

APPENDIX B: PROJECT BACKGROUND SUPPORTING DOCUMENTATION

Table B-1
Acres Worked and Technical Assistance Hours

Shasta Land Class Acres by Calendar Years 2007-2017

COUNTY	LANDCLASS	Calendar Year	Acres
SHASTA	BLM LAND	2007	16,500
		2008	16,500
		2009	16,500
		2010	16,500
		2011	16,500
		2012	16,500
		2013	16,500
		2014	16,500
		2015	16,500
		2016	76,500
		2017	60,000
	TOTAL BLM LAND		285,000
	PRIVATE LAND	2007	61,273
		2008	63,429
		2009	53,960
		2010	43,888
		2011	40,522
		2012	16,539
		2013	17,133
		2014	21,888
		2015	20,728
		2016	14,049
		2017	7,418
	TOTAL PRIVATE LAND		360,827
SHASTA COUNTY (AIRPORTS)	COUNTY OR CITY LAND	2009	1,500
		2010	1,500
		2014	1,500
		2015	1,500
		2016	1,500
		2017	1,500
	TOTAL COUNTY OR CITY LAND		9,000
Grand Total			654,827

Table B-1
Acres Worked and Technical Assistance Hours

Shasta Hours by Work Task Form Type Calendar Years 2007-2017

Calendar Year	Administrative	Direct Controls	Technical Assistance	Grand Total
2007		2,689	225	2,914
2008	433	2,193	232	2,857
2009	531	2,207	340	3,078
2010	695	2,547	192	3,434
2011	894	2,566	170	3,630
2012	825	2,557	159	3,541
2013	912	2,350	221	3,483
2014	1,205	2,202	280	3,686
2015	1,213	2,270	200	3,682
2016	882	2,447	213	3,542
2017	727	2,651	123	3,501
Grand Total	8,315	26,677	2,354	37,346

Source: USDA APHIS-WS Management Information System 2019 (USDA 2019b)

TABLE B-2: SHASTA COUNTY CONFIRMED BLACK BEAR DAMAGE BY RESOURCE CATEGORY 2007-2018

Year	Field Crops	Livestock	Agriculture Other - Hives	Natural Resources	Property	Total Black Bear-Caused Damages
2007	-	\$660	\$11,000	-	\$250	\$11,910
2008	-	\$2,500	\$1,200	-	\$1,500	\$5,200
2009	\$1,400	\$6,120	\$16,500	-	\$1,200	\$25,220
2010	\$500	\$750	\$8,450	\$15,125	\$1,350	\$26,875
2011	-	\$7,300	\$40,700	\$5,000	\$1,725	\$54,725
2012	-	\$8,236	\$26,349	-	\$6,000	\$40,586
2013	-	\$265	\$27,439	-	\$2,600	\$30,304
2014	-	\$622	\$28,771	\$250	\$5,250	\$34,894
2015	-	\$1,343	\$33,748	-	-	\$35,092
2016	-	\$5,969	\$89,539	-	\$100	\$95,600
2017	-	\$4,950	\$72,552	-	-	\$77,703
2018	-	\$7,069	\$19,023		\$1,100	\$27,193
Total confirmed black bear damage over 12 years	\$1,900	\$45,787	\$375,475(a)	\$20,375(b)	\$21,775	\$465,312
Percent of total black bear damage over 12 years	< 1%	9%	81%	5%	5%	100%
Primary resources experiencing loss	Produce: \$1,900 (100%)	Cattle/calves: \$29,091 (64%)	Hives, bees, honey: \$375,475 (100%)	Aquaculture (rainbow trout): \$20,125 (98%)	Residential and non-residential buildings: \$13,000 (63%)	
Percent of total damages, all species, over 12 years	< 1%	2%	21%	1%	1%	26%

Notes:

(-) indicates \$0 damage value

(a) Wildlife damages to hives includes damages to bees, consumption of honey, and damages to hive structures.

(b) Natural resources damages are predominantly from wildlife damage to aquaculture activities.

Source: USDA 2019b

TABLE B-3: SHASTA COUNTY CONFIRMED DAMAGE CAUSED BY MAMMAL SPECIES 2007-2018

Year	Agriculture Field Crops	Agriculture Livestock	Agriculture Other	Natural Resources	Health and Safety	Property	Total Mammal Damages Confirmed by APHIS-WS
2007	\$500	\$6,405	\$11,000	-	-	\$2,050	\$19,955
2008	-	\$6,960	\$1,200	-	-	\$3,000	\$11,160
2009	\$1,400	\$10,750	\$16,500	-	-	\$18,850	\$47,500
2010	\$500	\$15,550	\$8,450	\$15,125		\$34,635	\$74,260
2011	-	\$29,680	\$41,100	\$5,652		\$7,985	\$84,417
2012	-	\$20,948	\$26,349	-	-	\$13,800	\$61,097
2013	\$84,980	\$36,023	\$27,439	-	-	\$16,350	\$164,793
2014	\$50,616	\$24,448	\$28,771	\$5,750		\$15,950	\$125,535
2015	\$60	\$17,835	\$33,748	\$1,100		\$18,775	\$71,518
2016	\$635	\$21,033	\$89,564	-	-	\$4,750	\$115,983
2017	-	\$12,272	\$72,552	-	\$100	\$1,750	\$86,875
2018	\$500	25,030	\$20,895	-	-	\$27,000	\$73,424
Total confirmed damages from mammals species over 12-year period	\$139,192	\$227,103	\$377,771	\$27,627		\$164,895	\$936,521
Percent of total over 12-year period	15%	24%	40%	3%	< 1%	18%	100%
Total all confirmed damages all species over 12-year period	\$1,007,269	\$227,103	\$377,771(a)	\$27,627(b)		\$166,395	\$1,806,265
Percent of mammal damage total of all confirmed damages all species over 12-year period	14%	100%	100%	100%	< 1%	1%	52%

Notes:

(-) indicates \$0 damage value

(a) Wildlife damage includes damages to bees, consumption of honey, and damages to hive structures (\$377,546) plus livestock (\$225).

(b) Natural resources damages are predominantly from wildlife damage to aquaculture activities

Source: USDA 2019b

TABLE B-4: SHASTA COUNTY CONFIRMED DAMAGE CAUSED BY AVIAN SPECIES 2007-2018

Year	Agriculture Field Crops	Agriculture Livestock	Agriculture Other	Natural Resources	Property	Total Avian Damages Confirmed by APHIS-WS
2007	-	-	-	-	-	-
2008	-	-	-	-	-	-
2009	-	-	-	-	-	-
2010	-	-	-	-	-	-
2011	\$1,500	-	-	-	-	\$1,500
2012	-	-	-	-	-	-
2013	\$136,663	-	-	-	-	\$136,663
2014	\$122,211	-	-	-	\$1,500	\$123,711
2015	\$101,843	-	-	-	-	\$101,843
2016	\$177,322	-	-	-	-	\$177,322
2017	\$159,840	-	-	-	-	\$159,840
2018	\$168,697	-	-	-	-	\$168,697
Total confirmed damages from avian species over 12-year period	\$868,077	-	-	-	\$1,500	\$869,577
Percent of total avian damage over 12-year period	> 99%	0%	0%	0%	< 1%	100%
Total all confirmed damages all species over 12-year period	\$1,007,269	\$227,103	\$377,771(a)	\$27,627(b)	\$166,395	\$1,806,265
Percent of avian damage of all confirmed damages all species over 12-year period	86%	0%	0%	0%	< 1%	48%

Notes:

(-) indicates \$0 damage value

(a) Wildlife damage includes damages to bees, consumption of honey, and damages to hive structures (\$377,546) plus livestock (\$225).

(b) Natural resources damages are predominantly from wildlife damage to aquaculture activities.

Source: USDA 2019b

Integrated Wildlife Damage Management Control Methods

NONLETHAL CONTROL METHODS

APHIS-WS may recommend nonlethal control methods to resource owners. Those methods, descriptions, and their associated limitations are presented below and are summarized from USDA (2015a: Appendix C [Wildlife Damage Management Methods Available for Use in California]). Some nonlethal methods are appropriate and may be safely used by resource owners (e.g., animal husbandry practices, exclusion [fencing/penning], and frightening devices (e.g., lights)). However, some methods must be used only by trained professionals (e.g., pyrotechnics). Some nonlethal methods have the potential to result in unintentional effects on species that are protected by federal and/or state law. The types of nonlethal methods that have been used in Shasta County from 1998 to 2017 are shown in tables included at the end of this section. As with lethal methods, Shasta County would not be responsible for determining the nonlethal methods to be used.

RESOURCE MANAGEMENT

Resource management includes a variety of practices that may be used by agriculture producers to reduce their exposure to potential wildlife depredation losses. Implementation of these practices is appropriate when the potential for depredation can be reduced without significantly increasing the cost of production or diminishing the resource owner's ability to achieve land management and production goals. Changes in resource management are recommended through the technical assistance extended to producers when the change appears to present a continuing means of averting losses.

ANIMAL HUSBANDRY

This general category includes modifications in the level of care and attention given to livestock, shifts in the timing of breeding and births, selection of less vulnerable livestock species to be produced, and the introduction of human custodians or guarding animals to protect livestock.

The level of care or attention given to livestock may range from daily to seasonal. Generally, as the frequency and intensity of livestock handling increases, so does the degree of protection. In operations where livestock are left unattended for extended periods, the risk of depredation is greatest. The risk of depredation can be reduced when operations permit nightly gathering so that livestock are inaccessible during the hours when predators are most active. This risk diminishes as age and size increase and can be minimized by holding expectant females in pens or sheds to protect births and by holding newborn livestock in pens for the first two weeks. Shifts in breeding schedules can also reduce the risk of depredation by altering the timing of births to coincide with the greatest availability of natural prey to predators or to avoid seasonal concentrations of migrating predators such as golden eagles.

The use of human custodians and guarding animals can also provide significant protection in some instances. The presence of herders to accompany bands of sheep on an open range may help ward off predators. Guard dogs have also proven successful in many sheep and goat operations. The supply of proven guarding dogs is generally quite limited, requiring that most people purchase and rear a pup. Therefore, there is usually a four- to eight-month period of time necessary to raise a guarding dog before it becomes an effective deterrent to predators. Because 25 to 30 percent of dogs are not successful, there is a reasonable chance that the first dog raised as a protector will not be useful. The effectiveness of guarding dogs may not be sufficient in areas where there is a high density of predators, where livestock widely scatter to forage, or where dog-

to-livestock ratios are less than recommended. Guarding dogs often harass and kill nontarget wildlife.

Altering animal husbandry to reduce wildlife damage has many limitations. Nightly gathering may not be possible where livestock are in many fenced pastures and where grazing conditions require livestock to scatter. Hiring extra herders, building secure holding pens, and adjusting the timing of births is usually expensive. Furthermore, the timing of births may be related to weather or seasonal marketing of young livestock. The expense associated with a change in husbandry practice may exceed the savings.

HABITAT MANAGEMENT

Some habitat can be managed to not produce or attract certain wildlife species. For example, when depredation cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate the loss potential. Lure crops are planted or left for consumption by wildlife as an alternative food source. This approach provides relief for critical crops by sacrificing less important or specifically planted fields. For lure crops to be successful, frightening techniques may be necessary in fields where crops are to be protected; wildlife should not be disturbed in sacrificial fields.

Limitations of habitat management as a method of reducing wildlife damage are determined by the characteristics of the species involved, the nature of the damage, economic feasibility, and other factors. Also, legal constraints may preclude altering particular habitats, particularly those that support threatened and endangered species, California species of special concern, critical habitat, or rare plants.

Establishing lure crops is expensive, requires considerable time and planning to implement, and may attract other unwanted species to the area, causing additional wildlife damage problems. Also, there are potential legal consequences regarding hunting near lure crops, which must be considered before lure crops or alternate foods are used.

URBAN DESIGN

Change in the architectural design of a building or a public space can often help to avoid potential wildlife damage. For example, selecting species of trees and shrubs that are not attractive to wildlife can reduce the likelihood of potential wildlife damage to parks, public spaces, or residential areas. Similarly, incorporating devices into architectural design that exclude wildlife can significantly reduce potential problems. Grids or screens that prevent birds from entering are an example.

Architectural changes are often more feasible if considered during the design stage, rather than after a facility is built. The consideration of wildlife conflicts is frequently overlooked in the construction of new buildings and facilities. Modifying structures or public spaces to remove the potential for wildlife conflicts is often impractical because of economics or the presence of other nearby habitat features that attract wildlife.

PHYSICAL EXCLUSION

Physical exclusion methods restrict the access of wildlife to resources. These methods, including fences, sheathing, tree protectors, and entrance barricades, provide a means of appropriate and effective prevention of wildlife damage in many situations.

Fences are widely used to prevent damage to farm crops caused by rabbits and other wildlife. Predator exclusion fences constructed of woven wire or multiple strands of electrified wire are also effective in some areas, but fencing does have limitations. Even an electrified fence is not predator proof and the expense may exceed the benefit in most cases. Herd animals such as sheep may be protected through fencing/penning, as has been demonstrated in Marin County.

If large areas are fenced, the predators have to be removed from the enclosed area to make it useful. Some fences inadvertently trap, catch, or affect the movement of nontarget wildlife. It is not uncommon for coyotes to use fences to trap deer or antelope. As such, fencing large areas could result in unintended consequences on wildlife migratory corridors. Fencing may not be practical or legal in some areas (e.g., restricting access to public land). Predators deterred by fencing may move to another area where they could create new problems or exacerbate an existing one (i.e., predation would not necessarily be controlled, just relocated).

Entrance barricades of various kinds are used to exclude bobcats, coyotes, foxes, opossums, raccoons, or skunks from dwellings, storage areas, gardens, or other areas. Metal flashing may be used to prevent entry of small rodents into buildings.

Sheathing or tree protectors can be used in some situations to avoid damage to trees but may be impractical where there are numerous plants to protect.

DETERRENTS

Deterrents may effectively alter the behavior of the target animal to eliminate or reduce the potential for loss or damage to property. Most deterrent methods are used for birds. An important consideration for deterrent use is safety; some methods should be used only by trained professionals. In addition, some methods have a potential to affect nesting avian species.

Frightening Devices

The success of frightening methods depends on an animal's fear of and subsequent aversion to offensive stimuli. Once animals become habituated to a stimulus, they often resume their damaging activities. Persistent effort is usually required to consistently apply frightening techniques and then vary them sufficiently to prolong their effectiveness. Over time, some animals learn to ignore commonly used scare tactics. In many cases, animals frightened from one location become a problem at another. The effects of frightening devices on nontarget wildlife need to be considered. For example, special-status birds or birds protected under the Migratory Bird Treaty Act (MBTA) may be disturbed or frightened from nesting sites.

Electronic Distress Sounds

Distress and alarm calls of various animals have been used singly and in conjunction with other scaring devices to successfully scare or harass animals. Many of these sounds are available in digital format. Animals react differently to distress calls; their use depends on the species and the problem. Calls may be played for short (few seconds) bursts, for longer periods, or even continually, depending on the severity of damage and relative effectiveness of different treatment or "playing" times. Some artificially created sounds also repel birds in the same manner as recorded "natural" distress calls. Calls are played back to the animals from either fixed or mobile equipment in the immediate or surrounding area of the problem.

Propane Exploders

Propane exploders operate on propane gas and are designed to produce loud explosions at controllable intervals. They are strategically located (elevated above the vegetation, if possible) in areas of high wildlife use to frighten wildlife from the problem site. Because animals are known to habituate to sounds, exploders must be moved frequently and used in conjunction with other scare devices. Exploders can be left in an area after dispersal is complete to discourage animals from returning. Similar to frightening devices, the effects of propane exploders on nontarget wildlife need to be considered. For example, special-status birds or birds protected under the MBTA may be disturbed or frightened from nesting sites.

Pyrotechnics

Pyrotechnic devices, such as shell crackers or scare cartridges fired from a shotgun, noise bombs, whistle bombs, racket bombs, rocket bombs fired from a flare pistol, firecrackers, rockets, and Roman candles, are used for dispersing animals. These methods are primarily used to disperse birds in crop fields. As with frightening devices and propane exploders, the effects of pyrotechnics on nontarget wildlife need to be considered. For example, special-status birds or birds protected under the MBTA may be disturbed or frightened from nesting sites.

Lights

A variety of lights, including strobe, barricade, and revolving units, can be used with mixed results to frighten birds. Brilliant lights, similar to those used on aircraft, are most effective in frightening night-feeding birds. These extremely bright-flashing lights have a blinding effect. Flashing amber barricade lights, like those used at construction sites, and revolving or moving lights may also frighten birds. However, most birds rapidly become accustomed to such lights and their long-term effectiveness is questionable. In general, the type of light, the number of units, and their location are determined by the size of the area to be protected and by the power source available.

Harassment

Scaring and harassment techniques to frighten animals are probably the oldest methods of combating wildlife damage. A number of sophisticated techniques have been developed to scare or harass wildlife from an area. The use of noise-making devices is the most popular and commonly used; however, other methods, including aerial hazing and visual stimuli, are also used. Harassment using vehicles, people, falcons, or dogs is used to frighten predators or birds from the immediate vicinity. Boats, planes, automobiles, and all-terrain vehicles are used as harassment methods. As with other wildlife damage management efforts, these techniques tend to be more effective when used collectively in a varied regime rather than individually.

Chemical Repellents

Chemical repellents are compounds that prevent consumption of food items or use of an area. They operate by producing an undesirable taste, odor, feel, or behavior pattern. Effective and practical chemical repellents need to be nonhazardous to wildlife; nontoxic to plants, seeds, and humans; resistant to weathering; easily applied; reasonably priced; and capable of providing good repelling qualities. The reaction of different animals to a single chemical formulation varies, and for any species there may be variations in repellency between different habitat types. Chemical repellents are strictly regulated, and suitable repellents are not available for many wildlife species or wildlife damage situations.

MODIFICATION OF HUMAN BEHAVIOR

Many wildlife species adapt well to human settlements and activities, but their proximity to humans may result in damage to structures or threats to public health and safety. APHIS-WS wildlife specialists may recommend alteration of human behavior to resolve potential conflicts between humans and wildlife. For example, APHIS-WS may recommend the elimination of feeding of wildlife that occurs in residential areas. Eliminating wildlife feeding and handling can reduce potential problems, but many people who are not directly affected by problems caused by wildlife enjoy wild animals and engage in activities that encourage their presence. It is difficult to consistently enforce no-feeding regulations and effectively educate all people concerning the potential liabilities of feeding wildlife.

DIRECT CONTROL METHODS

The lethal control of animals by APHIS-WS is authorized under APHIS-WS Directive 2.505 (USDA 2011). A variety of methods for removing a target animal species are available in California. Those methods and their descriptions are presented below and are summarized from USDA (2015a: Appendix C [Wildlife Damage Management Methods Available for Use in California]). These descriptions are provided for disclosure purposes. Shasta County would not be responsible for determining the methods to be used. The lethal methods that have been used in Shasta County from 1998 to 2017 are shown in tables included at the end of this section.

PHYSICAL CAPTURE AND CONTROL METHODS OVERVIEW

APHIS-WS Directive 2.101 (USDA 2009) governs tool selection by APHIS-WS employees. In selecting damage management techniques for specific wildlife damage situations, consideration must be given to the species responsible and the frequency, extent, and magnitude of damage. In addition to damage confirmation and assessment, consideration must be given to the status of target and potential nontarget species, local environmental conditions, relative costs of applying management techniques, environmental impacts, and social and legal concerns. These factors must be evaluated in formulating management strategies and may include the application of one or more techniques.

APHIS-WS Directive 2.450 (USDA 2014) sets forth the guidelines for the use of certain types of capture devices by APHIS-WS wildlife specialists. Policy 4 directs that the use of all traps, snares (cable device), and other capture devices must comply with applicable federal, state, and local laws and regulations; traps and trapping devices are not to be used unless appropriate authorization is granted by the landowner or designee; and all exceptions must be authorized by the director. Trapping regulations for California are specified in 14 CCR Section 465.5, and County-funded APHIS-WS activities in the County must adhere to those regulations.

WS Directive 2.450 requires that appropriate warning signs be posted on main entrances or commonly used access points to publicly accessible areas where certain traps or snares are in use. Signs must be routinely checked by APHIS-WS wildlife specialists to ensure they are present, obvious, and readable. Capture devices are to be set where they would minimize the public's view of captured animals. In California, pursuant to California Code of Regulations (CCR), Title 14 Section 465.5, traps must be checked at least once daily, and each time traps are checked, all trapped animals must be removed.

Except in limited cases where CDFW makes an individual exemption, CDFW does not allow the relocation of wildlife causing damage. Relocation of wildlife known to cause resource damage in

one area does not correct the damaging behavior and can spread the problem to a new area. Relocation can also spread disease to other wildlife and domestic species. CDFW dictates that the type of disposition of all wildlife captured for resource protection be euthanasia, unless it grants an individual exemption. Captured wildlife may be euthanized using a handgun or rifle, or by chemical means.

Both APHIS-WS tool selection and target specific equipment used by APHIS-WS is protective of nontarget species and animals including threatened and endangered species. In the unlikely event a nontarget species is captured (e.g., in a trap, snare, or cage), APHIS-WS is required to make efforts to release it unharmed, unless the animal is injured and the wildlife specialist has determined that it would not likely survive if released. Incidents of nontarget animal deaths are extremely low. This is due to the techniques used by the APHIS-WS wildlife specialist to ensure that the most target-specific tools and techniques are used.

In addition, APHIS-WS has prepared risk assessments on many of the methods it uses. The risk assessments evaluate the impacts of IWDM methods on people (APHIS-WS employees as well as the public) and the environment. Results of the assessments are also peer-reviewed by non-federal professionals (USDA 2019a).

Padded Leg-Hold Traps

Padded leg-hold traps are used to capture animals such as coyote and bobcat. These traps are the most versatile and widely used tool for capturing these species. The padded leg-hold trap can be set under a wide variety of conditions. In some situations, a “draw station,” such as a carcass or large piece of meat, is used to attract target animals. In this approach, one to several traps are placed in the vicinity of the draw station. APHIS-WS program policy prohibits placement of traps closer than 30 feet to the draw station. This provides protection to nontarget animals. These traps usually permit the release of nontarget animals. In California, padded leg-hold traps are used only for the protection of public health and safety and threatened and endangered species. They may not be used to capture animals for agricultural resources protection.

Cage Traps

A variety of cage traps are used in different wildlife damage control efforts. The most commonly known cage traps used in the current program are box traps, which are usually rectangular, made from wood or heavy gauge mesh wire. These traps are used to capture animals alive and can often be used where many lethal or more dangerous tools would be too hazardous. Cage traps usually work best when baited with foods attractive to the target animal. They are used to capture animals ranging in size from mice to bears. However, they are virtually ineffective for coyotes.

Cage traps are well suited for use in residential areas and are the primary management tool used to remove small mammals such as raccoons, skunks, and opossums in urban areas. Traps are placed in the shade whenever feasible, and in California they must be checked at least once daily; each time traps are checked, all trapped animals must be removed, pursuant to 14 CCR Section 465.5. Checking cage traps frequently is done to ensure that captured animals are not subjected to extreme environmental conditions. Some animals fight to escape from cage traps and become injured.

There are some animals that avoid cage traps and others that become “trap happy” and purposely get captured to eat the bait, making the trap unavailable to catch other animals.

Snares

Snares made of wire or cable are among the oldest existing control tools. They can be used effectively to catch most species but are most frequently used to capture coyotes. They have limited application but are effective when used under proper conditions. They are much lighter and easier to use than padded leg-hold traps and are not generally affected by inclement weather.

Snares may be employed as both lethal or live-capture devices depending on how and where they are set. Snares set to capture an animal by the neck are usually lethal but stops can be applied to the cable to make the snare a live-capture device. Snares positioned to capture the animal around the body can be useful live-capture devices. The foot or leg snare is a spring-powered nonlethal device, activated when an animal places its foot on a trigger pan. Snares can incorporate a breakaway feature to release nontarget wildlife and livestock that are significantly larger than the target species. Snares can be effectively used wherever a target animal moves through a restricted lane of travel (e.g., crawls under fences, trails through vegetation, or den entrances). When an animal moves forward into the loop formed by the cable, the loop tightens and the animal is held.

In some situations, using snares to capture wildlife is impractical due to the behavior or animal morphology of the animal, or the location of many wildlife conflicts. Neck snares must be set in locations where the likelihood of capturing nontarget animals is minimized. The APHIS-WS program uses a leg snare with a built-in pan tension device that can be set to exclude capturing animals lighter than the target animal.

The catch-pole snare is used to capture or safely handle problem animals. This device consists of a hollow pipe with an internal cable or rope that forms an adjustable noose at one end. The free end of the cable or rope extends through a locking mechanism on the end opposite of the noose. By pulling on the free end of the cable or rope, the size of the noose is reduced sufficiently to hold an animal. Catch poles are used primarily to remove live animals from traps or confined areas without danger to or from the captured animal.

The Collarum is a nonlethal, spring-powered, modified neck snare device that is primarily used to capture coyotes. It is activated when the animal bites and pulls a cap with an attractive lure, whereby the snare is projected from the ground up and over its head. As with other types of snares, the use of the Collarum device to capture coyotes is greatly dependent upon finding a location where coyotes frequently travel where the device can be set. Collarums must also be set in locations where the likelihood of capturing nontarget animals is minimized.

Conibear, Quick-Kill, and Snap Traps

A number of specialized “quick-kill” traps are used in wildlife damage management work. A Conibear is an example of such a trap and is used mostly in shallow water or underwater to capture beaver. The Conibear consists of a pair of rectangular wire frames that close like scissors when triggered, killing the captured animal with a quick body blow. Other examples include snap-traps, such as those commonly used for small rodents such as rats and mice.

Use of Dogs

Trained dogs are used primarily to locate, pursue, or decoy animals. Training and maintaining suitable dogs requires considerable skill, effort, and expense. Dogs are used to track or trail

animals, detect particular species or their sign, retrieve animals taken with another method such as firearms, haze animals from an area where they are not wanted such as at an airport or agricultural field, and decoy or attract other species such as coyotes, which are highly territorial. APHIS-WS Directive 2.445 (USDA 2016) governs the use, training, and care of dogs used by the APHIS-WS program.

Shooting

Shooting is frequently performed in conjunction with calling particular predators such as coyotes, bobcats, and fox. Trap-wise coyotes are often vulnerable to calling. Shooting is limited to locations where it is legal and safe to discharge firearms. Shooting may be ineffective for controlling damage by some species and may actually be detrimental to control efforts. Shooting is used selectively for target species but may be relatively expensive because of the staff hours required. The use of no-lead ammunition is required under California Fish and Game Code (FGC) Section 3004.5(b).

The Airborne Hunting Act (Shooting from Aircraft Act) enacted by Congress in 1971 was added to the Fish and Wildlife Act of 1956 (Section 742j-1) and allows shooting animals from aircraft for certain reasons, including protection of wildlife, livestock, and human life as authorized by a federal- or state-issued license or permit.

Chemicals

Pesticides have been developed to reduce wildlife damage and are used because of their efficiency. Most chemicals are aimed at a specific target species, and suitable chemicals are not available for most animals. All pesticides used or recommended by the APHIS-WS program are registered with, and regulated by, the U.S. Environmental Protection Agency and the Department of Pesticide Regulation. APHIS-WS is required to use all chemicals according to label directions as required by these agencies and in accordance with WS Directive 2.401 (USDA 2009), which identifies steps that must be implemented to minimize risk to the environment and the public. Warning signs must be posted. The directive prohibits APHIS-WS from conducting operational activities involving pesticide use on private property where other persons are known to be using the same or a similar pesticide(s) intended for control of the same target species.

Fumigants or gases may be used to reduce burrowing wildlife by placing cartridges in the active burrows of target animals (sometimes referred to as denning), which results in oxygen depletion and carbon monoxide poisoning. Denning is not used in Shasta County.

Sodium cyanide is used in the M-44, a spring-activated, baited ejector device developed specifically to kill coyotes and other canine predators. The M-44 was banned in California in 2014 except as authorized on sovereign tribal lands. In OIG's 2014 audit of APHIS-WS, the audit report specifically noted: "The State of California banned the use of M-44 devices. While we were conducting site visits in California, we examined the hazardous materials records of WS' State and district offices, and of its wildlife specialists. In addition, we conducted a physical inventory of WS' State, districts, and wildlife specialists' hazardous materials inventories. We determined that WS in California did not use or maintain M-44 devices." (USDA 2015b: 9).

Immobilizing and Euthanizing Drugs

Several chemicals are authorized for immobilization and euthanasia by APHIS-WS. WS Directive 2.430 (USDA 2019b) identifies approved drugs and sets forth requirements for using these

substances, most of which are regulated by state and federal law (including the U.S. Food and Drug Administration and the Drug Enforcement Administration) because of their potential hazard to animals or humans. Within APHIS-WS, only properly trained personnel are certified to possess and use approved immobilizing and euthanizing agents. In urban and suburban locations, chemical techniques can be more appropriate for euthanizing wildlife. Chemical capture methods require specialized training and skill.

REFERENCES

- USDA (United States Department of Agriculture). 2009. Animal and Plant Health Inspection Service. WS Directive 2.401, Pesticide Use.
- . 2011. WS Directive 2.505, Lethal Control of Animals.
- . 2014. WS Directive 2.450, Traps and Trapping Devices.
- . 2015a. Animal and Plant Health Inspection Service – California Wildlife Services Program. *Pre-Decision Environmental Assessment, Mammal Damage Management in California APHIS-WS North District*.
- . 2015b. Office of the Inspector General. *APHIS Wildlife Services – Wildlife Damage Management*. Audit Report 33601-0002-41. <https://www.usda.gov/oig/webdocs/33601-0002-41.pdf>.
- . 2016. WS Directive 2.445, Use of Trained Dogs in Wildlife Services Activities.
- . 2019a. Wildlife Services Methods Risk Assessments. Available at: https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nepa/ct-ws-risk_assessments
- . 2019b. WS Directive 2.430, Controlled Chemical Immobilization and Euthanizing Agents.

Shasta County Methods 1999-2006

COUNTY	SPECIES	METHOD	FATE	1999	2000	2001	2002	2003	2004	2005	2006	Grand Total
SHASTA	BADGERS	SNARES, NECK z-(OTHER)	FREED		1							1
	BADGERS	TRAPS, CAGE	KILLED			1						1
	BEARS, BLACK	CALLING/SHOOTING	KILLED		1							1
	BEARS, BLACK	DOG, CHASE	FREED		2							2
	BEARS, BLACK	DOGS (TRACKING, TRAILING, DECOY)/TAKE	KILLED	2	1							3
	BEARS, BLACK	FIREARMS	KILLED								2	2
	BEARS, BLACK	HARASSMENT/SHOOTING	DISPERSED		20							20
	BEARS, BLACK	HARASSMENT/SHOOTING	KILLED		1							1
	BEARS, BLACK	SHOOTING	KILLED	3	1	1	1	4	1			11
	BEARS, BLACK	SNARES, FOOT/LEG	KILLED	1		1		1			1	4
	BEARS, BLACK	TRAPS, CAGE	KILLED		3			2				5
	BEARS, BLACK	TRAPS, CULVERT	FREED		3							3
	BEARS, BLACK	TRAPS, CULVERT	KILLED	2	8	7	15	13	11	11	6	73
	BEARS, BLACK	VEHICLES (ALL) (PLANES, BOATS, AUTO, ATV)	DISPERSED		2							2
	BEAVERS	CALLING/SHOOTING	KILLED	2								2
	BEAVERS	FIREARMS	KILLED								6	6
	BEAVERS	SHOOTING	KILLED	2		19	3	1	4	1		30
	BEAVERS	SNARES, NECK z-(OTHER)	KILLED	4	4	4	4	7	1			24
	BEAVERS	TRAPS, BODY GRIP	KILLED								2	2
	BEAVERS	TRAPS, QUICK-KILL (CONIBEAR)	KILLED	24	11	8	2	1	10	4		60
	BLACKBIRDS, BREWER'S	FIREARMS	KILLED								13	13
	BLACKBIRDS, BREWER'S	TRAPS, DECOY	KILLED							214		487
	BLACKBIRDS, BREWER'S	TRAPS, DECOY	KILLED						82	91		173
	BLACKBIRDS, RED-WINGED	FIREARMS	KILLED							21	815	836
	BLACKBIRDS, RED-WINGED	TRAPS, DECOY	KILLED						409	78	65	552
	BLACKBIRDS, YELLOW-HEADED	FIREARMS	KILLED							5	2	7
	BLACKBIRDS, YELLOW-HEADED	TRAPS, DECOY	KILLED						890	1,105	690	2,685
	BLACKBIRDS, z-(MIXED SPECIES)	SHOOTING	KILLED		1,082	826	361	875				3,144
	BLACKBIRDS, z-(MIXED SPECIES)	TRAPS, CAGE	KILLED		7,386	14,075	3,352	3,439				28,252
	BLACKBIRDS, z-(MIXED SPECIES)	TRAPS, DECOY	KILLED						178			178
	BOBCATS	CALLING/SHOOTING	KILLED			1			1			2
	BOBCATS	DRUG DELIVERY DEVICES (ALL) ***	KILLED			1						1
	BOBCATS	SHOOTING	KILLED		1	1	1	1				4
	BOBCATS	SNARES, FOOT/LEG	KILLED		2							2
	BOBCATS	SNARES, NECK	KILLED							2	1	3
	BOBCATS	SNARES, NECK z-(OTHER)	KILLED	2	1							3
	BOBCATS	SNARES, NECK z-(OTHER)	KILLED			1						1
	BOBCATS	SNARES, NECK z-(OTHER)	KILLED		3	1	1					5
	BOBCATS	TRAPS, CAGE	KILLED		2	3				1		6
	CATS, FERAL/FREE RANGING	TRAPS, CAGE	FREED		1		2	1				4
	COOTS, AMERICAN	FIREARMS	KILLED								25	25
	COOTS, AMERICAN	SHOOTING	KILLED					263				263
	COOTS, AMERICAN	TRAPS, CAGE	KILLED					63				63
	COWBIRDS, BROWN-HEADED	TRAPS, DECOY	KILLED						1,915	2,190	2,154	6,259
	COYOTES	AIRCRAFT (INCL. AERIAL HUNTING) ****	KILLED							10		10
	COYOTES	CALLING DEVICE, ELECTRONIC	KILLED								42	42
	COYOTES	CALLING DEVICE, MANUAL(HAND,BLOWN)	KILLED							4	52	56
	COYOTES	CALLING/SHOOTING	KILLED	5	30	39	46	22	35	31		208
	COYOTES	DENNING *****	KILLED			11	6					17
	COYOTES	DOGS (TRACKING, TRAILING, DECOY)/TAKE	KILLED				2					2
	COYOTES	FIREARMS	KILLED							33	7	40
	COYOTES	HAND CAUGHT (BARE HANDS, SNARE POLE, ETC.)	KILLED	1								1
	COYOTES	SHOOTING	KILLED	5	18	26	16	11	3	2		81
	COYOTES	SNARES, FOOT/LEG	KILLED	1	9	1						11
	COYOTES	SNARES, NECK	KILLED							27	22	49
	COYOTES	SNARES, NECK z-(OTHER)	KILLED	16	50	15	29	12	10	5		137
	DEER, z-(OTHER)	SNARES, NECK z-(OTHER)	KILLED	1								1
	DOGS, FERAL/FREE RANGING & HYBRIDS	HAND CAUGHT (BARE HANDS, SNARE POLE, ETC.)	FREED		2							2
	DOGS, FERAL/FREE RANGING & HYBRIDS	SNARES, FOOT/LEG	FREED		1							1
	DOGS, FERAL/FREE RANGING & HYBRIDS	SNARES, NECK z-(OTHER)	FREED	1								1
	DOGS, FERAL/FREE RANGING & HYBRIDS	SNARES, NECK z-(OTHER)	KILLED	1								1
	DOGS, FERAL/FREE RANGING & HYBRIDS	SNARES, NECK z-(OTHER)	KILLED			1						1
	FOXES, GRAY	SNARES, FOOT/LEG	FREED			1						1
	FOXES, GRAY	SNARES, FOOT/LEG	KILLED			1						1
	FOXES, GRAY	TRAPS, CAGE	FREED							2		2
	FOXES, GRAY	TRAPS, CAGE	KILLED		2		15			2		19
	LIONS, MOUNTAIN (COUGAR)	CALLING DEVICE, ELECTRONIC	KILLED								1	1
	LIONS, MOUNTAIN (COUGAR)	CALLING/SHOOTING	KILLED							1		1
	LIONS, MOUNTAIN (COUGAR)	DOGS (TRACKING, TRAILING, DECOY)/TAKE	KILLED	2	13	8	10	5	16			54
	LIONS, MOUNTAIN (COUGAR)	FIREARMS	KILLED							2	8	10
	LIONS, MOUNTAIN (COUGAR)	SHOOTING	KILLED			1		1	5	6		13
	LIONS, MOUNTAIN (COUGAR)	TRAPS, CAGE	KILLED			1		1	3	1	1	7
	MARMOTS/WOODCHUCKS (ALL)	SHOOTING	KILLED		2	10						12
	MARMOTS/WOODCHUCKS (ALL)	SNARES, NECK z-(OTHER)	KILLED		1							1
	MARMOTS/WOODCHUCKS (ALL)	TRAPS, CAGE	KILLED			7						7

COUNTY	SPECIES	METHOD	FATE	1999	2000	2001	2002	2003	2004	2005	2006	Grand Total
SHASTA	MUSKRATS	FIREARMS	KILLED							11	183	194
	MUSKRATS, z-(OTHER)	FIREARMS	KILLED							19		19
	MUSKRATS, z-(OTHER)	SHOOTING	KILLED		8	13	640	1,123	505	180		2,469
	MUSKRATS, z-(OTHER)	TRAPS, CAGE	KILLED	1	3	2	107	83		8		204
	MUSKRATS, z-(OTHER)	TRAPS, QUICK-KILL (CONIBEAR)	KILLED		67	2	40	147				256
	OPOSSUMS, VIRGINIA	TRAPS, CAGE	KILLED	1			1	1	7			10
	RACCOONS	SNARES, NECK z-(OTHER)	FREED		1							1
	RACCOONS	SNARES, NECK z-(OTHER)	KILLED		4	1						5
	RACCOONS	SPOTLIGHTING, NIGHT VISION EQUIPMENT/SHOOTING	KILLED		1							1
	RACCOONS	TRAPS, CAGE	FREED	1	22							23
	RACCOONS	TRAPS, CAGE	KILLED	30	3	3	12		3	2	9	62
	RATS, PACKRATS/WOODRATS (OTHER)	SHOOTING	KILLED						10			10
	RATS, PACKRATS/WOODRATS (OTHER)	TRAPS, CAGE	KILLED			1		2				3
	RINGTAILS	TRAPS, CAGE	FREED	2	1							3
	SAPSUCKERS, YELLOW-BELLIED	SHOOTING	KILLED				1					1
	SAPSUCKERS, YELLOW-BELLIED	TRAPS, SNAP (RAT, MOUSE, ETC.)	KILLED			1						1
	SKUNKS, STRIPED	SNARES, NECK z-(OTHER)							1			1
	SKUNKS, STRIPED	TRAPS, CAGE	KILLED					4				4
	SKUNKS, STRIPED	TRAPS, CAGE		6	12	32	31	5	3		2	91
	SPARROWS, HOUSE	TRAPS, DECOY	KILLED							1		1
	SQUIRRELS, GROUND, OTHER	SHOOTING	KILLED				50					50
	SQUIRRELS, GROUND, OTHER	TRAPS, CAGE	KILLED			10						10
	STARLINGS, EUROPEAN	TRAPS, CAGE	KILLED		426	1,115	1,054		757			3,352
	STARLINGS, EUROPEAN	TRAPS, DECOY	KILLED						1,703	2,395	721	4,819

Source: USDA APHIS-WS (USDA 2019c)

Shasta County Methods 2007-2018

COUNTY	DA_TYPE	FATE	SPECIES	METHOD	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Grand Total
SHASTA	BIRD	DISPERSED	BLACKBIRDS, BREWER'S	FIREARMS									250				250
			BLACKBIRDS, RED-WINGED	FIREARMS					26,000	198,300	456,400	902,600	317,800	665,187	865,113		3,431,400
			BLACKBIRDS, YELLOW-HEADED	FIREARMS								8,650	800				9,450
			BLACKBIRDS, Z-(MIXED SPECIES)	FIREARMS								75,000					75,000
			COOTS, AMERICAN	FIREARMS						1,075	3,075	9,200	3,950				17,300
			COWBIRDS, BROWN-HEADED	FIREARMS									1,750				1,750
			DUCKS, BUFFLEHEAD	FIREARMS								15					15
			DUCKS, MALLARD	FIREARMS								435	100				535
			DUCKS, SCAUP, LESSER	FIREARMS								10					10
			DUCKS, TEAL, CINNAMON	FIREARMS								82					82
			DUCKS, WOOD	FIREARMS								94					94
			GEESE, WHITE-FRONTED, GREATER	WHISTLERS/SCREAMERS					500								500
		KILLED	BLACKBIRDS, BREWER'S	FIREARMS	42	60						17	54				173
				TRAPS, DECOY	577	314	22		37		190	4					1,144
			BLACKBIRDS, RED-WINGED	FIREARMS	701	5,581	4,088	2,497	3,028	10,868	4,277	5,069	3,412	8,090	5,782		53,393
				TRAPS, DECOY	130	278	203		143		26	1					781
			BLACKBIRDS, YELLOW-HEADED	FIREARMS		15						412	317				744
				TRAPS, DECOY	390	1,007	396		5		61	61					1,920
			COOTS, AMERICAN	FIREARMS	110		211	252		94	529	232	90		211		1,729
			COWBIRDS, BROWN-HEADED	FIREARMS	29	15						46	715				805
				TRAPS, DECOY	3,646	2,218	549		180	504	950	101					8,148
			SPARROWS, HOUSE	TRAPS, DECOY	4					35							39
			STARLINGS, EUROPEAN	FIREARMS								11	1				12
				TRAPS, DECOY	706	369	533		117	642	171	18				97	2,653
	MAMMAL	DISPERSED	COYOTES	FIREARMS									1				1
			LIONS, MOUNTAIN (COUGAR)	DOG				1									1
			SWINE, FERAL	FIREARMS						11							11
		FREED	BEARS, BLACK	TRAPS, CULVERT				1									1
			CATS, FERAL/FREE RANGING	TRAPS, CAGE						1							1
			DOGS, FERAL, FREE-RANGING AND HYBRIDS	TRAPS, CAGE						1							1
			FOXES, GRAY	TRAPS, CAGE								1				1	2
			OPOSSUMS, VIRGINIA	TRAPS, CAGE							4						4
			RACCOONS	TRAPS, CULVERT								1					1
			SKUNKS, STRIPED	TRAPS, CAGE		1											1
		KILLED	SWINE, FERAL	TRAPS, CAGE						1							1
			BEARS, BLACK	FIREARMS				4	5	4	1	2	2	3	2	1	24
				SNARES, FOOT/LEG				1	1	1							3
				TRAPS, CAGE			5		3	2			2		1		13
				TRAPS, CULVERT	7	7	7	17	13	20	9	10	4	14	25	8	141
			BEAVERS	FIREARMS	1	1			1	4	2		2	4		5	20
				SNARES, NECK	5	3	6	3	2	5			1	2	1		28
				TRAPS, BODY GRIP	7	5	1	11	8	2	1	3	2	3		14	57
				TRAPS, CAGE					1								1
			BOBCATS	FIREARMS						3							3
				SNARES, NECK						1	1						2
				TRAPS, CAGE		1			1	2	1						5
			COYOTES	CALLING DEVICE, ELECTRONIC	49	33	14	2	18	9	1	6		2	1	5	140
				CALLING DEVICE, MANUAL(HAND,BLOWN)	12	9	15	17	8	3	4	11		1		2	82
				FIREARMS	13	1	2	5	31	45	22	19	25	32	19	12	226
				FIXED WING		2	9										11
				SNARES, FOOT/LEG				7			2						9
				SNARES, NECK	10	10	13	17	18	36	31	11	17	11	3	2	179
			DEER, BLACK-TAILED	FIREARMS								1					1
			DOGS, FERAL, FREE-RANGING AND HYBRIDS	SNARES, NECK					1				1				2
				TRAPS, CAGE						1							1
			FOXES, GRAY	FIREARMS						3	1	1					5
				TRAPS, CAGE			4		1			1	2			1	9
			LIONS, MOUNTAIN (COUGAR)	CALLING DEVICE, ELECTRONIC	1												1
				FIREARMS	14	6	4	6	11	4	8	5	1	1		9	69
				TRAPS, CAGE	1		2	2	2	1		4	4	6	2	4	28
			MUSKRATS	CDFA (SLN) RODENT BAIT BLK								19					19
				FIREARMS	798	1,168	289	377	90	113	120	76	195	9	109	529	3,873
				TRAPS, BODY GRIP	17		12									540	569
				TRAPS, CAGE				14									14
			OPOSSUMS, VIRGINIA	CATCH POLE								1					1
				TRAPS, CAGE			1		1								2
			OTTERS, RIVER	TRAPS, BODY GRIP										1			1

COUNTY	DA_TYPE	FATE	SPECIES	METHOD	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Grand Total
			RACCOONS	FIREARMS						1							1
				TRAPS, CAGE	1		1	12	1			11			1	1	28
			SKUNKS, STRIPED	CATCH POLE				1									1
				FIREARMS	2		1		2	13	3	4				1	26
				HANDCAUGHT/GATHERED					1						2		3
				TRAPS, CAGE	8		6	3	7	12	8	9	1		1	8	63
			SQUIRRELS, GROUND, CALIFORNIA	FIREARMS				19									19
				TRAPS, SNAP (RAT, MOUSE, ETC.)										3			3
			SWINE, FERAL	FIREARMS				1		1		1					3
				TRAPS, CORRAL				2							3		5
				TRAPS, LIVE, FERAL HOGS								2					2
		RELOCATED	BEARS, BLACK	DRUG DELIVERY DEVICES (OTHER)		1											1
				TRAPS, CAGE												1	1
				TRAPS, CULVERT					1								1
			FOXES, GRAY	CATCH POLE					1								1
		TRANSFER OF CUSTODY	BEARS, BLACK	TRAPS, CAGE				1									1
				TRAPS, CULVERT						1					1		2
			DOGS, FERAL, FREE-RANGING AND HYBRIDS	TRAPS, CAGE										1			1
SHASTA COUNTY (AIRPORTS)	MAMMAL	KILLED	COYOTES	FIREARMS			2										2
				SNARES, NECK			3	4				2	4		1		14

Source: USDA APHIS-WS Management Information System (USDA 2019b)