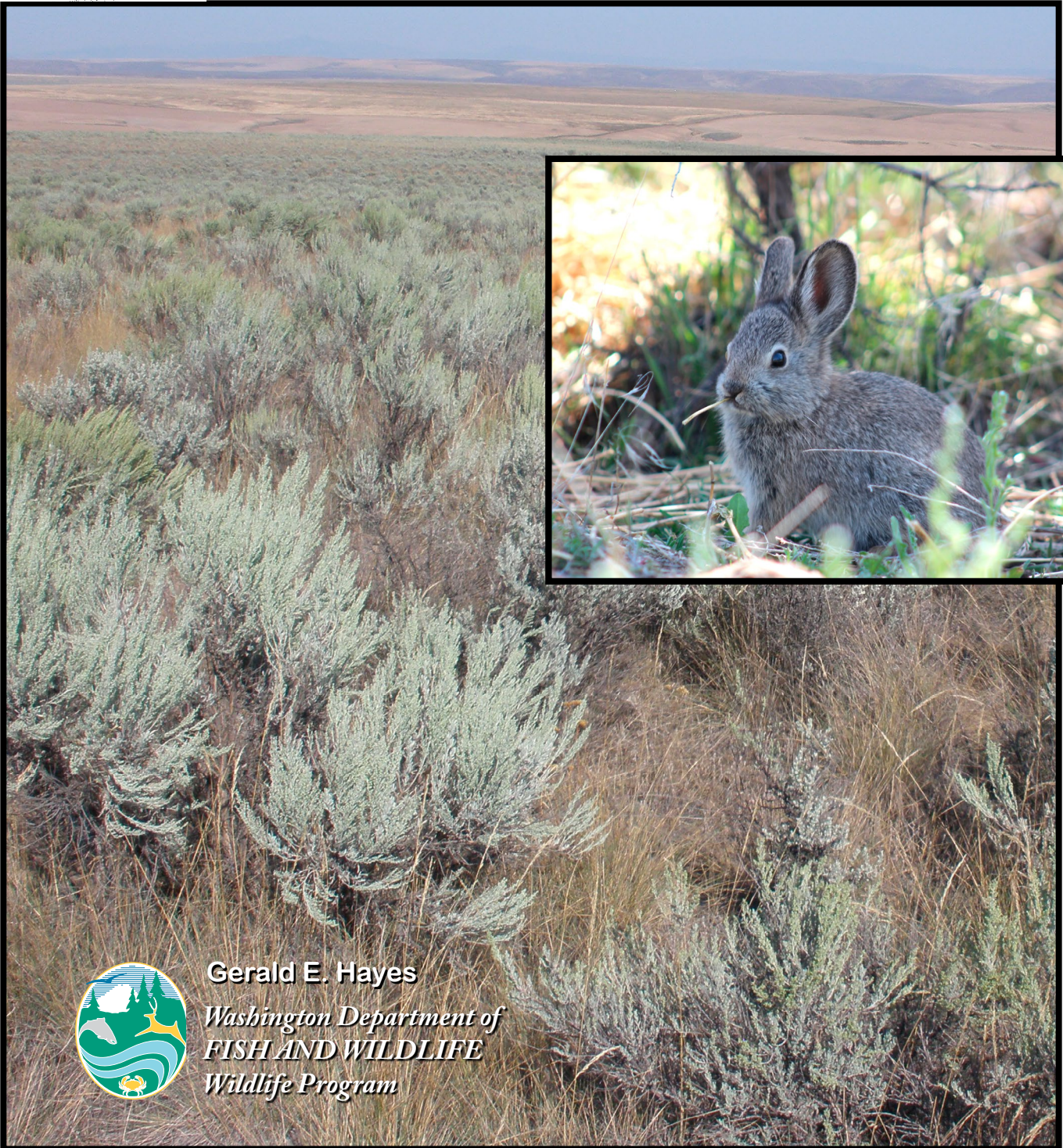




# Periodic Status Review for the **Pygmy Rabbit**



Gerald E. Hayes  
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The Washington Department of Fish and Wildlife maintains a list of endangered, threatened, and sensitive species (Washington Administrative Codes 220-610-010 and 220-200-100). In 1990, the Washington Wildlife Commission adopted listing procedures developed by a group of citizens, interest groups, and state and federal agencies (Washington Administrative Code 220-610-110). These procedures include how species listings will be initiated, criteria for listing and delisting, a requirement for public review, the development of recovery or management plans, and the periodic review of listed species.

The Washington Department of Fish and Wildlife is directed to conduct reviews of each endangered, threatened, or sensitive wildlife species at least every five years after the date of its listing by the Washington Fish and Wildlife Commission. These periodic reviews include an update on the species status to determine whether the species warrants its current listing or deserves reclassification. The agency notifies the general public and specific parties interested in the periodic status review, at least one year prior to the end of the five-year period, so that they may submit new scientific data to be included in the review. The agency notifies the public of its recommendation at least 30 days prior to presenting the findings to the Fish and Wildlife Commission. In addition, if the agency determines that new information suggests that the classification of a species be changed from its present state, the Department prepares documents to determine the environmental consequences of adopting the recommendations pursuant to requirements of the State Environmental Policy Act.

This draft periodic status review for the Pygmy Rabbit was reviewed by species experts and was available for a 90-day public comment period from February 6, to May 9, 2018. All comments received were considered during the preparation of this final periodic status review. The Department intends to present the results of this periodic status review to the Fish and Wildlife Commission for action at the June 2018 meeting in Richland.

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# Periodic Status Review for the Pygmy Rabbit in Washington



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## EXECUTIVE SUMMARY

Pygmy rabbits (*Brachylagus idahoensis*) occur mainly in the Great Basin and some of the adjacent intermountain areas of the western United States, including Washington, Oregon, California, Idaho, Montana, Wyoming, Colorado, Nevada, and Utah. Columbia Basin pygmy rabbits are geographically and genetically discrete from the remainder of the taxon and this population is significant due to the unique ecological setting (i.e., geologic, climate, soil, and vegetation community) in which it occurs. For these reasons, the Columbia Basin pygmy rabbit was designated as a Distinct Population Segment (DPS) for protection under the U.S. Endangered Species Act.

Pygmy rabbits are sagebrush obligates. Within their broad geographic range, pygmy rabbits have a patchy distribution and are found where sagebrush occurs in tall, dense clusters and soils are sufficiently deep and friable to allow for burrowing. Dense stands of sagebrush provide pygmy rabbits with year round food and shelter; native, perennial grasses and forbs provide an important food source beginning in spring and especially in summer and fall and deep, friable soils allow them to construct burrows for shelter and to give birth to their young.

Historic documented locations of pygmy rabbits indicate a past distribution that included portions of five counties but nothing is known about the extent of area they occupied in these locations. By 1997, pygmy rabbits were known to occur at only six isolated populations in pockets of suitable habitat in Douglas County (5 sites) and northern Grant county (1 site) and three of these sites had fewer than 30 active burrows. By March 2001, five of the six populations had disappeared and pygmy rabbits were known to occur only at Sagebrush Flat Wildlife Area. Captive breeding of purebred Columbia Basin pygmy rabbits began in 2002 from a small number of rabbits remaining in the wild, but from the outset reproductive output was very poor. Beginning in 2003, intercrossing purebred Columbia Basin pygmy rabbits with Idaho pygmy rabbits increased genetic diversity and improved reproduction of captive rabbits over the years (2003-2010), but mortality of young was high, especially pre-emergence, and disease accounted for over one-half of known mortalities of juveniles and adults. High mortality from disease and limited space in breeding facilities hampered efforts to increase the size of the off-site captive population. As a result, the off-site captive breeding program was de-emphasized in 2011 and transitioned to on-site semi-wild breeding in enclosures located in a more natural setting. From 2011 to 2013, wild adult pygmy rabbits were translocated from other states and added to the breeding enclosures to bolster population size and genetic diversity. Semi-wild breeding within enclosures on release sites and subsequent capture and release of suitable numbers of kits for release into the wild (2012-present) has been more successful.

Large-scale loss, degradation, and fragmentation of native shrub-steppe habitat likely played a primary role in the long-term decline of the Columbia Basin pygmy rabbit. By the mid-1900s, large portions of shrub-steppe habitat within the Columbia Basin were converted to agricultural crops or urban and rural developments. Remaining stands of sagebrush are affected by other, often interacting, factors including historical overgrazing by livestock, invasion by non-native plant species, and altered fire frequency. Predation is the main cause of pygmy rabbit mortality in the wild. Disease has been a significant threat to pygmy rabbits in the captive and semi-wild population.

The Columbia Basin pygmy rabbit population has not met population or secure habitat criteria for down-listing from its current state endangered classification. The population remains small and its distribution in the wild is extremely limited. It is therefore recommended that the pygmy rabbit remain a state endangered species in Washington.

## INTRODUCTION

The Washington Department of Fish and Wildlife is required to conduct a review of the status of each endangered, threatened, and sensitive species at least every five years after the date of its listing (WAC 232-12-297). The purpose of this periodic status review is to determine whether the pygmy rabbit (*Brachylagus idahoensis*) warrants its current listing status of endangered or deserves reclassification.

## DESCRIPTION AND LEGAL STATUS

The pygmy rabbit is the smallest rabbit species in North America. Adults weigh 375 to about 500 g (0.83-1.1 lb), and measure 23.5-29.5 cm (9.3-11.6 in) in length with females tending to be slightly larger than males (Gahr 1993, USFWS 2003). Overall pelage color is slate-gray, tipped with brown; legs, chest and nape are a tawny cinnamon brown; the ventral surface is buff; and the edges of their ears are pale buff (Figure 1). A single annual molt occurs, usually in mid to late summer. The pygmy rabbit is distinguished from other rabbit species within its range by its relatively small size; small hindfoot; short, rounded ears, and short tail that's buff in color rather than white on the underside (WDFW 1995, Chapman and Litvaitis 2003, USFWS 2003, Shai-Braun and Hackländer 2016).



Figure 1. Pygmy rabbit.

Pygmy rabbits are members of the family Leporidae, which includes the rabbits and hares. The pygmy rabbit is the only species in the genus *Brachylagus* (Green and Flinders 1980a, Hoffmann and Smith 2005, Shai-Braun and Hackländer 2016). The Columbia Basin pygmy rabbit population in eastern Washington is discrete from other populations of the taxon. Fossil evidence indicates that rabbits in this population were disjunct from the remainder of the species' range by 10,000 years ago (USFWS 2010a). The historic distribution of the Columbia Basin population is separated by over 200 km (125 miles) from the nearest historic population in central Oregon (USFWS 2003, USFWS 2010a). Genetic analyses of both mitochondrial and nuclear DNA markers indicate that purebred Columbia Basin pygmy rabbits have markedly different genetic characteristics compared to the remainder of the taxon and “*these genetic differences are similar to subspecific differences recognized in other mammal species*” (USFWS 2010a). Based on information indicating that the Columbia Basin pygmy rabbit population is geographically and genetically discrete from the remainder of the taxon and that this discrete population is significant due to the unique ecological setting in which it occurs, it was designated as a Distinct Population Segment (DPS) for protection under U.S. Endangered Species Act (USFWS 2003, 2010a).

The pygmy rabbit was classified as a state threatened species (WAC 220-200-100) in 1990 and reclassified as state endangered (WAC 220-610-110) in 1993 (WDFW 1993). In 2001, the U.S. Fish and Wildlife Service (hereafter the Service) published an emergency rule to federally list the Columbia Basin distinct population segment (DPS) of the pygmy rabbit (hereafter Columbia Basin pygmy rabbit) as endangered under the Endangered Species Act (USFWS 2001). In 2003, the Service published a final rule listing the Columbia Basin pygmy rabbit as endangered, without critical habitat designated (USFWS 2003). In 2010, the Service completed a five-year status review of the Columbia Basin pygmy rabbit and re-affirmed its federal listing as an endangered DPS (USFWS 2010a). A petition to federally list the pygmy rabbit as threatened or endangered throughout the entire Great Basin was made in 2003 and found to be not warranted (USFWS 2010b).

## DISTRIBUTION

**North America.** Pygmy rabbits are distributed mainly in the Great Basin and adjacent intermountain areas of Washington, Oregon, California, Idaho, Montana, Wyoming, Colorado, Nevada, and Utah (Green and Flinders 1980a; Chapman and Litvaitis 2003; USFWS 2010a,b; Estes-Zumpf et al 2014; Figure 2).

Within this broad geographic range, pygmy rabbits are found where sagebrush occurs in tall, dense clusters and soils are sufficiently deep and soft to allow for burrowing.

**Washington.** Historically, the Columbia Basin pygmy rabbit probably occurred in parts of Douglas, Grant, Lincoln, Adams, Franklin, and Benton Counties during the first half of the 20<sup>th</sup> century (WDFW 1995, USFWS 2012). Currently, the only wild population is within the Sagebrush Flat Recovery Area in southern Douglas County and a small number of wild rabbits occur in the Beezley Hills Recovery Area in northern Grant County (J. Gallie pers. comm., Gallie and Zinke 2018, Appendix A).

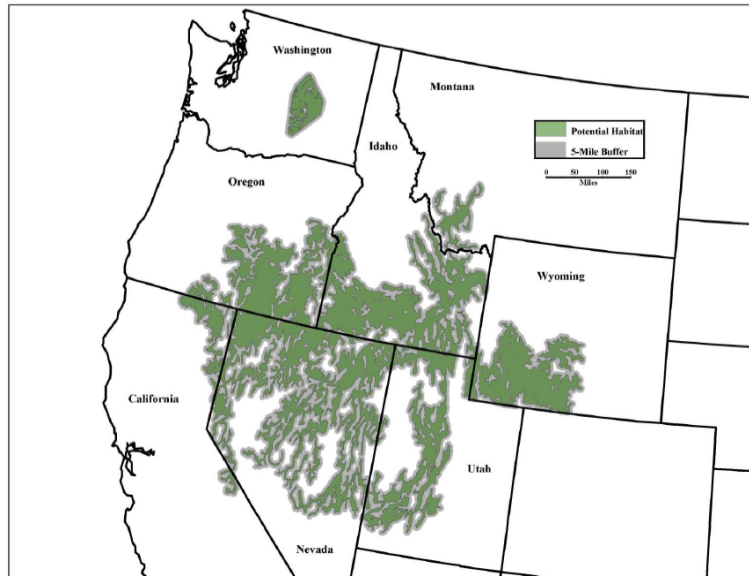


Figure 2. Approximate historical distribution of the pygmy rabbit based on available occurrence data and the distribution of potentially appropriate shrub-steppe community types (source USFWS 2010a).

## NATURAL HISTORY

**Habitat Requirements.** Nearly the entire historical distribution of the Columbia Basin pygmy rabbit overlaps the big sagebrush (*Artemisia tridentata*) – bluebunch wheatgrass (*Pseudoroegneria spicata*) zonal habitat type (Daubenmire 1988). This habitat type consists of four well-defined vegetation layers: big sagebrush, perennial grass - bluebunch wheatgrass, low-lying (<10 cm [4 in]) perennial and annual grasses dominated by Sandberg bluegrass (*Poa secunda*), and a thin and fragile layer of cryptogamic crust composed of lichens, mosses and occasionally liverworts.

Pygmy rabbits are sagebrush obligates (Heady and Laudré 2005). Pygmy rabbits have a patchy distribution and are typically found in areas of tall, dense sagebrush (*Artemisia* spp.) and deep, sandy-loam soils (Green and Flinders 1980b, Weiss and Verts 1984, Gahr 1993, Katzner and Parker 1997, Larrucea and Brussard 2008a, Figure 3). Burrows are typically excavated under big sagebrush of greater height and canopy cover (Katzner and Parker 1998, Schmalz et al. 2014). Dense stands of sagebrush provide pygmy rabbits with year round food and cover (Green and Flinders 1980b, Weiss and Verts 1984,



Schmalz et al. 2014), while native, perennial grasses and forbs provide an important food source beginning in spring and especially in summer and fall (Green and Flinders 1980b, Thines et al. 2004, Schmalz et al. 2014). Deep, loose soil allows pygmy rabbits to construct burrows for shelter and to give birth to their young (Janson 1946, Rachlow et al. 2005).

Throughout the year, pygmy rabbits select for habitat features associated with reduction of predation risk, including concealment from aerial and ground predators and proximity to a burrow system (Camp et al. 2012, Camp et al. 2013, Milling et al 2017). During summer, rabbits use above-ground rest sites characterized by lower levels of shortwave radiation and cooler ambient temperatures and animals at the majority of rest sites will use depressions in the ground known as “forms” to facilitate conductive heat dissipation (Milling et al 2017). During winter, security properties of a rest site (concealment and proximity to burrows) have a greater influence on selection of rest sites than thermal properties (Milling et al 2017).



Figure 3. Pygmy rabbit sagebrush habitat.

At a landscape scale, the patchy distribution of pygmy rabbit habitat corresponds in many areas to a mounded microtopography (mima mounds) with taller, denser shrub cover in the deeper soils on mounds and lower, sparser shrub cover between mounds (Tullis 1995). In sagebrush, pygmy rabbits use mima mounds extensively for excavation of burrows, foraging, and resting (Laruccia and Brussard 2008a, Estes-Zumpf and Rachlow 2009, Parsons et al. 2016, DeMay et al. 2017). Browsing can modify sagebrush structure by reducing the availability of potential forage and concealment cover with increasing duration of occupancy of mima mounds (Parsons et al. 2016). Declining habitat quality around burrow systems over time may explain pygmy rabbits shifting their use of areas over time. Therefore, for pygmy rabbit populations to persistence within a landscape may require maintaining many suitable burrow locations to allow vacated habitat to recover before being reoccupied (Parsons et al. 2016). Further, pygmy rabbits may be adversely affected by fragmentation of sagebrush communities and associated increases in edge due to increased predation (Pierce et al. 2011, Lawes et al. 2013).

**Diet and Foraging.** The winter diet of pygmy rabbits is almost exclusively (99%) sagebrush (Green and Flinders 1980b, Thines et al. 2004, Schmalz et al. 2014, Shai-Braun and Hackländer 2016). Beginning in spring and coincident with “green-up” of vegetation, grasses and forbs increase in frequency in the diet, comprising up to 9% and 6%, respectively in spring, 43% and 10% in summer, and 31% and 11% in fall (Green and Flinders 1980b, Schmalz et al. 2014, Shai-Braun and Hackländer 2016). At Sagebrush Flat, grasses (53%) and forbs (33%) form the bulk of the diet in summer (Thines et al. 2004). During summer and fall periods, sagebrush comprises about 50% or more of the diet. Pygmy rabbits have relatively high energy and low protein requirements for their size (Shiple et al. 2006) and are able to minimize absorption and detoxify plant secondary metabolites (PSMs) allowing them to consume large amounts of sagebrush (Shiple et al. 2006, Shiple et al. 2012). Pygmy rabbits have a relatively lower capacity to digest cellulose in plant fiber and will consume more PSMs in their diet to avoid consuming higher levels of fiber that reduces the amount of nutrients they can acquire from plants (Camp et al. 2015). Sagebrush browsed by pygmy rabbits is higher in crude protein, lower in fiber, and lower in some plant secondary compounds compared to unbrowsed sagebrush (Schmalz et al. 2014, Ulappa et al. 2014, Pu et al. 2015).



**Home Range and Movements.** Home range size varies by sex and season. Earlier studies describing basic space use by pygmy rabbits suggested that male pygmy rabbits use larger home ranges than females (Gahr 1993, Heady and Laudré 2005, Burak 2006) and home ranges are more restricted in the winter (Katzner and Parker 1997). At Sagebrush Flat, home ranges during the breeding season averaged 2.7 ha (6.7 acres) for females and 20.2 ha (49.9 acres) for males (Gehr 1993). Comparisons between sexes, seasons, and populations across these studies are confounded, however, by differences in method of home range estimation, study season duration, habitat quality, and by small sample sizes. In the most comprehensive study to date, Sanchez and Rachlow (2008) maintained larger sample sizes of radio tagged animals (n=36-46) and assessed variation in home range both between sexes and seasons. Their results showed a similar pattern as previous studies with home ranges of males up to three times larger than females and breeding season home ranges were larger than nonbreeding season ranges (Sanchez and Rachlow 2008). Male home ranges were nearly five times larger than female home ranges during the breeding season, whereas this inter-sexual difference was much reduced during the nonbreeding season. In addition, seasonal range fidelity by individual pygmy rabbits is highly variable. Percent overlap between home ranges was 18.1-30.6% between consecutive seasons (breeding-nonbreeding) and 2.8-37.1% between like seasons (e.g., breeding-breeding) over two years (Sanchez and Rachlow 2008). Overall, these data demonstrate that pygmy rabbits use larger home ranges than expected based on their body size (Swihart 1986, Swihart et al. 1988).

Home range size also varies with habitat and the dispersion of resources (Burak 2006, Sanchez 2007). Sanchez and Rachlow (2008) documented significant differences in movement patterns between two study sites in the Lemhi Valley of east-central Idaho. Home range sizes, number of burrow systems used, and frequency of switching between burrows were all lower on one study site on which shrub cover was lower and more clumped in distribution and appeared to restrict rabbit movements to maintain proximity to clumped food and cover, relative to rabbits on a second study site, which had greater and more dispersed shrub cover and a greater density of burrow systems. These movement patterns suggest that rabbits vary their space use decisions in response to perceived predation risk.

Median natal dispersal distances are three times farther for juvenile females (2.9 km, range = 0.02-11.9 km [1.8 mi, range = 0.01-7.4 mi]) than juvenile males (1.0 km, range = 0.03-6.5 km [0.6 mi, range = 0.01-4.0 mi]) in Idaho (Estes-Zumpf and Rachlow 2009). Juveniles monitored with telemetry at Sagebrush Flat remained close (mean 204 m, range 0 m -1.5 km [669 ft, range 0 ft-0.93 mi]) to release sites but this method likely underestimated dispersal based on evidence from fecal DNA (DeMay et al. 2017). Translocated pygmy rabbits exhibit great variability in distances traveled from release sites to settlement sites (mean travel mean distances of 525 m, range 2-2,827 m [1,722 ft, range 6.5-2,713 ft]) with longer movements made when translocated across marginal than suitable habitat (Lawes et al. 2013).

**Reproduction and Survival.** Pygmy rabbits begin breeding after their first winter (Gahr 1993, Shai-Braun and Hackländer 2016), but breeding by juvenile females has been documented for enclosure-born kits (DeMay et al. 2016). Photoperiod and vegetative habitat condition influence the timing of breeding with the breeding period extending from late February through early June (Elias et al. 2006). Breeding is highly synchronous and promiscuous. Mating behavior includes chasing, by both sexes, followed by brief copulation. Male reproductive activity begins in January, peaks in March, and declines in June. Females can be pregnant from late February through June and nurse young from March through September.

Most females become pregnant and produce kits (Elias et al. 2006, DeMay et al. 2016). About 2-3 weeks after mating but a week before giving birth, the female excavates a single-entrance natal burrow at a location separate from the residential burrow system. The natal burrow terminates at a nest chamber that the female lines with grass and fur (Rachlow et al. 2005, Elias et al. 2006, Scarlata et al 2015). After a

gestation period of about 24 days the female opens the entrance to the natal burrow and gives birth to her young that are born with their eyes closed and with little fur (Elias et al. 2006). Litter size averaged about 4 kits (range 1 to 9) in captivity (Elias et al. 2013) and 3 emerged kits in semi-wild breeding enclosures at Sagebrush Flat (DeMay et al. 2016) and females had an average of about 3 litters per year per female in both captivity and in semi-wild breeding enclosures (Elias et al. 2013, DeMay et al. 2016). After giving birth, females cover the entrance to the natal burrow with soil, presumably to conceal the location and protect against predators. Females open the natal burrow prior to nursing the young once or twice daily. After nursing, young remain in the natal burrow. Juveniles permanently emerge from the natal burrow two weeks after birth and are first observed in March (DeMay et al. 2016). Nursing ceases by about two weeks post-emergence (Elias et al. 2006). Juvenile dispersal rates are high for both males (90%) and females (80%) and dispersal occurs between 2.5 and 12 weeks of age with most dispersal movements completed within one week of initiation (Estes-Zumpf and Rachlow 2009).

Pygmy rabbits generally live less than three years (Sanchez 2007, Zeoli et al. 2008) though survival rates can be highly variable among study sites, years, and sexes (Sanchez 2007, Crawford et al. 2010, Price et al. 2010). In east-central Idaho, juvenile mortality was 69.2% and 88.5% for male and females, respectively, with the highest mortality occurring within the first two months of emergence from natal burrows (Estes-Zumpf and Rachlow 2009). Annual adult survival of males and females in Idaho ranged from 0.07 to 0.45 (Sanchez 2007) and 0.003 to 0.173 in Oregon and Nevada (Crawford et al. 2010).

## POPULATION AND HABITAT STATUS

**Global.** The pygmy rabbit is classified as a species of least concern on the IUCN Red List (Rachlow et al. 2016). Population status is extremely varied across its discontinuous distribution where its dependence on big sagebrush makes it vulnerable to habitat loss from rangeland conversion and fire, and the resulting fragmentation of habitat often leads to small, isolated populations and associated loss of genetic diversity. However, several robust populations continue to persist in less disturbed areas and suitable habitat occurs in many areas. The species has a patchy distribution and remains relatively common to locally abundant where suitable habitat occurs (Rachlow et al. 2016, Shai-Braun and Hackländer 2016). Reliable estimates of abundance on a range-wide basis do not currently exist but distribution information indicates pygmy rabbits continue to occupy the same general areas previously known (USFWS 2010b).

**Columbia Basin Pygmy Rabbit subpopulation past.** Prior to European settlement an estimated 4.2 million ha (10.4 million acres) of shrub-steppe existed in eastern Washington (Dobler et al. 1996). However, because pygmy rabbit habitats require areas of tall, dense (>25% canopy cover) sagebrush in deep soils and these conditions likely cover only 5-26% of the state's shrub-steppe (Franklin and Dryness 1988), much of the pygmy rabbit populations were likely restricted to localized areas of suitable habitat in pre-settlement times (WDFW 1995). Today, over half of Washington's original shrub-steppe habitat has been converted to agricultural lands resulting in high fragmentation of extant habitat (Dobler et al. 1996) and disproportionate loss of deep-soil shrub-steppe communities (Vander Haegen et al. 2000).

Pygmy rabbits were considered fairly common in the coulees and slopes of central Adams County in the early 1900s (Taylor and Shaw 1929). By the mid-1900s, they were reported only to occur in the central part of the Columbia Basin and considered to be "rare and of local occurrence" (Dalquest 1948) and "very scarce occurring only in a small area in the arid parts of Adams and Grant counties" (Booth 1947). In 1979, Washington Department of Fish and Wildlife biologists found pygmy rabbits at a site in Douglas County but surveys in 1985 found no signs of a population at this site or elsewhere in the state, and the species was thought to be extirpated. However, in 1987 Washington Department of Fish and Wildlife (WDFW) biologists found a colony of pygmy rabbits at another site in Douglas County and intensive

surveys conducted in 1988 found colonies at four additional sites in southern Douglas County, including Sagebrush Flat. By 1995, pygmy rabbits were still present at these five isolated sites in pockets of suitable habitat, but three of these populations had <30 active burrows (WDFW 1995). A sixth population was found in 1997 in northern Grant County, but by 2001 five of the six populations had disappeared. In March 2001, pygmy rabbits were known to occur only at Sagebrush Flat Wildlife Area (WDFW 2001, USFWS 2003, Becker et al. 2011). That same year, a genetic analysis found that the Columbia Basin population had lost significant genetic diversity over the past 50 years and few of these genetically unique rabbits remained in the wild. In May 2001, 16 individuals were captured to establish a founding captive population for future recovery efforts. The last known wild subpopulation of the Columbian Basin pygmy rabbit was extirpated in Washington by early 2004 (USFWS 2010a).

Captive breeding of Columbia Basin pygmy rabbits began in 2002. Poor reproduction from the outset was attributed to the low genetic diversity in the founder population (Elias et al. 2013). As a result, intercrossing with captive Idaho pygmy rabbits occurred from 2003 to 2011 to introduce genetic diversity into the population. The off-site captive breeding program was effective in managing the genetic characteristics of the population and maintaining the captive population, with the number of kits produced each breeding season increasing from a low of 19 in 2002 to a high of 275 in 2010 (USFWS 2012). While genetic diversity and reproduction of the captive population largely improved, survival of young declined primarily due to disease, which led to the production of insufficient numbers of pygmy rabbits for large-scale reintroductions.

***Columbia Basin Pygmy Rabbit subpopulation present.*** In 2011, the recovery effort transitioned to semi-wild breeding within four enclosures located within their former range (Appendix A). Between 2011 and 2013, 109 adult pygmy rabbits were translocated from other parts of their range (OR, NV, UT, WY) and added to the breeding enclosures to augment population size and bolster genetic diversity of the semi-wild breeding population (Wisniewski 2015, Gallie 2017). Since 2011, 2,222 kits have been produced in enclosures and 1,808 kits and 165 adults have been released to the wild (Gallie and Zinke 2018, Table 1) in suitable sagebrush habitat primarily on the Sagebrush Flat Wildlife Area (Appendix A).

Table 1. Annual summary of pygmy rabbit kits born (produced) within breeding enclosures and rabbits released into the wild, Columbia Basin, Washington 2011-2017.

	2011	2012	2013	2014	2015	2016	2017	Total
Kits produced	0	150	381	794	590	155	152	2,222
Kits released	42	104	272	717	528	119	26	1,808
Adults released	0	0	0	113	51	1	0	165
Total no. released	42	104	272	830	579	120	26	1,973

Winter surveys are conducted on and around release areas to locate active burrows and collect fecal pellets for genetic analysis that allow researchers to determine the distribution, abundance and survivorship of released rabbits (DeMay et al 2017, Table 2). Adequate snow makes rabbit tracks, active burrows, and fecal pellets conspicuous and is the most effective method for locating and identifying active pygmy rabbit burrows. Intensive ground-based transect surveys are conducted in areas known to be occupied at medium to high density, while low density areas are surveyed with a combination of transect and adaptive sampling plot methods. Genetic analyses also provide the means to quantify reproduction in the wild (wild-born kits), an important metric to assess sustainability of the wild population and progress towards species recovery.



Table 2. Annual summary of winter burrow surveys on Sagebrush Flat Recovery Area, Columbia Basin, Washington.

	Survey year (winter)					
	2012-13	2013/14	2014/15	2015-16	2016/17	2017/18
# active burrows	52	64	174	88	146	364
% released kits detected	37	11	8	<1	4	0
# genetically identified pygmy rabbits	45	44	91	17	62	175
% identified pygmy rabbits, wild-born	8.9	9.1	3.3	88	93	100

In the Sagebrush Flat Recovery Area, the most recent winter survey (2017-18) found 364 active pygmy rabbit burrows corresponding to 175 unique pygmy rabbits all of which were wild-borne kits (Gallie and Zinke 2018, Table 2). During the first three winters following rabbit releases, the majority of active burrows were located on native shrub-steppe habitat on the Sagebrush Flat Wildlife Area, but in the last three winters, the majority of active burrows are found on lands enrolled in the Conservation Reserve Program (CRP) adjacent to Sagebrush Flat Wildlife Area (Figure 4). If adequate sagebrush cover and canopy height are present, CRP can be highly productive pygmy rabbit habitat given that these lands often occur on high quality, deep soils that provide opportunities for burrowing and consist of younger sagebrush plants that are more vigorous and palatable to pygmy rabbits (Gallie and Zinke 2018).

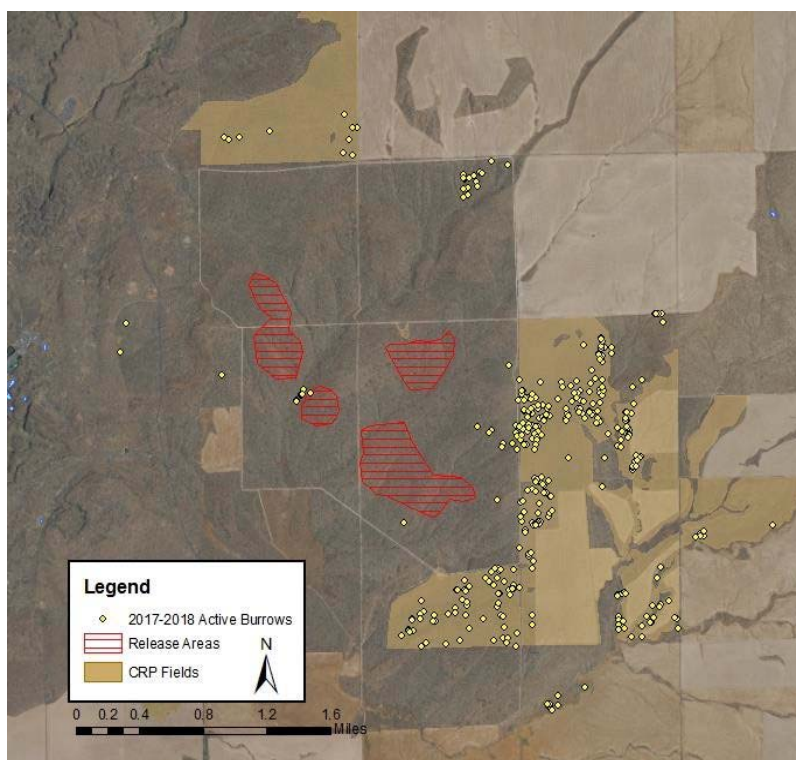


Figure 4. Active pygmy rabbit burrows in the Sagebrush Flats Recovery Area during winter 2017-2018 survey season.

In the Beezley Hills Recovery Area, recent reintroductions have been unsuccessful. Following a release of 420 pygmy rabbits in 2015, both ground and broad aerial surveys in the winter of 2015-2016 and ground surveys in the summer of 2016 failed to locate any active burrows or live pygmy rabbits in the surrounding area (Gallie 2017). In the spring of 2017, release efforts resumed on the Beezley Hills Recovery Area with the release of kits into small, temporary release pens. In late June, the Sutherland Canyon wildfire burned 30,000 acres of shrub-steppe habitat within the Beezley Hills Recovery Area and swept through the 10-acre breeding enclosure and three release pens. Fire-related mortality likely claimed 80 rabbits, including all 26 kits in the release pens, 48 rabbits (15 adults, 22 kits, 11 unknown)

recovered dead within the breeding enclosure, and an additional 6 rabbits that were recovered alive but subsequently died. Thirty-two rabbits (4 adults, 28 kits) survived the fire and were transferred to the three other enclosures at other sites.

Late summer surveys of breeding enclosures in 2017 provided an estimate of a minimum of 75 pygmy rabbits distributed among the three breeding enclosures (Gallie and Zinke 2018). After replacing the breeding enclosure at Beezley Hills with a new design in late summer 2017 an additional 14 rabbits were transferred from the large enclosure on Sagebrush Flat Wildlife Area. In 2018, the Department plans to reintroduce rabbits for the first time on the Sagebrush Flat Wildlife Area Dormaier Unit within the Burton Draw Recovery Area and within the Beezley Hills Recovery Area.

## FACTORS AFFECTING CONTINUED EXISTENCE

***Adequacy of existing regulatory mechanisms.*** The Columbia Basin pygmy rabbit receives protections through its endangered classification under federal and state laws. Washington State classification of the Columbia Basin pygmy rabbit as endangered makes it illegal to attempt to kill, injure, capture, harass, possess, or control individuals of the species (WDFW 1995). As a federally listed species under the ESA, section 9 of the Act provides prohibitions that make it illegal to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect pygmy rabbits, or attempt any such conduct (USFWS 2003).

***Habitat loss, degradation, and fragmentation.*** Large-scale loss, degradation, and fragmentation of native shrub-steppe habitat has played a primary role in the in the long-term decline of the Columbia Basin pygmy rabbit (WDFW 1995, Knick et al. 2003, USFWS 2003, Gallie 2017). By the mid-1900s, large portions of shrub-steppe habitat on deep soils within the Columbia Basin were converted to agricultural crops (Buechner 1953, Daubenmire 1988, Franklin and Dryness 1988, USFWS 2003). Urban and rural developments (e.g., housing, industrial facilities, transportation corridors) also result in permanent conversion of native shrub-steppe. An estimated 60% of Washington's original shrub-steppe habitat has been converted to agriculture resulting in high fragmentation of extant habitat and a disproportionate loss of deep-soil shrub-steppe communities (Dobler et al. 1996, Vander Haegen et al. 2000). Pygmy rabbits cannot occupy converted lands and conversion of native shrub-steppe habitat removes or severely limits dispersal corridors between suitable habitat areas (USFWS 2003).

Remaining stands of sagebrush are affected by other, often interacting, factors including historical improper livestock grazing, invasion by non-native plant species, and altered fire frequency (USFWS 2003). Remaining stands of sagebrush used for grazing livestock were historically overgrazed or cleared of sagebrush to increase production of grasses and forbs as forage for livestock (Franklin and Dryness 1988, Harris 1991, WDFW 1995, Knick et al. 2011). Past overgrazing sometimes resulted in structural damage to dense stands of older sagebrush (Dobler and Dixon 1990). In addition, improper grazing practices often led to loss of perennial native grasses and forbs and contributed to invasions of annual grasses, such as cheatgrass (*Bromus tectorum*) (Franklin and Dryness 1988, Dobler and Dixon 1990, Harris 1991, WDFW 1995, Knick et al. 2003, Knick et al. 2011). Invasions of annual grasses, particularly cheatgrass, provide fine fuels that facilitate fire spread and result in more frequent fires in cheatgrass-dominated sagebrush communities (Miller et al. 2011). Sagebrush is easily killed by fire and when it occurs at increased frequency, sagebrush can be eliminated from the vegetation assemblage (Daubenmire 1988, Franklin and Dryness 1988, Miller et al. 2011). Absent a sufficient seed source, sagebrush cannot readily reinvade sites where it has been removed (Miller et al. 2011). Fire was not historically frequent in sagebrush, but instead burned at multi-century intervals (Baker 2011). Cheatgrass invasion has altered fire regimes resulting in shorter fire return intervals, larger areas burned, and increased probability of fire (Miller et al. 2011, Balch et al. 2013).

Pygmy rabbits are associated with tall, dense stands of sagebrush; therefore, areas that are frequently burned or treated mechanically to remove sagebrush cover remove habitat patches potentially used by pygmy rabbits and further fragment remaining suitable habitat (USFWS 2003). Pygmy rabbits have not been found in recently burned areas (Rachlow and Svancara 2006). Fragmentation of sagebrush and corresponding increases in edge can result in a reduction in active burrows and relative abundance of pygmy rabbits near edges that may be attributable to an increase in occurrence of competitors and terrestrial predators near habitat edge (Pierce et al. 2011). Depending on timing and intensity, livestock grazing can reduce the biomass available and nutritional quality (e.g., less protein and greater fiber content of grasses) of native grasses and forbs (Camp et al. 2014, Thines et al. 2004), important seasonal foods of pygmy rabbits. In some study areas, pygmy rabbit presence decreased with increased occurrence of cheatgrass (*Larrea* and Brussard 2008a). Cheatgrass is a poor food source, creates dense root mats that may make it difficult for pygmy rabbits to form burrows, and as it becomes more widespread it may form barriers to dispersal due to loss of shrub cover that provides protection from predators (Larrea and Brussard 2008a,b). Shortened fire cycles and loss of native grasses and forbs eventually made overgrazed areas unsuitable for pygmy rabbits in the Columbia Basin (WDFW 1995).

***Small subpopulation size and isolation.*** Once pygmy rabbit population numbers declined below a certain threshold, a combination of factors, including environmental events (e.g., extreme weather), catastrophic habitat loss (e.g., fire), predation, disease, loss of genetic diversity, and inbreeding, likely contributed to the eventual extirpation of wild populations in the state by 2004 (USFWS 2003, Wisniewski 2015, Gallie 2017). The level of genetic diversity in the Columbia Basin population declined significantly and at an accelerated rate since the mid-1900s (WDFW 2003). A recent and rapid decline in the number of individuals contributing to reproduction suggested that the population was likely experiencing inbreeding (USFWS 2010a). Following the final federal listing determination in 2003, it became apparent that wild Columbia Basin pygmy rabbits used to found the off-site captive breeding population were likely suffering from severe inbreeding depression and had a diminished reproductive capacity that could not produce enough offspring for reintroduction efforts. Augmentation of the captive population with additional purebred animals was not possible because the last known wild subpopulation of the Columbia Basin population was extirpated in 2004. Therefore, a determination was made to intercross purebred captive animals with pygmy rabbits from other states to try and conserve the markedly different genetic characteristics of the founding Columbia Basin animals while also ensuring sufficient genetic diversity could be retained in the recovered population.

While intercrossing purebred Columbia Basin pygmy rabbits with Idaho pygmy rabbits increased genetic diversity and improved reproduction (e.g., kit production, pregnancies per female) of captive rabbits over the years (2003-2010), survival of emerged kits decreased, primarily due to disease (i.e., enteritis and coccidia). Additionally, the breeding facilities were costly to maintain and were constrained to only breed animals for outcrossing which reached an upper limit with limited space. As a result, the recovery effort transitioned to semi-wild breeding in enclosures located on release sites. Wild adult pygmy rabbits translocated from other states were added to the breeding enclosures to bolster population size and genetic diversity (Wisniewski 2015, Gallie 2017). A pilot reintroduction study conducted in Idaho with captive Idaho pygmy rabbits in 2002-2003 (Westra 2004) and a small-scale release at Sagebrush Flat in 2007 were critical in the development of release protocols and demonstrated the potential to restore populations of pygmy rabbits in Washington. Semi-wild breeding within enclosures on release sites and subsequent release of suitable numbers of kits for release into the wild (2013-present) has been largely successful, although repeated use of the enclosures and high population numbers have contributed to coccidian outbreaks in recent years despite changes in husbandry and regular disease monitoring (Gallie 2017).



**Predation.** Predation is considered to be the main cause of pygmy rabbit mortality in the wild (42%, Sanchez 2007; 57.6 of juveniles, Estes-Zumpf and Rachlow 2009; 70%, Crawford et al. 2010; 69% of juveniles, Price et al. 2010). Known predators include Great Horned Owl (*Bubo virginianus*), coyote (*Canis latrans*), Northern Harrier (*Circus cyaneus*), weasels (*Mustela* spp.), badger (*Taxidea taxus*), and bobcat (*Felis rufus*); potential predators include Long-eared Owl (*Asio otus*), Prairie Falcon (*Falco mexicanus*), Ferruginous Hawk (*Buteo regalis*), Golden Eagle (*Aquila chrysaetos*), and Common Raven (*Corvus corax*) (Gahr 1993, Crawford et al. 2010, USFWS 2012). Pygmy rabbits evade predators by maneuvering through dense shrub cover of their preferred habitat or by escaping into their burrows (USFWS 2003). Predation pressure remains a significant concern to the Columbia Basin pygmy rabbit population due to its extremely small size and localized occurrence (USFWS 2003).

**Competition.** Mountain cottontails (*Sylvilagus nuttallii*) depend on understory plants for food and their presence has been negatively correlated with the presence of pygmy rabbits in some areas (Larracea and Brussard 2008). However, in Washington mountain cottontails and pygmy rabbits are often found coexisting in the Sagebrush Flat Recovery Area (J. Gallie, pers. comm.).

**Disease and parasites.** A large number of captive pygmy rabbits died as a result of substrate-borne diseases, especially coccidiosis and mycobacteriosis (Harrenstien et al. 2006, USFWS 2010a, Elias et al. 2013). Coccidiosis is caused by protozoa that occur in soil and feces and which invade the intestines and other tissues of animals. A new strain of coccidian, *Eimeria brachylagia*, was identified in the captive pygmy rabbits (Duszynski et al. 2005). The bacterium that causes mycobacteriosis, *Mycobacterium avium*, commonly occurs in soil and water, and can survive long periods of time in the soil. High numbers of the bacterium can also occur in feces and urine. Purebred Columbia Basin pygmy rabbits have a significantly poor immune response to this bacterium compared to pygmy rabbits elsewhere and in other lagomorph species (USFWS 2010a). Preventative measures taken to help control coccidiosis and mycobacteriosis include soil treatments, antibiotic treatment of individuals (coccidiosis), and monitoring and quarantine of infected animals (mycobacteriosis). Measures taken to help address the negative effects of disease in the rabbits in the breeding enclosures have intensified the husbandry of this population, and disease remains a significant threat to the ultimate recovery of the Columbia Basin pygmy rabbit (USFWS 2010a). Three types of ectoparasites are common to pygmy rabbits, notably fleas (*Cediopsylla inaequalis*), ticks (*Dermacentor abdersoni*), and bot flies (*Cuterebra maculate*) (Gahr 1993). Plague is a bacterial disease transmitted by fleas infected with the bacterium, *Yersinea pestis* (USFWS 2010b). Plague was reported in a coyote taken from the site of one of the extirpated subpopulations of the pygmy rabbit in the Columbia Basin (USFWS 2003) and may represent a significant threat to the pygmy rabbit in the Columbia Basin (USFWS 2003).

**Overutilization for commercial, recreational, scientific, or educational purposes.** Under Section 10 of the Endangered Species Act, WDFW was issued a recovery permit for activities associated with the recovery program. In accordance with the permit, WDFW has tracked levels of incidental take associated with the program (defined as the amount of human-caused disability and mortality of pygmy rabbits as a percentage of the total captive population) and provided the Service with annual reports addressing these activities. The Service's Biological Opinion concluded that this level of incidental take is not likely to jeopardize the continued existence of the Columbia Basin pygmy rabbit (USFWS 2010a). Pygmy rabbits can be difficult to distinguish from species of cottontail rabbits (*Sylvilagus* spp.), therefore accidental shooting of Columbia Basin pygmy rabbits may occur in association with hunting of other small game species in Washington. However, this risk factor is considered to be relatively low based on low population numbers, localized distribution, association with dense shrub cover and relatively few small game hunters in these areas (USFWS 2003).

**Climate change.** Gradual climate change that affected the distribution and composition of sagebrush communities is thought to have contributed to the reduction of the Columbia Basin pygmy rabbit's range during the late Holocene (Lyman 1991). In the Great Basin, an upward shift in elevation of extant historical pygmy rabbit sites closely corresponded to the predicted elevation increase in average global temperature over the last century (Larrucea and Brussard 2008b). In addition, environmental changes resulting from climate change could facilitate the invasion and establishment of invasive species or exacerbate fire regimes that accelerate the loss of sagebrush habitats (USFWS 2010b).

## MANAGEMENT ACTIVITIES

**Conservation planning.** A state recovery plan was developed for the Columbia Basin pygmy rabbit in 1995 (WDFW 1995) and subsequently amended (WDFW 2001, WDFW 2003, WDFW 2011). Shortly after publishing the final federal listing rule, a recovery team developed a federal recovery plan (USFWS 2012). In 2004, the Columbia Basin Pygmy Rabbit Recovery Team assessed and prioritized ten possible reintroduction sites for the Columbia Basin pygmy rabbit. One of the two highest priority sites identified for expanded reintroduction efforts is managed by WDFW (Sagebrush Flat Wildlife Area, 1,515 ha [3,740 acres]), and the other site is managed by The Nature Conservancy (Beezley Hills area, 1,374 ha [3,390 acres]). These two sites are currently referred to as recovery emphasis areas (USFWS 2010a).

**Habitat protections and management.** In 2006, the Service and WDFW entered into a Safe Harbor Agreement for the Columbia Basin Pygmy Rabbit that provides a process whereby non-federal landowners and managers can voluntarily contribute to recovery efforts for the pygmy rabbit without incurring additional regulatory burdens or management requirements related to this species. To date, the Service has issued 25 Enhancement of Survival Permits under the Safe Harbor Agreement that cover management activities on 41,822 ha (103,344 acres) of private lands within the rabbits' historic range and another 11,876 ha (29,346 acres) of property managed by Washington Department of Natural Resources. Currently, an additional 1,468 ha (3,628 acres) of WA DNR land are pending enrollment in Safe Harbor (D. Comstock, pers. comm.; USFWS 2010a). Surveys of historical pygmy rabbit habitat in conjunction with Safe Harbor Agreement baseline surveys have occurred from 2006 to present (Wisniewski 2015, Gallie and Zinke 2018). A general conservation plan for Douglas County also provides best management practices to maintain or enhance pygmy rabbit habitat on private land (FCCD 2015). In recent years, the majority of active pygmy rabbit burrows have been found in habitat established on lands enrolled in CRP. CRP lands can be highly productive pygmy rabbit habitat and could play a role in future release efforts with adequate outreach, permission from private landowners, and cooperation with the Washington Department of Natural Resources (Gallie 2017, Gallie and Zinke 2018). However, given that the majority of the wild pygmy rabbit population now occurs on CRP, the security of the population is subject to the ephemeral nature of enrolled lands in this program. Federal lands (e.g., BLM) could also play an important role in future pygmy rabbit recovery.

**Predator management.** WDFW implemented a predator control program around and including the Sagebrush Flat site during the winters of 1998-99 and 1999-2000. Numerous coyotes and several long-tailed weasels were removed by shooting, trapping, or snaring (USFWS 2003). The efficacy of the predator control program to protect the Columbia Basin rabbit population is unknown. Two obsolete windmills were removed to reduce the occurrence of predatory birds that could use the structures as perch or nest sites. Several measures have been taken (wire fencing of enclosures, overhead netting, perch deterrents, electrical wire along periphery of enclosures, and removal of problem northern harriers) to reduce the risk of predation on the population in breeding enclosures (Becker et al. 2011).

**Subpopulation augmentation.** Since the recovery effort transitioned from off-site captive breeding to on-site semi-wild breeding enclosures in 2011, 1,973 pygmy rabbits (1,808 kits and 165 adults) have been released in the Sagebrush Flat and Beezley Hills Recovery Areas (Table 1).

**Research.** Studies conducted during the Columbia Basin pygmy rabbit recovery effort include: documenting survival of released pygmy rabbits; dispersal, and distribution of free-ranging rabbits (DeMay et al. 2017); DNA sampling to identify species and individual pygmy rabbits from fecal pellet samples (DeMay et al. 2013); population viability analysis (Zeoli et al. 2008); reproductive behavior (Elias et al. 2006, DeMay et al. 2016); effects of genetic management on demographics of the captive population (Elias et al. 2013); tradeoffs between security and thermal needs in sagebrush habitat (Camp et al. 2012, Camp et al. 2013, Milling et al. 2017); effects of land use practices on pygmy rabbit ecology (Thines et al. 2004, Camp et al. 2014); and parasitology and disease (Duszynski et al. 2005, Harrenstien et al. 2006).

**Recovery Plan Objectives.** The Washington State Recovery Plan (WDFW1995) indicates pygmy rabbits could be considered for down-listing to threatened when a minimum population size (5-year average) of 1,400 adult rabbits in six populations with a distribution of two populations with at least 500 adults each and four populations with at least 100 adults each, and the habitat supporting all six populations is secure. The federal recovery plan (USFWS 2012) identifies criteria for down-listing the species from endangered to threatened that specifically address threats related to: 1) small population size and associated vulnerability to genetic threats and demographic and environmental stochasticity, 2) quantity and quality of habitat through its treatment of recovery emphasis areas and dispersal corridors, 3) adequate regulatory mechanisms in place to protect key recovery sites, 4) overutilization, and 5) disease or predation.

## CONCLUSIONS AND RECOMMENDATION

The Columbia Basin pygmy rabbit, once found in portions of five counties, was considered extinct in the state by 2004. Through captive breeding of purebred Columbia Basin pygmy rabbits and later intercrossing with pygmy rabbits from populations outside Washington, pygmy rabbits were reintroduced to Washington. Reintroductions of pygmy rabbits in the Beezley Hills Recovery Area failed for unknown reasons in 2015 and again in 2017 due to wildfire. Reintroductions in the Sagebrush Flat Recovery Area are re-establishing a small wild population. Breeding enclosures contain a minimum breeding population of 75 pygmy rabbits and recent winter burrow surveys indicate a minimum of 172 wild pygmy rabbits within the Sagebrush Flats Recovery Area. Many local, state, federal and private landowner partners have helped maintain the pygmy rabbit population. Since pygmy rabbits have not reached the population, distribution, or security criteria in the Washington State Recovery Plan for down-listing, it is recommended the species remain state-listed as endangered.



## LITERATURE CITED

The references cited in the *Periodic Status Review for Pygmy Rabbit in Washington* are categorized for their level of peer review pursuant to section 34.05.271 RCW, which is the codification of Substitute House Bill 2661 that passed the Washington Legislature in 2014. A key to the review categories under section 34.05.271 RCW is provided in Table A. References were categorized by the author.

Individual papers cited cover a number of topics discussed in the report, including information on: 1) the species' taxonomy, distribution, and biology; 2) habitat requirements; 3) population status and trends; 4) conservation status and protections; 5) management activities; and 6) factors affecting the continued existence of the species.

**Table A. Key to 34.05.271 RCW Categories:**

Category Code	34.05.271(1)(c) RCW
i	(i) Independent peer review: review is overseen by an independent third party.
ii	(ii) Internal peer review: review by staff internal to the department of fish and wildlife.
iii	(iii) External peer review: review by persons that are external to and selected by the department of fish and wildlife.
iv	(iv) Open review: documented open public review process that is not limited to invited organizations or individuals.
v	(v) Legal and policy document: documents related to the legal framework for the significant agency action including but not limited to: (A) federal and state statutes; (B) court and hearings board decisions; (C) federal and state administrative rules and regulations; and (D) policy and regulatory documents adopted by local governments.
vi	(vi) Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under the processes described in (c)(i), (ii), (iii), and (iv) of this subsection.
vii	(vii) Records of the best professional judgment of department of fish and wildlife employees or other individuals.
viii	(viii) Other: Sources of information that do not fit into one of the categories identified in this subsection (1)(c).

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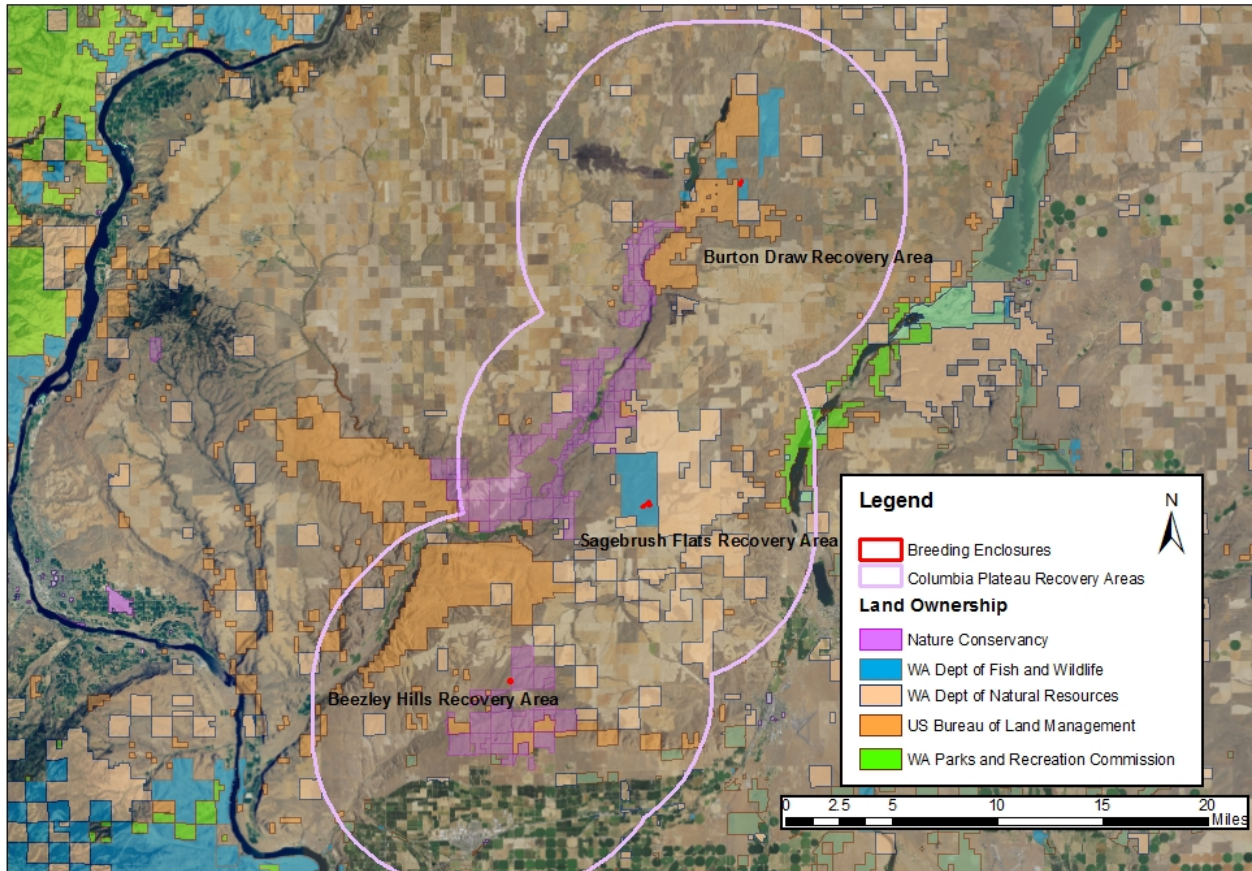
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## PERSONAL COMMUNICATION

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Appendix A. Project location, Douglas and Grant Counties of the Columbia Basin, Washington (Gallie and Zinke 2018).



Appendix B. WDFW responses to public comments received during the 90-day public review period for the draft *Periodic Status Review for the Pygmy Rabbit in Washington* conducted from February 6, 2018 to May 9, 2018. The comments presented here are summaries of the remarks provided by one or more people.

Report Section	Comment and Response
General comments	<p>1. I support the continued listing of the pygmy rabbit as endangered in Washington.</p> <p><i>Thank you for your comment. WDFW recommends that the pygmy rabbit should remain on the state list of endangered species for the reasons given in the periodic status review.</i></p>

# WASHINGTON STATE PERIODIC STATUS REVIEWS, STATUS REPORTS, RECOVERY PLANS, AND CONSERVATION PLANS

## Periodic Status Reviews

2017 Columbian Sharp-tailed Grouse  
2017 Fisher  
2017 Blue, Fin, Sei, North Pacific Right, and  
Sperm Whales  
2017 Woodland Caribou  
2017 Sandhill Crane  
2017 Western Pond Turtle  
2017 Green and Loggerhead Sea Turtles  
2017 Leatherback Sea Turtle  
2016 American White Pelican  
2016 Canada Lynx  
2016 Marbled Murrelet  
2016 Peregrine Falcon  
2016 Bald Eagle  
2016 Taylor's Checkerspot  
2016 Columbian White-tailed Deer  
2016 Streaked Horned Lark  
2016 Killer Whale  
2016 Western Gray Squirrel  
2016 Northern Spotted Owl  
2016 Greater Sage-grouse  
2016 Snowy Plover  
2015 Steller Sea Lion

## Conservation Plans

2013 Bats

## Recent Status Reports

2017 Yellow-billed Cuckoo  
2015 Tufted Puffin  
2007 Bald Eagle  
2005 Mazama Pocket Gopher,  
Streaked Horned Lark, and  
Taylor's Checkerspot  
2005 Aleutian Canada Goose  
1999 Northern Leopard Frog  
1999 Mardon Skipper  
1999 Olympic Mudminnow  
1998 Margined Sculpin  
1998 Pygmy Whitefish  
1997 Aleutian Canada Goose  
1997 Gray Whale  
1997 Olive Ridley Sea Turtle  
1997 Oregon Spotted Frog  
1993 Larch Mountain Salamander  
1993 Oregon Silverspot Butterfly

## Recovery Plans

2012 Columbian Sharp-tailed Grouse  
2011 Gray Wolf  
2011 Pygmy Rabbit: Addendum  
2007 Western Gray Squirrel  
2006 Fisher  
2004 Sea Otter  
2004 Greater Sage-Grouse  
2003 Pygmy Rabbit: Addendum  
2002 Sandhill Crane  
2001 Pygmy Rabbit: Addendum  
2001 Lynx  
1999 Western Pond Turtle  
1996 Ferruginous Hawk  
1995 Upland Sandpiper  
1995 Snowy Plover

Status reports and plans are available on the WDFW website at:



<http://wdfw.wa.gov/publications/search.php>

