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Ranchers' Friend and Farmers' Foe: Reshaping Nature with Beaver Reintroduction in California

Abstract

The twentieth-century project to restore animals to their former ranges often relied on the common support of sportsmen's groups, wildlife managers, and biologists. Beavers were common but controversial subjects of early reintroduction programs throughout the North American West. In California, rapidly expanding industrial agriculture created a particularly intense conflict over the fate of remaining beaver habitat. Advocates turned to higher elevation ranch lands to relocate problem beavers, emphasizing the economic benefits of raising water tables and reclaiming the potential resource repositories of the foothills and mountains. These habitat extensions were a novel means of commoditizing an animal whose status shifted from harmful to beneficial depending on location and situation.

INTRODUCTION

By the spring of 1950, beavers had pushed A. N. Bain to his limit. His long-running battle with the California Division of Fish and Game

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revolved around animals the agency had planted near his property on Redwood Creek. Writing from Orick in coastal Humboldt County, he laid out his complaint one more time: "In regards to the beaver that was so unfairly forced upon us land holders here about five years ago. They are doing much damage [as] they have cut the willows away from the banks and dug holes in the bank. The bank is washing away on my place."¹ Fish and Game agent Nathan Rogan investigated Redwood Creek in June 1950 and he reported that, contrary to Bain's complaint, "apparently there are only a very few [beaver] there" and that the complaint stemmed from the fact that "the beaver damaged some carrots."²

A subsequent letter reflected Bain's mounting complaints over the summer. Exhibiting both creative spelling and grammar, Bain referred to his latest strategy, a "pertition" to extirpate the beaver:

In regard to your letter about the legality of me trapping the beaver here, what we ask for in the pertition was a open season on Redwood Creek as long as there are *any* beavers here, and not for a permit for me to catch a part of the beaver or for a fish & game trapper to catch part we have had trouble enough this time and we don't perpose to go thru this again. If you want to send a trapper to catch all the beaver on Redwood creek and tributories that is all right with us, but if you are just going to catch some and then forget about the strglers then, We insist that you declair an open season as you perposed when you was here.³

As they had for several months, Fish and Game once again put off Bain with the explanation that it would be necessary to submit any such petition to both the California legislature and the Fish and Game Commission. They also noted that the legislature would not meet again until January 1951 and that, even if they chose to enact any such legislation, it would not take effect until a further ninety days passed. With this conjectural scenario totaling well over a year from his initial complaint, they again advised Bain that the best method of removing the beavers would be by a state trapper who would, they reassured him, "remove *all* the beaver from the area," relocating them to a distant site.⁴

The 350 miles between Orick and Sacramento was a very long day's drive in 1950, and some of the responses from the state capitol had crossed Bain's complaints in the mail. No petition appears in the file containing Bain's other correspondence, and the accumulated responses seem to indicate that Fish and Game never received one in spite of Bain's repeated references. However, upon understanding that Fish and Game intended to finally remove the beavers from the neighborhood, Bain appeared to be content. He wrote, "I am perfectly satisfied with it and kuick [sic] results is what we want . . . now we will be

looking forwid [sic] to the catching of them."⁵ By the end of winter, Fish and Game relocated the troublesome animals once again and rid themselves at last of one of their most prolific complainants, promising a brighter future for carrots along Redwood Creek.

Mr. Bain could be understood as simply one of many Californians complaining about wildlife and state government protection of troublesome animals. However, in practice, trapping and relocation tended to move animals from lowland agricultural areas where they were a problem to more remote areas where they could do less harm. Indeed, the so-called reintroductions often introduced beaver into areas where they had never extended their range before. By the time Bain engaged in his letter-writing campaign, California's beaver program was in the middle of its second decade and increasing in momentum. Beaver relocation programs moved animals that farmers and water managers considered to be bad actors, most often transferring them from rich farmlands to less valuable ranchlands and woodlands.

The twentieth-century project to restore beaver populations in California is in some respects typical of the larger story of American conservation. The history of animal management is replete with incidents revealing the complex relationships between and interests of sportsmen, conservationists, farmers, and ranchers. Concerns about the disappearance of animals from the landscape played a genuine role, but such worries most often extended to landscapes that still seemed likely to remain in a semiwild, pastoral state. William Cronon has described this perceived distinction as one between first nature and second nature, while convincingly arguing that there are very few landscapes unshaped by humans.⁶ For those who advocated California's increased productivity, agricultural land in the Central Valley was a landscape of a recognizably different nature than mountainous California. Prosperity after the Gold Rush relied on making the valley floor an efficient agricultural machine, and this, in turn, shaped beaver translocation. To farmers and ranchers, and, ultimately, state biologists and land managers, the distinctions between rapidly mechanizing lowland farms and pastoral upland ranches made the critical difference. The partitioning of California's landscape between obviously industrialized agricultural landscapes and more pastoral uplands played a central role in restoring beaver to their supposed place in California.

In terms of reestablishing viable populations, beaver restoration was one of the great successes of animal management in the twentieth century. Under protection and relocation programs, California beaver populations expanded from about 1,300 in 1942 to an estimated 20,000 by 1950.⁷ However, where and how the species could be restored hinged on perceived distinctions between the right and wrong places for wild animals.

MAKING SECOND NATURE

It took only a few years in the early nineteenth century for trappers to nearly exterminate beaver from much of the American West. Using their monopoly to extend British policies, the Hudson's Bay Company (HBC) operated both to ensure future profitability for more valuable northern territory and as a de facto arm of the British government in the Far West. Their deliberate strategy to "scorch the streams" and destroy the fur resources south of the Columbia River resulted in intense competition between British and American trappers. As HBC trappers hunted furbearers year round in the Far West, their American rivals scrambled to harvest the same resource. The predictable (and predicted) effect was devastation of beaver populations in an arc from California to Montana. From the mid-1820s to the 1840s, this "fur desert" effectively thwarted American trappers' efforts to penetrate the Pacific Northwest. By 1841 HBC governor George Simpson could announce that it was "highly gratifying to be enabled to say that all opposition from the United States is now at an end."⁸

Having won the western beaver wars, the HBC secured the thicker, more valuable pelts of British Columbia and Alberta for their long-term management and profit. Though the most common explanation for American failure in the fur trade has long been the collapse of markets for felt hats, the HBC continued to ship beaver pelts throughout this period. The company deliberately reduced production in the 1840s as both a measure to deal with "the new fashion of using silk in the place of beaver wool," but also as a conservation measure to maintain a steady fur resource. Prices bottomed out in 1847, and careful management enabled the company to enter a new era of prosperity. E. E. Rich, historian of the HBC, noted that "by the 1860's [sic] the fur trade was prosperous as it had never been before."⁹

Beaver populations across the American West, with time and a reprieve from such intense market forces, rebounded across much of their former range. However, many areas remained without beaver by the mid-twentieth century. Biologists surveying California found fewer than twelve hundred animals. Anthropologists conducting culture element surveys failed to find beaver in areas where trappers had caught the animals and observed items made from beaver pelts. For example, Frank Essene listed beaver as "not eaten" in the Coast Range homelands of Kalekaus and Lassiks "because lacking or impossible in environment inhabited." Harold Driver listed beaver-tooth scrapers used elsewhere as an explicitly absent cultural item among his Native American informants in Northern California. In fact, no other beaver items appear in Driver's survey of northwestern California. Of all of the culture element surveys made in California, only in the Cascade Range in the northeast did indigenous people report regular beaver use as food, clothing, or tools.¹⁰

In areas isolated from nearby repopulation pools, such as northern Nevada and much of California, beavers disappeared completely. With an overland travel range of roughly five kilometers between water sources the maximum observed for beaver, it would have been miraculous for beaver to reestablish themselves by crossing the desert basins between ranges in Nevada or Southern California. In much of the state, the habitat to encourage expansion was simply not present. The steep gradients of many Sierra Nevada streams fed by melting snow are unsuitable for beaver dams. Beaver were so rare higher than a thousand feet above sea level and so plentiful in the lowlands in the early nineteenth century that HBC trappers did not bother themselves with the mountains.¹¹

The only historically documented beaver populations in the Sierra come from the Carson River on the eastern slope. There, a remnant population of a Great Basin subspecies native to the Humboldt and Carson Rivers lived on until extirpated in the early 1890s. Elsewhere, silence from experienced trappers actively seeking beaver in the Sierra speaks volumes. Zenas Leonard is typical in making no mention of beaver crossing the Sierra along the upper Merced River in 1832, even though his party of trappers was suffering from hunger and desperately searching for animals to trap and eat. HBC trapping parties thus followed a lowland strategy in spite of ongoing problems navigating the seasonally inundated Sacramento River valley, partly because they understood the Sierra foothills as poor beaver habitat.¹²

Unsuitable riparian vegetation, rocky banks, and steep fast-flowing streams combined to keep beaver largely confined to the lowlands that have been their range for millennia. Though some beaver made their homes in the high Sierra, the animals were far more plentiful at lower elevations. Fluctuations between the low water of late summer and spring freshets would have destroyed beaver dams on a regular basis in most Sierra foothill streams, and beaver tended toward the areas with the lowest gradients as an adaptation to California's hydraulic patterns. Throughout the first decades of the project, beavers placed at less than optimal sites continued to abandon high gradients for flatter terrain.¹³ In addition, hydraulic mining related to the Gold Rush era later made the hydrology of rivers flowing from the Sierra Nevada even less suitable for beavers. Gold mining literally turned many streams upside down, dredging river bottom sediments and gravels and then depositing rocky banks of mine tailings. Even on the valley floor, these barren gravel ridges replaced many willow and cottonwood flood plains.

Levees confine the same rivers in their lower reaches. In some cases, siltation from upstream hydraulic mining elevated riverbeds above the level of surrounding towns and farmland. Debris loads did not peak until the early decades of the twentieth century in several major Sacramento River tributaries. Californians have long worried about

flooding from elevated rivers crossing drained bottomlands en route to the ocean. Robert Kelley argued that the combination of snowmelt and the reengineered Sierra Nevada streams made “the intensity of flood conditions in the Sacramento Valley. . . greater than in any other river valley in the United States.” Continuing vigilance against burrowing animals further reduced beaver populations in some areas, especially in the Central Valley near towns and farms protected by an extensive system of dikes and levees.¹⁴

Thus, by the twentieth century, beaver remained scarce in much of their original range. Only three regions of California held beaver in the early 1900s. In the extreme south, along the Lower Colorado River and extending into northern Mexico, lived a population of Sonoran beaver (*Castor canadensis repentinus*). Scattered throughout the San Joaquin-Sacramento River Delta less than a thousand Golden beaver (*C. c. subauratus*) made up the most widespread population. Thirteen “native colonies” of Shasta beaver (*C. c. shastensis*) in northeastern California’s Modoc County comprised the final population within California’s borders. The Humboldt subspecies (*C. c. baileyi*) had been present on the Carson River east of the Sierra as late as the 1890s but appears to have been extirpated early in that decade. By 1942 the American Committee for International Wild Life Protection listed all four subspecies in their guide, *Extinct and Vanishing Mammals of the Western Hemisphere*.¹⁵



Figure 1: “Investigating a 100-foot long dam, Merced County, CA, Feb. 22, 1920.” Locals told Joseph S. Dixon that this beaver pond near Snelling was at least sixty years old but that beaver plugging nearby irrigation ditches had recently become a nuisance. Trappers caught nineteen beaver here and over a hundred from adjacent waterways in the first two and a half months of 1920. Credit: Joseph S. Dixon, photographer. Museum of Vertebrate Zoology, University of California, Berkeley, Image 3250.

Of course, beavers were not the only animal missing from the landscape. On a regional level, many animals had been locally extirpated or had retreated into shrunken ranges. In the Central Valley, over 90 percent of wetlands disappeared, remade into farmland. Market hunting also took its toll on several game species, serving as a rallying cry for sportsmen's associations. By the reckoning of conservation booster and editor of *Outdoor Life* Lonnie Williamson, "the 20th Century arrived with wildlife flat on its back."¹⁶

Sportsmen's first focus of animal protection and propagation through the late 1800s and the early 1900s was of several species of game fish, reflected in the 1870 formation of the California State Fish Commission. Hunters also lobbied for measures to secure their favorites: deer, elk, and especially waterfowl; the commission recognized their expanded responsibilities, adding "Game" to their name in 1909. Two further changes reflected the pattern of wildlife regulation as an increasingly important concern for California's legislature. The commission transformed into the Division of Fish and Game as a component of the Department of Natural Resources in 1927. By 1950 Fish and Game was elevated to separate department status.¹⁷ However, increased bureaucracy did little to change the agency from its early twentieth-century status as a chronically underfunded and understaffed arm of state government. Within California, regional game wardens attempted to enforce a growing number of new hunting and fishing regulations with varying success in the face of older traditions.

The onset of the Great Depression boosted wildlife restoration efforts arising over the previous decade, bringing key federal funding and an ethos of turning at least some marginal farmlands over in the interest of conservation. The 1930s witnessed passage of the Duck Stamp Act (1934), the Fish and Wildlife Coordination Act (1934), and the Cooperative Wildlife Research Program (1935). Most importantly for wildlife restoration efforts, the Federal Aid in Wildlife Restoration Act (popularly known as the Pittman-Robertson Act) passed Congress in 1937, and California began participation in 1940. The program levied an 11 percent federal excise tax on rifles, shotguns, ammunition, and archery equipment, and eventually included recreational fishing equipment as well.¹⁸ Game refuges and preserves, numerous biological studies, and even shooting ranges funded partially or wholly by these funds have shaped wildlife management and outdoor recreation ever since. The central aim of the act was clearly to support hunters and hunting through conservation of game, not to restore wildlife or ecosystems as a whole.

Refuges for waterfowl emerged in an era in which hunting waterfowl served the dual purposes of hunters' interests and as a measure to reduce crop damage. The state Fish and Game Commission reported in 1918 that "[t]here has been no more important problem confronting the Commission during the past biennium than that relating to ducks

and the rice grower." The same year, the Sacramento District Office (it turns out falsely) claimed to have finally quashed illegal market hunting of waterfowl, breaking the "Calusa ground sluicers."¹⁹ Yet as early bird refuge managers struck an uneasy balance with neighboring farms and predator control efforts aimed to maximize deer and elk populations, a small group of biologists began a program to reinsert beavers into California ecosystems.

The beaver reintroduction program's purpose was an unusual one. It sought to rehabilitate a nongame species during an era in which Fish and Game departments concerned themselves almost exclusively with protecting the prey of hunters and stocking waters for fishermen. It did not always go smoothly, and the introduction of a new species to Redwood Creek was not the only one to generate a substantial complaint file in the state Fish and Game headquarters in Sacramento.

The economic benefit to rural communities near restored hunting areas has long been a key selling point of the various incarnations of Fish and Game departments. In the years before World War II, and perhaps especially so during the Great Depression, the state and federal agencies involved in conservation emphasized the links between hunting, fishing, and economic benefits. Reflecting its sportsmen's origins and funding, over the past seventy years, the Pittman-Robertson Act has bestowed most of its monies on big game and waterfowl. The contemporary economics of outdoor activity rarely considered citizens who traveled to view wildlife, but instead focused on the more obvious economic contributions of hunters who traveled to kill game. In a 1950 pitch to the California State Chamber of Commerce typical in its appeal to the intangibles of nature appreciation, a consultant to the California Wildlife Conservation Board expounded, "Thank God, there are still some fine things left in life upon which man has not yet stamped a dollar mark. Among them are the beauty of a gorgeous sunset, a shimmering waterfall, an enthralling mountain panorama, the thrill of seeing creatures of the wild in their natural element, or the character and health building values of close association with the beauties of nature." He then proceeded to outline, in dollar amounts, the calculated contribution of hunting and fishing to California's economy.²⁰

It is interesting, then, to consider the role of nongame wildlife in the context of hunting-based conservation efforts of the mid-twentieth century. The Tule Elk, which in many ways stood in for the buffalo as a big game cause célèbre in California, was one of only two non-game-bird species to significantly benefit from Pittman-Robertson funds in the initial years of the program in California.²¹ The other, more enigmatically, was the beaver.

The Delta and the rich farmlands of the lower Sacramento and San Joaquin Rivers were followed by the irrigation-fed farms of the Imperial Valley adjacent to the Lower Colorado River as sites of rapid large-scale

agricultural transformations. Flood irrigation networks quickly replaced beavers' efforts with another kind of hydraulic manipulation. The rapid transformation of thousands of acres of wetlands into farms helps to explain why duck and goose hunters lobbied for refuges to protect their favored birds. However, in comparison to waterfowl, beavers had few supporters. A vague attachment to a romanticized Mountain Man past was not enough to sway most landowners to allow the threatening animals to multiply. Farmers, irrigation district managers, and others argued that beaver did not belong in valuable agricultural lands, in part because the same features that had made the flat valley floor and lowlands California's original beaver habitat also made for prime farmland.²²

Sportsmen and farmers viewed beavers newly introduced in the mountains as a restoration of an animal to its rightful place, but they increasingly perceived the same animals in the levee-strewn Delta or the canals of the Imperial Valley as vermin. An excerpt from a 1930 US Forest Service newsletter for the California region reveals the official division of good and bad animals. Acknowledging the admirable efforts of the Department of Agriculture's Biological Survey to destroy varmints, the author gave a "conservation-based" list of good and bad animals. "The Biological Survey of the Department of Agriculture is our great custodian and fosterer of wild life. . . . It exterminates varmints, like wolves, coyotes, mountain lions, bobcats, lynxes, prairie dogs, pocket gophers, porcupines, moles and field mice. It also

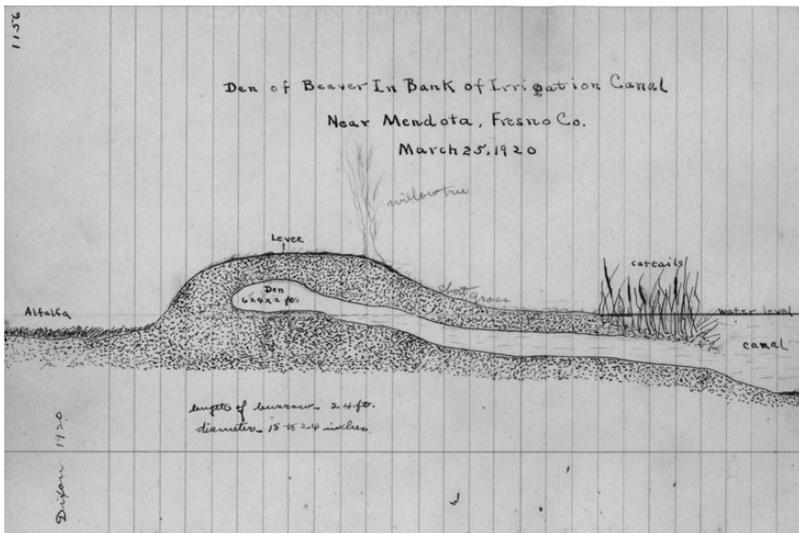


Figure 2: "Den of beaver in bank of irrigation canal near Mendota, Fresno County, CA, March 25, 1920." Dixon's sketch of a 24-foot-long burrow illustrates the obvious potential for levee failure. Credit: Joseph S. Dixon, field notes section 2, "Fresno Co., Calif., 1920," 1156. Museum of Vertebrate Zoology, University of California, Berkeley, v595_s2_p007.

cultivates and encourages beneficent and useful creatures like muskrats, bison, antelope, mule deer, mountain sheep, reindeer, karakul sheep, raccoons, martens, and silver foxes."²³

The custodial role of the Biological Survey fell well within the ambitions of the Department of Agriculture to manage the landscape to increase economic benefits, but the survey's ongoing charge to protect at least some good animals placed it at the focal point of contention between conservationists and farmers. In the atmosphere of the Great Depression, sympathy and occasional optimism shaped schemes to produce money from game animals, furbearers, and even exotic oddities such as karakul sheep or reindeer. In contrast, a range of varmints, from wolves to field mice, threatened farmers, ranchers, and sportsmen.²⁴

The particular mission and ethic, which supposedly put the survey at odds with its parent department, was especially relevant to furbearing animals. According to the agency newsletter, the survey "specially delights in animals which bear furs. It therefore adores swamps. This love of swamps, one of the Biological Survey's main points, exhibits most strikingly its conservational—rather than agricultural—character. Agriculture wishes to reclaim lands from being swampy. The Biological Survey suffers great agony when a swamp is drained and a muskrat loses its home."²⁵

Swamps were a particularly potent symbol of wasted land antithetical to efficient agricultural management practices. The editorial ended with an appeal to move the Biological Survey into a "general department which is not dedicated to the special business welfare of any one group." Only outside the Department of Agriculture's intentions to destroy wetlands and weigh farmer's interests first, the author argued, could the Biological Survey's mission "to conserve wild life for the benefit of farmers, trappers, hunters, vacationists, citizens in general, and the nation at large" effectively address the needs of all groups. That the article made no specific mention of beaver is not surprising because the animal was far from common in 1930. Highlighting the more common muskrats shows that determining whether an animal was worth defending or extermination almost completely depended on circumstance and perspective. However, in contradiction to the Biological Survey's beneficial assessment, the California Division of Fish and Game proclaimed that burrowing muskrats caused much more damage to levees than any species of beaver, squarely placing them in the category of bad actors.²⁶

Hyperbolic agony over the poor muskrat aside, the appearance of trappers as one of the major groups to benefit from the work of the survey speaks to official attitudes within both the Forest Service and the conservation movement of animals as resources. Animals appearing to detract from profits, or having little economic value in and of themselves, were almost always labeled as varmints. Those animals from which some dividend could be reaped were tagged as beneficial, and

the Biological Survey, Forest Service, Fish and Game, sportsmen, and conservationists took varying measures to boost the populations of their favored animals. True conservationists, so the reasoning ran, should see the logic of beavers as worth saving as they embodied potential economic value of up to \$30 each in the 1930s.²⁷

In one of a series of pamphlets designed to encourage fur farming, a Biological Survey author admitted that the time for beaver farming was premature, in spite of the potential. A safely profitable future where beavers might be raised on fur farms much as rabbits, foxes, or minks, depended on getting the animals to "a wholly controlled if not a fully domesticated condition." The conclusion emphasized that "if beavers are to be treated as public property, it is as objectionable to place them on private land where they will destroy crops and timber as it would be to turn herds of hogs and cattle into cultivated grainfields to fatten on what they like best."²⁸ In short, domestication and private ownership were the keys to a return of the heyday profits of the nineteenth century.

Mirroring their efforts to help conserve good animals, agencies attempted to reduce the presence of animals perceived as having negative economic and aesthetic effects. Waging war on undesirable animals has a lengthy history, but the connections of commercial value and animals grew increasingly stronger and broader in the early twentieth century. Not only were carnivores considered enemies of humans and of their favorite game, but other animals joined the expanding category of varmints. Two quite different animals illustrated this in California in a manner far different from later concerns about invasive or introduced species. A 1928 Forest Service memo advised rangers to "carry a 'shooting iron'" if they noticed signs of porcupine in their districts. The native species was, in light of economic measures, vermin. Though porcupines had killed "comparatively few" trees by peeling away bark to eat the cambium, "many ha[d] been girdled toward the top, resulting in deformity."²⁹ Straight wood was millable and thus profitable; deformed wood was not.

In contrast, ring-necked pheasants introduced from China were a species caught between two economies. Described as "one of the most important game species in California," the birds' habitat consisted almost entirely of private agricultural lands. Crop damage, especially to corn in the Delta region led to Department of Fish and Game studies on pheasant control through poisons and other means. An undated report from the late 1950s or early 1960s finally concluded that heavier hunting pressures could best prevent crop damage.³⁰ Conveniently, this solution also increased hunting revenues.

Of course, the hunter's favorites, deer and waterfowl, caused much more damage than porcupines, pheasants, or beaver. A 1951 report stated that deer damaged "almost all" crops in the state to some extent. Even so, deer damage estimates totaled only 0.06 percent of

the annual value of agricultural produce in California. In contrast, based on a calculation of \$75 each, the state's population of 750,000 to 1 million deer resulted in an estimated resource value of at least \$50 to \$75 million.³¹

Migrating birds did more economic harm to agriculture than all other animals, but damage costs of an estimated \$1.5 million paled in comparison to numbers generated by sportsmen and their conservationist supporters. Bureau of Game Conservation figures of over \$4 million in meat from ducks, geese, and coots taken over the 1948–49 hunting season, as well as an additional \$7.5 million in cash spent by hunters each year, made a compelling argument that hunted animals more than compensated for agricultural losses.³² All but the hardest hit farmers tolerated bird and deer losses, though some did not do so without grumbling. Beavers had considerably fewer allies because they also annoyed farmers. Ultimately, California's farmers and waterfowl hunters far outnumbered its small contingent of trappers who proved an important exception in lobbying for the species' conservation.

REMOVAL, REINTRODUCTION, AND REGULATION

Despite the celebratory language of the Pittman-Robertson boosters, attempts to mend broken ecosystems did not always reintroduce beavers to their former range. The first known transplantation of beavers in California by Will E. Stanford was also a commercial effort. Though detailed accounts of his operation appear to be lost, Stanford trapped sixty-six Sonoran beavers in January and February 1923 and successfully transported an unknown number of survivors nearly 700 miles from the Colorado River to his fur ranch on Indian Creek in Plumas County. By September of that year, Stanford had twenty-three live beavers. Continuing to build his herd the following year, he added twenty-seven more beavers from the Colorado and eleven Golden beavers from the San Joaquin River.³³

Stanford observed that the different San Joaquin and Colorado River subspecies fought for territory, resulting in ten animals killed, though each appeared to live harmoniously with the five hundred muskrats he also collected to place in his enclosure. By feeding the animals cut willow, hay, carrots, and even bread, the fur ranch apparently carried on until Stanford died a few years later. The experiment was not a financial success, though Stanford reported that he had several orders for breeding pairs. His top offer was \$70 each for a pair of beaver; however, his net expense in catching and transporting each animal amounted to \$109.³⁴ The disposition of the beavers upon Stanford's death is unknown. At least some may have established a colony



Figure 3: "Will E. Stanford holding a large male beaver (front view)," Stanford Fur Farm, Taylorsville, Plumas County, CA, September 18, 1924. Credit: Joseph S. Dixon, photographer. Museum of Vertebrate Zoology, University of California, Berkeley, Image 4506.

farther downstream, but whether the remainder were harvested, released, escaped, or simply died remains in question.

Believing the beaver to be nearly extinct, the California State Legislature provided complete protection for beavers in 1911, making it illegal to either trap or harm the animal. Only six years later, Fish and Game amended regulations to provide relief from the "pests" for farmers in the Delta. Fourteen years of managed protection resulted in a precipitous increase in both beaver sightings and complaints, and a 1925 liberalization of trapping laws led to a de facto open season on beavers

throughout the state. The fines for unlicensed trapping ran from \$25 to \$500 or 25 to 150 days in jail, or both. The Fish and Game Commission only issued licenses to applicants writing directly for purpose of removing animals endangering levees. However, trapping exacted an unexpectedly heavy toll on the temporarily resurgent population. The rapid reversal of beaver populations forced a repeal in 1933, essentially returning to the old system in which trapping was allowed only by permit, and only where beavers clearly threatened damage.³⁵

Beginning in August 1934, a full decade after Stanford's private experiment, the US Forest Service responded to growing sentiment to re-establish wildlife. The Forest Service carried out eight planting attempts between 1934 and August 1938. The two 1934 projects involved beavers taken in or near the Snake River in agricultural counties in southern Idaho. Four transplants in September 1936 redistributed beaver trapped in Modoc County to other Northern California counties. After a break in 1937, the Forest Service and the California Division of Fish and Game each completed two transplant projects of beavers from Oregon to widely separated locations.³⁶

A departure from these planned reintroductions followed the 1939 Golden Gate International Exposition. The Oregon exhibit featured live beavers, and with the end of the fair, the animals were turned over to the California Division of Fish and Game. Wardens released the "gift" of five animals above the community of Crannell in Humboldt County. Spotty records do not indicate whether this Little River colony succeeded over the long term, but three years later, the Division of Fish and Game recommended removal of these foreign beavers and replacement with the native Shasta subspecies.³⁷

The era was one of heightened attention to race in California, even in the policies of the Department of Fish and Game. A wartime influx of black families from the East, internment of Japanese citizens, and the implementation of the Bracero program brought unavoidable news coverage and wartime propaganda. Intradepartmental notices against "racial mixing" of beaver derived only partly from Will Stanford's early experiments. Some concern for purity of subspecies appeared in the 1930s, but the first explicit recommendation against "racial pollution" between different beaver subspecies came in 1942, only after several years of actively importing beavers from Idaho and Oregon. Donald Tappe, director of the beaver program in California, railed against "racial pollution" and praised preservation of "pure racial stock" in his management report for beaver.³⁸ Just as Oregon beaver were not appropriate for the northwest corner of the state, California Fish and Game biologists suddenly deemed the beavers native to the Colorado River valley unsuitable for export to other ranges.

The international border posed its own particular understanding of foreign animals in part because the canals delivering water to American crops crossed into Mexico. The original Alamo Canal, for example,

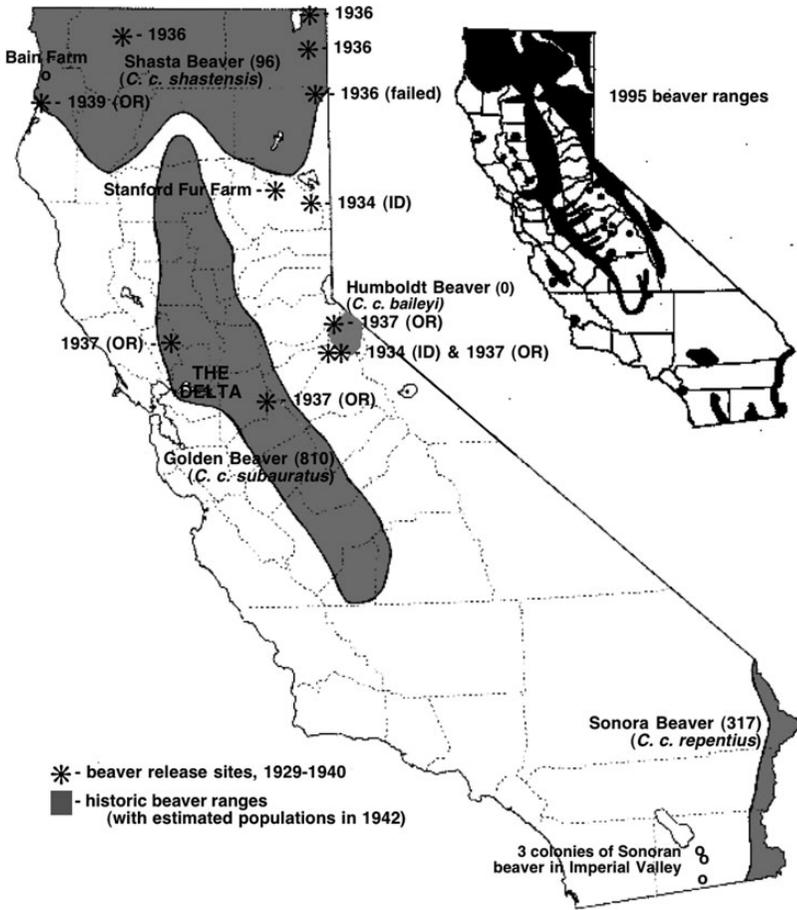


Figure 4: "Map: Early Beaver Translocations and Ranges," based on V. Johnson and M. Harris, "M112 Beaver," in California's *Wildlife*, Vol. 3: *Mammals*, ed. David C. Zeiner, William F. Laudenslayer Jr., Kenneth E. Mayer, and Marshall White (Sacramento: Department of Fish and Game, 1990), with additions by the author.

begins in the United States, crosses into Mexico for most of its westward run, and then reenters California. This was the canal that brought devastating flooding in 1904–7 when the Colorado River spilled into it, and it also served as the entry vector for Sonoran beaver to move into the former desert through an expanding irrigation system. Wartime reports that more beavers lived on the Mexican portions of the canals just upstream from the border posed the looming threat of an infiltration of foreign beaver wreaking havoc on American waterworks. The very nature of the canal system and its system of controlled head gates made many subsidiary canals intermittent, thus forcing many of the beaver to be "for the most part wanderers that do not build permanent

date	agency	species	qty.	initial location	transplant location
1923	private	<i>C. c. repentius</i>	66	Colorado River, CA	Stanford Fur Farm, Indian Creek, Plumas Co.
1924	private	<i>C. c. repentius</i>	27	Colorado River, CA	Stanford Fur Farm, Indian Creek, Plumas Co.
1924	private	<i>C. c. subauratus</i>	11	San Joaquin River, CA	Stanford Fur Farm, Indian Creek, Plumas Co.
1934	USFS	<i>C. c. taylori</i>	4	Snake River, Bingham Co., ID	Rowland Creek, Plumas Co.
1934	USFS	<i>C. c. taylori</i>	4	Snake River, Blaine Co., ID	Wheats Meadow, Tuolumne Co.
1934	USFS	<i>C. c. taylori</i>	3	Snake River, Blaine Co., ID	Rowland Creek, Plumas Co.
1936	USFS & CDFG	<i>C. c. shastensis</i>	4	Modoc Co., CA	Marlahan Slough, Scott Valley, Siskiyou Co.
1936	USFS	<i>C. c. shastensis</i>	4	Modoc Co., CA	Pine Creek, Modoc Co.
1936	USFS	<i>C. c. shastensis</i>	5	Modoc Co., CA	Bear Creek, Modoc Co.
1936	USFS	<i>C. c. shastensis</i>	6	Modoc Co., CA	South Fork of East Creek, Lassen Co.
1937	USFS	<i>C. c. shastensis</i>	4	Rogue River NF, OR	Meiss Meadow, upper Truckee River, El Dorado Co.
1937	USFS	<i>C. c. pacificus</i>	4	Crooked River, OR	Dardanelle Creek, Tuolumne Co.
1937	CDFG	<i>C. c. pacificus</i>	7	Crooked River, OR	junction of Littlejohns & Rock Creeks, Stanislaus Co.
1937	CDFG	<i>C. c. pacificus</i>	22	Crooked River, OR	junction of Ragg & Putah Creeks, Napa Co.
1939	CDFG	<i>C. c. pacificus</i>	5	Bridge Creek, Wheeler Co., OR	Little River, Humboldt Co.

Figure 5: California beaver translocations before 1940. Sources: Department of Natural Resources Records, California State Archives, Sacramento, F3735:540; Dixon Field Notes, University of California Museum of Veterinary Zoology, Berkeley; and Donald T. Tappe, *The Status of Beavers in California* (Sacramento: Department of Natural Resources, Division of Fish and Game, 1942), 1321.

homes.” When canals went dry, beavers moved to other portions of the 3,000-mile canal and ditch system or perished. At the same time, the unregulated seepage that many Mexican farmers relied on made for an expanded habitat in northern Mexico. Imperial Irrigation District canal tenders north of the border undoubtedly cared more about Mexican beavers expanding into California than they did about the transnational range of the Sonoran subspecies. Even if beaver could be extirpated in the Imperial Valley, University of California biologist Joseph S. Dixon argued that “it would only be a short time before the canals were reinfested from the breeding stock in Lower [Baja] California since they have free access along all of the main canals, and beavers and muskrats do not need passports in crossing the International Boundary.”³⁹

Though it is tempting to point an accusing finger at the insensitivity of 1940s biological authorities, the interchangeability of “race” and “subspecies” within the biological community speaks to the ongoing lack of consensus on what constitutes either term. For both the layperson and scientist, “race” continues to be a concept lacking precision. Arguments based in biological concern over what had been separate

beaver populations took on additional meaning for nonspecialists in 1940s California. However, after World War II had passed, so did most concerns about racial purity. Further introductions of Idaho beaver to California's National Forests in 1947, 1948, and 1949 appear to have been free of such concern over nativity.⁴⁰ Indeed, the beaver translocations began moving the animals into new ranges on a much larger scale than ever before.

Changes in trapping regulations required the Fish and Game Commission to establish "beaver-control areas" in parts of the Delta in which beavers threatened to damage levees, crops, or canals. Officials at the Division of Fish and Game stated that they did "not do any dead trapping of beaver," that is, trapping that deliberately killed the animals rather than the live cage trapping used in relocations. Citing danger to levees as the sole reason, Fish and Game trapped 108 animals over the winter of 1941–42 and transplanted the survivors elsewhere.⁴¹ With the influx of federal money to aid transplant efforts, the program grew to several transplants each year throughout the 1940s and early 1950s. In a large-scale restaging of Will Stanford's basic scheme, roughly three thousand beavers eventually found themselves transported by Fish and Wildlife trucks (and later, by helicopters) to suitable locations throughout the state, without regard to previous beaver

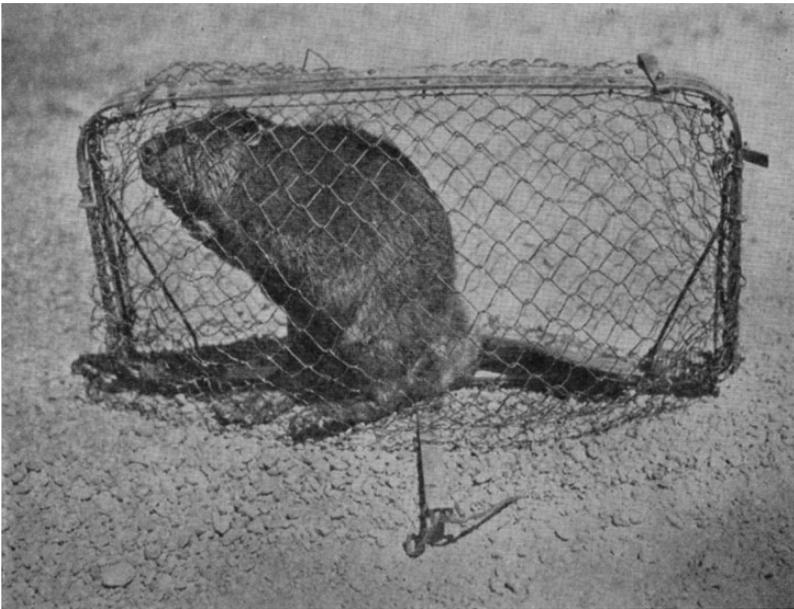


Figure 6: "Bailey Live Beaver Trap with captured Shasta beaver, Aug. 28, 1940." Such suitcase traps have become a standard tool for beaver removal. Credit: Donald T. Tappe, photographer, in *The Status of Beavers in California*, Division of Fish and Game Bulletin, no. 3 (Sacramento: California Department of Natural Resources, 1942).

ranges. Beavers from agricultural areas became emigrants opening up new territory throughout the remainder of the state.

RANCHERS' FRIEND, FARMERS' FOE

Beavers, even before the inception of the reintroduction program, appeared as ranchers' friend and farmers' foe. The actual damage from beavers was often no more substantial than a localized nuisance, but the fear of burrowing animals in reclaimed lands created a negative image for beavers in the Sacramento-San Joaquin Delta and the Imperial Valley. The most common cost to farmers was the extraction of equipment breaking through to unseen burrows, not damage caused by beaver flooding. In the south, the Imperial Irrigation District kept "watchmen . . . at the more important headings or gates day and night to fish out the rubbish and to regulate the flow of the water." Beaver-cut willow and cattails contributed to blockages and "fresh cut willow saplings and white peeled willow sticks are pulled out of the gates several times a day."⁴²

Damage from flooding caused by beaver dams, cutting trees, or burrowing into stream banks or levees was well documented, especially in the Delta region. Dixon made investigations "several times each year" to examine reports of beaver damage between 1919 and 1927. Often, eager trappers generated damage reports in hopes of gaining access to valuable pelts. During Dixon's tenure, he described few cases resulting in serious damage, and even irrigators agreed that pocket gophers were a far more pernicious problem. However, in 1920, beaver burrowing collapsed a dike between two parallel canals in Fresno County, and though no flooding occurred, "much valuable irrigation water was wasted because it went where it was not needed." On Cache Slough the following year, burrows nearly caused another levee to collapse; this one protected 1,000 acres of reclaimed land planted in barley.⁴³ However, in spite of the threat of more significant disasters, foraging on field crops or gnawing on fence posts, wooden canal gates, or planted fruit trees comprised the usual damage caused by beavers.

Perhaps most disappointing for proponents of the reintroduction program were complaints about beavers that the Division of Fish and Game had planted. Letters from irrigators, irrigation districts, water districts, and farms arrived at the Division of Fish and Game from all parts of the state. From the north, landowners complained about beavers on Davis Creek, in Porter Reservoir, and on the XL Indian Reservation in Modoc County. Beavers blocking the spillway of the San Carlos Dam generated almost constant complaints over at least a four-year span. In 1944 Arthur Oppenheimer, an absentee landowner of property adjacent to San Carlos Reservoir, announced, "now that I have done my part," the beavers should be removed since "[t]hey have been left there now about two years." The following year, with the problem



Figure 7: "Dredger repairing Cache Slough levee, Solano County, CA, Jan. 4, 1921." Inspecting levees for burrows continues to be a necessary maintenance task nearly a century after this west Delta repair. Credit: Joseph S. Dixon, photographer. Museum of Vertebrate Zoology, University of California, Berkeley, Image 3455.

unsolved despite efforts of Fish and Game to trap the beavers, Oppenheimer's complaints became more urgent. Acknowledging that the division had "tried very hard," he nonetheless demanded an end to the problem "as soon as possible."⁴⁴

In one notable Delta beaver battle, a farmer repeatedly struggled with a dam in an irrigation canal. Every morning, upon finding his fields dry, the farmer removed a beaver dam with his pitchfork. Apparently making use of the removed material from the bank of the canal, beavers rebuilt the dam each night. Attempts to siphon water directly out of the beaver pond failed, as did scaring the beavers away from the stockpile of removed material by hanging a lantern on the bank. Even administering "spankings with a good stout board" did not have the desired effect for long.⁴⁵ Bad beaver remained so, even after corporal punishment.

Concurrent with long-standing difficulties in the Delta, complaints from another portion of the state escalated as beaver reintroduction grew. In response to the complaints of farmers and irrigation districts in the far south, the California Division of Fish and Game and the Arizona Game and Fish Commission carried out a cooperative trapping effort on the Colorado River beginning in 1943. The two states split the fees as well as the income from the sale of furs. Efforts to "put out plenty of sucker bait in the invitations for bidders" at the resulting fur auctions evidently paid off as the program continued for the remainder of the

decade. Funding for ongoing trapping of nuisance animals came from Pittman-Robertson monies and the income from auctioned pelts.⁴⁶

Though Fish and Game would eventually plant a few Sonoran beavers in other parts of Southern California, almost all the beaver spreading through that portion of the state did so on their own, migrating through the new system of canals and ditches emanating from the Colorado. By bringing water to the desert, the waterways also brought the riverine mammals into new ranges, creating new problems. A water warden reported fifty beaver undermining the bank in a 3-mile section of the All American Canal. Sections where the canals had been elevated above surrounding farmlands were especially susceptible to a catastrophic break.⁴⁷

Complaints to the Division of Fish and Game increased during trapping. The outcry against “nuisance beaver” in the canals and the problem of poachers preying on the protected but locally abundant animals became a regular topic of letters between Arizona and California game officials. The management of beavers and trapping also generated resentment because individuals wanted a piece of the economic benefits the states touted in relation to Pittman-Robertson programs. On the Colorado River, locals complained about the division’s use of “imported northern and eastern trappers” and state profits from animals that had survived only through “protection given the beaver by residents of the river bottoms.” The number of complaints from farmers in the region about the damage done to and blockage of canals and ditches belied any enthusiastic protection of beaver. One resident went so far as to claim that his son was “shocked [when] a state bureau came in and trapped, on my land, the beaver that the boy had practically raised.”⁴⁸ If indeed farmers’ sons saw beavers along the Colorado as their special pets, they would likely have been few and unpopular among their complaining neighbors.

The forested Sierra Nevada foothills became the destination for beaver removed from flatlands reclamation projects, restoring the animals in a specific, economically determined manner. Beaver advocates emphasized the animals’ utility as a tool for expansion of pastoralism into marginal upland grazing lands and forests. By creating dams on small streams, the animals could raise the water table and prolong stream flows through the dry California summer season. This potentially meant a longer grazing season for ranchers and less reliance on irrigation, purchased feed, or lowland pastures. Beavers thus became an agent to expand the scope and efficiency of California ranches even as restoration efforts touted their place in the natural landscape.

As beaver populations recovered, ranchers praised the ability of beaver dams to raise the water table on their land or to regulate stream flows. One rancher living in the low foothills east of Turlock told Joseph Dixon in 1919 that “he believed the beaver were worth several hundred dollars to him each year.” Beaver kept the fields near the

Merced River side channels greener and water pumped from a beaver pond supplied "a field some distance back and several feet above the pond."⁴⁹ In Modoc County, the proximity of irrigation-fed alfalfa fields and cattle grazing made the contrast between ranchers and farmers stark. Tappe reported that "cattlemen appear to favor the introduction of beaver in the high mountain meadows where they will not conflict with agricultural interests."⁵⁰ There, on small mountain streams, the benefits of water flows regulated by new beaver dams contrasted with the repeated problems reported in the flatlands. Higher water tables at low elevations would only render potentially valuable farmland unusable. Beavers' mere presence meant that roots of field crops rotted in the ground in some fields even as increased water levels tended to benefit hay raising and grazing.

In 1936 a Siskiyou County rancher was among the first to ask the Department of Fish and Game to plant a beaver colony in hopes of raising the water table enough to "enable hay to be grown on the adjacent land." How satisfied the Scott Valley landowner was with the reported "considerably more forage" and the greening of the meadow throughout the summer is unknown. However, as more beavers appeared, other ranchers began to report the increased value of having beavers on their property. J. R. Sidwell praised a colony introduced with the express purpose of maintaining stream flow through the summer on Napa County's Ragg Creek. Water storage and regulation by beaver dams made a rapid, notable change and contributed substantially to the value of the ranch. Where in previous years the stream had shrunk to a trickle in summer, water meted out slowly through the series of beaver dams enabled cattle to graze in the area year round.⁵¹

However, even in pastoral lands, engineering landscapes with animals was not an exact science. Colonies planted in the Sierra Nevada to reduce erosion met with varying results. In 1945 a representative of the Bureau of Game Conservation was forced to write of his "regret to learn that the beaver have been misbehaving" at a release site on the East Fork of the Carson River. Beavers blocked a private ditch that carried "all or practically all of the main stream" of the river to irrigate a hay meadow. Beaver dams had forced the flow out of the ditch and into yet another new channel. The ranch manager complained that beavers, by blocking the ditch, were "tearing the heart out" of the meadow.⁵²

Concerns about fish habitat and the blockage of fish runs generated another category of complaints.⁵³ Until recently, the relationship between beaver dams and anadromous fish was poorly understood. Though fishermen were initially concerned about dams blocking fish passage, the presence of beaver dams strongly correlates with increased numbers of salmon, especially coho. In fact, beaver dams tend to at most impede, rather than block, passage. The deeper pools and increased nutrients of salmon carcasses behind dams result in larger fish, and all

along the Pacific Slope, beavers are now an important tool in salmon recovery. After the early reintroductions, delighted California fishermen also found nonnative trout behind beaver ponds to be much larger than in other portions of the creeks.⁵⁴

Following World War II, the program's scale increased dramatically, averaging nearly 250 animals transplanted each year in the late 1940s. In 1942 the Department of Fish and Game estimated the resurgent California beaver population at around thirteen hundred animals. By 1950 populations exceeded twenty thousand. The increased numbers resulted in an inevitable increase in complaints. Contrary to Central Valley notions of mountain wilderness, the uplands were also intensely managed landscapes. Pastoral ranchers' hay meadows often occupied the same low-gradient riparian habitats most suitable for beaver and the number of optimal unoccupied sites diminished with increased beaver population. When beavers shifted from their approved sites, they could turn reclaimed land back into wetlands as easily as they made formerly impractical sites available for extended grazing. As beavers spread through both their old ranges and new territories, complaints came in from both fresh sites and perennial problem areas. In 1947 the California Division of Fish and Game fielded thirty-four separate requests for removal based on beaver damage, fears of future damage, or inconvenience. In addition, lowland reclamation districts repeatedly asked Fish and Game to open a general season on beaver to protect their works.⁵⁵

A. N. Bain was thus not the only frustrated landowner who threatened to file a claim against the state to compensate for property damage from beavers. Even highlands ranchers sometimes found themselves in unfriendly battles with beaver. From his ranch adjacent to the Tahoe National Forest in Sierra County, Frank Turner complained of being "plagued with Beaver-Dam trouble" and "put to a great deal of expense to clear out the damage caused by said beavers." As with Bain in the far northwestern corner of the state, Fish and Game promised "on several occasions" that they would remove the beaver from Turner's ranch. Bain may have worn down Fish and Game down by his sheer persistence, but a demanding letter from Turner's lawyer got quick results, and his problem beavers were soon *re*-reintroduced elsewhere.⁵⁶

CONCLUSIONS

In spite of missteps, the program won converts as beavers increasingly accomplished foresters' and ranchers' on-site goals. This was, in part, due to increased attention to and understanding of ideal release habitats in concert with awareness of erosion and soil conservation. Fish and Game employees continued to believe in the beaver as one of the easier and more effective methods of combating erosion, provided the

site was suited to the animal. As success stories made converts, ranchers wrote requesting information on planting beavers on grazing leases and private property to combat erosion or to increase water supplies.⁵⁷

In the postwar era, promoters of animal reintroduction faced a long-term balancing act. A promotional film created by the California Division of Fish and Game emphasized the restorative powers of beavers on damaged landscapes. Last-minute changes to the narration manuscript reveal the careful balance between promoting beaver transplants and acknowledgment of anti-beaver sentiment. In the film, an overgrazed eroded valley with a "dying stream" that depicted a landscape beaver could restore to "verdant meadowland" was initially described as an example of sage brush "invasion." The change to "intrusion" of sagebrush indicates a biologist's sensibility about the dynamics of environmental processes and a sensitivity to the fact that sagebrush, whatever its economic value, was a part of the cycle of the arid West. Supposed damage wrought to the California landscape by "man and nature" became "man and livestock" in the final script. The Division of Fish and Game's authorized version of nature worked as a healing agent, not something that caused damage. Beaver "improved habitat and range conditions for wildlife and fish life, as well as for livestock . . . at a minimum of cost." They were "the solution to many of the high mountain meadow problems," and a direct link existed between beaver reintroduction and "beef for your T-bone steaks."⁵⁸

By acquiescing to agricultural complaints, the California Division of Fish and Game upheld a long tradition of removing animals in the name of progress. The campaigns of the Biological Survey encouraged farmers and ranchers to kill varmints, but beavers did not clearly fit into categories of either good or bad. Beavers thus occupied a liminal space in conservation policies that defied easy classification and allowed competing parties to tailor their views of the animals to fit their needs. Rather than solely serving as a conservation-oriented reintroduction program, the portion of Pittman-Robertson moneys dedicated to wildlife was, in this case, used to improve agricultural land. Where the animals assisted ranchers in reducing the costs of summer feed, or made water available at the height of California's long dry season, the beaver program was a success. Where the animals in any way interfered in the commerce or convenience of landowners, the focal point of the reintroduction program turned to removal.

The reintroduction program thus became a sales pitch to ranchers to validate removal and introduction to new ranges. Wildlife agents could argue that in most cases, stocking beaver would help ranchers' pocket-books while simultaneously relieving farmers of their problems.

In an attempt to further ameliorate farmers' ongoing concerns, the Department of Fish and Game attempted to add similar economic potential to lowland animals as well. The official departmental assessment of beaver reintroduction published in 1942 recommended that private

landowners be allowed to harvest the furs in compensation for the inconvenience. Other recommendations included planning in a manner that would yield “a maximum return” on beaver pelts after “considering the probable immediate and future economic aspects involved.”⁵⁹ The suggestions resulted in a pattern of progressively implemented small steps toward repeal of regulations hindering the most trusted method of controlling nuisance animals: extermination.

Projects in other states varied only slightly from the California case. Oregon’s first project using Pittman-Robertson funds in 1937 was beaver restoration. Three years later, Oregon planted over five hundred beavers in mountainous areas, many of which the Department of Fish and Game took from private land in central Oregon. The aim of one early Idaho Pittman-Robertson project was to double the previous year’s total of 750 beavers removed from agricultural regions to “high country where they would be of inestimable value in water conservation, flood, and erosion control.” Complaints of flooding and subsequent damage by beavers in Idaho and Oregon ditches and canals drove programs remarkably similar to California’s that moved beavers from farmland to mountains. Idaho perhaps offered the most extreme cases of translocation, where game managers pushed “beaver drop boxes” attached to war-surplus parachutes out of airplanes over remote and rugged terrain.⁶⁰

By midcentury, beavers held two identities within the same beast. In the interests of their program, the Division of Fish and Game eventually honed a sales pitch that consistently emphasized the mutability of the animals and downplayed negative aspects. Indeed, the 1947 film assured troubled farmers that “bad beaver” would be carted away if necessary and accentuated the capture and release program created through Pittman-Robertson funds. The ecological services offered by beavers could simultaneously appeal to both nascent environmental concerns and economic self-interest. Where appropriate, good beaver could work their restorative powers, and grazing extended into areas with previously inadequate water. Nature could thus be reclaimed in concert with the propagation of rehabilitated animals.

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Notes

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- 1 A. N. Bain to Division of Fish and Game, May 17, 1950, F3735:540, "Project 18D, Beaver Livetrapping and Transplanting, 1934-49," Department of Natural Resources Records, California State Archives, Sacramento [hereafter DNRR].
- 2 Nathan Rogan to Al Lynn, interoffice correspondence "Re: Bain," June 25, 1950, DNRR, F3735:540.
- 3 Bain to Division of Fish and Game, August 25, 1950, DNRR, F3735:540.
- 4 Lynn to Bain, August 21, 1950, DNRR, F3735:540; emphasis added.
- 5 Bain to Division of Fish and Game, August 25, 1950, DNRR, F3735:540.
- 6 William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton, 1991), 56-58; Cronon, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," *Environmental History* 1, no. 1 (1996): 7-28.
- 7 Donald T. Tappe, *The Status of Beavers in California* (Sacramento: Department of Natural Resources, Division of Fish and Game, 1942), 5; Robert C. Lee, "The Status of Harvested Furbearers in California," Nongame Wildlife Investigations Project W-54-R-9 Progress Report (Sacramento: Department of Fish and Game, 1977), 7.
- 8 Simpson to Governor and Committee, June 20, 1841, in *London Correspondence Inward from Sir George Simpson, 1841-42*, ed. Glyndwr Williams (Winnipeg: Hudson's Bay Record Society, 1973), 33. George Simpson, "Simpson Journal," October 28, 1824, in *Fur Trade and Empire: George Simpson's Journal: Remarks Connected with the Fur Trade in the Course of a Voyage from York Factory to Fort George and Back to York Factory, 1824-1825* (Cambridge, MA: Harvard University Press, 1931), 46, offers a clear statement of the HBC policy.
- 9 Arthur S. Morton, *A History of the Canadian West to 1870-71*, 2nd ed. (Toronto: University of Toronto Press, 1973), 696-98; Margaret A. Ormsby, "Introduction," in *Fort Victoria Letters, 1846-1851*, ed. Hartwell Bowsfield (Winnipeg: Hudson's Bay Record Society, 1979), xvi-xvii; E. E. Rich, *The History of the Hudson's Bay Company, 1670-1870*, vol. 2 (London: Hudson's Bay Record Society, 1959), 485-497, 818. John S. Galbraith, *The Hudson's Bay Company as an Imperial Factor* (Berkeley: University of California Press, 1957), 78-110, remains the most complete concise overview of this HBC competition with their American rivals.
- 10 Joseph Grinnell, Joseph S. Dixon, and Jean M. Linsdale, *Fur-Bearing Mammals of California: Their Natural History, Systematic Status, and Relations to Man* (Berkeley: University of California Press, 1937), 634-37; B. W. Aginsky, "Culture Element Distributions: XXIV Central Sierra," *University of California Anthropological Records* 8, no. 4 (1943): 393-468; Frank Essene, "Culture Element Distributions: XXI Round Valley," *University of California Anthropological Records* 8, no. 1 (1942): 4; Harold E. Driver, "Culture Element Distributions: VI Southern Sierra Nevada," *University of California Anthropological Records* 1, no. 2 (1937): 108, 130; Driver, "Culture Element Distributions: X Northwest California," *University of California Anthropological Records* 1, no. 6 (1939): 371; Erminie W. Vogelien, "Culture Element Distributions: XX Northeast California," *University of California Anthropological Records* 7, no. 2 (1942): 59, 83, 169, 177, 198, 206, 211. Driver specifically recorded beaver-derived items as absent from Yuki, Sinkiyone, Mattole, Nongatl, Wiyot, Chimariko, Hupa, Chilula, Yurok, Karok, and Tolowa cultures.
- 11 Tappe, *Status of Beavers*, 13-15, 41. Of course, beavers regularly move much further along watercourses.

- 12 Tappe, *Status of Beavers*, 14; John Work, March 11, 1833, in *Fur Brigade to the Bona-ventura: John Work's California Expedition 1832–1833 for the Hudson's Bay Company*, ed. Alice Bay Maloney (San Francisco: California Historical Society, 1945), 35. E. W. Nelson "Description of a New Subspecies of Beaver," *Proceedings of the Biological Society of Washington* 40 (1927): 125–126, describes the Humboldt subspecies. Wendy Rae Townsend, "Beaver in the Upper Kern Canyon, Sequoia National Park," (master's thesis, California State University, Fresno, 1979, 62–64), often cited as proof of beaver populations, though suggestive, concludes that beaver are "exotic" to the high Sierra. Richard B. Lanman, Heidi Perryman, Brock Dolman, and Charles D. James, "The Historic Range of Beaver in the Sierra Nevada: A Review of the Evidence," *California Fish and Game* 98, no. 2 (2012): 65–80, also misreads several historical documents. Far more convincing is Charles D. James and Richard B. Lanman, "Novel Physical Evidence That Beaver Historically Were Native to the Sierra Nevada," *California Fish and Game* 98, no. 2 (2012): 129–32, which discusses pre-Gold Rush beaver dam remains on upper Feather River tributaries.
- 13 Paul Beier and Reginald H. Barrett, "Beaver Habitat Use and Impact in Truckee River Basin, California," *Journal of Wildlife Management* 51, no. 4 (1987): 794–99.
- 14 Andrew C. Isenberg, *Mining California: An Ecological History* (New York: Hill and Wang, 2005), 44–46, 69–74; Robert Kelley, "Taming the Sacramento: Hamiltonianism in Action," *Pacific Historical Review* 34, no. 1 (1965): 23, 27–28; Kelley, *Battling the Inland Sea: American Political Culture, Public Policy, and the Sacramento Valley, 1850–1986* (Berkeley: University of California Press, 1989), 10–16, 139–54; Ann Vileisis, *Discovering the Unknown Landscape: A History of America's Wetlands* (Washington, DC: Island Press, 1997), 85–90, 128–31; Philip Garone, *The Fall and Rise of the Wetlands of California's Great Central Valley* (Berkeley: University of California Press, 2011), 110–29.
- 15 Grinnell, Dixon, and Linsdale, 634–37; Donald T. Tappe, "Quarterly Progress Report: Wildlife Research as Required by Federal Aid in Wildlife Restoration Act," October 1, 1940, "Records Relating to Pittman-Robertson Projects, 1946–52," DNRR, F3735:507; Tappe, "Quarterly Progress Report: Wildlife Research as Required by Federal Aid in Wildlife Restoration Act," December 31, 1940, DNRR, F3735:507; Tappe, *Status of Beavers*, 14; Glover M. Allen, *Extinct and Vanishing Mammals of the Western Hemisphere with the Marine Species of All the Oceans* (Lancaster, PA: American Committee for International Wild Life Protection, 1942), 60–61, 69–71, 81–86. The ACIWLP formed in 1936, and the catalog of endangered species was an early focus.
- 16 Robert M. Wilson, *Seeking Refuge: Birds and Landscapes of the Pacific Flyway* (Seattle: University of Washington Press, 2010), 34; Lonnie L. Williamson, "Evolution of a Landmark Law," quoted in *Restoring America's Wildlife 1937–1987: The First 50 Years of the Federal Aid in Wildlife Restoration (Pittman-Robertson) Act*, ed. Harmon Kallman (Washington, DC: USNited States Fish and Wildlife Service, 1987), 1.
- 17 A subdepartment, the Bureau of Game Conservation, directed many of the programs relevant to the cases to follow. The Board of Fish Commissioners oversaw game issues beginning in 1878, but the name change occurred later.
- 18 Jared Orsi, "From Horicon to Hamburgers and Back Again: Ecology, Ideology, and Wildfowl Management, 1917–1935," *Environmental History Review* 18, no. 4 (1994): 25–34; Robert J. Sousa, "A National Overview of Wildlife Management Investigations Funded by the Pittman-Robertson (P-R) Program," *Wildlife Society*

- Bulletin* 10, no. 3 (1982): 254–58. Handguns are taxed at a lower 10 percent rate. Vileisis, 175–86, notes the contradictions of New Deal programs simultaneously reclaiming and conserving wetlands.
- 19 *Seventh Biennial Report of the State Forester of the State of California, 1916–18* (Sacramento: California State Printing Office, 1919), 83, 95–96. The optimistic report was premature. Garone, 146, offers 1956 as the year that “the era of illegal market hunting in California had effectively come to an end.”
 - 20 Seth Gordon, “Water Resources and Wildlife: California’s New Fish and Game Program,” California State Chamber of Commerce, April 12, 1950 (Sacramento: Department of Natural Resources, Conservation Education Section, 1950).
 - 21 Since 1972, Pittman-Robertson funds have also supported hunter education. Tule Elk are uniquely protected under both state (1971) and federal (1976) laws removing the species from the purview of the California Fish and Game Commission and placing the Bureau of Land Management at the head of a Tule Elk Interagency Task Force. See Peter J. P. Gogan, “Considerations in the Reintroduction of Mammalian Species to Restore Natural Ecosystems,” *Natural Areas Journal* 10, no. 4 (1990): 215–217; and Garone, 76–77, 199–200. Gerhard Bakker, *History of the California Tule Elk* (Los Angeles: Los Angeles City College Press, 1965), covers the era before federal legislation.
 - 22 See Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850–1931* (Berkeley: University of California Press, 1984), 283–380; Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Oxford University Press, 1985), 191–256; and Kelley, *Battling the Inland Sea*, 223–306; and Garone, 149–61. Wilson, 10, argues that these refuges were “a hybrid landscape in which human artifice and non-human nature merged” to become rather specialized farms producing waterfowl to hunt.
 - 23 “Renovating the Federal Machine, Part IV,” *California District Newsletter* 11, no. 5 (1930): 3.
 - 24 Thomas R. Dunlap, *Saving America’s Wildlife: Ecology and the American Mind, 1850–1990* (Princeton, NJ: Princeton University Press, 1988), 34–40, covers some of the changes within the Biological Survey and its twin charge of conserving animals and exterminating varmints.
 - 25 “Renovating the Federal Machine,” 3. Lisa Mighetto, *Wild Animals and American Environmental Ethics* (Tucson: University of Arizona Press, 1991), 76–86, 95–96, and Dunlap, 48–61, offer accounts of the Bureau of Biological Survey’s application of human standards to “good” and “bad” animals. Not until the 1934 Fish and Wildlife Coordination Act would the Biological Survey also be explicitly responsible for migrating waterfowl and the wetland refuges they relied on. The Biological Survey merged with the Bureau of Fisheries in 1940 to become the U.S. Fish and Wildlife Service.
 - 26 “Renovating the Federal Machine,” 3; Tappe, *Status of Beavers*, 33. For the origins of the combined projects of conservation and wildlife within the U. S. Forest Service, see John F. Reiger, “Wildlife, Conservation, and the First Forest Reserve,” in *American Forests: Nature, Culture, and Politics*, ed. Char Miller (Lawrence: University Press of Kansas, 1997), 35–47. Hal K. Rothman, “‘A Regular Ding-Dong Fight’: The Dynamics of the Park Service-Forest Service Controversy during the 1920s and 1930s,” in *American Forests*, 109–124, examines the concomitant state of the U. S. Forest Service and conservation. On threats from burrowing and changes

- in groundwater level in southern Idaho, see Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle: University of Washington Press, 1999), 60–64, 75–76.
- 27 The \$30 figure is the average price paid for a top-grade beaver pelt in the late 1930s. Prime beaver pelts brought \$33 each in 1920; while poorer grade pelts from the Imperial Valley brought only \$8 in 1921. See Grinnell, et al., 12; Joseph S. Dixon, Field Notes, March. 20, 1921, 1336, Archives of the Museum of Vertebrate Zoology, University of California, Berkeley.
 - 28 Vernon Bailey, *Beaver Habits and Experiments in Beaver Culture*, Technical Bulletin no. 21 (Washington, DC: U.S. Department of Agriculture, 1927), 1, 37.
 - 29 T. D. W., "War on Porcupines," *California District Newsletter* 9, no. 45 (1928): 4. See Stephen Kellert, et al., "Human Culture and the Large Carnivore Conservation in North America," *Conservation Biology* 10, no. 4 (1996): 977–89, for shifting relationships between humans and carnivores.
 - 30 "Field Repellency Trials: Lindane to Pheasants," Department of Fish and Game, Game Management Branch, "Pittman-Robertson Projects, Food Habitat Investigations," CSA, F3498:779.
 - 31 Earl R. Biehn, *Crop Damage by Wildlife in California with Special Emphasis on Deer and Waterfowl*, Game Bulletin no. 5 (Sacramento: Department of Fish and Game, Bureau of Game Conservation, 1951), 15, 43. The \$75 figure was based on a calculated average amount spent by each successful hunter in bagging a deer in a given season.
 - 32 Biehn, 66–67.
 - 33 Dixon, Field Notes, September. 3, 1923, 1587–1588; Dixon, Field Notes, September 17, 1924, 1768.
 - 34 Dixon, Field Notes, September 17, 1924, 1768; Tappe, *Status of Beavers*, 42, 46–47.
 - 35 Harold C. Bryant, "California's Fur-Bearing Mammals," *California Fish and Game* 1, no. 3 (1914): 96; George Neale, "The Future of the Beaver," *California Fish and Game* 10, no. 1 (1924): 114–15; Tappe, *Status of Beavers*, 11–13; Grinnell, et al., 703–18. Dixon, Field Notes, April. 16, 1927, 2073–74, noted the subsequent decline in wood ducks in some of his favorite beaver ponds as dams declined.
 - 36 Tappe, *Status of Beavers*, 42–54. See Paul Beier and Reginald H. Barrett, "Beaver Distribution in the Truckee River Basin, California," *California Fish and Game* 75, no. 4 (1989): 233–38, for an update on the Meiss Meadow plant and others in the Truckee River watershed. The Rowland Creek site is now within the Dixie Mountain State Game Refuge. The second plant to that location followed the death of a female from the first group. No sign of beaver could be found at the Lassen County site in 1940 and probably failed. Nine of the Modoc County beaver were later removed from farmlands near Willow Ranch and Alturas. Both of the 1937 CDFG sites were later inundated by reservoirs.
 - 37 Tappe, *Status of Beavers*, 16, 42–43.
 - 38 *Ibid.*, Tappe, *Status of Beavers*, 7, 42, 55–58.
 - 39 Joseph S. Dixon, "Rodents and Reclamation in the Imperial Valley," *Journal of Mammalogy* 3, no. 3 (1922): 140; Tappe, *Status of Beavers*, 28–30. Evan R. Ward, *Border Oasis: Water and the Political Ecology of the Colorado River Delta, 1940–1975* (Tucson: University of Arizona Press, 2003), tells the story of the

- Imperial Valley flooding and irrigation projects. In 1942, the All-American Canal completely replaced the Alamo as the main supply canal.
- 40 Gary M. Fellers, *Historical Evaluation and Management Recommendations for Beavers at Lassen Volcanic National Park*, Technical Report no. 3, Contribution Number CPSU/UCD 023/1 (San Francisco: Department of the Interior, National Park Service, 1981), 9–11. Stanley G. Jewett and E. Raymond Hall, "A New Race of Beavers from Oregon," *Journal of Mammalogy* 21, no. 1 (1940): 87–89, was typical in its application of the term within scientific and professional circles as a geographically based distinction. The recent trend in ecological speciation has been to deemphasize geography in favor of process, but "race," "sub-species," and "breed" continue to appear as roughly equal concepts in biological studies. Ernst Mayr, "Races in Animal Evolution," *International Social Science Journal* 17, no. 1 (1965): 121–22, remains a succinct summation of the use and hazards of "race" in biological contexts.
 - 41 Tappe to Joseph C. Roller & Co., May 27, 1942, and Tappe to Fuchs Bros. & Sulzer, Inc., March 17, 1942, DNRR, F3735:540; George Seymour, *Wildlife of California* (Sacramento: Department of Fish and Game, 1968), 6. Currently, killing beaver with guns, bows and arrows, dogs, or traps is legal in 44 of 58 California counties. See California Department of Fish and Game, *Fish and Game Laws and Regulations*, (Sacramento: Department of Fish and Game, 2012), <http://www.fgc.ca.gov/regulations/current/mammalregs.aspx#463>, and <http://www.fgc.ca.gov/regulations/current/mammalregs.aspx#465> (accessed July 17, 2012).
 - 42 Tappe, *Status of Beavers*, 33; Dixon, Field Notes, March. 20, 1921, 1336.
 - 43 Dixon, "Rodents and Reclamation," 140; Grinnell, et al., 705–16. Dixon, "Rodents and Reclamation," 143, notes the rarity of the Imperial Valley pocket gopher only fifteen years earlier, stating that "museums had difficulty in securing even a few specimens. Today hundreds could be secured in almost any part of the irrigated sections."
 - 44 William Stewart to G. True, Field Correspondence, January 28, 1943, Hensley to Lee O. Hunt, 1946, and H. C. Jackson to Bureau of Game Conservation, July 23, 1947, DNRR, F3735:540. "Two years" from Arthur C. Oppenheimer, Owner, Rancho San Carlos, to George P. Miller, Executive Secretary, Division of Fish and Game, June 14, 1944, DNRR, F3735:540. "As soon as possible" from A. D. Edmonston, Department of Public Works to Hensley, August 5, 1948, DNRR, F3735:540 referred to earlier complaints in December 1947.
 - 45 Grinnell, et al., 709–14.
 - 46 The "sucker bait" comment is from Arthur L. Hensley to B. C. Fox, February 5, 1945, "Project 18D, Colorado River Project, 1943–49," DNRR, F3735:547. The 1943–44 season netted sixty-eight pelts, sold for a total of \$2129.60 split between the two states. Two years later the Colorado River take had increased to 186 beaver pelts sold at auction. "State of Arizona Miscellaneous Encumbrance Requisition," April. 27, 1944, and "Arizona California Beaver Project 1945–1946 (Report June 14, 1946)," DNRR, F3735:547.
 - 47 Dixon, "Rodents and Reclamation," 138–41. Grinnell, et al., 727, noted the "invasion" of beaver into the Imperial Valley by 1911. Grinnell, et al., 702–3, warns of the propensity towards overestimation of beaver populations, even by trained observers. He gave a maximum population of ten beaver per mile of sloop in the most favorable portion of the Delta.

- 48 Fox to Gordon H. True, Jr., January 12, 1945, Fox to Hensley, January 27, 1945, and Hensley to Fox, February 5, 1945, DNRR, F3735:547; "Arizona Policy Irks Trappers, Claim State Commercializes on Beaver," clipping from the *Blythe Times* attached to letters from Fox to Hensley, December 22, 1944, DNRR, F3735:547.
- 49 Dixon, Field Notes, December 23, 1919, 1099–1100. Dixon also noted several oaks felled by beaver that ranchers subsequently cut up and hauled away for firewood.
- 50 Tappe, "Quarterly Progress Report," October 1, 1940.
- 51 Tappe, *Status of Beavers*, 30, 31. "Considerably more forage" was in reference to the joint CDFG-USFS September 1936 plant on Marlahan Slough. Sidwell referred to a CDFG plant in the summer of 1938.
- 52 William F. Taber, H. F. Danberg Land and Livestock Company to Division of Fish and Game, September 17, 1945; True to Taber, September 20, 1945; and Taber to Hensley, November 7, 1945, DNRR, F3735:540.
- 53 C. L. Gourley to Gordon Bolander, Field Correspondence, November 30, 1948, DNRR, F3735:539 concerned the steelhead run on Carr Creek in Trinity County.
- 54 Much of the research is mixed and site-dependent. Though removal programs to enhance trout fisheries continue, recent research has emphasized beavers as a means to ecological recovery: Michael M. Pollock, George R. Pess, Timothy J. Beechie, and David R. Montgomery, "The Importance of Beaver Ponds to Coho Salmon Production in the Stillaguamish River Basin, Washington, USA," *North American Journal of Fisheries Management* 24 (2004): 749–60; Frank Rosell, Orsolya Bozsér, Peter Collen, and Howard Parker, "Ecological Impact of Beavers *Castor Fiber* and *Castor Canadensis* and Their Ability to Modify Ecosystems," *Mammal Review* 35, no. 3/4 (2005): 248–76; Dirk W. Lang, Gordon H. Reeves, James D. Hall, and Mark S. Wipfli, "The Influence of Fall-Spawning Coho Salmon (*Oncorhynchus kisutch*) on Growth and Production of Juvenile Coho Salmon Rearing in Beaver Ponds on the Copper River Delta, Alaska," *Canadian Journal of Fisheries and Aquatic Sciences* 63, no. 4 (2006): 917–30; Michael M. Pollock, Timothy J. Beechie, and Chris E. Jordan, "Geomorphic Changes Upstream of Beaver Dams in Bridge Creek, an Incised Stream Channel in the Interior Columbia River Basin, Eastern Oregon," *Earth Surface Processes and Landforms* 32, no. 8 (2007): 1174–85; Glynnis A. Hood, and Suzanne E. Bayley, "Beaver (*Castor Canadensis*) Mitigate the Effects of Climate on the Area of Open Water in Boreal Wetlands in Western Canada," *Biological Conservation* 141, no. 2 (2008): 556–67; Barry R. Taylor, Charles MacInnis, and Trevor A. Floyd, "Influence of Rainfall and Beaver Dams on Upstream Movement of Spawning Atlantic Salmon in a Restored Brook in Nova Scotia, Canada," *River Research and Applications* 26, no. 2 (2010): 183–93; C. Rhett Jackson and Catherine M. Pringle, "Ecological Benefits of Reduced Hydrologic Connectivity in Intensively Developed Landscapes," *BioScience* 60, no. 1 (2010): 37–46; Paul S. Kemp, Tom A. Worthington, Terence E. L. Langford, Angus R. J. Tree, and Martin J. Gaywood, "Qualitative and Quantitative Effects of Reintroduced Beavers on Stream Fish," *Fish and Fisheries* 13, no. 2 (2012): 158–81; and T. Beechie, H. Imaki, J. Greene, A. Wade, H. Wu, G. Pess, P. Roni, J. Kimball, L. Stanford, P. Kiffney, and N. Mantua, "Restoring Salmon Habitat for a Changing Climate," *River Research and Applications*, early view edition (2012) (DOI: 10.1002/rra.2590). For larger fish in the wake of reintroductions, see Tappe, *Status of Beavers*, 31–33.
- 55 Tappe, *Status of Beavers*, 5; Lee, 7; "Beaver Damage Complaints 1947," Fish and Game Report; W. E. Bedesew, Office of County Surveyor to Division of Fish and Game, May 28, 1943; L. W. Moran, Superintendent, Union Island Reclamation

- Districts No. 1 & 2 to Joe Hunter, Division of Fish and Game, July 16, 1943; Arthur L. Hensley to L. W. Moran, July 26, 1943; and John A. Wilson, Attorney for L. W. Moran to Division of Fish and Game, January. 20, 1944, DNRR, F3735:540. David M. Selleck to R. H. Beckham, June 15, 1948, DNRR, F3735:539, expressed the game manager's regret to hear of the death of beavers from the "Clark Valley plant."
- 56 Leonard A. Wilson, attorney for Frank Turner to California Fish and Game Commission, May 12, 1950; and E. L. MacCaulay to Leonard A. Wilson, May 22, 1950, DNRR, F3735:540.
- 57 Howard V. Shebley to Hensley, Field Correspondence, November 30, 1948, "Beaver Correspondence, 1940–50"; Richard M. Bond to Fred A. Houghton, Soil and Conservation Service, February. 18, 1944, DNRR, F3735:539. The first Resource Conservation District in California began operations in 1939, and awareness increased in the 1940s as the Soil and Conservation Service extended its programs in the state.
- 58 Ben Glading to Emil J. Ott, Jr., Richard Croker, A. C. Taft, William Bostwick, and H. P. Bagley, interoffice correspondence, "Beaver Picture Script," copy, August 6, 1947, DNRR, F3735:547. Quotes from scenes 3, 5, and 6.
- 59 Tappe, *Status of Beavers*, 54–57. In 1957, beavers were classified as "furbearers" and came under standard CDFG regulations.
- 60 Joseph P. Linduska, ed., "State by State," in *Restoring America's Wildlife*, 367; "Final Report: Beaver Management of the State of Oregon Federal Aid in Wildlife Restoration Act, 1940 Season Project No. 1-D-1," "Miscellaneous Files, 1934–1955," DNRR, F3735:543; "Preliminary Project Statement, Idaho Project 1-D," n. d., DNRR, F3735:543; Elmo W. Heter, "Transplanting Beavers by Airplane and Parachute," *Journal of Wildlife Management* 14 (1950): 143–47. Heter reported only one fatality out of seventy-six animals dropped in 1948.