1985). This site, located just south of the Mattole River, is one of twelve investigated on the rugged coastline and falls within the boundaries of the area historically occupied by the Sinkiyone tribe. The tooth itself has yet to

undergo analysis, however, the shallow depth at which it was found suggests it is probably between 1000 and 500 years old (William Hildebrandt, pers. comm. 2013). While radiocarbon dating and isotope analysis are beyond the scope of this re-evaluation, they could yield a more accurate date and indicate from which watershed this specimen came.

Three investigators over the span of 100 years identified beaver remains in the Emeryville Shellmound located in Emeryville, California, on Temescal Creek at CA-ALA-309. Dr. Max Uhle conducted excavations in 1902 and in his report (1907:18) lists *C. canadensis* as one of the types of fauna found in the area studied (the lowest strata up to three feet above the base).

For her Masters thesis, Carole Cope (1985:43) also identified *C. canadensis* in the Emeryville assemblage. While no stratigraphic information is provided for the three bones listed (Cope 1985:96), knowing what we know about the period of deposition for the site as a whole, the bones could have been deposited anywhere between 700 to 2600 radiocarbon years before present (John Broughton, pers. comm., 2013).

John Broughton (1995:137) also utilized the Emeryville collection for his doctoral dissertation. During his analysis he identified an incisor tooth from *C. canadensis*. Associated material found in this stratum (Uhle's stratum 8) has been dated at 2070 radiocarbon years before the present. With three investigators independently identifying these remains, the case for positive identification as *C. canadensis* is very strong (John Broughton, pers. comm. 2013).

In addition to the beaver remains in the Emeryville collection, in 1986 Randy S. Wiberg located a lower incisor from a beaver at CA-ALA-555 in a stratum dated to 2200—1650 b.p. (Wiberg 1986). This site is in Pleasanton on Arroyo de la Laguna Creek, a low gradient sub-tributary of Alameda Creek.

Museum Evidence

The search for U.S. museum specimens collected prior to 1923 for the genus "*Castor*" yielded one specimen from the study area in the Smithsonian National Museum of Natural History (NMNH), collected near Santa Clara by James G. Cooper in Dec. 1855. Biographer Eugene Coan (1982) reported that Cooper collected specimens in present-day Saratoga Creek (formerly Arroyo Quito), which flows to the San Francisco Bay. When Cooper was collecting his specimens, Arroyo Quito was still a tributary of the Guadalupe River, a system that currently supports beaver.

Historical Evidence

The earliest account of beaver trapping on the California coast our research yielded is from 1809, when Captain Ivan Kuskov anchored the Russian American Fur Company ship *Kodiak* at Bodega Bay from January to August. During his stay "some otter and beaver skins were procured and friendly relations were established with the Indians" before he returned to Sitka, Alaska (Thompson, 1896:3).

A year later the fur trading ship *Albatross* plied the California coast from the Santa Barbara Islands to San Francisco before sailing for Hawaii in October of 1811, with 248 beaver listed in her ship's log. (Bancroft 1886:94)

In 1811 Ivan Kuskov returned to Bodega Bay sailing the *Chirikof* and established Fort Ross, a Russian colony 16 miles north of the Bodega Head (Thompson 1896:4). According to T. Blok (1933:189), "The rich, fertile soil and [sic] the abundance of seal, otter and beaver were the principal factors which favored this colonization, and in a short time the colony had increased from a small number to about 800 persons."

Peter Corney, English privateer and explorer sailed into the Monterey Bay in July of 1815 on his ship the *Santa Rosa*. He wrote the following about the fauna of the bay: "About four miles to the southward, stands the Mission of Carmel; and about twelve miles to the northward, is the mission of Santa Cruz... There are many bears, wolves, foxes, deer, beavers, etc., and in the winter the ducks and geese are very plentiful" (Corney and Alexander 1896, O'Neil 1930).

Six years later, American sea captain William Gale convinced Boston trading firm Bryant, Sturgis and Company to finance a trip on the *Sachem* to procure merchantable items on the coast of California to be sold to China. Adele Ogden reports the frigate arrived in Monterey harbor in 1822 and "For over a year the *Sachem* remained on the California coast taking on hides, tallow, horns and beaver skins" (Ogden 1829:290).

Between 1826 and 1829, French sea captain Auguste Duhaut-Cilly (1999) traveled extensively in California from San Diego to Fort Ross. He kept a journal of his travels, reporting that "For the skin of a rabbit or a beaver the bow is bent and the lethal arrow does not fly through the air without impunity" (p. 161), "To prevent the sound of the string from warning the game, they wrap a small part of it with a sleeve of beaver skin, which stops the vibration..." (p. 163), and, "When they go to war or to the hunt they put some dozens of these [arrows] into a pretty fox or beaver pelt..." (p. 163). Writing specifically of Mission San Francisco Solano (now Sonoma), he wrote, "While young men are letting fly their arrows at beaver or stag, their sweethearts are engaged in another kind of hunt" (p. 139).

In 1826 the Hudson's Bay Company began their campaign to create a "fur desert" south and east of the Columbia River. By 1829, in a letter to John McLoughlin, Alexander McLeod of the Hudson's Bay Company's noted that "Beaver is become an article of traffic on the Coast as at the Mission of St. Joseph alone upwards of Fifteen hundred Beaver Skins were collected from the natives at a trifling value and sold to Ships at 3 Dollars" and "The Country to the northward of Bodega is said to be rich in Beaver and no encouragement given to the Indians to hunt" (Nunis 1968:34).

Writing about the Hudson's Bay Company's trapping parties, Bryant (1915:100) reports, "...[in 1829] the California district was entrusted to McKay. He ventured even to the Bay of San Francisco and took 4,000 beaver along its reedy shores, but the fur was inferior in quality...and brought only \$2 a pound."

Carlos Antonio Carrillo (1831:9) reported in his *Exposicion dirigida a la Camara de diputados*

del Congreso de la union [Exhibition aimed at the Chamber of Deputies of the Congress of the union] submitted to the Mexican government that the Russians "...have cleared the coast, from their establishments in Sitka, to the port of San Francisco, of otters and seal lions, and the river mouths of beavers..."

While assisting in the Hudson's Bay Company's attempt to extinguish the beaver, fur trapper Michel Laframboise stated in 1832 that "the Bay of San Francisco abounds in beaver", and that he "made his best hunt in the vicinity of the missions" (Maloney and Work 1943: 323-348). The missions he refers to here are San Jose (Fremont), San Francisco Solano (Sonoma), and San Raphael Arcángel (San Rafael).

On April 5th of 1833, John Work recorded an account of some American trappers who "caught very few beaver" between Fort Ross and the Mission at Sonoma (Maloney and Work 1944:19), "few" being presumably more than none. Work's expeditions to Sonoma Creek in April (Maloney 1944:21), and the Napa River in May (Maloney 1944:32, Grossinger 2012:240) reported catching beaver.

Also in April of 1833, General Mariano Vallejo traveled from Mission Sonoma to Ft. Ross, and reported "Four leagues away, more or less one finds Livantuligüeni, which forms in its basin great tulare lakes teaming with beaver. One can find here, as well as in other places, some vestiges [left by] the foreigners who hunted these animals" (Vallejo, Farris and Beebe 2000:6). Livantuligüeni is footnoted as "Levantolome (Livancacayomi); rancheria on west side of Santa Rosa lagoons, five or six miles north of Sebastopol (Merriam 1977:69-70)."

The rapid growth of the Fort Ross settlement did not escape the notice of General Mariano Vallejo, who sent James Black, Edward McIntosh and James Dawson to establish "American settlements" southwest of Fort Ross and prevent the Russian colony from growing further (Gudde and Bright 2004). The American Settlements became the Mexican land grants Rancho Estero Americano (Dawson and McIntosh) and Rancho Cañada de Jonive (Black), including present-day Salmon Creek, Atascadero Creek and the Estero Americano (which the Russians called the Avacha River). The Estero Americano currently forms the border between Sonoma and Marin Counties. See Figure 4 for details.

Describing these settlements, in a report to the Russian American Fur Company spanning 1817-1832, Kyrill T. Khlebnikov wrote, "...although it happens rarely, nonetheless one does sometimes see close to the American settlements American lions (puma)[sic] and amphibious animals such as river beavers and otters (Dmytryshyn and Crownhart 1976:142)."

On a visit to Fort Ross and Bodega Bay in August 1839, French Rear Admiral Cyrille Laplace was given a tour of the three Russian farms near Bodega Bay. About his journey from the Chernykh farm to the Khlebnikov farm, he wrote the following: "It was thus that we came at last, after several hours en route, to the second farm [the Khlebnikov farm] that we were to see, but not before we had stopped a moment by a little river on the banks of which my traveling companion pointed out to me the former habitations of beaver, probably destroyed by the Indians in order to catch the rich prize that lay within." (Laplace 2006:54).

Eugene Duflot de Mofras (1841) mapped the three Russian farms in his *Carte détaillée des établissements russes dans le haute Californie: et du terrain compris entre le sud du Port de la Bodega et la Baie de San Francisco* (see Figure 4). In this French map one can find the Chernykh farm listed as “Ferme de Tschernisch” and the Khlebnikov farm as “Ferme Vasili Khlebnikoff.” Archaeological investigations have placed the Khlebnikov farm nearest to the current day town of Bodega, CA (Selverston 2000). Salmon Creek is the only creek that runs through this valley and is the most likely place where Laplace observed the beaver lodge.



Figure 4. Duflot de Mofras (1841) Map of Fort Ross and Nearby Russian Farms

During his “Journey Round the World During the Years 1841 and 1842”, Sir George Simpson wrote that “Beaver and otter have recently been caught within half a mile of Mission San Francisco de Solano” (present day Sonoma) (Simpson 1847:313). A little farther south, Kit Carson was granted trapping rights to Alameda Creek in the 1840s and reported that beaver

"abounded...from the mouth of its canyon to the broad delta on the bay" (MacGregor 1976:13, Gustaitis 1995:69).

Fifteen years after Work's report on Napa Creek, in 1847 William Trubody wrote that, "Charlie Hooper used to catch beaver in Napa Creek" (Trubody and Camp, 1937:134).

In 1850, the Laura Virginia sailed into Humboldt Bay. In his description of the bay, passenger Charles Gilman writes to his sister "...but what exceeds all I ever saw is the quantity of game and fish. Elk, deer, Black and Grizzly bear, beaver, otter, geese, ducks, curlews, snipe, robin, partridge are without number" (Gilman 1901:40).

Early Sonoma County settler S. H. Torrance built a cabin in 1856 across the Russian River from Guerneville where he "engaged in trapping beaver and in hunting," dressing the skins and making them into gloves for sale (Lewis Publishing Company 1889:573).

Despite hunting and trapping pressure, twenty five years later the Russian River area still had beaver, according to the Sacramento Record-Union's Pacific Coast Items section, which stated in 1881, "Beaver are being trapped near Healdsburg." Figure 5 on the following page illustrates relative locations of the physical and historic evidence described above.

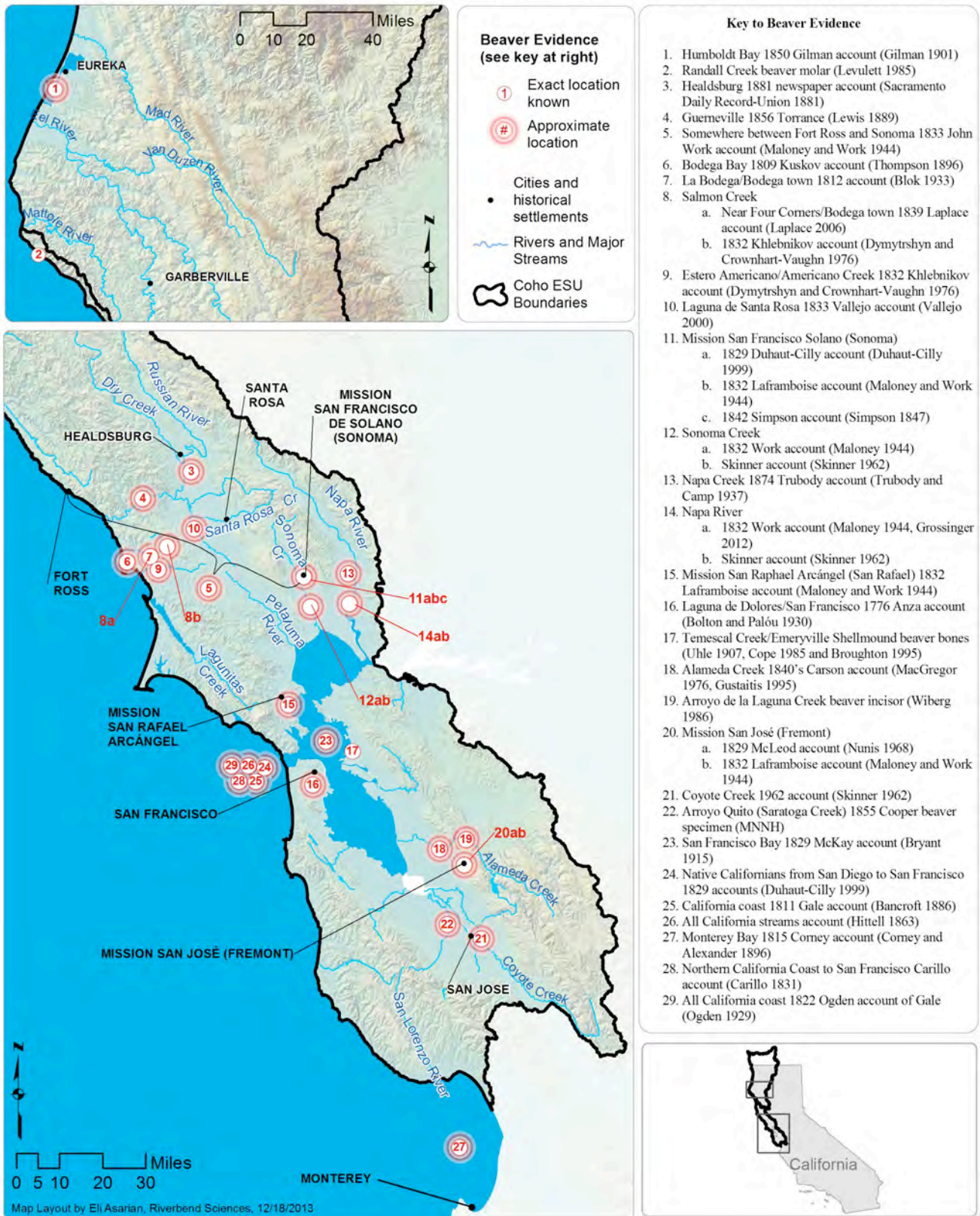
Ethnographic Evidence

The earliest record of the use of beaver pelts by native Californians comes from an account of the second Anza Expedition to the Presidio at San Francisco. On June 22, 1776, Father Francisco Palóu wrote of the Indians sighted near the Laguna de los Dolores (the site of the future Mission Dolores), "The men go totally naked, though here and there one covers his shoulders with a sort of a little cape of beaver skins and pelican feathers (Bolton and Palóu 1930:390)."

Through online searches of university and county libraries and personal communications with professional archaeologists, we compiled seven sources yielding ethnographic evidence, which currently includes 22 languages with names for beaver in the study area.

P. Kostromitinov, an agent of the Russian American Company, reported two Native California words for beaver in an 1839 report written with Baron F.P. Wrangell about ethnographic observations made during their visits to the Russian Colony Ross and the environs (Kostromitinov 1979). The Kashaya Pomo (Sonoma Coast north of the Russian River) word is listed as "Ikh-shi" and the Bodega Miwok (Olamentke) word is listed as "Poo." See figure 6 for tribal territory locations.

Figure 5. Map of Physical Evidence and Historic Accounts Within Study Area



The linguistic appendix to Stephen Powers' *Tribes of California* (1877:431-519) lists words for beaver from tribes with territories ranging from the south fork of the Eel River to the Monterey Bay. See Table 1 for results.

TABLE 1: Tribes With A Word For Beaver As Reported By Powers*		
Sub-group and language family	Source	Word for beaver
Huch'nom Yuki Family	Gathered at Round Valley (Pg. 483)	"tik-keh" (Pg. 486)
Pomo Pomo Family	Gathered at Round Valley (Pg. 491)	"kat-si-keh" (Pg. 498)
Yu-kai Pomo Family	Gathered at Head of Russian River (Pg. 492)	"ko-o" (Pg. 499)
Yo-kai-a Pomo Family	Gathered at Ukiah (Pg. 491)	"ka-tai-u-ki'ah" (Pg. 499)
Gal-li-no-me'-ro Pomo Family	Gathered at Healdsburg (Pg. 491)	"tek'-keh" (Pg. 498)
Venaambakaia Pomo Family	Gathered from "Indians who twenty or thirty years ago inhabited the country around the Russian Settlement Ross" (Pg. 493)	"khavena" (Pg. 506)
Tcho-ko-yem Mut'-sun Family	"obtained from Indians living at the head of Sonoma Valley" (Pg. 535)	"ti-mis" (Pg. 544)
No sub-group given Mut'-sun Family	Gathered at San Rafael Mission (Pg. 537)	"timis" (Pg. 552)
Santa Cruz Mut'-sun Family	Gathered at Santa Cruz (Pg. 536)	"Gupi" (Pg. 545)
*Powers, Stephen, 1877. <i>Tribes of California</i> , Contributions to North American Ethnology Vol. III, Edited by John W. Powell, Government Printing Office, Washington, DC.		

Naturalist C. Hart Merriam traveled from 1902 to 1935 documenting tribes and languages throughout California and the Northwest. In 1979 Robert F. Heizer assembled, annotated and published this portion of Merriam's unpublished work under the title of *Indian Names for Plants*

and Animals Among Californian and Other Western North American Tribes. The following maps are drawn from that work, using Merriam's tribal and linguistic boundaries with other ethnographer's material included. For results, see Figure 6 on the following page.

Drawing on Pliny E. Goddard's 1923 paper "The Habitat of the Wailaki" among others, in his 1958 study *California Athabascan Groups*, Martin Baumhoff compiled all the currently available information on California Athabascan language groups, distribution and numbers. In the "Villages West Side of the Eel" section he places a Wailaki village name "sa'kAntEtdAñ, 'beaver valley place' ... about midway between the mouth of Blue Rock Cr. and Bell Springs Cr. on a fine large flat." This is located on the main stem of the Eel River 3 miles southwest of its confluence with the North Fork of the Eel, 20 miles east of Garberville, CA.

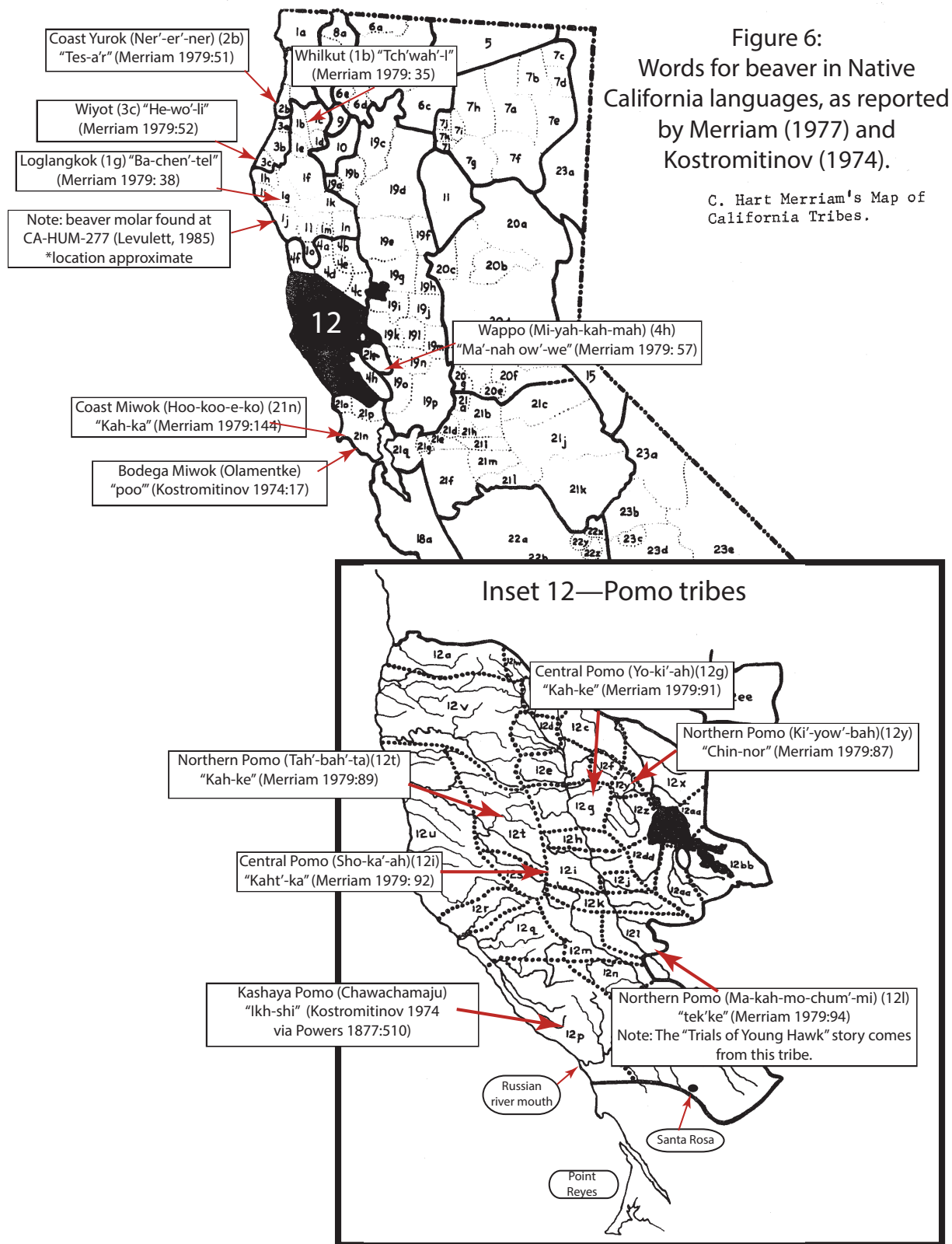
Recorded in 1940 and later published in Herbert Luthin's (2002) *Surviving Through the Days: Translations of Native California Stories and Songs*, "The Trials of Young Hawk" is a Southern Pomo story that includes two beaver brothers. The storyteller was Annie Burke of the Makahmo "Salmonhole" Pomo, who resided on the Russian River near Cloverdale, CA. This evidence is consistent with the recording of a word for beaver in the Makahmo dialect (Merriam 1977).

Noted anthropologist George McClelland Foster, recipient of the Lifetime Achievement Award from the Society for Medical Anthropology (2005), covered some of the same ground doing field research among the Yuki in 1944. Based on interviews with informants, he recorded three references to beaver. He reports in the section "WEALTH; VALUES; TRADE; TRANSPORTATION" that among the Yuki based in Covelo and Round Valley near the Middle Fork of the Eel river, "Wealth was represented by a variety of utilitarian and non-utilitarian objects. A rich man owned hides of beaver, otter, mink, panther, bear, and occasionally elk" (Foster 1944:7). Additionally he writes, "Beavers and dogs were not killed" (Foster 1944:6), suggesting that beaver pelts were a trade item only.

The Yukis' southwestern neighbors the Huchnom, whose territory included Outlet Creek, Tomki Creek, and the South Fork of the Eel River just northwest of Willits, both ate beaver and used their hides. Under the sub-heading "Animals killed for food and pelts" he notes that beaver were "netted in water, shot with bow; good eating; skin saved for quivers." (Foster 1944: Appendix I). This evidence is further supported by Powers' listing of a word for beaver in the language of the Huchnom (Powers 1877).

Other indirect evidence of beaver in study area

A GNIS search for places in the north coast section of the study area with English language beaver names yielded no verifiable positive results. According to Turner and Turner (2010) the beaver place names within our study area in Humboldt County were named after a Mr. Jacob Beaver from Pennsylvania, and no origin could be determined for Beaver Point near Fort Bragg, or Beaver Creek and Beaver Glade Station in the Middle Fork of the Eel River watershed.



DISCUSSION

The evidence discovered in this study substantially extends Grinnell and Tappe's historic range, indicating that beaver were historically present throughout the study area prior to the planting efforts of 1923-1949

That Grinnell (1937) and Tappe (1942) overlooked the evidence found in this re-evaluation is not surprising as they based their assertions on interviews of then contemporary trappers or rangers working for CDFG or U.S. Forest Service, and a limited review of the then available historical trapper accounts. Information gaps were likely since mountain men were not thorough diarists, and often their exploits were not recorded in writing until several decades after their trapping expeditions (Novak 1987). Trapping records also may have grossly underestimated harvest of beavers, in one study 44% of California's licensed trappers failed to file reports (Williams 1986). Such underreporting may have been deliberate in order to conceal profitable hunting grounds. More importantly, the trappers and rangers that were contemporaries of Grinnell and Tappe recorded observations at a time when beavers had been nearly extirpated from California.

That we found only a few historic records of beaver specifically being caught on the north coast is not evidence of lack of beaver as much as lack of record keeping. While it was common to record numbers of beaver pelts taken aboard fur-trading ships (Ogden 1929, 1945; Ogden and Robinson 1944a, 1944b; Thompson and Mackenzie 1947), it was exceedingly uncommon to mention the specific watershed they came from. Additionally, some maritime fur traders relied on Native Americans to supply pelts, making it even more difficult to determine where the beaver originated (Dolin 2010:45). For example, a Mexican commission on California wrote in 1827 that "... Russians navigate the rivers and do an extensive business with the barbarian natives, providing them with arms in exchange for skins of the sea-otter, beaver, seal, bears, deer, and for kidney fat, grain, and other commodities on which information is not at hand." (Reynolds 1946: 439). Some sources mention beaver being obtained in California prior to the era of overland beaver trappers which began 1826, which suggests that the beaver were obtained from coastal areas, but unfortunately these sources lack details regarding how or where the beaver were obtained. For example, Nasatir (1945) quotes 1824 correspondence from a French official that "The Russian establishment of Bodega sends the skins which it procures directly to Russian from hence they are sent to the interior of China. These furs consist of otter skins, beaver, sea wolf, fox etc." The Mexican government signed an agreement with the Russian American Company in 1824 for the Russians to hunt otters and beavers on the California coast and San Francisco Bay (Fernandez 1874), which provides circumstantial evidence that beaver were present in those areas, but no detailed records of the result of the hunt are available. These early fur hunters were so thorough in their endeavors that the toll taken of such valuable fur-bearers as the fur seal, sea otter and beaver led to their practical extermination (Bryant 1915: 99). All of this happened well before the arrival of James Ohio Pattie, mistakenly described by Tappe (1942:9) as one of the first men to enter California in quest of beaver pelts.

Arriving overland 17 years after the *Kodiak's* 1809 fur trading visit to Bodega Bay, Pattie caught beavers on the lower Colorado River in 1827, Jedediah Smith trapped the San Joaquin, Sacramento, Trinity and Klamath watersheds in 1828, and Peter Skene Ogden led the first

Hudson's Bay Company fur brigade across the northeast corner of California during 1826-1827 (Hensley 1946, Warner 1966). Ogden's orders included the creation of a "fur desert" south and east of the Columbia River that, theoretically, would so deplete the region of fur-bearing mammals that westward American migration by those in pursuit of beavers would be stifled (Dolin 2011:292).

In less than 20 years, the Hudson's Bay Company had reduced beaver populations in California to the point where, after 1843, they ceased sending "hunting parties in that direction" (Nunis 1968:169). By the time Cooper took his specimen from Saratoga Creek in 1855, it would have been difficult to assess the historic range of beaver based on the remaining populations. It is no surprise then that nearly a century later Grinnell and Tappe characterized beavers' historic range as they did. Only now have modern technology and research methods given us access to a much wider range of evidence.

This evidence includes archeofaunal remains found at both the north and south extremes of the study area, and our analysis of beaver mobility and habitat suitability indicates no barriers to beaver colonization and occupation of much of the study area.

The Randall Creek beaver molar was dug up from a shallow strata dating 500-1000 years b.p., indicating that beaver could in fact colonize the "rocky, steep" streams of the north coast well before the maritime fur traders began trapping them. Additionally, since beaver have been proven capable of traveling up to 20 miles over land, and many lower reaches of the creeks and rivers found between the Klamath River and the Monterey Bay have the preferred valley width, slow flow, low gradient, and food supply to sustain beaver populations (Michael Pollock, pers. comm. 2013), there is no reason to exclude beaver from any other part of the north coast of California.

The Bay Area also has suitable beaver habitat. The Emeryville remains come from Temescal creek whose marshland had abundant cattail (*Typha latifolia*) (Cope 1985:43), one of many food sources beaver are known to feed on (Brenner 1967). Cattails could very well have been a significant component of the "reedy shores" referred to in John Work's report of taking four thousand beaver in one trip.

It has been documented that beaver can cross saltwater to reach islands, and travel along coastlines to colonize new territory (Anderson et al. 2009), as well as disperse up to 31 miles by stream (Müller-Schwarze 2011). Furthermore, a recent study has found that beaver construct dams and lodges in the brackish water of tidal marshes (Hood 2012). Taken together, this evidence suggests that beaver were likely found throughout most parts of the Bay Area as well as Monterey Bay that had suitable habitat.

In a modern example of beaver's dispersal capacity, beaver in Sonoma County have traversed approximately 10 miles from Sonoma Creek in Glen Ellen to Spring Lake in the Santa Rosa Creek watershed, a sub-tributary of the Russian River. More than the distance traveled, the terrain was remarkable, including busy roads, vineyard fences, the suburban development of Oakmont, and other significant passage barriers that would not have existed pre-contact.

Given such suitable habitat in the study area, and the well-documented mobility of beaver, it is curious that so few archaeological remains were found. In consulting professional archaeologists at universities and private cultural resource management firms, no consensus emerged on reasons for the low incidence of archeofaunal beaver evidence. While some theorize that hunting and trapping beaver was too difficult with aboriginal technologies (Bettinger and Hildebrandt, pers. comm. 2013), we found reliable records of native Californians hunting with arrows in the Eel River (Foster 1944) and Sonoma Creek (Duhaut-Cilly 1999).

UC Santa Cruz Professor Diane Gifford-Gonzales reports that while she has not found “any archeofaunal evidence of *C. canadensis* in coastal northern California south of the Golden Gate” herself, she concedes that “since most faunal analyses of the San Francisco Bay Area have been pretty cursory until recently, there’s always a chance of more” (pers. comm. 2012).

Searching for beaver remains via online databases can yield only limited information. Not all collections excavated from sites within the study area have been catalogued into searchable databases, nor have the bones been clearly identified by species. For example, while we have generously been granted access to Sonoma State University’s 2507 collections, only one third have been digitized, with the remainder still listed in paper catalogues. Reading through the entire catalogue of artifacts still might not reveal whether beaver are present as many artifacts are merely listed as “bone” or “small mammal.” To take full advantage of such a valuable resource would require identifying those collections that come from sites near the other forms of evidence we found and partnering with a faunal analyst to look through those collections containing mammal bones.

Having found buried beaver dams in the Sierra Nevada radiocarbon dated prior to re-introduction (James and Lanman 2012) we queried professionals who work with buried wood in the study area. Geoarchaeologist Jack Meyer (pers. comm. 2012) said, “I have explored and examined many miles of stream banks throughout the region and can’t say that I ever saw a buried beaver dam, but I can’t say that I was looking for them either.” Through our research we discovered that few professionals whose work might reveal buried beaver dams (stream surveyors, archaeologists, etc.) are aware that finding and radiocarbon dating wood within the study area could inform the understanding of where beaver previously occurred.

It is not surprising that we found only one museum specimen from Saratoga Creek, since no California museum contained any beaver specimen predating 1906, by which time beaver were nearly extinct even in their last refuge, the Central Valley’s Sacramento-San Joaquin River Delta. While the California Academy of Sciences was founded in 1853, all but a single cartful of its collections were destroyed in the 1906 San Francisco earthquake and subsequent fire (Lanman et al. 2012), at a time when California’s other museums were just initiating their mammal collections.

This lack of museum evidence may explain why 20th century naturalists were skeptical that beaver were historically plentiful in the watersheds of the San Francisco Bay Area below the Carquinez Strait. Our modern research found historic accounts showing that the beaver were “once very abundant in all the large streams of California, and it was chiefly for their sake that

the first American trappers entered the country some thirty-five or forty years ago” (Hittell 1863:125). This description would necessarily include the study area.

Of the inland fur-bearers, beaver were “one of the most valued of the animals taken and apparently was found in great abundance.” (Skinner 1962:157). Regarding the trade in these valuable animals, he writes, “California, and San Francisco specifically, was the center of this industry. Originally, the Bay Area was a major source of the animals themselves.”

Skinner was not alone in describing San Francisco as a center of the fur trade: “...commerce began between the Russians of Sitka and San Francisco...in the years 1819 and 1820... Afterwards, commerce was also established with the English, American, and later on, the French and others who brought their goods and would take local products such as cattle hides and beaver, bear, seal and deer pelts...” (Amador et al. 2005:145).

Ethnographic evidence shows that Native Americans, some of whom supplied the fur-trading ships, were well acquainted with the animal. Evidence was found across the entire study area, from Trinidad Bay in Humboldt County to the Monterey Bay in Santa Cruz County. In Humboldt County, the Randall Creek beaver molar was found in Sinkyone territory, bordering the territory of the Loglangkok, a tribe that has a word for beaver in their language. In neighboring Wailaki territory, modern terrain maps show that “sa’kAntEtdAñ,” the “beaver valley place,” is located in a section of the Eel River with a low gradient suitable for beaver habitat. Farther south, the six Pomo tribelets with words for beaver all had territories within easy reach of the trappers traveling from Fort Ross to the Bay Area, who also reported beaver in that area.

Finding evidence that beaver occurred in the north coast and the San Francisco Bay is important to their management as a native species. In the report *Mammal Species of Concern* the California Department of Fish and Wildlife recommended the “beaver be treated as a sensitive species” as they are “highly vulnerable to trapping” and that “alteration of aquatic habitats, including decreased stream flow, increased pollution, channelization of streams, stream-side brush clearing, and regulation of stream flow, also could affect beaver populations adversely” (Williams 1986:79).

Expanding the accepted historic native range of beaver could support the implementation of such beaver management recommendations, and the use of beaver as a tool for coho salmon recovery. Where beaver and salmon currently occur, survival rates and density could be increased through the protection of existing beaver colonies. This information could also support the relocation of beaver to areas where suitable habitat and coho salmon occur.

Although a great deal of historical information is presently digitized and searchable and our review of that material was exhaustive, further historical records of beavers in the north coast and San Francisco Bay may remain to be located in California state archives, college or university special collections, as well as Hudson’s Bay Company archives in Canada.

Naturalists and collectors from various European countries visited California in the nineteenth and early twentieth centuries (Beidleman 2006), but foreign museum collections were not

searched. Further research is needed to extend our findings by establishing how uniformly beavers were formerly distributed throughout our study area.

Few studies have previously been conducted to re-evaluate the historic range of a specific species (Schwartz et al. 2007), making this study an innovative expansion of historical ecology's use for modern restoration and management of sensitive species. The unique and inter-related lines of evidence we were able to access and analyze indicate that beaver were widely distributed across the north coast and the San Francisco Bay and thus we recommend that the historic range map be redrawn to reflect this new information.

RECOMMENDATIONS

1. Conduct an outreach campaign, using our website, social media platforms, targeted emails and PowerPoint presentations to educate state wildlife managers, fisheries conservationists, road and water agencies, watershed restoration practitioners and the general public about how the results of this study extend beaver's historic range to include the north coast and the San Francisco Bay.
2. Work with the California Department of Fish and Wildlife to revise the map of the historic range of beaver in California to reflect these and other new evidence findings.
3. Support the implementation of National Marine Fisheries Service Central California Coast coho salmon Final Recovery Plan's (NMFS 2012b) recommendations for utilization of beaver in coho salmon recovery. The following is a partial list of those recommendations (see Appendix D for the full summary of inclusion of beaver in the plan):
 - a. "3.1.1.7. Action Step: Utilize non-lethal methods to manage beaver depredation issues (e.g. flooding, crop damage) within range of CCC salmonids such as flow devices, fencing, and beaver re-location and enhance habitat complexity."
 - b. "3.1.1.8. Action Step: Where non-lethal methods prove unfeasible to resolve depredation issues, relocate beaver populations to remote CCC coho streams where habitat enhancement is needed and resource conflict is low."
 - c. "3.2.1.4. Action Step: Develop and update a Beaver Management Plan for California to benefit salmonids."
 - d. "3.2.1.5. Action Step: Work with CDFG and the CDFG Commission to reclassify beaver from a 'non-native nuisance' animal to a 'native non-nuisance' animal."
 - e. "3.2.1.6. Action Step: Work with CDFG and the CDFG Commission to modify Title 14 of the California code of Regulations to prohibit recreational hunting/trapping of beavers within all counties within the NCCC Recovery Domain."
 - f. "3.2.1.7. Action Step: Work with CDFG and the CDFG Commission to remove beavers from CDFG's list of depredated animals, and/or authorize only non-lethal management and relocation methods within the NCCC Recovery Domain."
4. Collaborate with Sonoma State University professor Dr. Jeff Baldwin, to conduct interviews of State and Federal agency staff to determine what obstacles exist to utilize beaver in watershed restoration statewide and coho recovery including non-lethal management and relocation of beaver within the coho salmon ESUs.
5. Convene a roundtable meeting with the California Department of Fish and Wildlife and all other lead agencies whose mandates are impacted by the presence of beaver in California to resolve issues identified through interview process and the roundtable itself.

6. Conduct public outreach to educate individuals, communities and policy makers about the importance of beaver to water quality and quantity, the restoration of watersheds and the recovery of the listed species who depend on the habitat they create.
7. Conduct a campaign to map current beaver populations through Riverbend Science's Beaver Mapper, redesigning the user interface to enlist wider support of citizen scientists in gathering more current occurrence data.
8. To further substantiate historic evidence of beaver in coastal California and inform current beaver management decisions and proposed reintroductions, conduct the following studies:
 - a. Co-design a study with the Anthropology Department at UC Davis to analyze the beaver molar from CA-HUM-277. Through carbon dating, isotope analysis and water testing, one could determine whether this tooth originated on the coast and near the site from which it was excavated.
 - b. Co-design a study with the Sonoma State Anthropological Studies Center to determine what archaeological sites and associated collections exist near areas where evidence discussed in this report was found. This project would require a cross-discipline partnership as the North West Information Center only grants access to this kind of information to qualified archaeological professionals.
 - c. Conduct ground penetrating radar in areas where physical evidence, reliable observer accounts and other indirect evidence overlap.
 - d. Continue to look for buried beaver dam evidence and conduct a campaign to educate professionals in the archaeology, excavation, fisheries recovery and stream restoration fields as well as recreationists about what this buried beaver dam evidence looks like.

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PHYSICAL EVIDENCE - Sorted by date			
Date	Collector or Investigator	Specimen	Source Information
Between 2600 - 700 radiocarbon years BP	Carol Cope	Three <i>Castor canadensis</i> bones (unspecified)	Cope, Carol, 1985. <i>The Mammalian Fauna of the Emeryville Shellmound, CA-ALA-309</i> . Thesis, Sonoma State University, Rohnert Park, CA. Page 96.
Between 2200 – 1650 BP	Wiberg	<i>Castor canadensis</i> lower incisor	Wiberg, Randy, S., 1996. <i>Archaeological Excavations and Burial Removal at Sites CA-ALA-483, CA-ALA-483 Extension, and CA-ALA-555, Pleasanton, Alameda County, California</i> , Coyote Press, Salinas, CA.
2070 radiocarbon years BP	John Broughton, University of Utah	<i>Castor canadensis</i> incisor from Uhle's stratum 8	Broughton, John Michael, 1995. <i>Resource depression and intensification during the late Holocene, San Francisco Bay: Evidence from the Emeryville Shellmound vertebrate fauna</i> , Department of Anthropology, University of Washington, Seattle, WA. Table E8.
1500 – 1700 years BP	Max Uhle	<i>Castor canadensis</i> bone (unspecified)	Max Uhle, 1907. "The Emeryville Shellmound," <i>American Archaeology and Ethnology</i> , 7 (1):32 University of California Publications, Berkeley, CA. Page 18.
500 - 1000 years old (Estimate based on depth)	William Hildebrandt, Far Western Anthropological Research Group	<i>Castor canadensis</i> molar	Levulett, Valerie, 1985. "The prehistory of southwestern Humboldt County: A study of coastal archaeological sites in the King Range National Conservation Area." PH.D, dissertation. Dept. of Anthropology, UC Davis. Davis, CA. Table 14, Page 651.
1855	James Graham Cooper	<i>Castor canadensis subauratus</i> skull	Housed in the Smithsonian Institution National Museum of Natural History. Collected in Santa Clara, California on December 31, 1855. Catalog Number: USNM 580354. http://collections.mnh.si.edu/search/mammals/?irn=7211761&QueryPage=%2Fvzmammals%2Fpages%2Fnmnh%2Fvz%2FDtlQueryMammals.php

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DOCUMENTED HISTORIC OCCURRENCE RECORDS - Sorted by date		
Date	Citation	Source Information
1776	"The men go totally naked, although here and there one covers his shoulders with a sort of a little cape of beaver skins and pelican feathers." (page 390)	Bolton, H.E. and F. Palóu, 1930. <i>Palóu's Account of the Founding of San Francisco, 1776</i> . H. E. Bolton, editor. Anza's California Expeditions Volume 3. University of California Press, Berkeley, CA.
1809	"...arrived at Bodega Bay on January 8th, 1809. Here the Kodiak remained at anchor until August. After carefully exploring the surrounding country...some otter and beaver skins were procured..." (page 3)	Thompson, R. A., 1896. <i>The Russian Settlement in California Known as Fort Ross, Founded 1812...Abandoned 1841: Why They Came and Why They Left</i> , Sonoma Democrat Publishing Company. Santa Rosa, CA.
1811	Bancroft cites William Gale's <i>Albatross, Log-book of a Voyage to the Northwest Coast in the Years 1809-1812</i> account of "248 beaver" being taken on the ship while in California. (page 94)	Bancroft, Hubert H. 1886. The Works of Hubert Howe Bancroft Vol. XIX, History of California Vol. II 1801-1824. A. L. Bancroft & Company, San Francisco, CA.
1812	"La Bodega, near San Francisco, was occupied by the Russians early in the year 1812, by permission of the Spanish government. The rich, fertile soil [and] the abundance of seal, otter and beaver were the principal factors which favored this colonization, and in a short time the colony had increased from a small number to about 800 persons." (Page 189)	Blok, G. K. 1933. "The Russian Colonies in California: A Russian Version," California Historical Quarterly 12(3):189-190, San Francisco, CA.

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1815	"About four miles to the southward, stands the Mission of Carmel; and about twelve miles to the northward, is the mission of Santa Cruz... There are many bears, wolves, foxes, deer, beavers, etc., and in the winter the ducks and geese are very plentiful" (Page 44)	Corney, P., And Alexander, W. D., 1896. <i>Voyages in the northern Pacific: narrative of several trading voyages from 1813 to 1818, between the northwest coast of America, the Hawaiian Islands and China, with a description of the Russian establishments on the northwest coast, interesting early account of Kamehameha's realm; manners and customs of the people, etc. and sketch of a cruise in the service of the independents of South America in 1819.</i> Thos. G. Thrum, Publisher, Honolulu, Hawaii, USA.
1817 - 1832	"...and although it happens rarely, nonetheless one does sometimes see close to the American settlements American lions [puma] and amphibious animals such as river beavers and otters." (Page 124)	Basil Dymytrshyn and E.A.P. Crownhart-Vaughn, 1976. "Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832" <i>Oregon Historical Society</i> , Portland, OR.
1822	Captain Gale's frigate arrived in Monterey harbor in 1822 and "For over a year the <i>Sachem</i> remained on the California coast taking on hides, tallow, horns and beaver skins" (Page 290)	Ogden, Adele, 1929. "Boston Hide Droghers along California Shores." <i>California Historical Society Quarterly</i> 8(4): 289-305

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1826-1829	<p>In talking about the Mission San Francisco Solano (Sonoma) he says “While young men are letting fly their arrows at beaver or stag, their sweethearts are engaged in another kind of hunt” (page 139). Also, “For the skin of a rabbit or a beaver the bow is bent and the lethal arrow does not fly through the air without impunity” (page 161). And, “To prevent the sound of the string from warning the game, they wrap a small part of it with a sleeve of beaver skin, which stops the vibration so well that the whistle of the arrow is the only sound heard by an animal that is missed, while the one hit has no time to perceive it.”)Page 163). And, “When they go to war or to the hunt they put some dozens of these [arrows] into a pretty fox or beaver pelt, the animal having been skinned from the rump; the arrow heads protrude through the mouth while the other ends adorned with feathers stick out behind, living this quiver an aspect at once wild and graceful.” (Page 163)</p>	<p>Duhaut-Cilly, Auguste, August Fruge and Neal Harlow 1999. <i>A Voyage to California, The Sandwich Islands and Around the World in the years 1826-1829</i>, University of California Press, Berkeley, CA.</p>
1829	<p>In a letter to John McLoughlin, Hudson's Bay Company's McLeod reported that in 1829, "Beaver is become an article of traffic on the Coast as at the Mission of St. Joseph alone upwards of Fifteen hundred Beaver Skins were collected from the natives at a trifling value and sold to Ships at 3 Dollars" and "The Country to the northward of Bodega is said to be rich in Beaver and no encouragement given to the Indians to hunt." (page 34)</p>	<p>Nunis, D. B. 1968. <i>The Hudson's Bay Company's First Fur Brigade to the Sacramento Valley: Alexander McLeod's 1829 Hunt</i>. The Sacramento Book Collectors Club, Fair Oaks, CA.</p>
1829	<p>"...the California district was entrusted to McKay. He ventured even to the Bay of San Francisco and took 4,000 beaver along its reedy shores, but the fur was inferior in quality...and brought only \$2 a pound." (Page 100)</p>	<p>Bryant, H. 1915. "California's Fur-bearing Mammals" <i>California Fish and Game Journal</i> (Volume I, No. 3). California Fish and Game Commission, Sacramento, CA.</p>

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1831	The Russians "...have cleared the coast, from their establishments in Sitka, to the port of San Francisco, of otters and seal lions, and the river mouths of beavers..." (Page 9)	Carrillo, Carlos, A., 1831. Exposicion dirigida a la Camara de diputados del Congreso de la union [Exhibition aimed at the Chamber of Deputies of the Congress of the union]. Printed by C. Alejandro Valdés, Mexico.
1832	In 1832 fur trapper Michel Laframboise travelled from the "Bonaventura River" (Sacramento River) to San Francisco and then the missions of San José (Fremont), San Francisco Solano (Sonoma) and San Raphael Arcángel (San Rafael). La Framboise stated that "the Bay of San Francisco abounds in beaver", and that he "made his best hunt in the vicinity of the missions" (Page 343)	Maloney, Alice and John Work, 1943. "Fur Brigade to the Bonaventura: John Work's California Expedition of 1832-33 for the Hudson's Bay Company," <i>California Historical Society Quarterly</i> 22(4):323-348.
1833	On April 5, 1833, John Work's Hudson's Bay Company expedition, while visiting Sonoma Mission, described a couple Americans who had left Ewing Young's party near Fort Ross, and caught "very few beaver" while returning to the Mission. (Page 19)	Maloney, Alice and John Work, 1944. "Fur Brigade to the Bonaventura: John Work's California Expedition of 1832-33 for the Hudson's Bay Company," <i>California Historical Society Quarterly</i> 23(1):19-40.
1833	<p>"Four leagues away, more or less one finds Livantuligüeni (19), which forms in its basin great tular (20) lakes teaming with beaver (21). One can find here, as well as in other places, some vestiges [left by] the foreigners who hunted these animals." (Page 6)</p> <p>Relevant footnotes: (19) Levantolome (Livancacayomi); rancheria on west side of Santa Rosa lagoons, five or six miles north of Sebastopol (Merriam 1977:69-70). (21) This is a good description of the great Laguna de Santa Rosa.</p>	Vallejo, Mariano, Glenn Farris and Rose Marie Beebe, 2000. <i>Report of a Visit to Ft. Ross and Bodega Bay in April 1833</i> , California Mission Studies Association Occasional Paper #4.

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1839	"It was thus that we came at last, after several hours en route, to the second farm that we were to see, but not before we had stopped a moment by a little river on the banks of which my traveling companion pointed out to me the former habitations of beaver, probably destroyed by the Indians in order to catch the rich prize that lay within." (Page 54)	Laplace, Cyrille and Glenn Farris, 2006. <i>Visit of Cyrille Pierre-Theodore Laplace to Fort Ross and Bodega Bay in August 1839</i> , Fort Ross Interpretive Association, Jenner, CA.
1841-1842	"Beaver and otter have recently been caught within a half mile of the mission..." This would have been the Mission San Francisco de Solano (Sonoma). (Page 313)	Simpson, Sir George, 1847. <i>Narrative of a Journey Round the World: During the Years 1841 and 1842, Volume 1</i> , H. Colburn, London, England.
1840's	beaver "abounded...from the mouth of its canyon to the broad delta on the bay"	MacGregor, Bruce A. 1976:13, <i>The Centennial History of Newark</i> . Newark Days Bi-Centennial Committee, Newark, CA. Gustaitis, Rasa, 1995:69, <i>San Francisco Bay Shoreline Guide</i> . University of California Press, Berkeley, CA.
1847	" Charlie Hooper used to catch beaver in Napa Creek." (Page 134)	Trubody, William A., and Charles L. Camp, 1937. "William Alexander Trubody and the Overland Pioneers of 1847", <i>California Historical Society Quarterly</i> 16(2):122-143.
1850	The Laura Virginia sailed into Humboldt Bay. Passenger Charles Gilman writes to his sister "...but what exceeds all I ever saw is the quantity of game and fish. Elk, deer, Black and Grizzly bear, beaver, otter, geese, ducks, curlews, snipe, robin, partridge are without number." (Page 40)	Gilman, Charles H., 1901. "Autobiography and Reminiscences of Charles H. Gilman, Deceased, 1901," <i>Autobiographies and Reminiscences of California Pioneers</i> , p. 38-41, Vol. 6. The Society for California Pioneers, San Francisco, CA.
1856	Early Sonoma County resident S. H. Torrance built a cabin directly across the Russian River from Guerneville, and "engaged in trapping beaver and in hunting", dressing the skins and making them into gloves for sale	Lewis Publishing Company, 1889. An illustrated history of Sonoma County, California. Containing a history of the county of Sonoma from the earliest period of its occupancy to the present time. The Lewis Publishing Company, Chicago, IL.

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1863	He describes beaver as "very abundant in all the large streams of California, and it was chiefly for their sake that the first American trappers entered the country some thirty-five or forty years ago. They are still found in nearly all parts of the state..." (Page 125)	Hittell, John S. 1863. <i>Resources of California, Comprising Agriculture, Mining, Geography, Climate, Commerce, Etc. Etc. and the Past and Future Development</i> , A. Roman & Company, San Francisco, CA.
1962	"It was the early fur trade more than any other single factor that opened up the West, and the Bay Area in particular, to world trade. The Spanish, French, English, Russians and Americans engaged in the California fur trade before 1825." (Page 155) "Evidence exists to show that they [beaver] were also found along the Napa River, and in Coyote and Sonoma creeks in small numbers at least." (Page 162)	Skinner, John A. 1962. "An Historical Review of the Fish and Wildlife Resources of the San Francisco Bay Area" California Department of Fish and Game, Water Projects Branch Report no. 1. Sacramento, CA.

NEWSPAPER ACCOUNTS

Date	Citation	Source Information
1881	"Beaver are being trapped near Healdsburg"	Sacramento Daily Record-Union, 1881 Feb 26. Volume 13, No. 5. Sacramento, CA. Pacific Coast Items, p. 8 (col. 5).

ETHNOGRAPHIC EVIDENCE

Date	Evidence	Source Information
1839	Kashaya Pomo name for beaver: ikh-shi (as per editor's note on page 14, found listing in Powers and Powell 1877:510) Bodega Miwok (Olamentke) name for beaver: poó (Page 17)	Von Wrangell, Ferdinand P., P. Kostromitonov, Fred Stross and R. Heizer, 1974. <i>Ethnographic Observations on the Coast Miwok and Pomo by Contre-Admiral F. P. Von Wrangell and P. Kostromitonov of the Russian Colony Ross, 1839</i> . Archaeological Research Facility Department of Anthropology, University of California Berkeley, Berkeley, CA.

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1877	<p><u>Native California Names for Beaver:</u></p> <ol style="list-style-type: none">1. Huchnom (Yuki Family): tik-keh (Pomo) (p. 486)2. Pomo (Pomo Family - gathered at Round Valley): kat-si-keh' (p. 498)3. Gal-li-no-me'-ro (Pomo Family – gathered at Healdsburg): tek'-keh (p. 498)4. Yo-kai-a (Pomo Family – gathered at Ukiah): ka-tai-u-ki'ah (p. 499)5. Yu-kai (Pomo Family – gathered at head of Russian River): ko-o' (p. 499)6. Venaambakaiia (Pomo Family – gathered from Indians who twenty or thirty years ago inhabited the country around the Russian Settlement Ross): khavena (p. 506)7. Tcho-ko-yem (Mut-sun Family – obtained from Indians living at the head of Sonoma Valley): ti-mis (p. 544)8. San Raphael Mission (Mut'-sun Family): timis (p. 552)9. Santa Cruz (Mut-sun Family – procured in Santa Cruz): gupi (p. 545)	<p>Powers, Stephen and John W. Powell, 1877. <i>Tribes of California</i>, Contributions to North American Ethnology Vol. III, Government Printing Office, Washington, DC</p>
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1902 - 1935	<ol style="list-style-type: none"> 1. Whilkut: "Tch'wah'-I" (p. 35) 2. Loglangkok: "Ba-chen'-tel" (p. 38) 3. Coast Yurok (Ner'-er'-ner): "Tes-a'r" (p. 51) 4. Wiyot: "He-wo'-li" (p. 52) 5. Wappo (Mi-yah-kah-mah): "Ma'-nah ow'-we" (p. 57) 6. Northern Pomo (Ki'-yow'-bah): "Chin-nor" (p. 87) 7. Northern Pomo (Tah'-bah'-ta): "Kah-ke" (p. 89) 8. Central Pomo (Yo-ki'-ah) (12g) "Kah-ke'" (p. 91) 9. Central Pomo (Sho-ka'-ah) (12i) "Kaht'-ka" (p. 92) 10. Southern Pomo (Mah-kah-mo-chum'-mi): "tek'ke" (p. 94) - Note: this is the tribe that the "Trials of Young Hawk" story comes from 11. Coast Miwok (Hoo-koo-e-ko): "Kah-ka" (p.144) 	Merriam, C. Hart, 1977. <i>Indian Names for Plants and Animals Among Californian and Other Western North American Tribes</i> , Assembled and annotated by Robert F. Heizer, 1979. Ballena Press, Socorro, NM.
1923	The following Wailaki placename occurs under "Villages West Side of the Eel" section: "sa'kAntEtdAñ, 'beaver valley place.' About midway between the mouth of Blue Rock Cr. and Bell Springs Cr. on a fine large flat." (Page 172)	Baumhoff, Martin A. 1958. <i>California Athabascan Groups</i> , University of California Press, Berkeley, CA. This excerpt is credited as being drawn from Pliny E. Goddard's "The Habitat of the Wailaki," <i>American Archaeology and Ethnology</i> , 20:95-109, University of California, Berkeley, CA.
1940 (date story was recorded)	Southern Pomo storyteller Annie Burke of Cloverdale (Northern Sonoma County on the Russian River), speaker of the Makahmo "Salmonhole" dialect recounts "The Trials of Young Hawk." Robert Oswalt translates. This story features two beaver brothers that come to the assistance of Young Hawk.	Luthin, Herbert W. 2002. <i>Surviving Through the Days: Translations of Native California Stories and Songs</i> , University of California Press, Berkeley, CA.

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1944	Under his summary of hunting, "Beaver and dogs were not killed." (Page 163). Under the Wealth, Values, Trade, Transportation section, "A rich man owned hides of beaver, otter, mink, panther, bear and occasionally elk." (Page 173). In Appendix I The Huchnom, under Animals Killed for Food and Pelts, "Beaver: netted in water, shot with bow; good eating; skin saved for quivers."	Foster, George M., 1944. <i>A Summary of Yuki Culture</i> , Anthropological Records 5:3, University of California Press, Berkeley, CA.
POST CONTACT PLACE NAMES		
Date	Place	County
None known	Beaver Point south of Ft. Bragg, Beaver Creek and Beaver Glade Station (both on the Eel River)	Mendocino County

APPENDIX B

UTILIZATION OF BEAVER FOR WATERSHED RESTORATION AND CLIMATE CHANGE RESILIENCY IN THE WEST

Recognizing the importance and economic benefits of the ecosystem services beaver provide (Buckley et al. 2011), many State agencies and conservation organizations in the West have recently created programs, publications, management plans and even passed legislation to take advantage of the benefits beaver provide to humans and other species. By providing education and technical assistance to landowners and agencies, these efforts increase tolerance of beaver in appropriate habitat, protect existing beaver populations, promote non-lethal management strategies, and facilitate beaver relocation when other management strategies will not work. The following table highlights a few of these efforts:

Table 1B. Efforts to Promote and Utilize Benefits of Beaver

WASHINGTON	
The Lands Council Beaver Solution Spokane, WA	Program conducts education, advocacy, beaver relocation, beaver habitat planting. <i>An Innovative Solution for Water Storage and Increased Late Summer Flows in the Columbia River Basin</i> (2010)
The Methow Conservancy's Methow Beaver Project	Cooperative state and private partnership conducts education, beaver relocation
Washington State Legislature	House Bill 2349 (2012), bill to sustainably manage beaver towards improved water management
OREGON	
Wayne Hoffman (MidCoast Watersheds Council) and Fran Recht (Pacific States Marine Fisheries Commission)	Background paper entitled <i>Beavers and Conservation in Oregon Coastal Watersheds</i> (2013)
Oregon Department of Fish and Wildlife (ODFW)	<i>Guidelines for Relocation of Beaver In Oregon</i> (2012)
Mark D. Needham and Anita T. Morzillo for the ODFW and the Oregon Watershed Enhancement Board	<i>Landowner incentives and Tolerances for Managing Beaver Impacts in Oregon Report</i> (2011)
Dana Sanchez on behalf of the ODFW's Beaver Working Group	Annotated Beaver Bibliography (2008)
UTAH	
Utah Division of Wildlife Resources	<i>Utah Beaver Management Plan 2010 – 2020</i> (2010)
Grand Canyon Trust with Utah State University Watershed Sciences	Beaver Rapid Assessment Tool (BRAT) to identify priority sites for beaver restoration
ECONorthwest (Buckley et al.), Portland OR on behalf of The Grand Canyon Trust	<i>The Economic Value of Beaver Ecosystem Services: Escalante River Basin, Utah</i> (2011)
NEW MEXICO	
Cathryn Wild, Seventh Generation Institute	<i>Beaver as a Climate Change Adaptation Tool: Concepts and Priority Sites in New Mexico</i> (2011)

COLORADO	
Sherrie Tippie, Wildlife 2000	<i>Working With Beaver For Better Habitat Naturally!</i> (2010)
MULTI-STATE COLLABORATIONS	
WildEarth Guardians, The Grand Canyon Trust and The Lands Council	<i>Beaver and Climate Change Adaptation in North America: A Simple, Cost-Effective Strategy for the National Forest System</i> (2011)

At the Federal level, agencies such as the National Oceanic and Atmospheric Administration (NOAA) are recognizing the potential benefits of beaver to salmonids. Scientists from NOAA's Northwest Fisheries Science Center are currently conducting an innovative multi-year study in Oregon's Bridge Creek to assess the potential for accelerating incised channel restoration and Steelhead (*Oncorhynchus mykiss*) recovery through human-assisted beaver damming. While still in progress, this cost-effective technique is being met with favorable initial results. Steelhead habitat is significantly improving through beaver dam induced aggradation of incised reaches and increases in pool habitat and floodplain connectivity (Pollock et al., 2012).

NOAA's National Marine Fisheries Service's final Central California Coast (CCC) Evolutionarily Significant Unit and draft Southern Oregon and Northern California Coast (SONCC) Evolutionarily Significant Unit coho salmon Recovery Plans contain language acknowledging the benefits of beaver to coho salmon (NMFS 2012 a and 2012b). For a summary of the CCC recommendations regarding beaver and coho salmon recovery, see appendix D.

Such efforts across the west and in areas where coho salmon occur indicate that there is a growing movement of agencies, non-profits and citizens interested in working with beaver to restore watersheds, recover endangered species and improve climate change preparedness. California is uniquely poised to draw the best from these efforts and create innovative policy to protect current beaver populations and support their greater utilization in restoration efforts.

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Methow Conservancy, Methow Beaver Project, WA.

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APPENDIX C

SUMMARY OF ECOSYSTEM SERVICES PROVIDED BY BEAVER

By Dr. Jeff Baldwin, Professor, Sonoma State University

Additional ecosystem services:	
In situ climate change mitigation	<p>Carbon sequestration:</p> <ul style="list-style-type: none">- In ponds 2-35 times more carbon, retained up to 6 times longer than in beaver absent stream reaches (Naiman, Johnson and Kelly 1988)- In wetland soils formed behind dams (Varekamp 2006)- In standing biomass, enhanced by soil nitrogen accumulation in ponds and wet meadows (Naiman, Johnson, and Kelly 1988)
Downstream climate change mitigation of risks identified by <i>The Oregon Climate Change Adaptation Framework</i> (AFWG 2010)	<ul style="list-style-type: none">- Ponds and charged local aquifers on average store about six acre feet of water (Müller-Schwarze and Sun, 2003). Beaver could help mitigate on-going loss of winter snowpacks and counteract decreasing summer stream flows- Decrease fire hazard by extending wetted riparian zones, approximately 10 ha per dam/pond (Westbrook <i>et al.</i> 2006)- Decrease wet season flooding (Hey and Philippi 1995)
Sediment sequestration	<p>Ponds accumulate significant amounts of sediment (Pollack et al. 2007), decreasing siltation downstream while producing agriculturally valuable land (Kramer, Wohl, and Harry 2012)</p>
Habitat enhancement	<p>Increased beaver presence would enhance habitat for 11 of the 62 bird, 2 of the 5 reptile, 17 of the 18 amphibian, and 20 of the 30 fish species listed for special treatment in the <i>Oregon Conservation Strategy</i> (ODFW 2006)</p>

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APPENDIX D

Summary of the inclusion of beaver (*castor canadensis*) in the Final Recovery Plan for the Central California Coast coho salmon ESU

“Central California Coast (CCC) Evolutionarily Significant Unit (ESU) coho salmon are listed as an endangered species under the Federal Endangered Species Act (ESA) due to a precipitous and ongoing decline in their population. Since their initial listing in 1996 by NOAA’s National Marine Fisheries Service (NMFS), the population has continued to decline and the species is now very close to extinction. Under the ESA, a recovery plan (which is a non-regulatory document) must be developed and implemented for threatened or endangered species. The purpose of recovery plans is to provide a road map that focuses and prioritizes threat abatement and restoration actions necessary to recover, and eventually delist, a species” (excerpted from the Executive Summary, page v. Volume I).

In early 2012, the Occidental Arts and Ecology Center’s WATER Institute and other colleagues working with beaver and salmonids, were contacted by National Marine Fisheries Service (NMFS) staff to contribute to and review draft language that explained the potential benefits of beaver to coho and what specific actions needed to be implemented to support their inclusion as a legitimate partner in coho recovery. It is significant that this agency is acknowledging the value of beaver to coho salmon as it was not too long ago that beaver were still considered an impediment to salmonid recovery. The final draft in its entirety can be found at: <http://swr.nmfs.noaa.gov/recovery/>.

In an effort to make this language more available to those interested in learning about what recommendations were made with regards to beaver and coho recovery we have gone through all three volumes (a total of 2,009 pages) and excerpted every section in which beaver language occurs throughout the document. See below for excerpts:

- **From Volume I: Recovery Plan, chapter 3, Overview of the CCC Coho salmon ESU in the introduction of the Life History Strategy, section 3.4 page 65-66:**

“Beaver (*Castor canadensis*) ponds have been shown to provide excellent winter and summer rearing habitat (Reeves *et al.* 1989; Pollock *et al.* 2004). Recent studies in the Lower Klamath, Middle Klamath and Shasta sub-basins confirm that beaver ponds provide high quality summer and winter rearing habitat for coho salmon (Chesney *et al.* 2009; Silloway 2010). The suitability of many coastal streams in the CCC coho salmon ESU to support beavers is unknown due in part to higher gradient redwood dominated riparian areas which may be less suitable than lower gradient stream with deciduous dominated riparian zones.”

- **From Volume I: Recovery Plan, chapter 3 (Coho Salmon Life History), section 3.4 (Overview of the CCC Coho salmon ESU), subsection 3.4.2 (Life History Habitat Requirements), page 73:**

“Unfortunately, the habitat requirements for coho salmon in most streams in the CCC ESU are not at properly functioning conditions and their abundance has decreased, in large part, because the natural rates of critical watershed processes (*e.g.*, sediment delivery, hydrology, wood

recruitment, loss of beaver habitat, temperature regulation, *etc.*) have been substantially altered by human activities.”

- **From Volume I: Recovery Plan, chapter 3 (Coho Salmon Life History), section 3.4 (Overview of the CCC Coho salmon ESU), subsection 3.4.3 (Optimal Coho Freshwater Habitat and Current Conditions), under the unnumbered subsection (Deep complex pools formed by wood) page 75:**

“Beavers are also believed to play an important role in the formation of salmon habitat. The felling of trees by beavers increases woody debris, leading to increased invertebrate diversity and biomass, and the debris cover, provided by the lodge and food cache, has been shown to attract some fish species including salmonids (Collen and Gibson 2001). The presence of beaver dams reduces siltation of spawning gravels below the impoundment (Macdonald *et al.* 1995). The deeper water in beaver ponds provides important juvenile rearing habitat (Scruton *et al.* 1998), as well as important habitat for adults during the winter (Cunjak 1996) and in times of drought (Duncan 1984). With regards to coho salmon specifically, beaver ponds have been shown to provide excellent winter and summer rearing habitat (Reeves *et al.* 1989; Pollock *et al.* 2004). Recent studies in the Lower Klamath, Middle Klamath and Shasta sub-basins confirm that beaver ponds provide high quality summer and winter rearing habitat for coho salmon (Chesney *et al.* 2009; Silloway 2010).”

- **From Volume II: Results & Recovery Actions, ESU, Diversity Strata and Population Level Recovery Actions, Central CA Coast Coho Salmon – ESU Level Actions for Restoring Habitats, section 3 (Restoration – Habitat Complexity), Objective 3.1 (Address the present or threatened destruction, modification, or curtailment of habitat or range), Recovery Action 3.1.1 (Improve habitat complexity), page 5-6:**

“3.1.1.7. Action Step: Utilize non-lethal methods to manage beaver depredation issues (e.g. flooding, crop damage) within range of CCC salmonids such as flow devices, fencing, and beaver re-location and enhance habitat complexity.”

“3.1.1.8. Action Step: Where non-lethal methods prove unfeasible to resolve depredation issues, relocate beaver populations to remote CCC coho streams where habitat enhancement is needed and resource conflict is low.”

- **From Volume II: Results & Recovery Actions, ESU, Diversity Strata and Population Level Recovery Actions, Central CA Coast Coho Salmon – ESU Level Actions for Restoring Habitats, section 3 (Restoration – Habitat Complexity), Objective 3.2 (Address the inadequacy of existing regulatory mechanisms), Recovery Action 3.2.1 (Improve watershed conditions), page 6:**

“3.2.1.4. Action Step: Develop and update a Beaver Management Plan for California to benefit salmonids.”

“3.2.1.5. Action Step: Work with CDFG and the CDFG Commission to reclassify beaver from a ‘non-native nuisance’ animal to a ‘native non-nuisance’ animal.”

“3.2.1.6. Action Step: Work with CDFG and the CDFG Commission to modify Title 14 of the California code of Regulations to prohibit recreational hunting/trapping of beavers within all counties within the NCCC Recovery Domain.”

“3.2.1.7. Action Step: Work with CDFG and the CDFG Commission to remove beavers from CDFG’s list of depredated animals, and/or authorize only non-lethal management and relocation methods within the NCCC Recovery Domain.”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon – Navarro Pt. – Gualala Pt. Diversity Stratum (Actions for Restoring Habitats), Action 3 (Restoration – Habitat Complexity) Objective 3.1 (Address the present or threatened destruction, modification, or curtailment of the species habitat or range), Recovery Action 3.1.2. (Improve habitat complexity) page 45:**

“3.1.2.1. Action Step: Investigate the feasibility of beaver re-location and re-introduction to the Navarro River, Gualala River and Garcia River populations to promote channel complexity, improve baseflows and provide rearing habitat.”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon –Coastal Diversity Stratum (Actions for Restoring Habitats), Action 3 (Restoration – Habitat Complexity) Objective 3.1 (Address the present or threatened destruction, modification, or curtailment of the species habitat or range), Recovery Action 3.1.1. (Improve habitat complexity) page 51:**

“3.1.1.1. Action Step: To promote channel complexity, improve baseflows and provide rearing habitat investigate the feasibility of beaver re-location and re-introductions to Sonoma County (such as Austin, Green Valley, lower Russian River independent populations and Salmon Creek) and Marin County (such as Lagunitas, Pine Gulch, Redwood, and Walker Creek populations).”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon –Lagunitas Creek (Actions for Restoring Habitats), Action 3 (Restoration – Habitat Complexity) Objective 3.2 (Address other natural or manmade factors affecting the species’ continued existence), Recovery Action 3.2.1. (Improve habitat complexity) page 400:**

“3.2.1.1. Action Step: Evaluate the potential and specific locations (e.g. State and Federal lands) for the re-location and re-introduction of beaver populations.”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon – Pine Gulch Creek Illustration, Priority 2 & 3 (Long Term Restoration actions) Page 545:**

“Investigate the feasibility of beaver re-location and re-introductions.”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon –Redwood Creek (Actions for Restoring Habitats), Action 3 (Restoration – Habitat Complexity) Objective 3.1 (Address the present or threatened destruction, modification, or curtailment of the species habitat or range), Recovery Action 3.1.3. (Improve habitat complexity) page 609:**

“3.1.2.1. Action Step: Evaluate the potential and specific locations (e.g. State and Federal lands) for the re-location and re-introduction of beaver populations.”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon – Russian River Illustration, Priority 2 & 3 (Long Term Restoration actions) Page 636:**

“Investigate the feasibility of beaver re-location and re-introductions.”

- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon –Russian River (Actions for Restoring Habitats), Action 3 (Restoration – Habitat Complexity) Objective 3.2 (Address other natural or manmade factors affecting the species’ continued existence), Recovery Action 3.2.1. (Improve habitat complexity) page 649:**

 “3.1.1.1. Action Step: Investigate the feasibility of beaver re-location and re-introductions to Sonoma (especially Austin, Green Valley, lower Russian River independent populations and Salmon Creek) to promote channel complexity, improve baseflows and provide rearing habitat.”
- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon – Salmon Creek Illustration, Priority 2 & 3 (Long Term Restoration actions) Page 700:**

 “Investigate the feasibility of beaver re-location and re-introductions to promote channel complexity, improve baseflows and provide rearing habitat.”
- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon – Salmon Creek (Actions for Restoring Habitats), Action 3 (Restoration – Habitat Complexity) Objective 3.3 (Address other natural or manmade factors affecting the species’ continued existence), Recovery Action 3.3.1. (Improve habitat complexity) page 649:**

 “3.3.1.1. Action Step: “Investigate the feasibility of beaver re-location and re-introductions to promote channel complexity, improve baseflows and provide rearing habitat.”
- **From Volume II: Results & Recovery Actions, Central CA Coast Coho Salmon – Ten Mile River (Actions for Restoring Habitats), Action 2 (Restoration – Floodplain Connectivity) Objective 2.1 (Address the present or threatened destruction, modification, or curtailment of the species habitat or range), Recovery Action 2.1.1. (Increase and enhance velocity refuge) page 1027:**

 “3.3.1.1. Action Step: Existing beaver habitat should be protected, and issues related to flooding resolved without the removal of beaver habitat (e.g. flow reduction devices, etc.).”



APPENDIX E

CURRENT AND HISTORIC DISTRIBUTION OF BEAVER IN CALIFORNIA

Knowing where North American beaver (*Castor canadensis*) currently occur in California could support the management of populations across the state. Knowing how stable and numerous the populations are across the state could inform current beaver trapping regulations and depredation decisions. This information could help wildlife managers identify and protect beaver populations that fall within priority coho salmon watersheds.

The private freshwater ecosystem consulting firm Riverbend Sciences created the “Beaver Mapper” in 2011 to provide researchers access to information on more current distribution data for beaver in California and Oregon (www.riverbendsci.com/projects/beavers). This is an interactive web-based tool that enlists the support of citizen-scientists to collect and input data on current sightings. Watershed-scale summaries are available to the public and point-specific locations are password protected. This new project would benefit from greater public participation and funding to help complete the data set.

Overlaying the Beaver Mapper’s current distribution data with the boundaries of the Southern Oregon Northern California Coast (SONCC) and Central California Coast (CCC) Evolutionarily Significant Units (ESUs) for coho salmon, we identified beaver populations in 15 watersheds (USGS fifth field hydrologic Unit Code (HUC)) (see Table 1E and Figures 1E and 2E).

Table 1E. Current sightings of beaver in California within study area - SONCC and CCC ESUs south of the Klamath (Riverbend Sciences 2013)

WATERSHED	SUBTRIBUTARY OF	COUNTY
Redwood Creek		Humboldt
Lower Mad River		Humboldt
Little River		Humboldt
Upper South Fork Eel River		Mendocino
Outlet Creek	Eel River	Mendocino
Bucknell Creek	Eel River	Mendocino
Noyo River*		Mendocino
Big River		Mendocino
Mark West Creek [Santa Rosa Creek]	Russian River	Sonoma
Sonoma Creek – Frontal San Pablo Bay Estuaries		Sonoma
Napa River		Napa
San Pablo Bay		Marin, Sonoma, Contra Costa and Solano
Pescadero Creek		Santa Cruz and San Mateo
Saratoga Creek – Frontal San Francisco Bay Estuaries		Santa Clara
Guadalupe River – Frontal San Francisco Bay Estuaries		Santa Clara

* Beaver on the Noyo River have not been reported to the administrator of the Beaver Mapper since 2000.

Distribution of Beavers in the California Portion of the SONCC Coho ESU

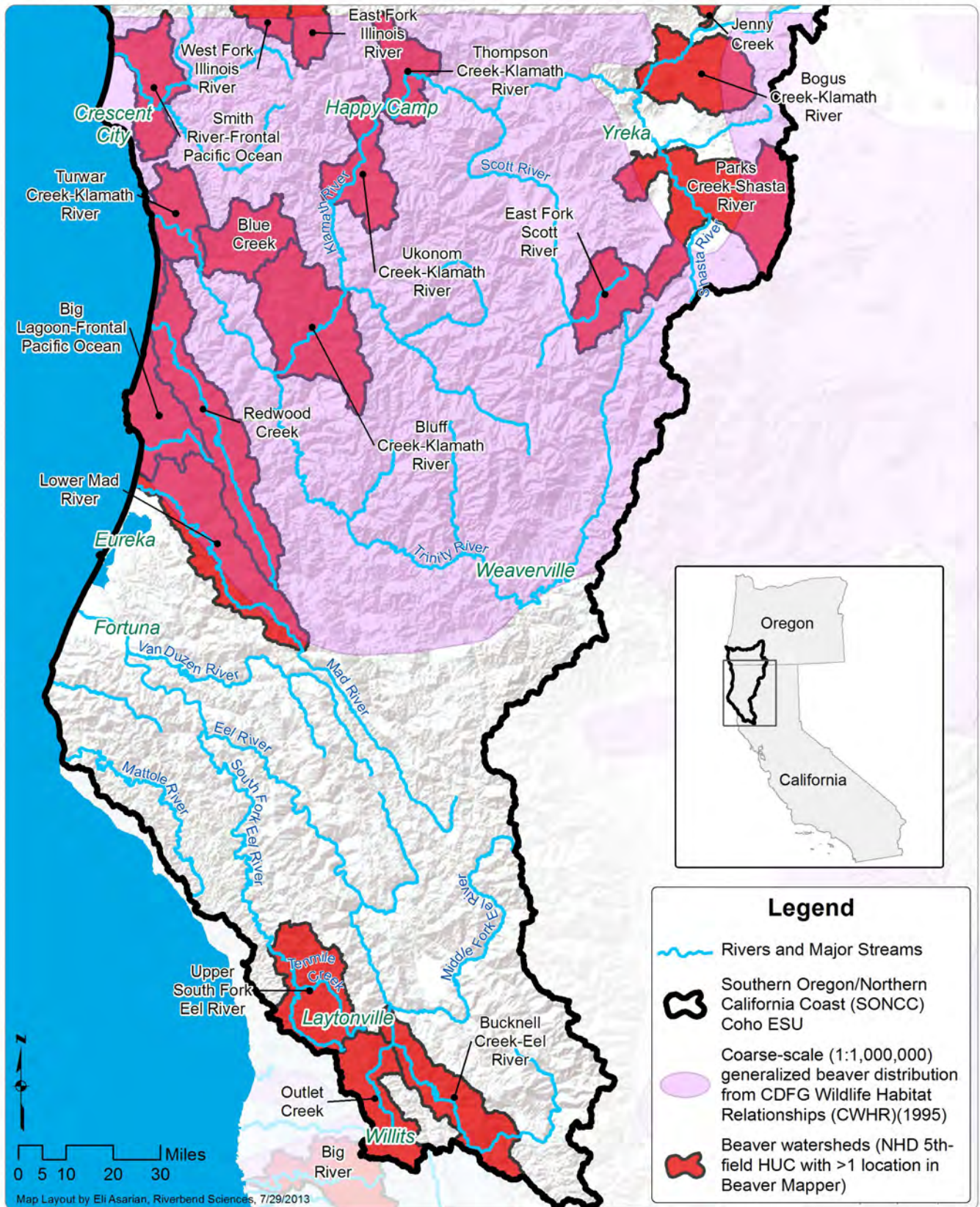


Figure 1E. Current Distribution of Beaver in the SONCC. Note: Data is not complete in the Klamath Basin. Riverbend Sciences 2013.

Distribution of Beavers in the Central California Coast (CCC) Coho ESU

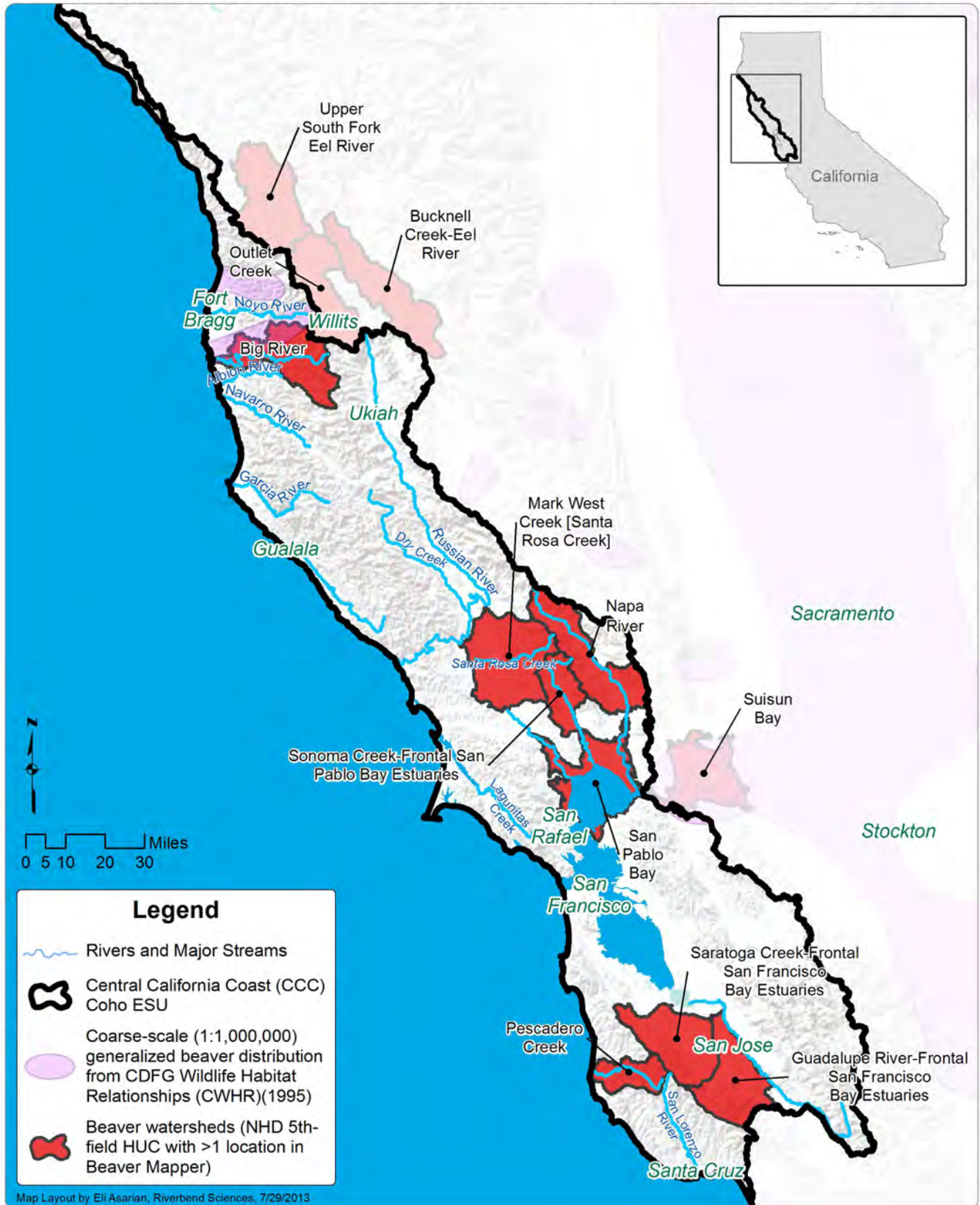
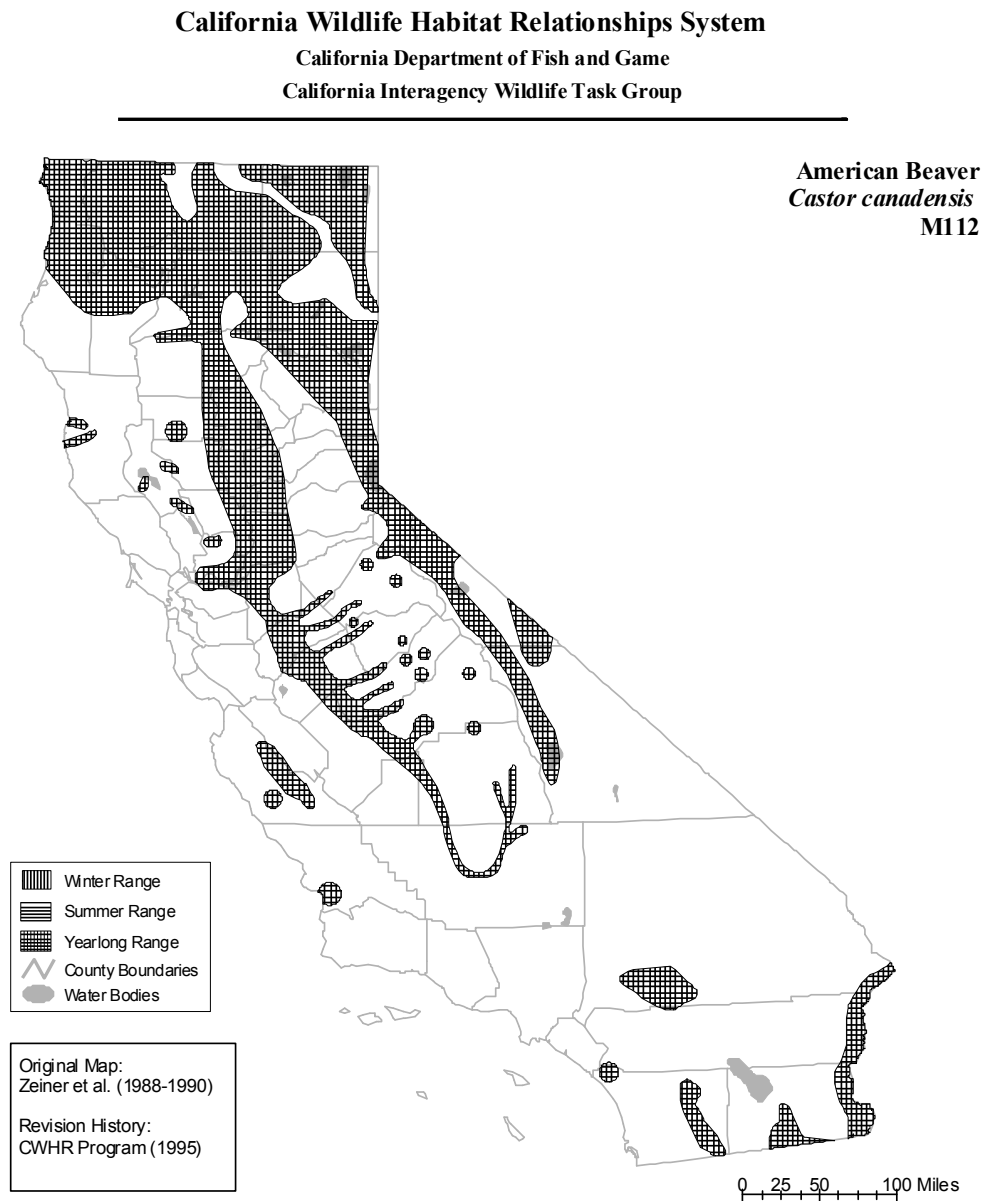


Figure 2E. Current Distribution of Beaver in the CCC. Riverbend Sciences 2013.

The following map is the only other known attempt to characterize current beaver populations in California (Figure 3E). This was generated by the California Department of Fish and Game to describe beavers' current distribution (Zeiner et al. 1990). There is no mention of total current population numbers in this reference.



Range maps are based on available occurrence data and professional knowledge. They represent current, but not historic or potential, range. Unless otherwise noted above, maps were originally published in Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California. Updates are noted in maps that have been added or edited since original publication.

Figure 3E. California Wildlife Habitat Relationships (CWHR) System distribution map last updated in 1995 (Zeiner et al. 1990)

There are not many current distribution maps for beaver in California. The following two maps (Figures 4E and 5E) published in Donald Tappe's *The Status of Beavers in California* report (1942) and Joseph Grinnell et al.'s *Fur Bearing Mammals of California* (1937) were generated at a time when the total population was estimated at 1300 beavers statewide.

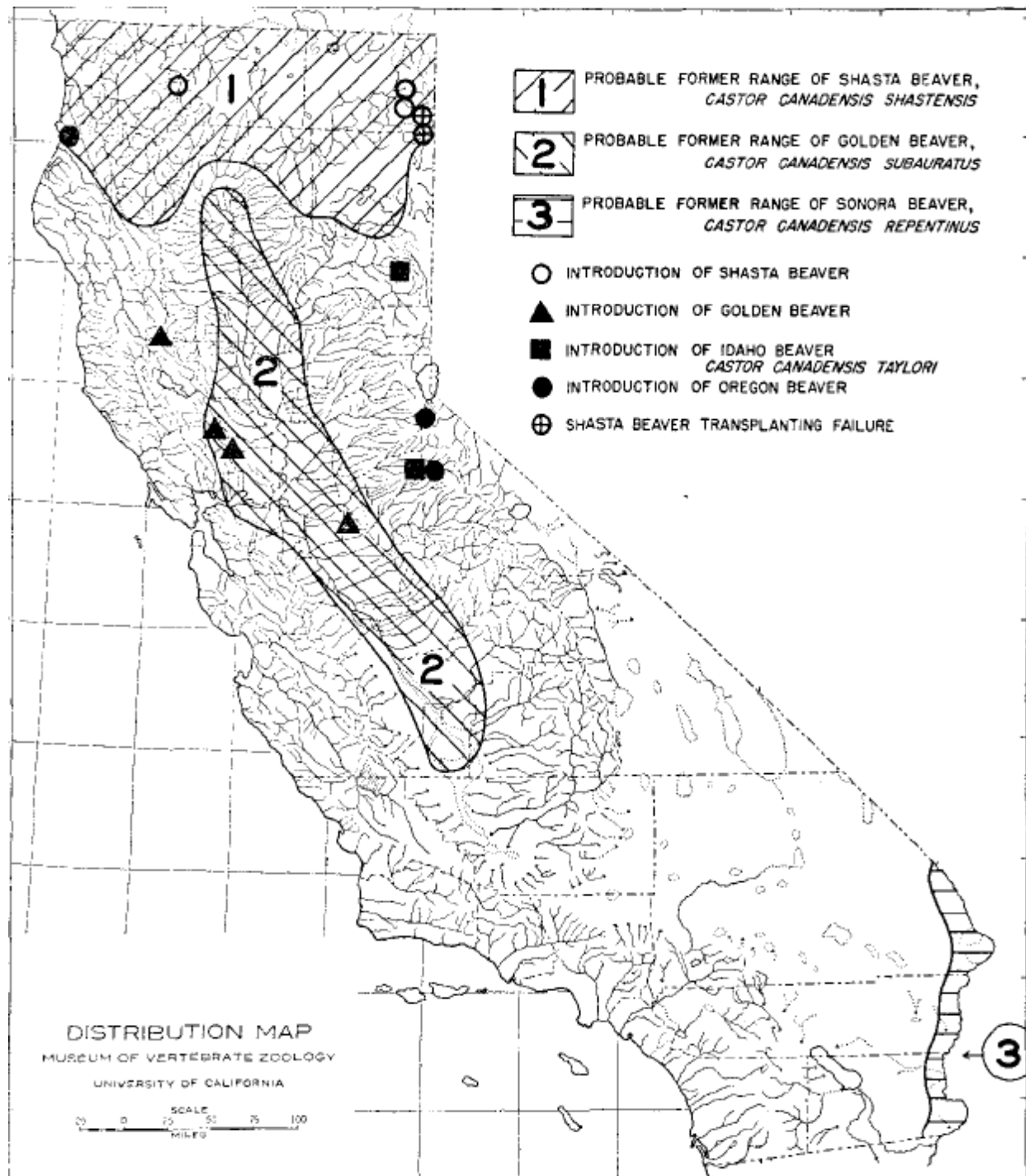


Figure 4E. Probable Former Range of beaver map from Donald Tappe's *The Status of Beavers in California* Report (1942).

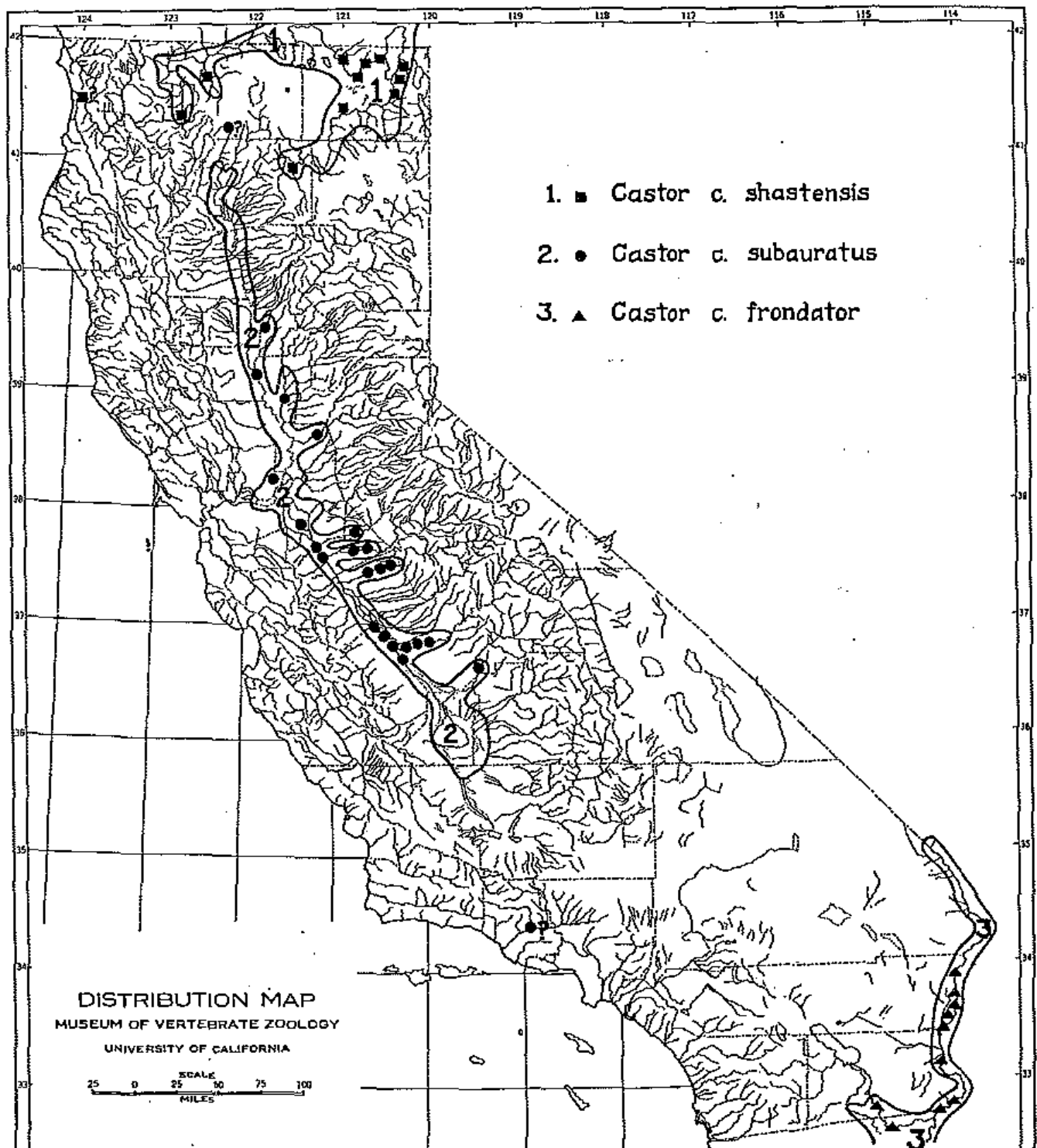


Figure 5E. "Assumed Former General Range of Beavers" map from Joseph Grinnell's *Fur-bearing Mammals of California* vol. II (1937)

The following excerpt and map (Figure 6E) from a biennial Report of the Fish and Game Commission is the earliest discussion we could find regarding the status of beaver in California. In his report from the Bureau of Education, Publicity and Research, Harold C. Bryant reports (1916:111):

“The present status of the beaver in California, according to data gathered in this office, is precarious. Colonies of this valuable furbearer are few at the present time, and give promise of becoming even more scarce. The Hudson Bay Company, when operating in California, beginning in 1828, secured thousands of beaver skins each year, and thereafter considerable numbers were taken each year by trappers. Since 1911, however, it has been necessary to give total protection to this animal, but even thus protected beavers do not seem to have increased to any considerable extent. The few scattered localities in which colonies are now to be found are shown on the accompanying map. In the San Joaquin and Sacramento river basins, where beaver are most abundant, reclamation projects are fast driving them to starvation, or to more limited quarters. The total extirpation of the beaver in California is not far distant unless further measures are taken for its protection.”

REFERENCES:

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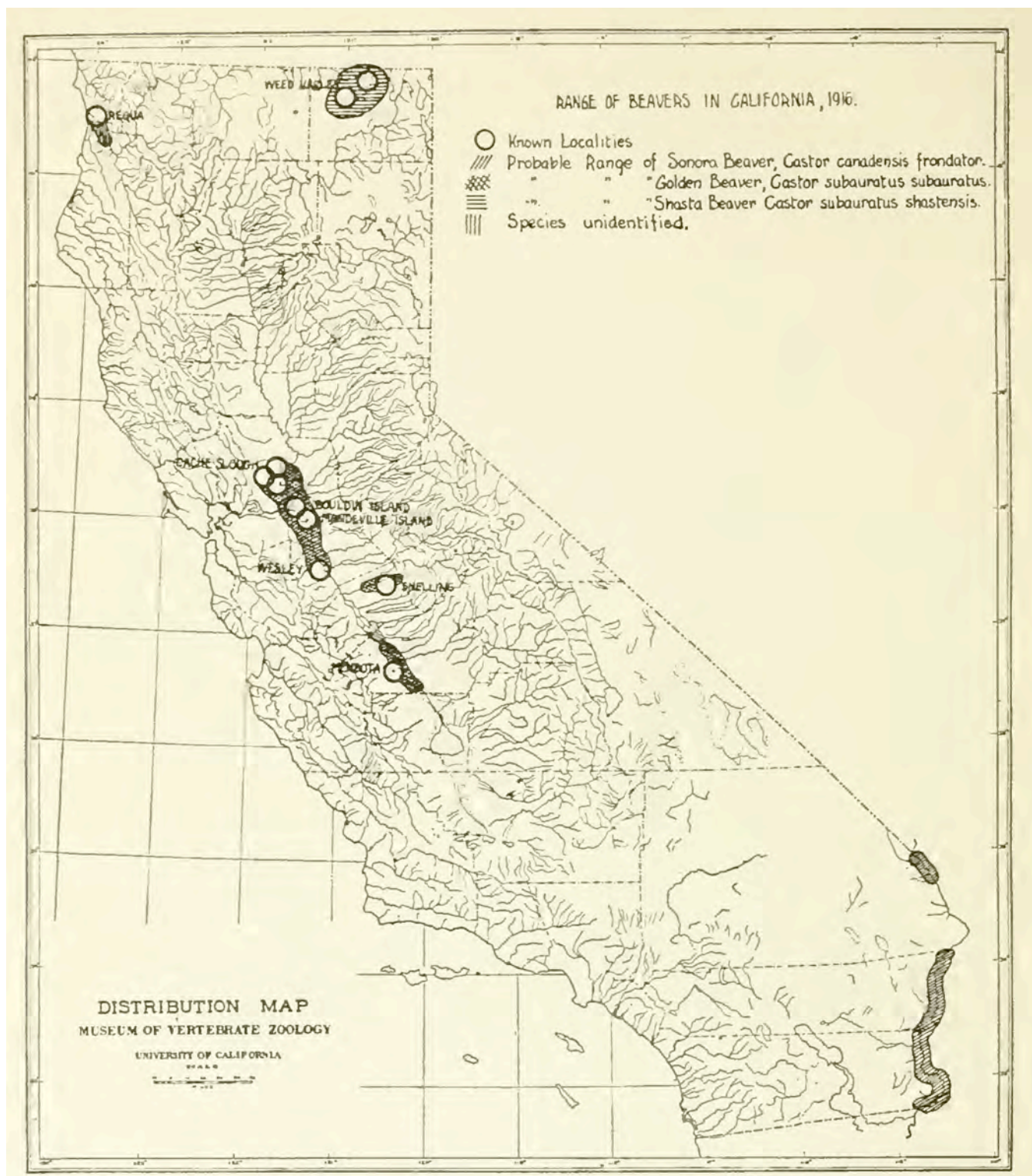


Figure 6E. 1916 map of beaver distribution in California by Harold C. Bryant

APPENDIX F

HISTORY OF BEAVER PLANTING IN CALIFORNIA

In an attempt to differentiate between current populations that have persisted indefinitely, and those that were planted, we conducted a thorough search of the literature and state archives to determine where beaver were planted within the historical range of coho salmon on the coast of California from the Klamath River to the Monterey Bay including the San Francisco Bay. We were unable to find a single-source reference that contains all beaver planting records for the State of California to date. While published data can be found for the years 1923 - 1946 (Hensley 1946) this record is incomplete because the planting program continued until 1950.

By querying the Online Archives of California we discovered records from the Pittman-Robertson Act Project 18D that contained records on planting locations from 1934-1946 and beaver planting and trapping in 1948. We also made a Public Records Act request to the California Department of Fish and Wildlife and were provided a summary on “Beaver Live Trapping and Transplanting,” a final report letter (Lynn 1950), a detailed official list of planting records from 1923-1949 and a description of the 1950’s parachute used to plant beaver into Eldorado County. We also found a 1950 letter on California Division of Fish and Game letterhead that describes two plantings in Big River, Mendocino County in 1937 and 1941 (Sturgeon 1950). See the end of this appendix for copies of these documents. While the 1941 plant is reflected in the record, the plant into Two Log Creek in 1937 was not reflected in this list. The latest date for plants we came across was 1950. While there are more recent incidences of beaver plantings such as those placed in Coyote Creek in Santa Clara County in the 1990’s, we were not able to find a State record for this. Of all reported beaver plantings across the State the following table lists those that were relocated to areas within the two coho salmon ESU boundaries south of the Klamath.

Table 1F. Beavers planted within coho salmon ESU ranges south of the Klamath.

Source: Tappe (1942), Hensley (1946), plants in Big River letter (Sturgeon 1950) and unpublished CA Division of Fish and Game “Beaver Plants in California” summary (author unknown).

DATE OF PLANT	TOTAL	COUNTY TRAPPED	COUNTY PLANTED	LOCATION OF PLANT
1937	?	Unknown	Mendocino	Big River (Two Log Creek)
1939	5	Bridge Creek, Wheeler Co., OR	Humboldt	Little River (near Crannel)
1940	6	Merced	Lake	Rice Creek, Eel River (near Lake Pillsbury)
1941	5	Yuba	Mendocino	Big River (outside of the town of Mendocino)
1942	4	Merced	San Mateo	Butano Creek (tributary of Pescadero)
1946	2	Humboldt	Humboldt	Lost Man Creek (tributary of Redwood Creek)
1946	4	Humboldt	Humboldt	Prairie Creek (tributary of Redwood Creek)
1946	4	Humboldt	Humboldt	North Fork Mad River
1947	5	Merced	San Mateo	Frenchman’s Creek
1947	4	Merced	Marin	Glenbrook Creek

Of all the plantings done, according to the Beaver Mapper (www.riverbendsci.com/beaver), beaver continue to persist in all of these watersheds except Frenchman's and Glenbrook. We presume that those planted in the North fork of the Mad River dispersed to the lower Mad, those in Prairie and Lost Man creeks dispersed into the upper reaches of Redwood Creek and those from Rice Creek dispersed to the upper south fork of the Eel River, Outlet and Bucknell Creeks.

The following two maps illustrate where beaver were planted across the State. The California Division of Fish and Game published this first map in 1946 (Figure 1F). This map was generated before the plants made in 1946 from Table 1F above and thus does not include them.

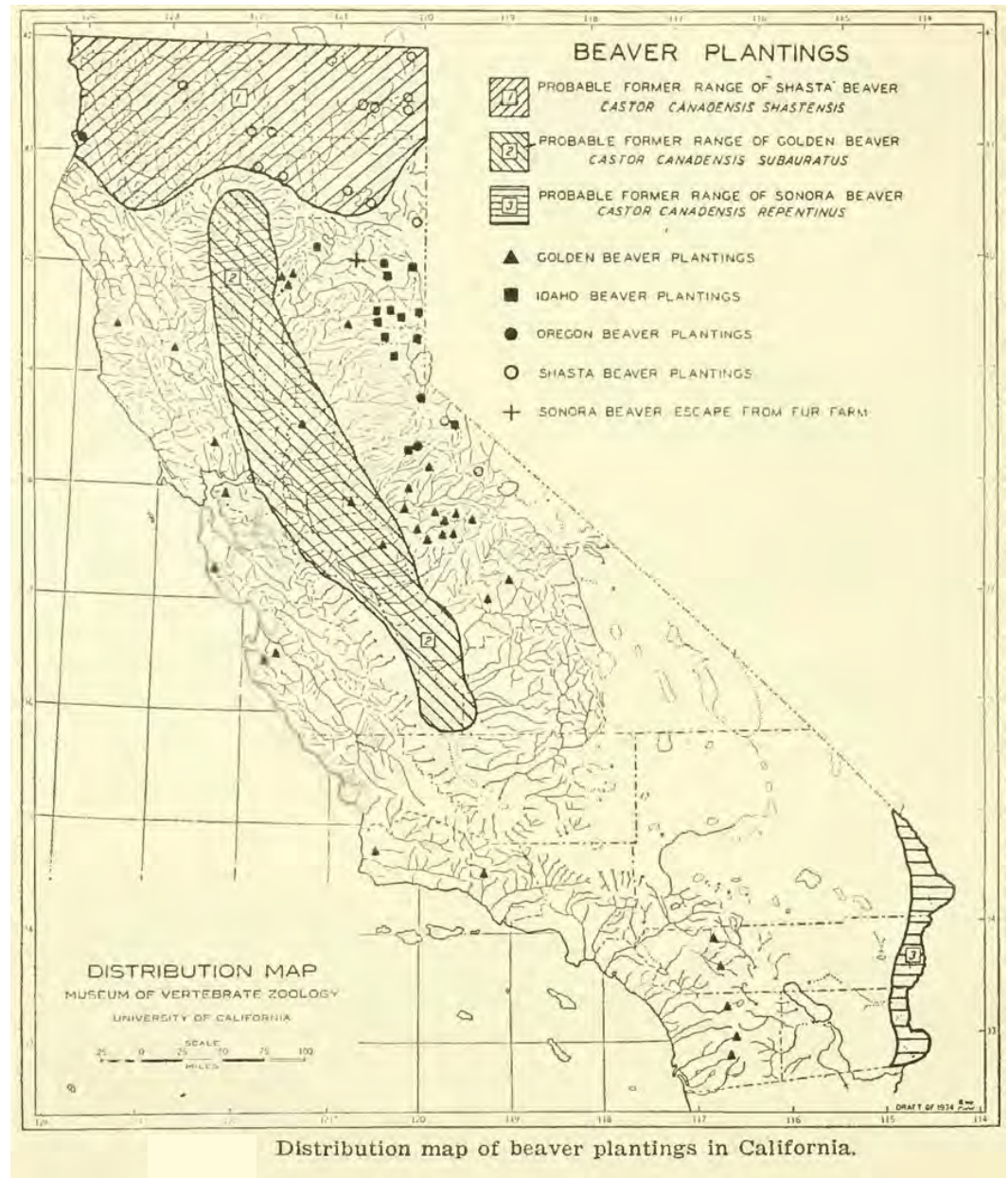


Figure 1F. Map of beaver plantings from Hensley's (1946) A *Progress Report on Beaver Management in California*

This next map was acquired through a public records request and includes plantings up to 1950. It is interesting to note that there are two "dots" within the CCC coho salmon ESU in Santa Cruz County and Alameda County. We could find no record of these plantings, nor are there any known colonies of beavers currently occurring in those counties.

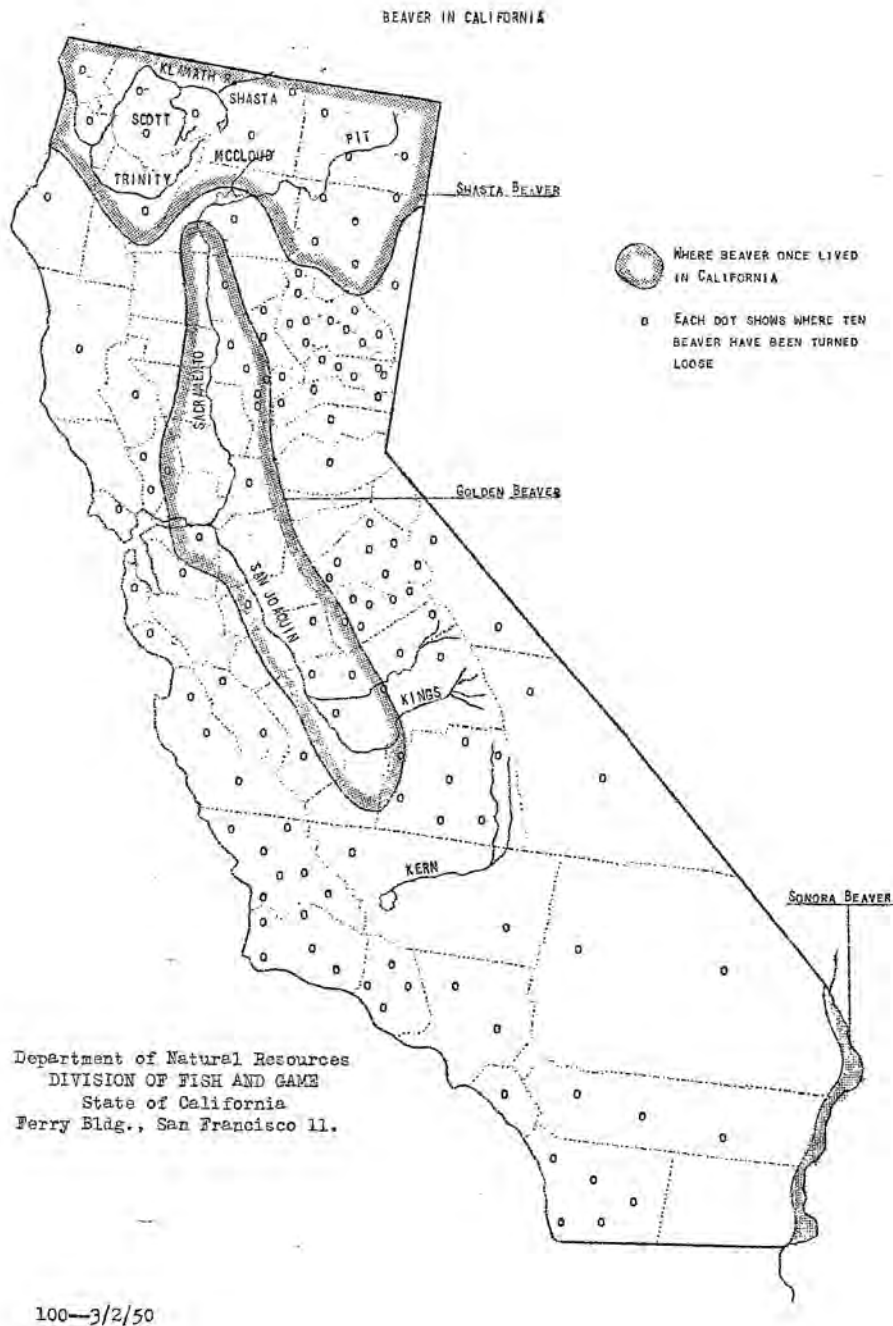


Figure 2F. Unpublished beaver planting map by the Division of Fish and Game from 1950. Author unknown.

This map ultimately illustrates just how extensive this planting program was. Without these efforts of the Division of Fish and Game, there would be far fewer beaver restored to what we now believe to be their former range. Evidence of the historic occurrence of beaver in the north coast suggests that it would be worthwhile for the Department of Fish and Wildlife to consider planting beaver in appropriate watersheds.

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ANNON. CA 1950

BEAVER LIVE TRAPPING AND TRANSPLANTING - REVIEW
1923 - 1950

The first beaver transplanting in California occurred in 1923, as an accidental escape of 23 beaver from a fur farm in Genesee into Indian Creek, Plumas County. According to the records these were Sonora beaver (*C. C. frondator*) from Riverside County.

The first authorized plants were made by the U. S. Forest Service in 1934. These were C. C. Taylor introduced from the Snake River in Idaho. One plant of two pair was made in Roland Creek, Plumas County, and another plant of two pair in Wheats Creek, Tuolumne County. The plant in Roland Creek was very successful, due possibly to the exceedingly favorable habitat and the adaptability of the Idaho beaver to high altitudes. More than 200 beaver - 178 at the end of 1949 - have been live trapped and transplanted from Plumas County to other water sheds in the State, and practically all of the streams adjacent to the original plant in the Plumas County are now stocked with beaver through natural migration. No beaver have been live trapped from the Tuolumne County plant but recent checks show that here to there has been considerable migration into adjacent waters.

The Bureau of Game Conservation beaver program developed as a result of a fur survey in which Gordon True, Donald Tappe, Howard Twining, Arthur Hensley, and George Seymour participated. This was in the early 1940's.

In 1942, according to Tappe, the beaver population was estimated at 1,300 animals in the entire State. (Est. 20,000 now.)

It was decided that a program of live trapping and transplanting would be beneficial, not only to the preservation of a valuable fur-bearing species which was on the way to extinction, but also in the removal of nuisance beaver from agricultural areas to mountainous regions where their work might prove beneficial to Fish and Game; also, as a soil erosion control measure and provide an additional supply of water and green forage for livestock and game through the dry months, and perhaps in time a fur crop.

About all these beaver pioneers had to work with was the old model Bailey beaver live trap, burlap bags, and the "tandex tail hold." Why there weren't more injuries to both the workers and the beaver is hard to understand.

Although experimental beaver plants were made by the U. S. Forest Service and the Division of Fish and Game as early as 1934, a large scale program was not launched until 1945, when Bill and Alfretta Pollard were employed on full time beaver work by the Bureau of Game Conservation.

Specifications and instructions for building holding pens, transportation boxes, nets, etc., was obtained from the Oregon Game Department. The method of external sexing now in use was perfected by Pollard and Hensley.

Methods of feeding holding, transporting, trapping, etc. were improved by field personnel as time went on.

Everyone who worked on the beaver project added something in the way of improvement until today we are able to transport and transplatn beaver from Northern California to the southern most portions of the State by plane and parachute in a matter of only a few hours, and at an average cost of less than \$10 per animal planted.

The idea of planting beaver by means of expendable parachute was first conceived by Elmo Heater and Ival Sies of the X Idaho Game Department. After experiments in the use of using burlap chutes was abandoned. However, they did successfully plant beaver by means of silk chutes. The cost of such chutes when not retirievable made their use prohibitive. A wooden box which opened under elastic tension was used as a conveyor for the beaver by the Idaho men.

After the 1949 live trapping season, Mr. Glading assigned me to the task of figuring out a practical method of planting beaver from the air. With the cooperation of the U. S. Forest Service we were able to fulfill the assignment. The experimental drops were made at Eagle Field, Dos Palos, on May 16, 1950. This experiment was so successful that it was decided to use this method of planting beaver. During the 1950 season 24 animals were successfully planted in Eldorado County by means of 10 x 10' burlap cargo chutes.

Beaver Population Estimates

1942 - (1300 Tappe)	Young	Yearlings	Adults
1942	500	300	500
1943	500	500	800
1944	800	500	1300
1945	1300	800	1800
1946	1800	1300	2600
1947	2600	1800	3900
1948	3900	2600	5700
1949	5700	3900	8300
1950	8300	5700	12200

Total Population 1950 estimate at 20,000

all

FINAL REPORT

PROJECT CALIFORNIA 34-D-2

"BEAVER TRANSPLANTING"

SUBMITTED BY:

APPROVED BY:

A. V. Lynn
Project Leader

Ben Glading, Chief
Bureau of Game Conservation
California Division of Fish and Game

MAY 1, 1941 — OCT 31, 1949

The beaver live-trapping and transplanting program began on May 1, 1949, and closed on October 31, 1949.

Personnel engaged on the Project through Federal Aid funds consisted of three Hunters and Trappers and one Game Conservation Aid. These were divided into two crews; each crew was assigned a district as follows:

Southern California - William A. Pollard, Hunter and Trapper, in charge and Alfaretta Pollard, Hunter and Trapper, as assistant.

Northern California - A. V. Lynn, Hunter and Trapper, in charge and Frank Brown, Game Conservation Aid, as assistant.

In addition to the above personnel, the Project was assisted at times by other members of the Division of Fish and Game and cooperating agencies, principally the U. S. Forest Service, U. S. Soil Conservation Service, and organized Sportsmen's groups.

At the close of the Project all equipment was stored in the PR warehouse near Fresno.

During the season a float device was constructed to permit the setting of the Bailey beaver live-trap in deep water and in places where there was considerable fluctuation. Experiments with this device proved it to be effective in catching beaver in places where heretofore it was impossible.

A total of 328 beaver were live-trapped; 34 beaver died from injury, exposure or extreme heat; 4 were released, these consisted of kits to young to be transplanted or lactating females; 290 beaver were divided into 54 plants and planted in good condition as follows:

DISPOSITION

Total number of beaver trapped.....	328
" " " " transplanted.....	290
" " " " lost.....	34
" " " " released.....	4
" " " " male.....	153
" " " " Female.....	171
" " " " not sexed.....	4
" " " " donated.....	2

(Two beaver were donated to the Santa Barbara County Fair and were planted in Jackson Creek, Santa Barbara County, by Warden H. L. Lantis when the fair was over.)

The following counties received beaver plants:

<u>COUNTY</u>	<u>NO. OF PLANTS</u>	<u>NO. OF BEAVER</u>
Lassen	2	11
Siskiyou	5	28
Monterey	1	4

(continued)

<u>COUNTY</u>	<u>NO. OF PLANTS</u>	<u>NO. OF BEAVER</u>
San Luis Obispo	3	14
Tulare	13	65
Orange	1	6
Los Angeles	3	18
Riverside	3	16
Kern	3	17
Yuba	2	30
Tehama	1	3
El Dorado	1	4
Santa Barbara	1	2
Modoc	1	7
Plumas	2	9
Sierra	2	6
Inyo	2	9
Ventura	2	11
San Diego	3	17
Fresno	2	9
Nevada	1	4
Total	54	290

BEAVER PLANTS IN CALIFORNIA
PRIOR TO 1945

DATE OF PLANT	SUB-SPECIES	MALE	FEMALE	UNKNOWN	TOTAL No.	COUNTY TRAPPED	COUNTY PLANTED	LOCATION OF PLANT	FOODS	ELEVATION	BY WHOM PLANTED
✓ 9-3-23	SONORA			23	23	RIVERSIDE	PLUMAS	INDIAN CREEK	PEN FED	3,500'	STANFORD
✓ 8-27-34	IDAHO	2	2		4	BLAINE COUNTY, IDAHO	PLUMAS	ROWLAND CREEK	ASPEN, WILLOW	6,000'	U.S.F.S., BEARD, WOODS
✓ 9-15-34	IDAHO	2	2		4	BLAINE COUNTY, IDAHO	TUOLUMNE	WHEATS CREEK	ASPEN, WILLOW, ALDER	6,600'	U.S.F.S., KENNEY
✓ 9-22-36	SHASTA	1	3		4	MODOC	SISKIYOU	SCOTT VALLEY	WILLOW, CHOKE CHERRY	2,800'	D.F. & G., STARR, JORDAN
✓ 8-30-40	SHASTA			3	3	MODOC	SISKIYOU	SCOTT VALLEY	WILLOW, CHOKE CHERRY	2,800'	U.S.F.S., DeCAMP
✓ 9-11-36	SHASTA			4	4	MODOC	MODOC	PINE CREEK	ASPEN, WILLOW	6,700'	U.S.F.S., NOREN
✓ 9-5-36	SHASTA	2		4	6	MODOC	MODOC	EAST CREEK	ASPEN, WILLOW	6,700'	U.S.F.S., NOREN
✓ 10-17-36	SHASTA		1	4	5	MODOC	MODOC	BEAR CREEK	ASPEN, WILLOW, COTTONWOOD, W. BIRCH	6,500'	U.S.F.S., NOREN
8-27-38	PACIFIC			4	4	CROOKED RIVER, OREGON	MODOC Tuolumne	DARDANELLE CREEK	ASPEN, WILLOW, ALDER	6,700'	U.S.F.S., KENNEY
8-27-38	PACIFIC			4	4	ROGUE RIVER, OREGON	MODOC Eldorado	MEISS MEADOW, TRUCKEE RIVER	ASPEN, WILLOW, ALDER	8,200'	U.S.F.S., MORRIS
✓ 8-29-38	GOLDEN			7	7	SAN JOAQUIN	STANISLAUS	LITTLEJOHNS CREEK	WILLOW	140'	CALIF. HIGHWAY PATROL, CAPT. DRIAS
✓ 9-15-38	GOLDEN			29	29	SAN JOAQUIN	NAPA	PUTAH CREEK	WILLOW, COTTONWOOD	300'	D.F. & G., HENSLEY, BERRY
10-29-39	PACIFIC			5	5	WHEELER COUNTY, OREGON	HUMBOLDT	LITTLE RIVER	WILLOW, ALDER	300'	D.F. & G., WALLACE, McLEAN

122
122
27

DATE OF PLANT	SUB-SPECIES	MALE	FEMALE	UNKNOWN	TOTAL No.	COUNTY TRAPPED	COUNTY PLANTED	LOCATION OF PLANT	FOODS	ELEVATION	BY WHOM PLANTED
4-40	GOLDEN	2	1		3	MERCED	TUOLUMNE ✓	ACKERSON CREEK	WILLOW	4,800'	D.F. & G., WALLACE, STEWART
8-40	GOLDEN			6	6	MERCED	LAKE ✓	RICE CREEK	WILLOW	1,800'	D.F. & G., WALLACE, CLOVER
8-40	SHASTA			2	2	MODOC	MODOC ✓	SHIELDS CREEK	ASPEN, WILLOW	6,400'	D.F. & G., DAVISON
8-41	GOLDEN			5	5	MERCED	PLUMAS ✓	BUCKS LAKE, HASKINS	ASPEN, WILLOW, ALDER	7,000'	D.F. & G., TAPPE
8-41	SHASTA	1	1	3	5	MODOC	MONO ✓	ROBINSON CREEK	ASPEN, WILLOW	6,000'	D.F. & G., TAPPE, TWINING
8-41	SHASTA			2	2	MODOC	SISKIYOU ✓	MC CLOUD RIVER	WILLOW	3,950'	D.F. & G., DAVISON
4-42	SHASTA	1			1	SISKIYOU	SISKIYOU ✓	MC CLOUD RIVER	WILLOW	3,950'	D.F. & G., TAPPE, TWINING
10-41	GOLDEN	1	1	3	5	YUBA	MENDOCINO ✓	BIG RIVER	WILLOW, ALDER	1,500'	D.F. & G., TAPPE, TWINING
4-42	GOLDEN			6	6	MERCED	VENTURA ✓	SESPE RIVER	WILLOW	5,000'	D.F. & G., TAPPE
2-42	GOLDEN			5	5	YUBA	MONTEREY ✓	SAN CLEMENTE CREEK, SAN CARLOS RANCH	WILLOW	900'	D.F. & G., TAPPE
7-42	GOLDEN	2	2		4	MERCED	SAN MATEO ✓	BUTANO CREEK	WILLOW, TULE	50'	D.F. & G., TWINING
8-42	"	1	1		2	"	"	"	"	"	" " Stewart
7-42	SHASTA	2			2	MODOC	ALPINE ✓	NORTH FORK CARSON RIVER	ASPEN, WILLOW	8,500'	D.F. & G., TWINING
9-42	IDAHO	2	2		4	PLUMAS	ALPINE ✓	NORTH FORK CARSON RIVER	ASPEN, WILLOW	8,500'	D.F. & G., HENSLEY
9-42	GOLDEN		3		3	MERCED	MARIPOSA ✓	SMITH CREEK	WILLOW	2,980'	D.F. & G., TWINING, LONGHURST
4-43	GOLDEN	2	1	1	4	STANISLAUS	MARIPOSA ✓	SMITH CREEK	WILLOW	2,980'	D.F. & G., HENSLEY
8-42	GOLDEN	2	1		3	YUBA	BUTTE ✓	SWAMP CREEK	ASPEN, WILLOW, ALDER	6,500'	D.F. & G., TWINING, HENSLEY

<u>DATE OF PLANT</u>	<u>SUB-SPECIES</u>	<u>MALE</u>	<u>FEMALE</u>	<u>UNKNOWN</u>	<u>TOTAL No.</u>	<u>COUNTY TRAPPED</u>	<u>COUNTY PLANTED</u>	<u>LOCATION OF PLANT</u>	<u>FOODS</u>	<u>ELEVATION</u>	<u>BY WHOM PLANTED</u>
✓11-42	GOLDEN	1	3		4	STANISLAUS	BUTTE ✓	BUTTE CREEK	ASPEN, WILLOW, ALDER, COTTONWOOD	4,500'	D.F. & G., TWINING, HENSLEY
✓12-43	GOLDEN	1			1	MERCED	MERCED ✓	DRY CREEK		600'	D.F. & G., STEWART
✓5-43	GOLDEN	2	1		3	YUBA	BUTTE ✓	LOMO CREEK	WILLOW, ALDER, DOGWOOD	3,500'	D.F. & G., HENSLEY
✓6-43	GOLDEN	3	1	1	5	MERCED	MARIPOSA ✓	MARIPOSA CREEK	WILLOW, TULE	800'	D.F. & G., HENSLEY
✓7-43	IDAHO	3	2		5	PLUMAS	SIERRA ✓	SMITHNECK CREEK	ASPEN, WILLOW, COTTONWOOD	5,500'	D.F. & G., HENSLEY
✓7-43	IDAHO	1	1		2	PLUMAS	PLUMAS ✓	JORDAN CREEK	ASPEN, WILLOW	6,000'	D.F. & G., HENSLEY
✓9-40	GOLDEN	2	1		3	MERCED	CONTRA COSTA ✓	WILDCAT CREEK	WILLOW, TULE	50'	D.F. & G., STEWART, WALLACE
✓12-40	GOLDEN	3	1	2	6	MERCED	CONTRA COSTA ✓	WILDCAT CREEK	WILLOW, TULE	50'	D.F. & G., STEWART, WALLACE
✓8-43	GOLDEN	1	2	1	4	MERCED	MARIPOSA ✓	BULL CREEK	ALDER, WILLOW	3,650'	D.F. & G., STEWART
✓11-43	SHASTA	1			1	MODOC	MODOC ✓	PIT RIVER	WILLOW, TULE	4,555	D.F. & G., HENSLEY, CURTIS
✓11-43 *	GOLDEN	1	3		4	MERCED	MARIPOSA ✓	MARIPOSA CREEK	WILLOW, TULE	800'	D.F. & G., STEWART
✓4-44	GOLDEN	2	2		4	MERCED	SAN DIEGO ✓	CARESITO CREEK	WILLOW, ALDER		D.F. & G., STEWART, HENSLEY
✓4-44	GOLDEN	1	1		2	MERCED	MARIPOSA ✓	UPPER MARIPOSA CREEK	WILLOW, ALDER TULE	2,019'	D.F. & G., STEWART, HENSLEY
✓5-44	GOLDEN	1	1	1	3	MERCED	MARIPOSA ✓	UPPER MARIPOSA CREEK	WILLOW, ALDER	2,019'	D.F. & G., STEWART,

<u>DATE OF PLANT</u>	<u>SUB-SPECIES</u>	<u>MALE</u>	<u>FEMALE</u>	<u>UNKNOWN</u>	<u>TOTAL NO.</u>	<u>COUNTY TRAPPED</u>	<u>COUNTY PLANTED</u>	<u>LOCATION OF PLANT</u>	<u>FOODS</u>	<u>ELEVATION</u>	<u>BY WHOM PLANTED</u>
✓ 5-44 10-44	GOLDEN "	1 3	1 2	2	4 5	MERCED Stanislaus	MARIPOSA ✓ "	BIG CREEK " "	WILLOW, ALDER, ASPEN "	5,000' "	D.F. & G., STEWART, HENSLEY "
✓ 5-44 18-44 18-44	GOLDEN " "	1 2 1	1 3 1	1 1	3 5 3	MERCED Stanislaus Monterey	MARIPOSA ✓ Tuluma ✓	MIAMI CREEK " " "Behu Meadow" Creek	WILLOW, ALDER, ASPEN " Willow, Aspen Cottonwood	4,200' " 6,300'	D.F. & G., STEWART, HENSLEY " D.F. & G. Hensley
✓ 40-44	"	1	2		3	Stanislaus	Mariposa ✓	Jordan Creek	W. Willow, Alder Cottonwood.	3200'	D.F. & G. Stewart.

in Sept

PROJECT 18-D BEAVER PLANTS FROM MAY 17, 1945 TO DECEMBER 15, 1946

DATE OF PLANT	KIND	MALE	TAG NO.	WEIGHT	FEMALE	TAG NO.	WEIGHT	UNKNOWN	TAG NO.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
5/17/45	GOLDEN	3	*	18 28 26	2	-	26 38	1	-	12	6	STANISLAUS	200'	FRESNO	6,000'	CHIPMUNK CREEK, TRIBUTARY TO SHAVER LAKE
5/28/45	GOLDEN	1	-	32	1	-	35	1	-	32	3	STANISLAUS MERCED	200'	SACRAMENTO	155'	ALDER CREEK, ALDER CREEK GAME REFUGE
6/5/45	GOLDEN	3	-	29 38 21	3	-	37 31 30	1	-	8	7	STANISLAUS MERCED	185'	FRESNO	2,500'	DRY CREEK, NEAR TOWN OF TOLLHOUSE
6/14/45	GOLDEN	2	-	39 13	1	-	9 46	3	-	9 9	6	STANISLAUS MERCED	175'	TUOLUMNE	2,100'	BELLVIEW OR SULLIVAN CREEK, TRIBUTARY TO UPPER WOODS CREEK
6/19/45	GOLDEN	2	-	34 32	3	-	38 32 26	-	-	-	5	STANISLAUS MERCED	200'	RIVERSIDE	8,000'	TAHQUITZ CREEK, 7 MILES EAST OF IDYLLWILD ON IDYLLWILD MOUNTAIN
7/6/45	GOLDEN	1	-	38	1	-	34	2	-	13	4	MONTEREY	1,000'	SANTA BARBARA	150'	CORRALITOS CREEK, ON POINT SAL ROAD, RANCHO CORRALITOS
7/9/45	GOLDEN	1	-	25	1	-	48	-	-	-	2	MONTEREY	1,000'	MONTEREY	950'	STOUVAL CREEK ON RANCHO SAN CARLOS
7/24/45	IDAHO	1	-	44	1	-	49	-	-	-	2	PLUMAS	6,000'	LASSEN	6,000'	ROBINSON CREEK, CHIMNEY CANYON
7/26/45	IDAHO	1	27	41	1	26	46	1	28	8	3	PLUMAS	6,000'	SIERRA	6,500'	LITTLE TRUCKEE RIVER NEAR OLD RAILROAD TRESTLE
7/26/45	IDAHO	2	29 31	36 25	2	30 32	42 23	1	33	9	5	PLUMAS	6,000'	SIERRA	6,000'	PASS CREEK, TRIBUTARY TO NORTH FORK YUBA RIVER
7/29/45	IDAHO	2	34 35	23 21	2	37 38	24 24	-	-	-	4	PLUMAS	6,000'	NEVADA	6,500'	SAGE HEN CREEK
8/3/45	IDAHO	1	40	18	1	41	26	-	-	-	2	PLUMAS	6,000' 5,500'	SIERRA	5,300'	CARMEN VALLEY CREEK TRIBUTARY TO NORTH FORK FEATHER RIVER
8/8/45	IDAHO	3	44 42 43	58 37 26	1	-	56	-	-	-	4	PLUMAS	5,500'	PLACER	6,100'	MAIN FORK MARTIS CREEK, TRIBUTARY TO TRUCKEE RIVER
8/14/45	IDAHO	3	46 47 49	24 32 45	2	48 50	35 45	-	-	-	5	PLUMAS	5,000' 6,000'	SIERRA	5,800'	COTTONWOOD CREEK, TRIBUTARY TO COLD CREEK
8/15/45	IDAHO	2	51 52	40 26	2	53 54	32 29	-	-	-	4	PLUMAS	5,000'	NEVADA	6,200'	JUNIPER CREEK, TRIBUTARY TO TRUCKEE RIVER
8/30/45	IDAHO	1	56	32	1	57	49	-	-	-	2	PLUMAS	3,500'	PLUMAS	4,700'	BUTT CREEK ABOVE BUTT LAKE

DATE OF PLANT	KIND	MALE	TAG No.	WEIGHT	FEMALE	TAG No.	WEIGHT	UNKNOWN	TAG No.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
6/3/46	GOLDEN	2	118	18		117	41									KELTY MEADOW CREEK, NEAR
			119	42	2	120	28	-	-	-	4	STANISLAUS	300'	MADERA	6,000'	KELTY MEADOW PUBLIC CAMP
6/3/46	GOLDEN	2	123	29		121	33									BEASORE MEADOW CREEK ON
			124	40	2	122	37	-	-	-	4	STANISLAUS	300'	MADERA	7,000'	CHARLES JONES RANCH
6/8/46	GOLDEN	3	125	53		128	22									CHINA CREEK, TRIBUTARY TO
			126	28	2	129	54	-	-	-	5	MERCED	300'	MADERA	2,500'	FRESNO RIVER NEAR TOWN OF
			127	18												OAKHURST
6/9/46	GOLDEN	2	132	43		130	36									WOODS CREEK, LOWER PORTION OF
			133	40	2	131	34	-	-	-	4	MERCED	300'	TUOLUMNE	1,050'	STREAM
6/13/46	GOLDEN	2	134	34		136	45									BEAR CREEK IN INDIAN
			135	45	2	137	35	-	-	-	4	MERCED	190'	MARIPOSA	400'	GULCH
6/14/46	GOLDEN	1	139	41	3	140	41									S.F. WILLOW CREEK NEAR CENTRAL
						141	21	-	-	-	4	MERCED	190'	MADERA	5,500'	CAMP
						142	28									
6/14/46	GOLDEN	2	145	23		143	31									N.F. WILLOW CREEK, NEAR
			146	28	2	144	26	-	-	-	4	MERCED	190'	MADERA	6,000'	GAGGS CAMP
													250'			
6/21/46	GOLDEN	1	151	40	1	152	41	-	-	-	2	MERCED	190'	TUOLUMNE	1,900'	CURTIS CREEK, TRIBUTARY TO
																WOODS CREEK
6/21/46	GOLDEN	2	147	35		148	23						180'			N.F. TUOLUMNE RIVER IN
			150	33	2	149	33	-	-	-	4	MERCED	190'	TUOLUMNE	5,000'	BROWN'S MEADOW
6/24/46	GOLDEN	2	155	35		153	26									HERRING CREEK PLANTED AT
			157	23	3	158	26	-	-	-	5	MERCED	180'	TUOLUMNE	7,600'	BLOOMER LAKE
						159	38									
6/25/46	GOLDEN	2	162	26		160	26									
			164	36	4	161	24	-	-	-	6	MERCED	180'	MADERA	5,000'	SOLDIER CREEK
						163	36									
						165	30									
7/1/46	GOLDEN	2	166	36		169	37							SAN		WILLOW CREEK, APPROXIMATELY
			167	45	2	170	31	-	-	-	4	MERCED	180'	BERNARDINO	4,800'	100 YDS. BELOW OLD FISH HATCH-
																ERY
7/6/46	GOLDEN	2	173	32		168	14									JUNCTION OF PRIEST VALLEY AND
			178	53	2	171	37	-	-	-	4	MERCED	400'	SAN BENITO	3,000'	NORTH FORK CREEK
7/6/46	GOLDEN	2	175	29		177	13									SAN BENITO RIVER AT BLUE JAY
			179	34	2	181	30	-	-	-	4	MERCED	400'	SAN BENITO	1,700'	SPLASH
7/6/46	GOLDEN	2	172	38		174	32									LAGUNA CREEK AND SAN BENITO
			180	43	2	176	28	-	-	-	4	MERCED	400'	SAN BENITO	2,500'	RIVER

DATE OF PLANT	KIND	MALE	TAG No.	WEIGHT	FEMALE	TAG No.	WEIGHT	UNKNOWN	TAG No.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
7/20/46	SHASTA	1	183	31	3	182 184 186	29 36 39	-	-	-	4	MONO	7,400'	MONO	10,000'	McGEE CREEK
7/30/46	IDAHO	1	189	41	2	187 190	31 26	-	-	-	3	PLUMAS	6,000'	MONO	8,000'	COTTONWOOD CREEK
8/6/46	SHASTA	3	194 195 198	36 10 6	2	192 193	29 29	-	-	-	5	MODOC	4,300'	MONO	9,000'	SOUTH FORK COTTONWOOD CREEK WHITE MOUNTAINS
8/8/46	SHASTA	2	201 202	40 31	2	191 196	40 31	-	-	-	4	MODOC	4,300'- 4,400'	MONO	10,000'	NORTH FORK COTTONWOOD CREEK WHITE MOUNTAINS
8/9/46	SHASTA	2	199 203	9 41	2	197 200	32 54	-	-	-	4	MODOC	4,300' 6,000'	INYO	8,500'	COYOTE CREEK, INYO NATIONAL FOREST
8/17/46	SHASTA	1	204 205	25 28	3	208 212	6 46	-	-	-	4	MODOC	6,000	LASSEN	7,000'	SELIE CREEK, WARNER MOUNTAINS
8/24/46	SHASTA	1	214 219	48 45	3	216 222	41 50	-	-	-	4	MODOC	4,300'- 4,800'	LASSEN	6,500'	PARSNIP CREEK, WARNER MOUNTAINS
9/5/46	SHASTA	2	213 215	12 9	2	209 210	32 32	-	-	-	4	MODOC	4,300'- 4,400'	LASSEN	6,000'	UPPER RED ROCK CREEK, ALASKA CANYON
8/24/46	SHASTA	2	217 220	42 32	2	218 221	13 40	-	-	-	4	MODOC	4,400' 4,800'	MODOC	7,500'	SOUTH FORK EAST CREEK, WARNER MOUNTAINS
9/5/46	SHASTA	2	225 226	33 51	2	223 227	42 31	-	-	-	4	LASSEN	6,000'	PLUMAS	5,000'	ROCK CREEK TRIBUTARY TO LAKE ALMANOR
9/15/46	SHASTA	2	224 228	28 25	1	232	13	-	-	-	4	LASSEN	6,000'	LASSEN	6,000'	HEADWATERS OF SUSAN RIVER
9/19/46	SHASTA	3	229 231 233 234	12 14 14 11	1	235	30	-	-	-	4	LASSEN	6,000'	LASSEN	5,600'	ROBBERS CREEK
10/19/46	OREGON	1	237 238	37 36	1	241 242	27 11	-	-	-	2	HUMBOLDT	20'	HUMBOLDT	200'	LOST MAN CREEK
10/19/46	OREGON	2	240 248	54 41	2	243 246	16 15	-	-	-	4	HUMBOLDT	20'	HUMBOLDT	50'	PRAIRIE CREEK
10/26/46	OREGON	2	245 249	31 15	2	247	45	-	-	-	4	HUMBOLDT	20'	DEL NORTE	100'	SOUTH FORK WINCHUCK RIVER
10/29/46	OREGON	3	245 249 -	31 15 16	1	-	56	-	-	-	4	HUMBOLDT	20'	HUMBOLDT	600'	NORTH FORK MAD RIVER

DATE OF PLANT	KIND	MALE	TAG No.	WEIGHT	FEMALE	TAG No.	WEIGHT	UNKNOWN	TAG No.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
11/9/46	GOLDEN	2	-	39 29	2	-	27 39	-	-	-	4	MERCED	180'	SAN DIEGO	2,900'	CAMPO CREEK
11/10/46	GOLDEN	1	-	31	1	-	28	-	-	-	2	MERCED	180'	SANTA BARBARA	150'	CORRALITOS CREEK
11/12/46	GOLDEN	1	-	40	2	-	36 39	-	-	-	3	MERCED	180'	SAN BENITO	1,700'	BLUE JAY SPLASH IN SAN BENITO RIVER
11/12/46	GOLDEN	2	-	36 20	3	-	45 42	-	-	-	5	MERCED	180'	SAN LUIS OBISPO	800'	KENTUCKY RANCH CREEK TRIBUTARY TO JACK CREEK
11/12/46	GOLDEN	3	-	17 17 34	3	-	46 46 44	-	-	-	6	MERCED	180'	SAN LUIS OBISPO	1,100'	SUNDERLAND CREEK
11/19/46	GOLDEN	4	-	18 20 28 16	1	-	37	-	-	-	5	MERCED	180'	TUOLUMNE	1,200'	SIX BITS CREEK

TOTALS	129	131	13	273
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AVERAGE WEIGHT OF MALES	31.47 POUNDS
" " " FEMALES	34.09 "
" " " UNKNOWNNS	11.38 "
" " " ALL ANIMALS	31.77 "

PROJECT 18-D-1 BEAVER PLANTS FROM APRIL 15, 1947 TO NOVEMBER 15, 1947

DATE OF PLANT	KIND	MALE	TAG NO.	WEIGHT	FEMALE	TAG NO.	WEIGHT	UNKNOWN	TAG NO.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
4/23/47	GOLDEN	3	-	44 26 24	3	-	43 33 18	-	-	-	6	MADERA	165'	SANTA BARBARA	375'	SAN ANTONIO CREEK
5/3/47	GOLDEN	2	-	45 33 40	2	-	48 34 41	-	-	-	4	MERCED	180'	SANTA BARBARA	682'	SALTSPUEDES CREEK, LOMPUE, LAS CRUCES ROAD
5/3/47	GOLDEN	2	-	19 38	2	-	30 40	-	-	-	4	MERCED	180'	SANTA BARBARA	600'	SANTA COTA CREEK, NEAR SANTA YNEZ
5/4/47	GOLDEN	2	-	33 36	3	-	26 36	-	-	-	5	MERCED	180'	SAN MATEO	100'	FRENCHMENS CREEK
5/9/47	GOLDEN	2	-	48 38	2	-	51 43	-	-	-	4	MERCED	180'	SAN LUIS OBISPO	1,156'	UPPER TROUT CREEK, SANTA MARGARITA RANCH
5/9/47	GOLDEN	2	-	31 28	2	-	30 28	-	-	-	4	MERCED	180'	MONTEREY	1,775'	HIGGINS CREEK, LOST VALLEY
5/13/47	GOLDEN	1	-	24 36	2	-	30 26	-	-	-	3	MERCED	180'	SAN LUIS OBISPO	800'	SUEY CREEK, SUEY RANCH
5/13/47	GOLDEN	2	-	36 32	3	-	36 32	-	-	-	5	MERCED	180'	SANTA BARBARA	1,500'	ZACA CREEK
5/18/47	GOLDEN	2	3	17 46	3	-	44 44	-	-	-	5	MERCED	180'	SAN LUIS OBISPO	1,000'	PASO ROBLES CREEK, JACK GREER RANCH
5/18/47	GOLDEN	1	-	27 40 32	3	-	27 40 45	-	-	-	4	MERCED	400'	SAN LUIS OBISPO	1,000'	LOWER TROUT CREEK, SANTA MARGARITA RANCH
5/18/47	GOLDEN	2	-	43 38	2	-	43 53	-	-	-	4	MERCED	180'	SAN LUIS OBISPO	1,550'	POZO CREEK, NEAR POZO RANGER STATION
5/25/47	GOLDEN	2	-	44 33	2	-	41 40	-	-	-	4	STANISLAUS	150'	MONTEREY	1,500'	SAN ANTONIO CREEK, SECOND CROSSING NORTH OF JOLON MISSION ON HUNTER LIGGETT
5/25/47	GOLDEN	3	-	35 27 19	2	-	32 40 19	-	-	-	5	STANISLAUS	150'	MONTEREY	2,000'	NACIMENTO CREEK AT NIGGER MARY FLAT IN HUNTER LIGGETT
5/31/47	GOLDEN	2	-	20 40	2	-	19 53	-	-	-	4	STANISLAUS	150'	TUOLUMNE	4,000'	HULL CREEK, 1 MILE ABOVE HULL MEADOWS

DATE OF PLANT	KIND	MALE	TAG NO.	WEIGHT	FEMALE	TAG NO.	WEIGHT	UNKNOWN	TAG NO.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
5/31/47	GOLDEN	2	-	38 33	2	-	32 48	-	-	-	4	STANISLAUS	150'	TUOLUMNE	4,800'	BEAVER CREEK, ACKERING LUMBER CO. PROPERTY
6/5/47	GOLDEN	3	-	24 34	2	-	32 26	-	-	-	5	STANISLAUS	150' 270'	BUTTE	6,000'	COLBY CREEK, TRIBUTARY TO BUTTE CREEK
6/5/47	GOLDEN	3	-	45 39 31	2	-	36 23	-	-	-	5	STANISLAUS	150' 270'	BUTTE	7,000'	SNAGG LAKE, TRIBUTARY TO WEST BRANCH FEATHER RIVER
6/10/47	GOLDEN	2	-	41 31 34	2	-	39 25	-	-	-	4	STANISLAUS	270' 300'	SAN DIEGO	4,000'	KITCHEN CREEK
6/11/47	GOLDEN	2	-	42 38	2	-	37 40	-	-	-	4	STANISLAUS	290' 300'	LAKE	1,800'	KELSEY CREEK BELOW INTERSECTION WITH ALDER CREEK
6/13/47	GOLDEN	2	-	32 35	2	-	26 43	-	-	-	4	STANISLAUS	150'	SAN BERNARDINO	4,500'	GRASS VALLEY CREEK
6/15/47	GOLDEN	2 2	-	36 35	2	-	43 43	-	-	-	4	STANISLAUS	170'	RIVERSIDE	2,050'	SAN MATEO CREEK
6/16/47	GOLDEN	2	-	19 33	1	-	36	-	-	-	3	STANISLAUS	300'	LAKE	1,700'	WEST BRANCH COLD CREEK ON NEIL LINDSAY RANCH
6/17/47	GOLDEN	5	-	43 35 25 35	-	-	-	-	-	-	5	STANISLAUS	300'	TUOLUMNE	2,100'	SULLIVAN CREEK, BOLSTER TO 18-D-4 - 1945
7/3/47	SHASTA	2	-	32 42	2	-	50 58	-	-	-	4	MODOC	4,300'	MODOC	7,500'	BEAR CAMP CREEK
7/15/47	SHASTA	-	-	-	3	-	43 44 48	-	-	-	3	MODOC	4,300'	LASSEN	7,000'	SELIE CREEK, WARNER MTS. BOLSTER TO 18-D-54 - 8/17/46
7/15/47	SHASTA	-	-	-	2	-	20 34	-	-	-	2	MODOC	4,300'	LASSEN	6,000'	UPPER RED ROCK CREEK, ALASKA CANYON, BOLSTER TO 18-D-56 8/24/46
7/20/47	SHASTA	-	-	-	1	-	41	-	-	-	1	MODOC	4,400'	MODOC	7,500'	SOUTH FORK EAST CREEK, WARNER MTS. BOLSTER TO 18-D-57 9/5/46
7/31/47	IDAHO	1	-	36	1	-	46	-	-	-	2	SIERRA	5,000'	NEVADA	6,550'	ALDER CREEK, TRIBUTARY TO PROSSER CREEK

DATE OF PLANT	KIND	MALE	TAG No.	WEIGHT	FEMALE	TAG No.	WEIGHT	UNKNOWN	TAG No.	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
8/13/47	IDAHO	1	-	35	3	-	50	-	-	-	4	PLUMAS	3,800'	PLUMAS	5,000'	HUMBUG CREEK, TRIBUTARY TO YELLOW CREEK
							38									
							39									
							36									
8/20/47	IDAHO	2	-	10	4	-	50	-	-	-	6	PLUMAS	3,800'	PLUMAS	4,600'	MUD CREEK
				52			40									
9/7/47	IDAHO	1	-	45	3	-	28	-	-	-	4	PLUMAS	4,800'	PLUMAS	5,500'	LONG VALLEY CREEK
							35									
							27									
9/8/47	IDAHO	1	-	34	3	-	42	-	-	-	4	PLUMAS	4,800'	SISKIYOU	5,500'	ALDER CREEK, TRIBUTARY TO UPPER BUTTE CREEK
							44									
				52			23						4,800'			
9/15/47	IDAHO	2	-	17	2	-	54	-	-	-	4	PLUMAS	5,500'	PLUMAS	5,000'	ONION VALLEY RESERVOIR, TRIBUTARY TO MIDDLE FK. FEATHER R.
				33			32									
9/17/47	IDAHO	2	-	29	2	-	36	-	-	-	4	PLUMAS	5,500'	NEVADA	6,950'	INDEPENDENCE CREEK NEAR INDEPENDENCE LAKE
				49												
9/21/47	SHASTA	3	-	28	-	-	-	-	-	-	3	LASSEN	4,100'	LASSEN	7,000'	SELIE CREEK, BOLSTER TO 18-D-54 - 8/17/46
				29												
9/23/47	SHASTA	1	-	46	-	-	-	-	-	-	1	LASSEN	4,100'	PLUMAS	5,500'	LONG VALLEY CREEK, BOLSTER TO 18-D-98 - 9/7/47
				32-36			30									
10/9/47	GOLDEN	6	-	33-13	3	-	26	-	-	-	9	MERCED	180'	BUTTE	6,000'	KIMSEW CREEK, CRANE VALLEY
				16-17			29									
				16			39									
10/18/47	GOLDEN	3	-	35	2	-	43	-	-	-	5	MERCED	180'	SAN BENITO	1,500'	CHOLAME CREEK
				38												
				35			42									
10/18/47	GOLDEN	3	-	43	2	-	45	-	-	-	5	MERCED	180'	MONTEREY	1,200'	JOLON CREEK
				18												
				46			36									
10/23/47	GOLDEN	2	-	36	2	-	16	-	-	-	4	MERCED	180'	MARIN	100'	GLENBROOK CREEK
				43			36					MERCED	190'	SAN		REDONDO CIENEGA CR. - TRIBUTARY TO HOLCOMB CREEK
11/2/47	GOLDEN	2	-	38	2	-	39	-	-	-	4	STANISLAUS	200'	BERNARDINO	6,850'	
TOTALS		83		2787	85		3137				168					47 PLANTINGS

BEAVER PLANTS FROM APRIL 15, 1947 TO NOVEMBER 15, 1947 - CONTINUED

AVERAGE WEIGHT OF 83 MALES - 33.58 POUNDS
 AVERAGE WEIGHT OF 85 FEMALES - 36.91 POUNDS
 AVERAGE WEIGHT OF 168 ANIMALS - 35.26 POUNDS

TOTALS FOR THREE SEASONS

YEAR	KIND	MALE	WEIGHT	FEMALE	WEIGHT	UNKNOWN	WEIGHT	TOTAL	NUMBER OF PLANTINGS
1945	ALL	47	1534	44	1550	13	148	104	27
1946	ALL	82	2526	87	2916	-	-	169	43
1947	ALL	83	2787	85	3137	-	-	168	41
GRAND TOTAL	ALL	212	6847	216	7603	13	148	441	111

PROJECT 18-D-2 BEAVER PLANTS FROM MAY 1, 1948 TO OCTOBER 30, 1948

DATE OF PLANT	PLANT No.	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
5/12/48	18-D-2	GOLDEN	3	42	2	42	5	STANISLAUS	180'	SAN LUIS OBISPO	1,100'	CHOLAME CREEK NEAR TOWN OF SHANDON
	112			17		42						
				44								
5/27/48	18-D-2	GOLDEN	3	40	2	43	5	STANISLAUS	275'	SAN LUIS OBISPO	700'	CLARK VALLEY CREEK, WEST OF TOWN OF SAN LUIS OBISPO
				43		49						
	113			33								
5/27/48	18-D-2	GOLDEN	1	43	1	45	2	STANISLAUS	300'	SANTA BARBARA	500'	UNNAMED STREAM 2 MILES N. TOWN OF SOLVANG ON GEO. S. HOWELL PROP.
	114											
5/27/48	18-D-2	GOLDEN	2	26			2	STANISLAUS	270'	SAN LUIS OBISPO	1,200'	LOWER TROUT CREEK, SANTA MARGARITA RANCH
	115			31								
5/27/48	18-D-2	GOLDEN	2	24	1	17	3	STANISLAUS	300'	SAN LUIS OBISPO	800'	KENTUCKY RANCH CREEK. TRIBUTARY TO JACK CREEK.
	116B			20								
6/11/48	18-D-2	GOLDEN			3	41	3	STANISLAUS	225'	TUOLUMNE	1,200'	SIX BITS CREEK
	117B					33						
						14						
6/12/48	18-D-2	GOLDEN	1	35	2	41	3	STANISLAUS	225'	SAN LUIS OBISPO	1,550'	POZO CREEK, NEAR POZO RANGER STATION.
	118B					37						
6/12/48	18-D-2	GOLDEN	2	31	3	48	5	STANISLAUS	250'	SANTA BARBARA	4,500'	INDIAN CREEK AT BLUFF CAMP
	119			45		13						
				20								
6/25/48	18-D-2	GOLDEN	3	41	2	38	5	FRESNO	80'	SANTA BARBARA	4,000'	UPPER CALIENTE CREEK, ON U. S. F. S. PROPERTY
	120			22		38						
6/5/48	18-D-2	IDAHO	1	30	2	34	3	PLUMAS	5,000'	SIERRA	5,000'	ANTELOPE CREEK, EAST AND SOUTH OF LOYALTON.
	500					22						
6/14/48	18-D-2	IDAHO	1	30	2	39	3	PLUMAS	5,000'	SIERRA	5,200'	SUMMIT PEAK CREEK, NORTH & EAST OF LOYALTON.
	501					19						
6/18/48	18-D-2	IDAHO			1	35	1	PLUMAS	6,000'	LASSEN	6,000'	ROBINSON OR WILLOW RANCH CREEK IN CHIMNEY CANYON
	502B											
6/20/48	18-D-2	IDAHO	2	34	2	49	4	PLUMAS	5,000'	SIERRA	5,200'	BALLS CREEK IN BALLS CANYON
	503			19		19						
6/20/48	18-D-2	IDAHO	1	33	2	50	3	PLUMAS	6,000'	SIERRA	5,300'	EVANS CREEK
	504					26						
6/21/48	18-D-2	IDAHO	2	27	2	37	4	PLUMAS	5,900'	PLUMAS	5,950'	LOOKOUT CREEK, NEAR DIXIE MT. LOOKOUT
	505			23		19						
6/23/48	18-D-2	IDAHO	1	20	2	36	3	PLUMAS	5,900'	SIERRA	5,400'	BEAR VALLEY CREEK
	506					40						

DATE OF PLANT	PLANT No.	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
7/13/48	18-D-2 121 B	GOLDEN	2	46 11	3	8 9	5	MERCED	190'	SAN DIEGO	3,000'	CAMP CREEK TRIBUTARY TO TECATE CREEK
7/13/48	18-D-2 122 B	GOLDEN	2	33 37	2	43 24	4	MERCED	190'	SAN DIEGO	4,200'	CEDAR CREEK ON C. A. GREY PROPERTY
7/13/48	18-D-2 123	GOLDEN	2	35 27	2	27 26	4	MERCED	190'	SAN DIEGO	3,400'	BLACK CANYON CREEK ON THE ALFORD PROPERTY.
7/24/48	18-D-2 124	GOLDEN	2	44 14	1	52	3	FRESNO & STANISLAUS	150'	SAN BENITO	2,300'	NORTH FORK PRIEST VALLEY CREEK
7/24/48	18-D-2 125	GOLDEN	2	41 44	2	35 47	4	FRESNO & STANISLAUS	150'	MONTEREY	2,500'	BOURDIEU VALLEY CREEK NORTH OF STONE COAL MINE
7/2/48	18-D-2 507	IDAHO	2	9 34	2	25 31	4	PLUMAS	5,800'	INYO	7,000'	BAKER CREEK WEST OF BIG PINE IN OWENS VALLEY
7/2/48	18-D-2 508	IDAHO	2	9 45	2	37 48	4	PLUMAS	5,800'	INYO	8,000'	WYMAN CREEK EAST OF BISHOP IN WHITE MTS.
7/6/48	18-D-2 509	IDAHO	2	29 21	2	25 40	4	PLUMAS	5,500'	SIERRA	5,600'	LEMON CANYON CREEK
7/9/48	18-D-2 510	IDAHO	2	21 35	2	61 22	4	PLUMAS	5,700'	SIERRA	5,800'	PARAZZO CREEK APPROX. 2 MILES BELOW WEBER LAKE
7/13/48	18-D-2 511	IDAHO	2	28 29	1	30	3	PLUMAS	6,000'	PLUMAS	5,000'	BARRY CREEK NEAR CLIO STATE FISH HATCHERY
7/23/48	18-D-2 512	SHASTA	2	31 31	1	43	3	MODOC	5,000'	LASSEN	7,000'	SILVER CREEK BELOW LOST LAKE WARNER MTS.
8/4/48	18-D-2 126	GOLDEN	3	11 47 33	2	43 29	5	MERCED	180'	FRESNO	5,700'	TEN MILE CREEK ABOVE HUME LAKE
8/4/48	18-D-2 127	GOLDEN	1	46	1	42	2	MERCED	180'	FRESNO	5,800'	BEARSKIN MEADOW CREEK
8/9/48	18-D-2 128	GOLDEN	3	37 38 35	2	35 31	5	MERCED	180'	FRESNO	5,100'	MILL F LAT CREEK AT MILLWOOD
8/9/48	18-D-2 129	GOLDEN	3	25 35 12	2	39 24	5	MERCED	180'	FRESNO	4,500'	ABBY CREEK
8/24/48	18-D-2 130	GOLDEN	2	34 33	2	25 31	4	MERCED & STANISLAUS	180'	LOS ANGELES	3,000'	UNNAMED STREAM ON THE KINSEY PROPERTIES NEAR GORMAN.

DATE OF PLANT	PLANT No.	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
8/25/48	18-D-2 131	GOLDEN	3	35 40 35	2	37 38	5	MERCED & STANISLAUS	180'	SAN BERNARDINO	5,600'	UNNAMED STREAM ON U. S. F. S. PROPERTY NEAR COXEY'S RANGER STATION.
8/25/48	18-D-2 132	GOLDEN	2	28 27	2	32 25	4	MERCED & STANISLAUS	180'	SAN BERNARDINO	7,000'	CIENEGA SECO CREEK OR HEADWATERS OF SANTA ANA RIVER.
8/2/48	18-D-2 513B	IDAHO	2	22 37	2	57 39	4	PLUMAS	3,200'	PLUMAS	4,000'	ROCK CREEK TRIBUTARY TO LAKE ALMANOR
8/2/48	18-D-2 514	IDAHO	3	37 12 14	2	31 36	5	PLUMAS	3,200'	PLUMAS	3,400'	WOLF CREEK, 4 MILES NORTH OF GREENVILLE.
8/10/48	18-D-2 515	IDAHO	3	30 34 30	4	40-7 28 - 10	7	PLUMAS	3,500'	PLUMAS	4,500'	HUNGRY CREEK NEAR MOUTH OF TAYLOR LAKE.
8/13/48	18-D-2 516	IDAHO	4	45 - 30 10 - 10	5	44 - 30 35 - 10 32	9	PLUMAS	3,500'	PLUMAS	5,237'	HASKINS CREEK NEAR BUCKS LAKE
8/30/48	18-D-2 517	IDAHO	2	36 41	5	38 - 46 23 - 48 16	7	PLUMAS	3,000'	TRINITY	2,300'	CARR CREEK, HAYFORK VALLEY
9/4/48	18-D-2 133B	GOLDEN			1	35	1	STANISLAUS	180'	TUOLUMNE	2,500'	PHOENIX LAKE
9/9/48	18-D-2 134	GOLDEN	2	28 46	2	26 31	4	STANISLAUS	180'	TUOLUMNE	6,500'	DARDANELLS CREEK
9/9/48	18-D-2 135	GOLDEN	2	29 19	2	25 22	4	STANISLAUS	180'	TUOLUMNE	6,500'	WHEATS MEADOW CREEK.
9/22/48	18-D-2 136	GOLDEN	2	42 27	2	29 39	4	STANISLAUS	180'	SANTA BARBARA	700'	ALAMO CREEK, NEWHALL LAND & CATTLE CO. PROPERTY
9/22/48	18-D-2 137	GOLDEN	2	44 13	1	39	3	STANISLAUS	180'	SANTA BARBARA	700'	FOXEN CANYON, DICK WICKENDEN PROPERTY.
9/4/48	18-D-2 518	SHASTA	1	40	1	40	2	SISKIYOU	3,000'	SISKIYOU	4,000'	TROUT CREEK
9/12/48	18-D-2 519	IDAHO	2	46 17	2	48 17	4	PLUMAS	4,000'	PLUMAS	3,500'	DOOLEY CANYON CREEK
9/27/48	18-D-2 520	IDAHO	3	31 36 19	3	46 21 40	6	PLUMAS	4,000'	PLACER	6,500'	PICAYUNE CREEK ABOVE FRENCH MEADOWS.
10/2/48	18-D-2 138	GOLDEN	2	48 33	3	55 44 - 36	5	MERCED	250'	SAN LUIS OBISPO	450'	WHITTENBERG CREEK.

DATE OF PLANT	PLANT No.	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
10/2/48	18-D-2 139	GOLDEN	2	35 39	3	45 44	5	MERCED	250'	SAN LUIS OBISPO	600'	LOPEZ CANYON CREEK.
10/2/48	18-D-2 140	GOLDEN	2	17 35	3	16 43	5	MERCED	250'	SANTA BARBARA	100'	CANADA HONDA CREEK.
10/22/48	18-D-2 141	GOLDEN	3	35 36 27	3	41 29 43	6	MERCED	180'	VENTURA	4,000'	REYES CREEK, LOS PADRES NATIONAL FOREST.
10/22/48	18-D-2 142	GOLDEN	3	24 28 49	4	32 - 27 51 - 32	7	MERCED	180'	VENTURA	500'	COYOTE CREEK, SANTA ANA VALLEY
10/6/48	18-D-2 521	GOLDEN	3	41 36 26	3	12 48 44	6	YUBA	500'	NEVADA	4,500'	LINDSEY CREEK, LINDSEY LAKE CHAIN
10/9/48	18-D-2 522	GOLDEN	3	12 41 48	3	12 50 45	6	YUBA	200'	NEVADA	1,200'	DEER CREEK
10/13/48	18-D-2 523	GOLDEN	3	54 56 36	3	23 56 46	6	YUBA	200'	BUTTE	600'	HONCUT CREEK, ONE MILE SE OF BROWN'S STORE.
10/22/48	18-D-2 524	GOLDEN	2	22 25	5	50 - 50 20 - 44	7	SUTTER	200'	YUBA	700'	DRY CREEK
10/24/48	18-D-2 143	GOLDEN	1	35	3	35 53 37	4	MERCED	180'	FRESNO	5,800'	INDIAN CREEK
TOTAL	57		116	3,584	127	4,425	243					

BEAVER SUMMARY FROM MAY 1, 1948 TO OCTOBER 30, 1948

AVERAGE WEIGHT OF 116 MALES - ALL AGES - 30.89 POUNDS

AVERAGE WEIGHT OF 127 FEMALES - ALL AGES - 28.70 POUNDS

AVERAGE WEIGHT OF 243 ANIMALS - ALL AGES - 30.34 POUNDS

TOTALS FOR FOUR SEASONS									
YEAR	KIND	MALE	WEIGHT	FEMALE	WEIGHT	UNKNOWN	WEIGHT	TOTAL	NUMBER OF PLANTINGS
1945	ALL	47	1,534	44	1,550	13	148	104	27
1946	ALL	82	2,526	87	2,916	--	--	169	43
1947	ALL	83	2,787	85	3,137	--	--	168	41
1948	ALL	116	3,584	127	4,425	--	--	243	57
GRAND TOTAL	ALL	328	10,431	343	12,028	13	148	684	168

PROJECT 34-D-2 BEAVER PLANTS FROM MAY 1, 1949 TO OCTOBER 31, 1949

DATE OF PLANT	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
5/13/49	GOLDEN	3	47 42 40	2	32 49	5	S. JOAQUIN	150'	TULARE	6,500'	FREEMAN CREEK
5/13/49	GOLDEN	2	34 31	2	46 26	4	MERCED	150'	TULARE	7,000'	BOULDER CREEK
5/14/49	IDAHO	2	50 27	2	29 24	4	PLUMAS	3,000'	PLUMAS	3,500'	GOULD SWAMP
5/20/49	IDAHO	3	23 37 42	2	30 42	5	PLUMAS	3,000'	PLUMAS	3,700'	CHANCE CREEK
5/25/49	GOLDEN	4	43 42 36 6	2	42 27	6	MERCED	180'	TULARE	6,500'	PEPPERMINT CREEK
5/25/49	GOLDEN	3	29 15 23	2	22 34	5	MERCED	180'	TULARE	6,500	TRIBUTARY TO PEPPERMINT CREEK
5/30/49	IDAHO	2	39 40	2	23 22	4	SIERRA	5,000'	SIERRA	6,000'	SMITH CREEK
6/3/49	GOLDEN	2	43 33	2	35 36	4	MERCED	200'	TULARE	6,000'	CLEIKS CREEK
6/3/49	GOLDEN	2	22 32	2	28 23	4	MERCED	200'	TULARE	6,400'	UPPER CLEIKS CREEK
6/4/49	IDAHO	2	40 49	-		2	PLUMAS	5,000	SIERRA	6,500'	BEAR VALLEY CREEK (BOLSTER)
6/7/49	IDAHO	2	25 24	2	29 34	4	PLUMAS	5,000	INYO	10,000'	CROOKED CREEK
6/10/49	GOLDEN	3	28 22 43	3	54 36 39	6	MERCED	200	VENTURA	4,000'	SERPE CREEK
6/10/49	GOLDEN	3	32 36 27	2	33 39	5	MERCED	200	VENTURA	3,200	TULE CREEK

DATE OF PLANT	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
6/13/49	IDaho	2	52 5	3	39 30 5	5	INYO	8,500'	INYO	6,000'	TINNEMAH CREEK
6/23/49	GOLDEN	2	33 23	2	21 37	4	MERCED	180'	S. LUIS OBISPO	200'	COON CREEK
6/23/49	GOLDEN	2	35 38	3	31 33 34	5	MERCED	180'	S. LUIS OBISPO	200'	ISLAY CREEK
6/27/49	SHASTA	3	46 26 40	3	48 50 30	6	MODOC	5,000'	LASSEN	7,500	MOSQUITA CREEK
7/5/49	SHASTA	3	23 22 23	2	46 28	5	MODOC	4,500'	LASSEN	8,000	RED ROCK CREEK
7/5/49	GOLDEN	2	29 40	2	26 45	4	STANISLAUS	150'	MONTEREY	1,600	UPPER CHALAME CREEK
7/5/49	GOLDEN	3	26 32 35	2	27 33	5	STANISLAUS	150'	S. LUIS OBISPO	200	DIABLO CREEK
7/13/49	GOLDEN	4	47 40 31 37	4	53 26 22 35	8	STANISLAUS	180'	TULARE	7,500'	PINE CANYON CAMP CREEK
7/15/49	SHASTA	2	42 26	2	31 46	4	SISKIYOU	2,500'	SISKIYOU	3,500'	NOYES CREEK
7/18/49	SHASTA	1	9 10	2	9 10	3	SISKIYOU	2,500'	SISKIYOU	3,500'	NOYES CREEK (BOLSTER)
7/22/49	SHASTA	2	51 31	4	24 50 11 9	6	SISKIYOU	2,500'	SISKIYOU	5,300'	MULE CREEK
7/22/49	GOLDEN	3	30 28 11	2	39 32	5	STANISLAUS	300'	TULARE	6,200'	NOBE YOUNG CREEK

DATE OF PLANT	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
7/26/49	GOLDEN	1	30	1	34	2	STANISLAUS	300'	S. BARBARA	500'	JACKSON CREEK
			23		29						
7/29/49	SHASTA	2	34	2	26	4	SISKIYOU	3,000'	SISKIYOU	5,400'	GROUSE CREEK
			34		38						
8/1/49	GOLDEN	3	27	3	40	6	STANISLAUS	300'	ORANGE	750'	GUBERNADORE CANYON CREEK
			44		20						
8/2/49	GOLDEN	2	28		8						
			36	4	41	6	STANISLAUS	300'	L. ANGELES	2,800'	SOLEDAD CREEK
					31						
					8						
8/3/49	SHASTA	2	50		42						
			54	2	24	4	SISKIYOU	2,800'	SISKIYOU	4,000'	FRENCH CREEK
			20		21						
8/6/49	GOLDEN	3	36	2	31	5	STANISLAUS	300'	RIVERSIDE	7,200'	WILLOW CREEK
			34								
8/6/49	GOLDEN	2	21		30						
			44	2	42	4	STANISLAUS	300'	RIVERSIDE	7,500'	TAHQUTY CREEK
			32		28						
8/8/49	SHASTA	2	43	2	40	4	SISKIYOU	2,800'	SISKIYOU	6,000'	MIDDLE BOULDER CREEK
					48						
8/14/49	SHASTA	1	12	2	40	3	SISKIYOU	2,800'	SISKIYOU	3,200'	NOYES CREEK (BOLSTER)
			28		34						
8/15/49	GOLDEN	2	24	4	26	6	STANISLAUS	300	KERN	4,000'	THOMPSON CREEK
					8						
					42						
8/22/49	GOLDEN	3	36		17						
			43	4	38	7	STANISLAUS	300	RIVERSIDE	5,200'	STRAWBERRY CREEK
			12		10						
					46						
8/23/49	GOLDEN	2	37		30						
			44	4	30	6	STANISLAUS	300	L. ANGELES	3,000'	KINSEY RANCH CREEK
					42						
					26						

DATE OF PLANT	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
8/23/49	GOLDEN	2	48 46	4	54 42 40 42	6	YUBA	64'	YUBA	1,000'	DRY CREEK (FOSS MEADOW)
8/29/49	GOLDEN	3	36 22 19	3	36 37 19	6	MERCED	280'	TULARE	7,000'	LONG MEADOW
8/29/49	GOLDEN	2	31 36	3	33 36 31	5	MERCED	280'	TULARE	8,600'	PEEKS CANYON CREEK
9/5/49	GOLDEN	4	54 45 44 62	8	26 29 35 40 47 32 44 32	12	MERCED & YUBA	180' 65'	YUBA	500'	DRY CREEK (CAMP BEAL)
9/7/49	GOLDEN	2	38 32	1	16	3	YUBA	65'	TEHAMA	2,200'	MIDDLE FORK BEE GUM CREEK
9/10/49	GOLDEN	2	43 36	3	38 30 44	5	MERCED	200'	KERN	3,500'	SAGE CANYON CREEK
9/10/49	GOLDEN	2	56 48	1	28	3	YUBA	100'	YUBA	500'	DRY CREEK (CAMP BEAL) (BOLSTER)
9/11/49	GOLDEN	2	35 26	3	36 22 35	5	MERCED	200'	TULARE	7,500'	FISH CREEK
9/14/49	IDAHO	2	54 40	2	54 18	4	NEVADA	5,000'	ELDORADO	6,500'	LYONS CREEK
9/16/49	GOLDEN	3	33 28 32	3	8 38 30	6	MERCED	180'	KERN	5,500'	CUMMINGS CREEK
9/16/49	GOLDEN	3	42 44 36	3	42 34 38	6	MERCED	180'	L. ANGELES	4,250'	FISH OR ATMORE MEADOWS CREEK
9/24/49	SHASTA	1	36	1	34	2	MODOC	4,446'	MODOC	5,500'	BARBER CREEK
9/30/49	GOLDEN	2	40 38	4	32 46 16 17	6	MERCED	180'	TULARE	6,000'	TAMARACK CREEK

DATE OF PLANT	KIND	MALE	WEIGHT	FEMALE	WEIGHT	TOTAL	COUNTY TRAPPED	ELEVATION TRAPPED	COUNTY PLANTED	ELEVATION PLANTED	LOCATION OF PLANT
9/30/49	GOLDEN	2	33 34	4	26 24 32 32	6	MERCED	180'	TULARE	6,500'	SHEEP CREEK
10/2/49	SHASTA	1	46	4	44 32 46 38	5	MODOC	5,500'	MODOC	5,500'	BARBER CREEK (BOLSTER)
10/7/49	GOLDEN	2	29 46	3	30 35 33	5	MERCED	180'	SAN DIEGO	4,800'	WEST FORK SAN LUIS REY RIVER
10/8/49	GOLDEN	3	33 11 25	4	26 28 32 12	7	MERCED	180'	S.DIEGO	1,800'	LOST VALLEY CREEK
10/11/49	GOLDEN	4	48 48 30 46	2	32 42	6	YUBA	65'	YUBA	1,000'	DRY CREEK (FOSS MEADOW) (BOLSTER)
10/9/49	GOLDEN	2	34 23	3	33 24 33	5	MERCED	180'	S.DIEGO	4,000'	LAPOSTA CREEK (ANTONE CANYON)
10/13/49	GOLDEN	2	18 18	2	42 30	4	YUBA	65'	NEVADA	1,700'	WOLF CREEK
10/18/49	GOLDEN	3	24 34 50	-	-	3	YUBA	65'	YUBA	500'	DRY CREEK (CAMP BEAL) (BOLSTER)
10/19/49	GOLDEN	1	34	2	40 36	3	MERCED	180'	FRESNO	5,700'	TEN MILE CREEK (BOLSTER)
10/19/49	GOLDEN	1	39	5	27 16 7 17 55	6	MERCED	180'	FRESNO	6,000'	INDIAN CREEK
TOTALS		139		164		303					54 PLANTINGS

25/2/21/50

BEAVER SUMMARY FROM MAY 1, 1949 TO OCTOBER 31, 1949

TOTALS FOR 5 SEASONS						
YEAR	KIND	MALE	FEMALE	UNKNOWN	TOTAL	NUMBER OF PLANTINGS
1945	ALL	47	44	13	104	27
1946	ALL	82	87	--	169	43
1947	ALL	83	85	--	168	41
1948	ALL	116	127	--	243	57
1949	ALL	139	164	--	303	54
GRAND TOTAL	ALL	467	507	13	974	222

30/2/23/50

Prior To 1945
TOTAL

NO. PLANTED NO. PLANTS

234 52

1208 274

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND GAME
FIELD CORRESPONDENCE

FROM: Merl A. Sturgeon

PLACE Lakeport, Calif.

TO:

DATE October 24, 1950

SUBJECT: Beaver plants made in Big River, Mendocino Co.

According to Warden Holmes, of Fort Bragg, beaver were planted at the mouth of Two Log Creek around 1937 (?). He did not recall the number or sex. These animals increased and are now in many of the tributaries of Big River - these being Wildhorse, Ramone, Clearbrook, East Branch, Valentine, Little North Fork, Dougherty, and perhaps others.

Information gathered from Mr. Al Lynn gives one male, one female, three, sex unknown, planted October, 1941 at S30-T17N-R17W. Plant accessible by car from Mendocino City. The sub-species planted were Goldens (*Castor Subauratus subauratus*, Taylor).

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CALIFORNIA REGION

DIVISION OF FISH AND GAME
GAME CONSERVATION

OCT 10 1949

Referred to

630 SANSOME STREET
SAN FRANCISCO 44, CALIFORNIA

ADDRESS REPLY TO
REGIONAL FORESTER
AND REFER TO

F
AERIAL
Cargo Parachutes

YOL-3111
4-580

October 7, 1949

Division of Fish and Game
Attention A. V. Lynn
Ferry Building
San Francisco 11, California

Dear Sir:

Reference is made to your letter of October 3.

We use 10x10 burlap parachutes to drop fire supplies and equipment in isolated areas. We have found the Baker modified cargo chute most satisfactory for this purpose. (See attached folding specifications.)

The following list of material is needed for one cargo chute:

- (a) 10x10 canopy (made up as per attached specifications).
- (b) 5 shroud lines (requires about 100 feet per canopy).
Use Army-Navy Specifications AN-C-63a, February 5, 1944.
550# test nylon cord, 75 yards per pound.
- (c) One 1 3/8" closed galvanized guy thimble.
- (d) One poultry bag #1.
The bag holds the chute after it has been packaged so as to insure good drop.
- (e) 6 feet of cord, 50# test.
This is used as pull-out cord.

The burlap canopies may be purchased, made up, from Ames, Harris, Neville Company, 2800 17th Street, San Francisco, at a cost of about \$3.50 each.

The nylon shroud cord may be purchased from Security Parachute Company, Oakland Airport, or Western Lace and Line Company, Glendale.

The guy thimble, string, and poultry bag can be purchased from regular dealers.

2-Division of Fish and Game-10/7/49

Our Regional Fire Warehouse at Redding has personnel trained in cargo packaging and parachute assembly. We would be glad to make their services available to you in giving your men training in this work. Our suggestion is after you purchase the necessary parachute material you take it to our Redding Warehouse and have our warehouseman Powell give your men training in the job of parachute assembly.

Mr. Reedy and Mr. Norton of your Sacramento office are also interested in some cargo dropping on the Eldorado Forest. It may be possible for both of your offices to get together on a consolidated purchase of parachute material and in the assembly training. We are sending them a copy of this letter for their information.

Very truly yours,

Attachment

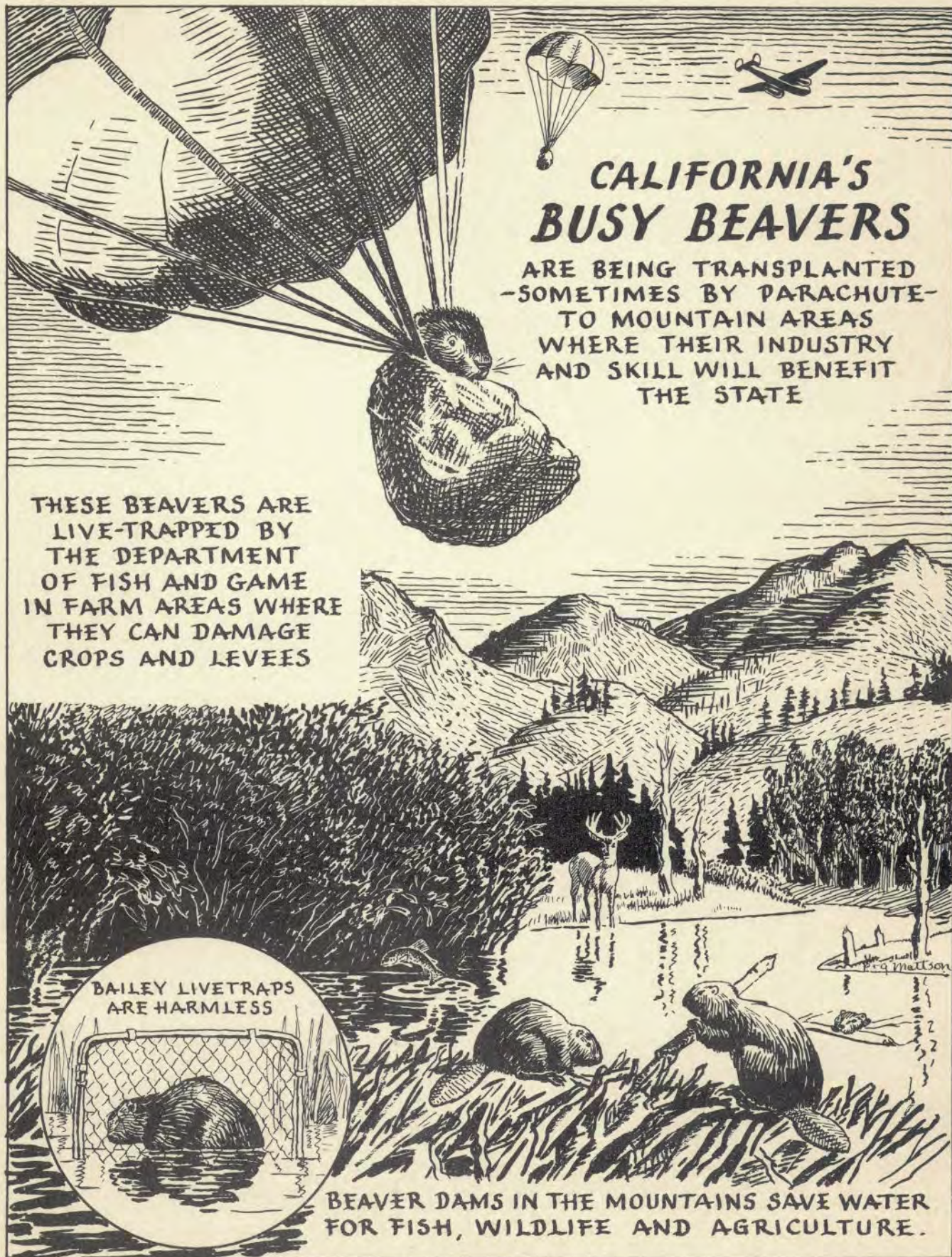
cc: Division of Fish and Game
Attention Mr. Reedy
Sacramento, California


FRANK J. JEFFERSON, Chief
Division of Fire Control



OUTDOOR CALIFORNIA

BY THE DIVISION
OF FISH & GAME



CALIFORNIA'S BUSY BEAVERS

ARE BEING TRANSPLANTED
-SOMETIMES BY PARACHUTE-
TO MOUNTAIN AREAS
WHERE THEIR INDUSTRY
AND SKILL WILL BENEFIT
THE STATE

THESE BEAVERS ARE
LIVE-TRAPPED BY
THE DEPARTMENT
OF FISH AND GAME
IN FARM AREAS WHERE
THEY CAN DAMAGE
CROPS AND LEVEES

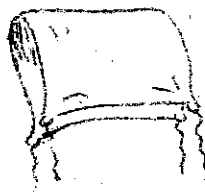
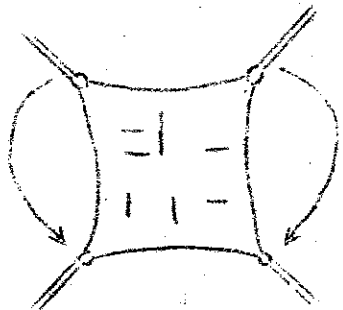
BAILEY LIVETRAP
ARE HARMLESS

BEAVER DAMS IN THE MOUNTAINS SAVE WATER
FOR FISH, WILDLIFE AND AGRICULTURE.

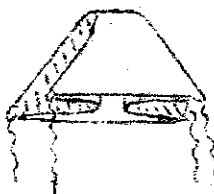
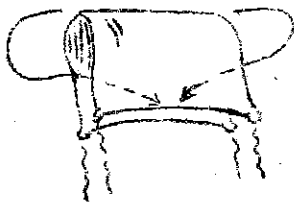
all

Folding Burlap Parachutes: Personnel Method

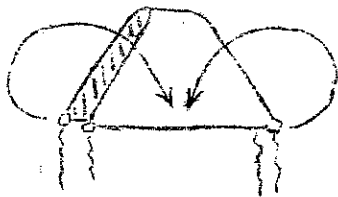
This method as described below gives the reliability and quick-opening so essential to successful aerial delivery. It applies to both modified and unmodified canopies. The paper container insures easy handling and air crew safety.



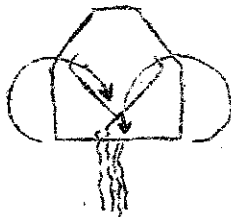
1. Lay chute flat; inspect corner knots to make sure they are tight. Fold chute in half.



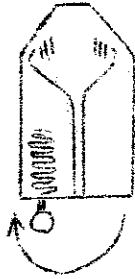
2. Fold top corners down to inside center.



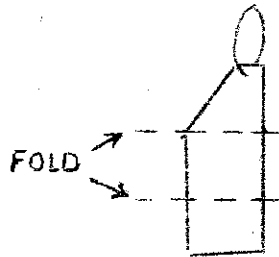
3. Overlap corners together at center.



4. Fold corners to center.

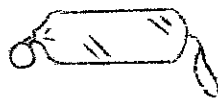


5. Place the folded shroud lines on one half of the chute. Fold the chute in half.



6. Sew in a pull-out cord having tensile strength of 50 lbs.

Accordian pleat the chute into a three-fold bundle.

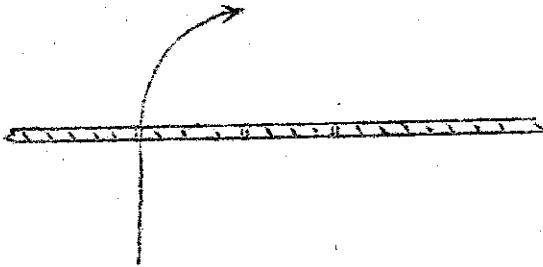


7. The pull-out cord is passed through a hole in the bottom of a paper bag,* and the chute slid in. The hondoo is left protruding from the open end of the bag. This opening is closed with four staples.

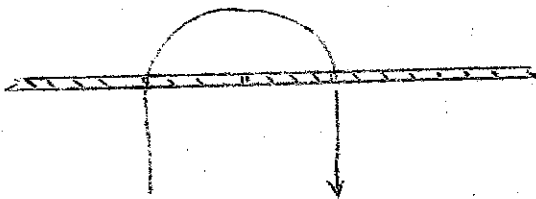
* Poultry Bag #1

Baker Modification

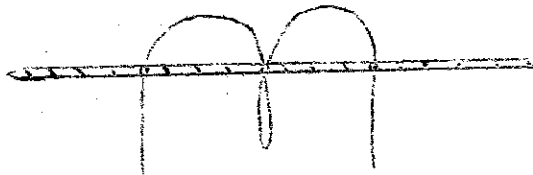
To install the Baker modification in the burlap cargo chute three grommets are first installed around the center of the canopy at the corners of an eight-inch equilateral triangle.



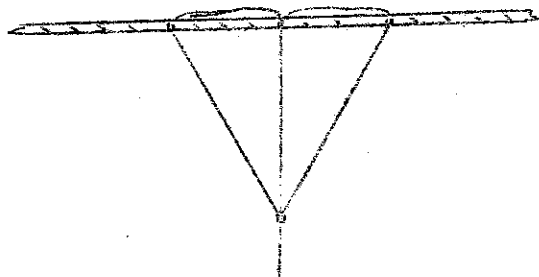
1. A length of shroud line approximately 19 feet long is threaded up through one grommet.



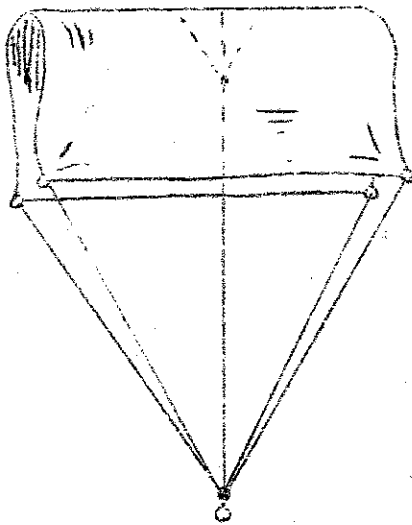
2. The shroud line is passed down through the third grommet.



3. The shroud is gathered at the top and the double line passed down through the second grommet.



4. The two loose ends are tied to the remaining shroud line with a Bowline knot 14 to 18 inches below the parachute canopy.



5. The length of the center cord is determined by folding the parachute in half, the corner shroud lines pulled taut and the center cord tied onto the hondoo.

Because of the quick opening characteristic of the Baker modified cargo parachute it will be used on all low-level cargo drops. In the event no modified chutes are available no dropping should take place below 250 feet.

Maximum weight limitations.

1. Unmodified 50 square feet canopy to 30 pounds.
2. Modified 50 square feet canopy to 40 pounds.
3. Unmodified 100 square feet canopy to 50 pounds.
4. Modified 100 square feet canopy to 60 pounds.

Minimum weight is 25 pounds.

Changing air density will necessarily decrease these limitations.

Above 3500 feet the cargo weight should be reduced 10% for each 1,000 feet of elevation.

3. FORM AD-215, "General Conditions Applicable to Supply Contracts" is attached and forms a part of this bid.

SPECIFICATIONS:

MATERIAL: To be of clean Jute Burlap, weight 10 (or 12) ounces per linear yard (40 inch basis), in accordance with Federal Specification CCC-B-811, June 28, 1932 as amended February 1936, and August 1936. The Burlap to be of the grade designated by the trade as "Cropped and Mangled".

CANOPY, 10' x 10' approximately. To be made of three widths, 40 inches wide, cut to finish 118 inches long over-all, including hem.

SEAMS: The separate widths or panels in canopies to be stitched together with one-inch overlapping seams, using triple chain stitch, 5 stitches per inch, in accordance with Seam Type LSa-3, Federal Specification DDD-S-751, March 4, 1930.

HEMS: All cut ends to be hemmed, using chain stitch, 5 stitches per inch, in accordance with Stitching Type EFb-1, Federal Specification DDD-S-751, March 4, 1930.

THREAD: Top or needle thread to be Number 12, 4-cord cotton, unbleached, tensile strength 9.10 pounds (minimum) silk or hard finish. Lower or lock stitch bobbin thread to be Number 16, 4-cord cotton, unbleached, tensile strength 6.20 pounds (minimum) soft finish. Both to be in accordance with Table I, Machine Thread Type I, Federal Specification V-T-276b, December 30, 1937.

- End of Bid -

85'
2 lines 30' long