



Tracking Number: (2019-025)

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, 1416 Ninth Street, Suite 1320, Sacramento, CA 95814 or via email to FGC@fgc.ca.gov. Note: This form is not intended for listing petitions for threatened or endangered species (see Section 670.1 of Title 14).

Incomplete forms will not be accepted. A petition is incomplete if it is not submitted on this form or fails to contain necessary information in each of the required categories listed on this form (Section I). A petition will be rejected if it does not pertain to issues under the Commission's authority. A petition may be denied if any petition requesting a functionally equivalent regulation change was considered within the previous 12 months and no information or data is being submitted beyond what was previously submitted. If you need help with this form, please contact Commission staff at (916) 653-4899 or FGC@fgc.ca.gov.

SECTION I: Required Information.

Please be succinct. Responses for Section I should not exceed five pages

1. Person or organization requesting the change (Required)

Name of primary contact person: Thomas Wheeler, Environmental Protection Information Center (EPIC)
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Additional Co-Petitioners: Center for Biological Diversity, Occidental Arts and Ecology Center, Northcoast Environmental Center, Safe Alternatives for our Forest Environment,

2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested: FGC 200, 203, 1050, 4009.5, 4180, 4181

3. Overview (Required) - Summarize the proposed changes to regulations:

Petitioners propose changing the regulations concerning the taking of beaver in the state to better reflect the beaver's unique ecological importance by clarifying the circumstances under which the California Department of Fish and Wildlife may issue a depredation permit for beavers. The proposed changes would require landowners to exhaust feasible non-lethal deterrence before killing and removing beavers, and require the Department to consider impacts to listed species from issuance of a depredation permit. The suggested changes not only better recognize the unique and valuable role beavers play in aquatic ecosystems, but also helps to shield the state against litigation and better aligns California's rules with those of other states.

Amend 14 CCR 401

§ 401. Issuance of Permit to Take Animals Causing Damage.

(a) Application. A person who is a property owner or tenant may apply to the department for a permit to take elk, bear, bobcat, beaver, wild pigs, deer, wild turkeys, or gray squirrels that are damaging or



destroying, or immediately threatening to damage or destroy, land or property. A bobcat in the act of injuring or killing livestock may be taken immediately provided the property owner or tenant applies for a permit from the department the next working day following the take.

(b) Permit Period.

(1) Permits issued pursuant to this section for beaver, wild pigs, or gray squirrels shall be valid for a period not to exceed one year.

(2) Permits issued pursuant to this section for bobcat, elk, bear, wild turkey, or deer shall be valid for a period not to exceed 60 consecutive days.

(3) Permits issued pursuant to this section authorizing the use of dogs for bear or bobcat shall authorize no more than three dogs and shall be valid for a period not to exceed 20 consecutive days.

(4) Permits may be renewed if damage or threatened damage to land or property continues to exist.

(c) Required Information and Conditions of Permit.

(1) The department shall collect the following information before issuing a depredation permit:

(A) The name, mailing address, and contact information of the property owner, including telephone, facsimile, and email. If the owner is a business entity, contact information for the person acting on behalf of the business.

(B) The name, mailing address, and contact information of the tenant (if applicable), including telephone, facsimile, and email.

(C) The name, mailing address, and contact information of any dog handlers or agents as described in subdivision (e), including telephone, facsimile, and email.

(D) The county and address of the location of the damage caused by depredation, or the nearest landmark or cross streets.

(E) A full description of the land or property damaged, destroyed, or immediately threatened, and the date the damage or threat occurred.

(F) The species suspected of damaging, destroying, or threatening land or property, and the method of identifying the species.

(G) A description of all non-lethal or less-lethal measures undertaken to prevent damage caused by animals prior to requesting the permit.

(H) A description of corrective actions that will be implemented to prevent future occurrence of the damage.

(I) The proposed method of take.

(J) Whether dogs will be used to pursue or take the animal, and if so, why dogs are needed, and the number of dogs to be used.

(2) The department may add terms and conditions to the permit necessary to protect wildlife and ensure public safety. To be valid, the permit shall contain a statement signed by the applicant that he/she has read, understands, and agrees to be bound by all the terms of the permit.

(3) The department may not issue any permit that would authorize activities that would violate federal, state or local law.

(4) For the taking of beaver, the department may issue a permit only if the department finds that the applicant has used at least one non-lethal deterrence or mitigation method prior to issuance of the permit, unless the department finds that exigent circumstances, such as a risk to human safety, require immediate lethal action. Non-lethal methods include, but are not limited to, wrapping trees, fencing, flow control devices, and other beaver deterrence. If the permit would remove beaver or their dams in areas occupied by endangered or threatened salmonids or other state or federally-listed species dependent on freshwater habitats maintained by beaver, the department shall analyze impacts to such species, document its findings in a report to accompany the permit, and include mitigation measures to eliminate harm to such species.

(d) Methods of Take.



(1) Animals taken pursuant to a permit may be taken in any legal manner except as herein provided and in accordance with the provisions of Section 465.5 of these regulations. Permits to take deer shall include conditions that comply with Fish and Game Code section 4181.5. Permits to take bear and bobcat with dogs shall include conditions that comply with Fish and Game Code Section 3960.2. No steel-jawed leghold traps may be used to take mammals, and no iron-jawed or any type of metal-jawed traps may be used to take squirrels or bears. No poison may be used. The department may specify the caliber and type of firearm and ammunition, archery equipment or crossbow to be used. The department may require that a permittee take animals alive by the use of live traps.

(2) The permittee and/or agent shall ensure that all animals are killed in a humane manner instantly and prevent any injured animal from escaping.

(e) Government Employees and Designated Agents.

(1) An employee of a federal, State, or local government agency or local district with responsibilities including but not limited to animal control, animal damage control, irrigation, flood, or natural resource reclamation, while acting in his/her official capacity may take depredating animals on the property designated in a permit issued pursuant to this section.

(2) The permittee may designate up to three other persons, including any dog handler who will be utilized in any pursuit, as his/her agents to take animals under the terms of the permit. A designated agent shall be any person who is acting under the direction and control of the permittee and who is 21 years of age or older. The designated agent(s) shall be named on the permit. The permittee may substitute designated agents with prior written approval of the department.

(f) Persons Prohibited from Taking Animals. No person shall take animals pursuant to the permit if he/she has been convicted of a violation related to the take or possession of game or furbearing mammals in the past 24 months or if he/she is on probation and may not hunt or possess a firearm as part of the terms of probation. A landowner who is on probation and may not hunt or possess a firearm as part of the terms of probation shall designate a qualified agent to take animals under a permit.

(g) Reports Required.

(1) Holders of permits authorizing take of wild pigs shall provide a report listing the date and sex of each wild pig taken. A report shall be submitted whether or not any animals were taken. The reporting period shall be by calendar month. The permittee or designated agent shall complete and submit the report to the department on or before the 15th day of the following month. Reports shall be submitted to the address provided by the department.

(2) Holders of permits authorizing the use of dogs to take bear or bobcat shall comply with the requirements of Fish & Game Code section 3960.2 and shall submit a report to the department within 30 days of permit issuance. Reports shall be submitted to the address provided by the department. Reports shall include the following information:

(A) Date of kill and the sex of any bear or bobcat that was killed.

(B) Details regarding all pursuits, including any information about a pursued bear or bobcat, even if the animal was not killed.

(C) An explanation of why any pursued bear or bobcat was not killed, and whether such bear or bobcat was harmed.

(3) Holder of permits authoring take of beavers shall provide a report documenting whether associated natural structures, such as beaver dams, were removed, destroyed, or otherwise altered.

(h) Tagging Animals. All animals taken pursuant to a permit, except wild pigs, shall be immediately tagged with tags provided by the department. Wild pigs shall be tagged prior to being transported from the property designated in the permit. Tags for animals except wild pigs shall be completed at the time the animal is taken. Tags for wild pigs shall be completed before the wild pigs are removed from the property. Tags shall clearly show the permittee's name, address, date and location the animal was taken and shall include the signature of the person taking the animal. The report portion of each tag shall be



mailed to the department without delay. No tags are required for squirrels or beavers.

(i) Utilization of Carcass. Animals taken pursuant to this permit must be disposed of as required in the permit. No animals, except wild pigs, may be utilized by the permittee or designated agent. The permittee or designated agent may leave the carcass of any wild pig where it was taken for reasons of high air temperatures, disease, parasites, or conditions which preclude use of the carcass. A person who makes every reasonable attempt to utilize the carcass of any wild pig as required in this subsection shall be deemed to be in compliance with Section 4304 of the Fish and Game Code. (1) After any taking of bear, the permittee or agent shall comply with Section 367.5 of these regulations, except the skull shall not be returned to the permittee or agent.

(j) Suspension and Revocation of Permits.

(1) Permits may be suspended temporarily by the director for a breach or violation of the permit by the holders thereof, their agents, servants, employees or any person acting under their direction and control. The commission shall be notified of any such suspension and subsequently may revoke or reinstate the permit, or fix the period of its suspension, after written notice to the permittee and the permittee has been afforded an opportunity to be heard.

(2) Any person who has had his/her permit revoked or suspended by the commission shall be required, upon application for a new or subsequent permit, to appear before the commission and demonstrate to its satisfaction that the use of such a permit will be consistent with depredation control, with these regulations, and with the laws under which they are promulgated.

(k) It is unlawful for a permittee or agent to violate any of the terms or conditions of a permit issued pursuant to this section.

(l) The permit does not invalidate any city, county, or state firearm regulation.

4. Rationale (Required) - Describe the problem and the reason for the proposed change:

The North American beaver (*Castor canadensis*) is native to California. Accordingly, the flora and fauna of the state have co-evolved with the beaver, developing unique and complex interwoven relationships. Beavers, however, are currently missing from much of their historic range and the effects of their absence are felt by the species that co-evolved with beavers. Beaver create freshwater habitats used by a variety of wildlife, including fish, birds, and other mammals. Their dams filter stream water, improve water quality, raise the water table, increase water storage, and repair eroded riparian areas. In particular, beavers have a significant beneficial relationship to many species currently listed as threatened or endangered under the California Endangered Species Act and/or the federal Endangered Species Act, such as coho salmon. The proposed amendments to the regulations recognize the unique ecological importance of beavers and take steps towards promoting our co-existence with beavers by prohibiting the commercial trapping of beavers, and by requiring that non-lethal or less-lethal measures have been taken to avoid and minimize conflicts with humans. The proposed regulations are in line with how many other states now manage beavers.

Beavers are Biologically Important to California

Beavers are native to much of California, from arid desert streams, to high mountain meadows, to coastal forests. California's beavers were nearly extirpated from the state by over trapping. Although some attempts have been made to reintroduce beavers or assist in their dispersal, beavers remain missing from much of their historic territory, in particular northern California coastal streams and high mountain meadows where the benefits of beavers may be most acutely felt.



The total impact of beavers to the hydrologic characteristics of streams is difficult to overestimate. Beaver dams increase in-stream storage capacity, which in turn has been shown to result in greater summer flows, even going so far as to result in continual flow in previously seasonal streams. Impoundment of water also has been shown to stabilize water temperatures. Beaver dams slow stream flow resulting in increased sedimentation, thereby raising incised channels to the point where streams are reconnected to their historic floodplains.

Beaver dams are so ecologically important that watershed restoration groups are now turning to “beaver dam analogs,” human engineered approximations of beaver dams, to provide the same ecological functions. Unlike beaver dams, continual human maintenance—and cost—is required.

Broadly, the presence of beaver has been shown to increase bird, fish, invertebrate, amphibian and mammalian abundance and diversity. Turning specifically to native fish species, the overall net effect of beavers is positive, as many of these hydrologic changes associated with beaver dams benefit fish. Over 80 species of North American fish have been documented using beaver ponds; 48 of which commonly use beaver pond habitats. The slow current and large surface to edge ratio has been shown to increase vegetation and aquatic invertebrates, providing substantially improved forage compared to unimpounded streams. The slow current also requires less expense of energy for fish. Turning specifically to coho salmon, the effects of these changes are perhaps most pronounced. For overwinter use, coho salmon use side channel habitat influenced by beaver dams at a higher density, and were larger and had a better juvenile survival rate than juvenile salmon in side channels not impacted by beavers. Similarly, beaver dams are important during the summer, as are salmon who were found upstream of beaver dam were not only consistently larger, but also occurred there in higher densities. One study found, for example, that though these upstream reaches accounted for less than 1% of the total available habitat, these dam-influenced areas contained over a third of the total juvenile salmon for the entire watercourse.

Beavers also have been shown to have positive benefits to other species. Beaver dams are associated with increased riparian habitat, such as willow. This willow serves as important habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell’s vireo (*Vireo bellii pusillus*). Tidewater goby (*Eucyclogobius newberryi*), listed as “endangered” under the Endangered Species Act, has been shown to utilize both inundated areas behind beaver dams and bank burrows made by beavers. (USFWS 2005). Beaver dams are thought to provide important refugia for endangered California red-legged frogs (*Rana draytonii*) and western pond turtles (*Actinemys marmorata*), a “species of special conservation concern” in California.

New Regulations Pose Minimal Hardship for Landowners

In some places, beavers can conflict with human uses of the landscape, as dams can cause flooding for adjacent lands. Additionally, beavers may remove some riparian vegetation or may alter the structure or composition of riparian areas in a way that is undesirable to a landowner. As the rules are currently written, it is too easy to obtain a permit to take beaver through a depredation permit, thereby discouraging non-lethal deterrence. The proposed rulemaking would not prohibit lethal removal of beavers but it would ensure that beavers are taken (killed) only when necessary, after non-lethal measures have been attempted. Further, the rules would still allow for the lethal removal of beaver if exigent circumstances require their removal.

Coexistence with beavers is often possible with minimal effort by landowners. Many beavers are removed because of the dams that they produce impound areas with water against the wishes of property



owners. A variety of devices and techniques have been developed to reduce impoundment and flooding. Beavers are also taken because of impacts to vegetation adjacent to waterways. This vegetation can easily be protected with hardware cloth or welded wire mesh wrapped around the base of the tree. The Department maintains a guide on “Living with Beavers,” which is attached to this petition, that discusses many of the ways humans can co-exist with beavers.

Proposed Regulations Insulate State Against Litigation

The proposed rulemaking also insulates the Department against potential litigation under the Endangered Species Act (ESA). In issuing permits to allow the taking of beavers, the Department may violate the ESA if such taking would, in turn, take any other species subject to the Endangered Species Act’s take prohibition. By making clear that the Department is unable to authorize the taking of beavers if such taking would result in the violation of the ESA or any other law and by requiring the Department to conduct a site-specific investigation of potential impacts, the Department will avoid future litigation.

As it relates here, the ESA prohibits any person, including state and local governments, from “tak[ing] any [endangered or threatened] species within the United States or the territorial sea of the United States.” 16 U.S.C. § 1538(a) (1) (B). In addition, the ESA makes it unlawful for any person “to attempt to commit, solicit another to commit, or cause to be committed, any offense defined” in the ESA. *See* 16 U.S.C. § 1538(g). The term “‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” § 1532(19). In turn, “[t]ake’ is defined...in the broadest possible manner to include every conceivable way in which a person can ‘take’ or attempt to ‘take’ any fish or wildlife.” S.Rep. No. 93-307, at 7 (1973); *see also Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687 (1995) (citing Senate and House Reports indicating that “take” is to be defined broadly). Pursuant to 16 U.S.C. § 1538(g), “It is unlawful for any person to...cause to be committed[] any offense defined in this section,” which includes the taking of a protected species. The Department, in issuing permits, is subject to the Act’s prohibition on authorizing take.

As the First Circuit Court of Appeals found in *Strahan v. Coxe*, “The statute not only prohibits the acts of those parties that directly exact the taking, but also bans those acts of a third party that bring about the acts exacting a taking.” *Strahan v. Coxe*, 127 F.3d 155, 163 (1st Cir. 1997) cert. den. 525 U.S. 830 (1998). This includes situations where a government authorizes another to conduct activities that would result in a violation of the act. In *Strahan*, the court found Massachusetts officials liable under the ESA for licensing commercial fishermen who employ methods known to harm listed whales.¹

The proposed regulation would make clear the Department’s obligation to deny any permit application that may cause the taking of any listed species or may otherwise cause a violation of federal, state, or local laws. Furthermore, it directs the Department to make a finding on impacts to listed species if lethal removal may adversely impair a listed species. Lastly, the proposed regulations would require a report if a beaver dam were to be removed.

Proposed Regulations are Consistent with Regulations in Other States

¹ The First Circuit is not alone. A long-line of “*Strahan-take*” cases have been upheld in courts across the country, including in California. *See Coalition for a Sustainable Delta v. McCamman*, 725 F. Supp. 2d 1162, 1167–68 (E.D. Cal. 2010) (recognizing that state regulating agencies may be held liable for take under the ESA, but holding there were disputes of material fact regarding whether the striped bass sportfishing regulations at issue caused take of listed salmonids).



In recognizing the unique biological importance of beavers and limiting their take to reduce impacts on the environment, California would join many other states who have come to recognize the importance of beaver in restoring and preserving healthy aquatic ecosystems. Massachusetts, for example, requires individuals to apply to remove beavers and limits their removal when beavers are causing material harm or when they pose a threat to human health or safety. Further, if removal of beavers, dams, or the de-watering of ponds may impact listed species, applicants have to seek other separate advance approval from the state. As another example, New York requires a site-specific consideration of local beaver populations and requires the state to inform applicants of the positive ecological benefits of beavers and alternatives to trapping prior to issuance of a depredation permit.

SECTION II: Optional Information

- 5. Date of Petition:**
- 6. Category of Proposed Change**
 - Sport Fishing
 - Commercial Fishing
 - Hunting
 - Other, please specify: Depredation permit issuance
- 7. The proposal is to:** *(To determine section number(s), see current year regulation booklet or <https://govt.westlaw.com/calregs>)*
 - Amend Title 14 Section(s): 401
 - Add New Title 14 Section(s):
 - Repeal Title 14 Section(s):
- 8. If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition**
Or Not applicable.
- 9. Effective date:** If applicable, identify the desired effective date of the regulation.
If the proposed change requires immediate implementation, explain the nature of the emergency:
- 10. Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: “Living with Beavers, produced by the California Department of Fish and Wildlife, is attached to this petition. .
- 11. Economic or Fiscal Impacts:** Identify any known impacts of the proposed regulation change on revenues to the California Department of Fish and Wildlife, individuals, businesses, jobs, other state agencies, local agencies, schools, or housing: The state already created resources on non-lethal methods of dealing with beavers, and the costs of implementing those methods on site will be the responsibility of the applicant. The proposed regulatory changes would likely result in fewer permit applications, reducing the need for processing and oversight of permits issued by the agency. If the



agency continues to issue permits to kill beavers in areas occupied by listed species that depend upon beavers, however, more resources may be required to analyze, document, and mitigate impacts to listed species.

12. Forms: If applicable, list any forms to be created, amended or repealed:

SECTION 3: FGC Staff Only

Date received: [Received by email on Friday, November 15, 2019 at 10:51 AM.](#)

FGC staff action:

- Accept - complete
- Reject - incomplete
- Reject - outside scope of FGC authority

Tracking Number 2019-025

Date petitioner was notified of receipt of petition and pending action: December 4, 2019

Meeting date for FGC consideration: February 5-6, 2020

FGC action:

- Denied by FGC
- Denied - same as petition _____
Tracking Number
- Granted for consideration of regulation change

Living with Beavers

The American Beaver (*Castor canadensis*) is the largest living rodent in North America, with adults averaging 40 pounds in weight and measuring more than 3 feet in length, including the tail. These semi-aquatic mammals have webbed hind feet, large incisor teeth, and a broad, flat tail (Figures 1 and 2).



Figure 1. Photo by Cheryl Reynolds and courtesy of Worth A Dam

Once among the most widely distributed mammals in North America, beavers were eliminated from much of their range in the late 1800s because of unregulated trapping and loss of suitable habitat. Beavers are native to California and historically occurred along the coast, throughout the Central Valley, Colorado River basin, and into the Sierra Nevada and Cascades mountain ranges. However, by the early 20th century their geographic range had decreased dramatically as a result of intensive fur-trapping and loss of suitable habitat caused by extensive land and water development. Between 1923 and 1950, the State of California conducted a successful reintroduction program using parachutes in some instances to plant beavers in remote mountain locations (Hensley 1946). Today, interest in beavers in California is on the rise as the benefits to fish and wildlife habitat, surface water storage and ground water recharge become more apparent during drought conditions.

Beavers are monogamous and mate for life. Females reach sexual maturity at 1.5 to 3 years of age and will typically birth 1-4 or more kits per year, depending on habitat quality and the availability of food. Beavers typically breed only once per year during the winter months, giving birth to kits in late spring, though significant variation occurs depending on latitude and climate (Baker and Hill 2003).

Life History

Beavers maintain family units which consist of an adult breeding pair, young of the year and young from the previous year. Sometimes, when habitat quality is poor or population levels are near their carrying capacity, older offspring will remain with the family unit for more than 2 years.

Beavers are strict herbivores and they generally prefer grasses, leaves, and aquatic plants such as cattails, bulrushes, and water lilies. Fermentation by special intestinal microorganisms allows beavers to digest 30 percent of the cellulose they ingest. In the fall and winter, they feed primarily on the bark and cambium of trees and shrubs. Aspen, cottonwood, willow and alder are preferred woody species in California. Beavers sometimes consume growing crops, and in some cases may travel 100 yards or more from a pond or stream to reach corn fields, soybean fields, and other growing crops. In these cases they generally cut the plants off at ground level and drag them back to the water.

Beavers do not hibernate. When the surface of the water is frozen, beavers eat bark and stems from a food “cache” they have anchored to the bottom of the waterway for the winter. They have also been seen swimming under the ice to retrieve roots and stems of aquatic plants. They are generally nocturnal, but it is not uncommon to see beavers during daylight hours, particularly in larger water bodies. They generally do not stray far from the relative safety of water.

Viewing Beavers

Look for signs of beavers during the day; look for the animals themselves before sunset or sunrise. Approach a beaver site slowly and downwind. (Beavers have poor eyesight but excellent hearing and sense of smell.) Look for a V-shaped series of ripples on the surface of calm water. A closer view with binoculars may reveal the nostrils, eyes, and ears of a beaver swimming.



Figure 2. Beaver at French Creek, Siskiyou County. Photo by M. Stapleton.

If you startle a beaver and it goes underwater, wait quietly in a secluded spot and chances are that it will reemerge within one or two minutes. However, beavers are able to remain underwater for at least 15 minutes by slowing their heart rate.

When seen in the water, beavers are often mistaken for muskrats. Try to get a look at the tail: Beavers have a broad, flat tail that doesn't show behind them when swimming, whereas muskrats have a thin tail that is either held out of the water or sways back and forth on the water's surface as the animal swims.

Beavers stand their ground and should not be closely approached when cornered on land. They face the aggressor, rear up on their hind legs, and hiss or growl loudly before lunging forward to deliver extremely damaging bites.

Wildlife Habitat Benefits

Beavers are well known for their construction efforts. They create dams and lodges for shelter and protection, largely with woody material. The woody material used in construction is either gathered from the ground locally, or from small and medium sized trees that the beavers fell with their teeth (Figures 4 and 5). The orange tooth enamel of their incisors is thicker on the front than the back, allowing for a self-sharpening wear pattern that maintains their chisel-like edge.



Figure 3. A beaver uses its tail as a prop in order to sit upright. (Miller and Yarrow 1994)

Depending on the type of water body and local habitat conditions, beavers may also construct burrows in the bank of a stream or river. These bank dens may be used in lieu of, or in conjunction with a lodge (Figure 5) and often take advantage of natural features such as logs or stumps.



Figure 4. Beavers have self-sharpening incisors. Photo courtesy Washington Dept. of Fish and Wildlife.

Beaver dams create habitat for many other animals and plants of California. Deer and elk

frequent beaver ponds to forage on shrubby plants that grow where beavers cut down trees for food or for use in constructing their dams and lodges. Weasels, raccoons, and herons hunt frogs and other prey along the marshy edges of beaver ponds. Sensitive species such as red-legged, yellow-legged and Cascade frogs all benefit from habitat created by beaver wetlands. Migratory water birds use beaver ponds as nesting areas and resting stops during migration. Ducks and geese often nest on top of beaver lodges since they offer warmth and protection, especially when lodges are formed in the middle of a pond. Willow flycatchers use the shrubby re-growth of chewed willow stumps to seek shelter and find food. The trees that die as a result of rising water levels attract insects, which in turn feed woodpeckers, whose holes later provide homes for other wildlife. In coastal rivers and streams, young coho salmon and steelhead may use beaver ponds to find food and protection from high flows and predators while waiting to grow big enough to go out to sea (Pollock et al. 2003).



Figure 5: Beaver pond and lodge on Sugar Creek, Siskiyou County. Photo by CDFW's Mary Olswang.

Preventing Conflicts

Beaver activities can cause problems, but before beginning a beaver control action, assess the problem and aim to match the most appropriate and cost-effective controls to the situation. There are two basic control methods used in California: prevention and lethal control. There are many non-profit organizations in California that support alternatives to lethal control. [The Benefits of Beaver to California & Stewardship Strategies Resource List](#) is a valuable educational resource.

Practical tips for minimizing conflict. It is almost impossible as well as cost prohibitive to exclude beavers from ponds, lakes, or impoundments.

Exclusion

Fencing off groups of trees or shrubs or garden plots with a low fence (three feet tall) will protect them. Since beavers generally do not like to stray far from water (this opens them up to greater risk of predation), fences may be effective even if they do not completely surround the area (if you choose to fence only part of an area, fence the portion of the area toward the water source, and part way along the sides). The fence should be constructed of woven or welded wire and be well anchored to the ground, so that beavers do not crush it, crawl under it, or walk over it.

An electrified wire strung 4-6" above the ground may also be an effective beaver deterrent. Fence chargers, wiring, and wire hangers suitable for use on pets and other small animals are generally available at hardware stores, feed stores, and home improvement centers.

Protection of individual trees and plants

Valuable trees and other plants adjacent to waterways may be protected from beavers by encircling them with hardware cloth (chicken wire is generally too flimsy), welded wire mesh or sheet metal (WDFW 2015). Welded wire mesh of 2" x 4" seems to be an optimal material in terms of

effectiveness, durability, aesthetics and cost of construction. The barrier should afford 6 inches to one foot of space between the barrier and the tree, extend at least three (preferably four) feet above ground level and be dug into the ground 3-4 inches for maximum effectiveness (Figure 6).

Alternatively, painting tree trunks with a sand and paint mixture may also prevent beaver gnawing, and may be more aesthetically pleasing than metal barriers. Beavers do not find the sand to be appetizing, and the mixture will be effective for approximately two years. The sand/paint ratio should be approximately 8 ounces (2/3 cup) of fine sand to one quart of latex paint.

Prevent flooding

Have you ever cut a notch into the dam and come back the next day to see it patched and re-enforced with mud? Beavers are attracted to the sound of running water and will repair most dam breaches and plug most culverts and pipes that are installed in order to drain the ponds. Beavers also require a certain depth of water to move around and escape predation.

A variety of devices and designs have been developed for controlling beaver impoundments and keeping blocked culverts open. The Flexible Leveler and Beaver Deceiver are two examples. Visit <http://www.beaversolutions.com/> for more information.

Modification of beaver dams, or any construction work within lakes or within the bed and bank of a stream, may require a Streambed Alteration Agreement permit from the California Department of Fish and Wildlife (CDFW). Before attempting to install any beaver devices, contact CDFW in order to determine for assistance.

Depredation Regulations

If all alternatives are exhausted and beavers are continuing to damage or threaten to damage land or property, the owner or tenant of such property may apply to the Department for a permit to kill the depredating animals. Upon satisfactory evidence of such damage or destruction, the Department shall issue a revocable permit allowing the taking of such animals (Fish and Game Code §4181). No animals killed pursuant to such a permit may be utilized by the permittee or his agent (Title 14, California Code of Regulations, §401(i)). For additional information, contact your regional Department of Fish and Wildlife office or visit <https://www.wildlife.ca.gov/Regions>.

Public Health Concerns

Beavers can be infected with the bacterial disease tularemia that is transmitted by ticks, flies and ingestion of contaminated water (Gaydos 1998). Human can also contract the disease by eating infected meat or allow an open wound come in contact with an infected animal.

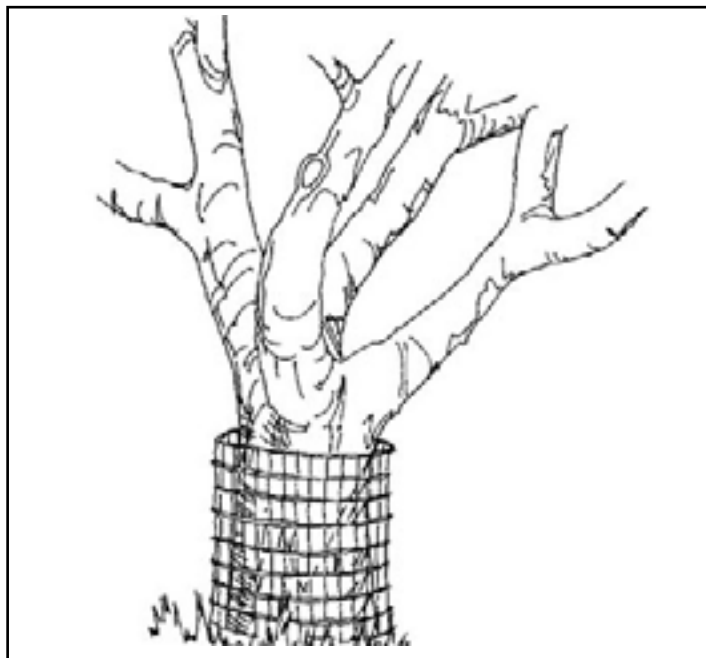


Figure 6. Drawing by Jenifer Reese (Miller and Yarrow 1994)

Beavers defecate in the water in which they live. Ingested water by humans may cause Giardia, a common flu-like infection.

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