

# Amendment to the Draft Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit

*(Brachylagus idahoensis)*



*Photo by John Musser  
Courtesy of Washington Department of Fish and Wildlife*

**Amendment to the Draft Recovery Plan for the  
Columbia Basin Distinct Population Segment of the  
Pygmy Rabbit (*Brachylagus idahoensis*)**

**May 2011**

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Region 1  
U.S. Fish and Wildlife Service  
Portland, Oregon

Approved: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
Regional Director, U.S. Fish and Wildlife Service

Date: \_\_\_\_\_

## DISCLAIMER

Recovery plans use the best available information to identify such reasonable actions as may be necessary to protect and conserve species listed as threatened or endangered pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Plans are published by the U.S. Fish and Wildlife Service and are sometimes prepared with the assistance of recovery teams, contractors, state agencies, and others. Attaining recovery objectives and the availability of funds are subject to budgetary and other constraints, as well as the need to address other priorities. Nothing in this plan should be construed as a commitment or requirement for any Federal agency to obligate or pay funds in contravention of the Anti-Deficiency Act (31 U.S.C. 1341), or any other law or regulation.

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<http://www.fws.gov/endangered/species/recovery-plans.html>

and

<http://www.fws.gov/pacific/ecoservices/endangered/recovery/plans.html>

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## I. BACKGROUND

On March 5, 2003, we, the U.S. Fish and Wildlife Service (Service or USFWS) published a final rule to federally list the Columbia Basin distinct population segment (DPS) of the pygmy rabbit (*Brachylagus idahoensis*), hereafter referred to as the Columbia Basin pygmy rabbit, as endangered pursuant to the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et seq.) (USFWS 2003). Our determination that this population is a DPS is based on its isolation within the unusual ecological setting of the Columbia Basin, the significant gap in the range of the taxon that the loss of this population segment would represent, and the population's markedly different genetic characteristics compared to the remainder of the taxon. Shortly after publishing the final rule, we convened a multi-party recovery team to assist us with development of a Draft Recovery Plan for the Columbia Basin pygmy rabbit, which was completed in August 2007 (USFWS 2007). In September 2010, we also completed a 5-Year Status Review of the Columbia Basin pygmy rabbit, which reaffirmed that this population is an endangered DPS and concluded that several threats to the population had increased since 2003 (USFWS 2010a). The current recovery priority number for the Columbia Basin pygmy rabbit is 6, on a scale of 1C (highest) to 18 (lowest). This ranking is based on our determination that the Columbia Basin pygmy rabbit is subject to a high degree of threat, has low to moderate potential for recovery, is classified as a DPS, and has relatively little conflict expected between implementation of the identified recovery actions and development or other economic activity.

Our 2007 Draft Recovery Plan provided detailed background information describing the taxonomy and life history attributes of the pygmy rabbit species, the general recovery environment of the Columbia Basin, known threats to the Columbia Basin pygmy rabbit, and various conservation measures that have been implemented for the population. The Draft Recovery Plan also defined the general long-term recovery strategy and goal, specific near-term recovery objectives and criteria, and detailed management actions that we considered necessary to conserve the Columbia Basin pygmy rabbit. Our 5-Year Status Review (USFWS 2010a) described pertinent new biological information that has become available concerning the genetics and habitat associations of the Columbia Basin pygmy rabbit and the risk of disease and other threats to the population. The body of this Amendment to the Draft Recovery Plan (Amendment) addresses only those background sections and specific management actions from the original Draft Recovery Plan (USFWS 2007) that require updating due to this new information. However, at the conclusion of this Amendment we provide a complete, updated implementation schedule of all management actions that we currently consider necessary to effect recovery of the Columbia Basin pygmy rabbit. The balance of the 2007 Draft Recovery Plan is incorporated herein by reference.

A number of significant gaps remain in our knowledge about pygmy rabbits in general and, more specifically, about how the Columbia Basin population will respond to ongoing and developing conservation measures. Recovery of the Columbia Basin pygmy rabbit in the wild will require both effective adaptive management through comprehensive monitoring and sustained conservation measures to ensure the population's long-term viability. The 2007 Draft Recovery Plan identified criteria for downlisting the species from endangered to threatened; however, it did not identify specific delisting criteria because of the uncertainties in the biological information and the ultimate effectiveness of ongoing population management actions.

For similar reasons, this Amendment does not identify delisting criteria. Nevertheless, we recognize the need for requisite data to develop more precise and biologically accurate long-term recovery and delisting criteria as a high priority, and we have identified specific actions to obtain this information. If feasible, we intend to finalize the Recovery Plan within 1 year of the publication of this Amendment, after expert peer review, public comment, and incorporation of any necessary changes. After the final Recovery Plan is completed, we will periodically review and update it as necessary, as research and management activities progress and as we gain further knowledge about the ecology of this species.

## **Distribution and Abundance**

The estimated historical distribution of the pygmy rabbit, as depicted in the 2007 Draft Recovery Plan, was based largely on information that was over 25 years old and on the best professional judgment of researchers familiar with only relatively small portions of the species' overall range. A newly developed database that consolidates and assesses the reliability of documented historical and contemporary rangewide occurrences of the pygmy rabbit (USFWS 2010b), combined with an assessment of potentially suitable shrub steppe vegetation communities throughout the western United States (USFWS 2010a), have allowed us to refine the estimated historical distribution of the pygmy rabbit in this Amendment (see Figure 1).

As indicated in our 2007 Draft Recovery Plan, the last known wild subpopulation of the Columbia Basin pygmy rabbit was extirpated by early 2004. However, only about 7.6% (45,828 hectares [113,244 acres]) of the potentially suitable shrub steppe habitat that remains within the Columbia Basin (599,132 hectares [1,480,489 acres]) has been surveyed specifically for pygmy rabbit presence since 2001 (USFWS 2010a). Therefore other wild, but as yet unknown, pygmy rabbit subpopulations may still be present within the Columbia Basin, and ongoing survey effort to detect any that may remain has been identified as a key action in this Amendment.

As of April 15, 2011, there were 92 intercrossed pygmy rabbits (44 females, 48 males) included in the captive breeding program for the Columbia Basin pygmy rabbit. These intercrossed animals, which average 65% Columbia Basin ancestry by pedigree, are the result of controlled matings between the founding purebred Columbia Basin pygmy rabbits and pygmy rabbits from Idaho (of the same species, but from a different population outside the Columbia Basin). The last purebred Columbia Basin pygmy rabbit kits recruited into the captive population were born in 2004, and the last purebred Columbia Basin pygmy rabbit in captivity died in August 2008 (USFWS 2010a).

## **Threats**

The available new information indicates that the Columbia Basin pygmy rabbit is still endangered and that several threats to the population, including disease and habituation in captivity and the potential for outbreeding depression in the wild, have increased since completion of the 2007 Draft Recovery Plan (USFWS 2010a). This new information is summarized below under the applicable threat factors, as identified pursuant to section 4 of the Act.

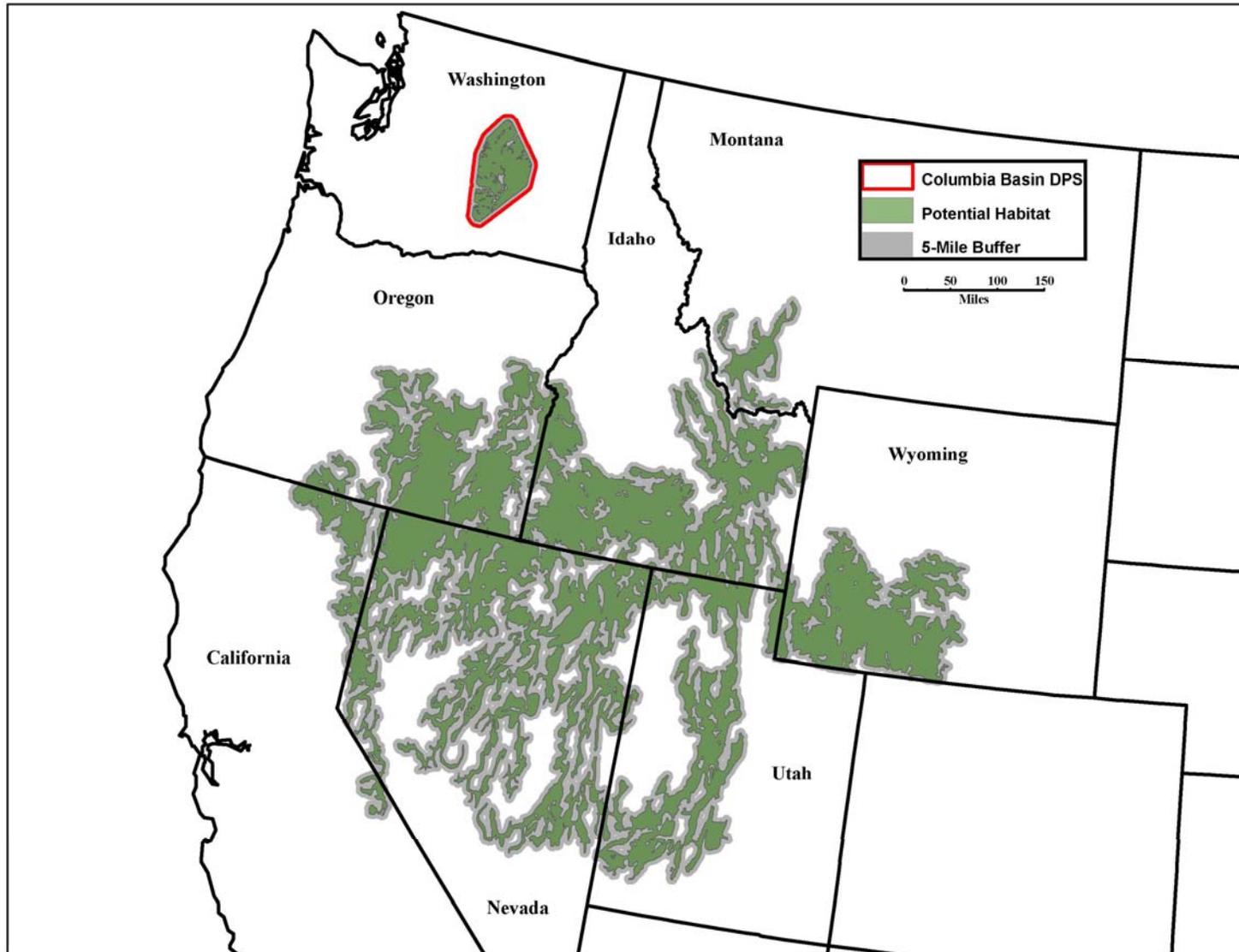


Figure 1. Approximate historical distribution of the pygmy rabbit (*Brachylagus idahoensis*) based on available occurrence data and the distribution of potentially appropriate shrub steppe community types.

Factor A – The Present or threatened destruction, modification, or curtailment of its habitat or range: This assessment remains the same as in the 2007 Draft Recovery Plan.

Factor B – Overutilization for commercial, recreational, scientific, or educational purposes: This assessment remains the same as in the 2007 Draft Recovery Plan.

Factor C – Disease and Predation: Due to ongoing concerns related to soil-borne diseases (mycobacteriosis and coccidiosis) in the captive pygmy rabbits, strategies to achieve off-soil husbandry have been a focus of the captive breeding program for a number of years (Science Advisory Group [SAG] 2010). While off-soil husbandry has been somewhat successful for maintaining pygmy rabbits in captivity, significant concerns remain about implementing such a management approach more broadly or for extended periods of time (e.g., multiple seasons) due to the likelihood of increased habituation to captive conditions (see Factor E, below). Concerns about soil-borne diseases are especially relevant to pregnant and nursing females and their litters, whose life history attributes are closely linked to burrowing behavior and which, to date, have not been successfully housed in off-soil conditions (L. Shipley, Washington State University, and M. Illig, Oregon Zoo, personal communications, April 2010).

Off-soil husbandry strategies, and other measures (soil testing and replacement, antibiotic treatment, etc.) that have been taken to attempt to address negative effects of soil-borne diseases in captive pygmy rabbits, have resulted in an extremely labor- and resource-intensive management scenario that was not fully anticipated when the captive breeding program began. To date, these efforts remain less than fully effective. As a result, we believe the threat of disease to the ultimate recovery of the Columbia Basin pygmy rabbit has increased since 2007 (USFWS 2010a).

Factor D – The inadequacy of existing regulatory mechanisms: This assessment remains the same as in the 2007 Draft Recovery Plan.

Factor E – Other natural or human-caused factors affecting the population’s continued existence: One objective of the captive breeding program for the Columbia Basin pygmy rabbit has been to mimic, to the extent practical, the natural habitat conditions encountered by wild pygmy rabbits to help lessen the extent of habituation to captive conditions and to better prepare naïve individuals for reintroduction (USFWS 2010a). However, even with such remediating measures, habituation to captive conditions can negatively affect various life history traits (e.g., behavior, physiology, genetics) within just a few generations (Frankham 2008, Zeoli et al. 2008). The captive breeding program for the Columbia Basin pygmy rabbit was not intended to be a long-term approach for recovery of the population (USFWS 2007). However, the originally anticipated reintroduction and augmentation efforts have not been possible under the existing captive breeding scenario and, as a result, the program has been extended for multiple generations with no further input of wild animals. In addition, the various measures that have been taken to help address the negative effects of disease in the captive population (see Factor C, above) have further reduced the ability of the existing program to mimic natural habitat conditions and to prepare the captive animals for eventual release. The above circumstances have increased the risk of excessive habituation to captive conditions, which could, ultimately and in combination with genetic limitations (see following), lower the potential to successfully

reestablish wild subpopulations of the pygmy rabbit within the Columbia Basin (USFWS 2010a).

We assume that the markedly different genetic characteristics of the purebred Columbia Basin pygmy rabbit population historically conferred an adaptive advantage to the taxon within its native ecological setting (USFWS 2010a). Therefore, one of the main objectives of the intercross strategy was to minimize the potential for outbreeding depression (i.e., a decline in population fitness due to the loss of locally adapted genetic variation) by conserving, to the extent practical, what remained of the unique genetic characteristics of the purebred Columbia Basin pygmy rabbit population. However, all currently available options for attempting to reestablish a viable population of pygmy rabbits within the Columbia Basin would require the input of additional wild animals captured from outside of this ecosystem (USFWS 2010a). Any such action will, necessarily, further limit the genetic representation of the historical Columbia Basin population and increase the risk of outbreeding depression. The extent to which this factor will ultimately reduce the likelihood of recovering the Columbia Basin pygmy rabbit is currently unknown, because outbreeding depression may manifest itself following the release of captive-bred intercrossed and translocated wild pygmy rabbits within the Columbia Basin. Nevertheless, the risk that outbreeding depression could negatively affect recovery of the Columbia Basin pygmy rabbit has increased since 2007 (USFWS 2010a).

## **Conservation Measures**

Captive Breeding and Genetics Management: Over the first 9 years of the captive breeding program, the average annual growth rate of the captive population has been 28%, ranging from 98% in 2006 to negative 11% in 2008 (results exclusive of 20 captive-bred animals released in 2007; see Reintroduction, below). The number of kits produced each breeding season has increased over time, from a low of 19 during the first year of the program in 2002 to a high of 275 in 2010. However, on a percentage basis, 2010 had the poorest annual recruitment of kits to the population: only 11% ( $n = 31$ ), compared to an average of 30% over the first 8 years of the program. As of April 15, 2011, the 92 pygmy rabbits included in the captive breeding program averaged 65% Columbia Basin ancestry by pedigree (ranging from 42% to 88%), with 54 individuals representing at least 75% Columbia Basin ancestry. Previously, we anticipated retaining at least 75% Columbia Basin ancestry in a recovered population (USFWS 2006a, USFWS 2007).

To date, the captive breeding program for the Columbia Basin pygmy rabbit has been effective at maintaining the captive population, while the intercross strategy has been effective at conserving many of the markedly different genetic characteristics (e.g., mitochondrial haplotypes, nuclear alleles) of the founding purebred animals and ensuring that sufficient genetic variability has been maintained in the captive population. However, population modeling based on the demographic and genetic parameters documented since captive breeding began indicates that the existing program cannot support the anticipated reintroduction needs of 100 to 200 individuals, representing at least 75% Columbia Basin ancestry, released to the wild annually (see Reintroduction, below). Furthermore, the program has not been able to significantly reduce the risks to the captive population from demographic and genetic bottlenecks due to long-term management in captivity with fewer than several hundred individuals (see Threats, above) and, currently, it is considered only minimally capable of maintaining itself (SAG 2010). Finally, all

currently available options for attempting to reestablish a viable population of pygmy rabbits within the Columbia Basin will necessarily further limit the genetic representation of the founding purebred Columbia Basin animals and increase the risk of outbreeding depression (see Threats, above).

As a result of the above circumstances, there is significant uncertainty regarding our ability to reestablish a demographically and genetically viable population of pygmy rabbits within the Columbia Basin without substantial changes to our current approach to recovery. To address this conservation challenge, actions prescribed in this Amendment include additional releases of the captive-bred, intercrossed pygmy rabbits combined with direct translocations of wild pygmy rabbits from other populations (USFWS 2011; see Recovery Strategy, below).

Reintroduction: The initial release of captive-bred, intercrossed pygmy rabbits that took place in March 2007, used only a minimal number of animals (8 females, 12 males) due to the ongoing constraints on growth in the captive population, and was largely conducted on an experimental basis. Key results of this effort, in addition to previous studies of pygmy rabbit reintroduction efforts conducted in Idaho, provided valuable information on the importance of seasonal timing of releases and the movement patterns, vulnerability to predation, habitat use, and over-winter survival of captive-bred pygmy rabbits following their release. This information was an important consideration in developing the recovery actions prescribed in this Amendment.

Population modeling indicates that the likelihood of success of reintroduction efforts for the Columbia Basin pygmy rabbit would be greatly improved by undertaking multiple releases of relatively large numbers of captive-bred and/or translocated wild animals over multiple years (SAG 2008). This information formed the basis for defining our general targets for the initial phase of reintroduction and augmentation planning: releasing 100 to 200 individuals to the wild annually for up to 3 years (USFWS 2010a). Beginning with these general targets, the recovery efforts prescribed by this Amendment will use a semi-annual iterative planning process based upon ongoing monitoring efforts to specify the overall numbers and types (e.g., source populations, sex ratios) of animals to be released, as well as release location(s), techniques, and post-release monitoring strategies. Ongoing monitoring will also help to evaluate the effects of pre-release pens, supplemental feeding, predator control, seasonal timing, and the differing make-up of release groups. Devising adaptive management measures based on the results of these ongoing investigations was an important consideration during development of the recovery actions prescribed in this Amendment, and implementing these measures should lead to an increasingly consistent and effective approach for reestablishing subpopulations of pygmy rabbits within the Columbia Basin.

Stakeholder Involvement: In October 2006, the Service and the Washington Department of Fish and Wildlife (WDFW) completed a Template Safe Harbor Agreement (SHA) for the Columbia Basin Pygmy Rabbit (USFWS 2006b). As of April 15, 2011, we had issued 17 Enhancement of Survival Permits under the SHA, covering management activities on over 49,000 hectares (120,000 acres) of habitat within the population's historical distribution. To date, no incidental take has occurred in association with the SHA. Measures to pursue and secure conservation agreements with other non-Federal landowners and managers, as well as other stakeholders potentially involved in recovery efforts for the Columbia Basin pygmy rabbit, are ongoing and

were important considerations during development of the recovery actions prescribed in this Amendment.

## **II. RECOVERY STRATEGY**

The 2007 Draft Recovery Plan defined three phases of the overall recovery strategy for the Columbia Basin pygmy rabbit, which are: 1) removal or abatement of imminent threats in order to prevent the extinction of the Columbia Basin pygmy rabbit; 2) reestablishment of an appropriate number and distribution of free-ranging subpopulations over the near term; and 3) establishment and protection of a sufficiently resilient, free-ranging population that would be expected to withstand foreseeable long-term threats. The recovery actions developed to address each phase are not mutually exclusive and may overlap chronologically and/or functionally. Furthermore, the overall recovery strategy that encompasses the different phases is meant to be a dynamic process and the associated recovery actions are expected to evolve over time in response to adaptive management. As such, this Amendment prescribes changes to specific actions defined in the 2007 Draft Recovery Plan based on implementation of adaptive management measures to respond to the available new information.

At the time of our emergency listing action in 2001, the Columbia Basin pygmy rabbit was imminently threatened by its small population size, loss of genetic diversity, and inbreeding depression, coupled with a lack of suitable, protected habitats in the wild (USFWS 2001). Since emergency listing, the captive breeding program, genetics management efforts, habitat acquisition and enhancement, stakeholder involvement, and identification of appropriate recovery emphasis areas have reduced the immediacy of these threats. Accordingly, many of the aims of the first phase of recovery have largely been met (USFWS 2007), and most of the measures prescribed in the 2007 Draft Recovery Plan and this Amendment emphasize actions considered necessary to accomplish phase 2 of recovery.

Originally, plans to reestablish free-ranging subpopulations of pygmy rabbits within the Columbia Basin depended entirely on using captive-bred animals. However, the existing captive breeding program cannot support anticipated reintroduction needs. Furthermore, all currently available options for attempting to reestablish a viable population of pygmy rabbits within the Columbia Basin, including expansion of the captive breeding program, would require the input of additional wild animals captured from outside of the ecosystem (USFWS 2010a). Trying to address this management need by expanding the captive breeding program would require a significant commitment of additional resources, yet such action would be unlikely to ultimately improve the success of reintroduction efforts (USFWS 2010a). To address this conservation challenge, actions prescribed in this Amendment include additional releases of the captive-bred, intercrossed pygmy rabbits, de-emphasis of captive breeding efforts beyond 2011, and direct translocations of wild pygmy rabbits from other populations. We believe that this new approach to recovery will maximize the likelihood of reestablishing a viable population of pygmy rabbits within the Columbia Basin by minimizing the potential for disease, habituation, and genetic drift to further affect the remaining captive animals, while minimizing the potential for outbreeding depression and helping to address demographic limitations in the wild.

Several factors may influence future management decisions regarding the number of pygmy

rabbits to translocate from other populations outside the Columbia Basin. These factors include, but are not limited to: 1) the potential that surveys may locate additional wild populations of Columbia Basin pygmy rabbits, which could be managed in-place and/or translocated to support reintroduction efforts at recovery emphasis areas; 2) possible differences in population fitness parameters (e.g., survival, reproductive success, habitat use) between the captive-bred and translocated wild pygmy rabbits or their progeny, which may become apparent once they are released; and 3) future decisions regarding the level of introgression considered appropriate. The extent to which the more comprehensive objectives of demographic and molecular (genetic and/or epigenetic) restoration of the Columbia Basin pygmy rabbit may be achieved will depend upon the results of the 2011 captive-breeding season and the performance of captive-bred and translocated wild pygmy rabbits following their release. Measures to monitor and manage demographic and molecular parameters in wild pygmy rabbits within the Columbia Basin, as feasible, were important considerations during development of the recovery actions prescribed in this Amendment, and will be crucial to advancing future recovery of the Columbia Basin pygmy rabbit.

As the near-term (i.e., 2011 to 2020) objectives currently identified for recovery are accomplished, revised implementation schedules will be developed to identify updated recovery objectives, criteria, and actions considered necessary to advance to the final phase of the overall recovery strategy.

### **III. RECOVERY GOAL, OBJECTIVES, AND CRITERIA**

The period encompassing the near-term recovery objectives identified in the 2007 Draft Recovery Plan (i.e., 2007 to 2016) has been adjusted in this Amendment to span from 2011 to 2020. In addition, near-term recovery objective 1.b. from the original draft requires updating due to the new information which has become available and changes to the overall recovery strategy to be implemented. All other recovery goals, objectives, and criteria from the original draft remain unchanged. Near-term recovery objective 1.b. addresses the anticipated ancestry of captive-bred pygmy rabbits to be used for reintroduction, and is updated as follows:

- 1.b. – Captive-bred pygmy rabbits to be released at recovery emphasis areas retain Columbia Basin genetic ancestry (see Recovery Action 3.3 below), and all captive-bred and translocated wild pygmy rabbits to be used for reintroduction are considered fit by veterinary staff and otherwise satisfy the requirements of the most current Reintroduction and Genetics Management Plan (WDFW 2011).

### **IV. RECOVERY PROGRAM**

Based on the available new information and changes to the overall recovery strategy to be implemented, Recovery Actions 1 through 4 from the 2007 Draft Recovery Plan, along with their associated sub-actions, require updating. The original Recovery Action 2 and its associated sub-actions, which addressed management of the Columbia Basin pygmy rabbit's genetic characteristics, are now incorporated within Recovery Actions 1, 3, and 4. Other than updated costs and duration estimates (see revised Implementation Schedule, below), none of the remaining recovery actions from the original draft (i.e., Recovery Actions 5 through 10) or their associated sub-actions require updating. Recovery Actions 1, 3, and 4 address management of

the captive breeding program, surveying for and monitoring free-ranging pygmy rabbits, and reestablishment of free-ranging subpopulations, respectively, and are updated as follows:

**Action 1: Manage the captive breeding program for the Columbia Basin pygmy rabbit.**

- 1.1 – Identify and produce an appropriate number and type of pygmy rabbits needed to maintain a viable captive population and to support reintroduction efforts through fall 2011 (also see action 1.4).

The captive breeding facilities currently contributing to recovery efforts include the Oregon Zoo, Washington State University, and Northwest Trek Wildlife Park. Coordination among the facilities is provided by WDFW and the Service. The most recent Reintroduction and Genetics Management Plan will guide 2011 breeding efforts (WDFW 2011). Estimates indicate that the current captive population of 92 animals will be able to maintain the population's genetic diversity and accommodate anticipated reintroduction efforts in 2011. Further assessment of the status of the captive population will be ongoing and target numbers and types (e.g., age, sex, genetic profile) of animals to be used for 2011 releases will be refined, as necessary.

- 1.2 – Optimize genetic diversity of the captive population.

The genetic characteristics of all captive pygmy rabbits are assessed by WDFW following each breeding season (WDFW 2011). Strategies to optimize the genetic diversity of the captive population include selecting individuals with the desired genetic makeup to breed with one another. When pairing animals for mating, considerations include the combined objectives of conserving the remaining unique genetic characteristics of the historical Columbia Basin pygmy rabbit population, maximizing the genetic diversity of the captive population, and avoiding breeding pairs that are closely related. Achieving these objectives will help minimize the potential for inbreeding, genetic drift, and outbreeding depression to negatively affect reintroduction efforts. Computer software (e.g., Population Management 2000), developed by conservation geneticists and population biologists in conjunction with the American Zoological and Aquarium Association, is used to guide these breeding management objectives.

- 1.3 – Identify and maintain an appropriate configuration of captive breeding facilities to support actions 1.1 and 1.2 (also see action 1.4).

Captive breeding efforts are currently distributed between three facilities to provide sufficient space and the necessary expertise to support an appropriate captive population, and to reduce the risk of disease transmission or other potential threats at a single facility. As reintroduction and augmentation efforts progress, activities at these facilities will be reduced and, as appropriate, eventually discontinued.

- 1.4 – Prior to each release, determine the feasibility and need to maintain a small captive population to support future reintroduction efforts or other recovery program needs.

Limited captive breeding and husbandry efforts may continue at one or more facilities beyond 2011 to accommodate future needs of the recovery program and/or to help fulfill other education or research objectives that could contribute to a better understanding of this species and its management needs.

**Action 2:** Now incorporated within actions 1, 3, and 4.

**Action 3: Survey for and monitor free-ranging Columbia Basin pygmy rabbits.**

3.1 – Search for any remaining wild subpopulations.

If any additional free-ranging, purebred Columbia Basin pygmy rabbits persist, they could provide a significant benefit to conservation of this population. Surveys of shrub steppe habitat within the population's historical distribution have not located any additional wild pygmy rabbits since 2004. However, the possibility still exists that free-ranging subpopulations may remain in areas that have not yet been surveyed.

3.1.1 – Prioritize and document potential search areas based on likelihood of identifying previously unknown occurrences.

Mapping exercises have been undertaken, using existing databases, to identify areas with appropriate soils and habitat conditions to prioritize areas of public and private lands for ongoing search efforts for the Columbia Basin pygmy rabbit. Private lands are only surveyed with the consent of individual landowners and/or appropriately designated managers (see Stakeholder Involvement and Action 7).

3.1.2 – Continue to survey public properties within the highest priority area(s).

3.1.3 – Continue to contact land owners and managers within the highest priority area(s) and pursue conservation agreements to undertake surveys and, as appropriate, implement monitoring and management measures for the Columbia Basin pygmy rabbit.

3.1.4 – Consolidate and document updated survey results and conservation agreement measures annually.

3.2 – Monitor free-ranging subpopulations and document their status.

Free-ranging pygmy rabbits will be monitored using the Skalski monitoring method, or similar method(s) (see Survey and Capture). Initially, free-ranging subpopulations will be monitored annually. The monitoring method used and frequency of monitoring will be continually assessed and, as necessary, updated and included within a revised Reintroduction and Genetics Management Plan (see action 4.7).

3.2.1 – Coordinate survey data collection, maintenance, and reporting among affected parties (also see action 7).

3.2.2 – Continue to develop and improve abundance indices of overall and effective population sizes based on counts of active burrows, and to refine appropriate survey and monitoring techniques for free-ranging subpopulations.

Appropriate indices based upon counts of active burrows will be needed to evaluate the annual status and trends of free-ranging subpopulations, and/or to infer changes in life history parameters attributed to various experimental treatments or adaptive management measures. Updated survey and monitoring techniques are being investigated for pygmy rabbits throughout the species' range. This work, along with ongoing investigations of newly released pygmy rabbits within the Columbia Basin, will facilitate continued improvement of these techniques.

3.2.3 – Develop and continue to refine criteria for evaluating and establishing appropriate management and habitat conditions for pygmy rabbit dispersal corridors (also see action 4.5).

Criteria based upon appropriate management and habitat conditions will be needed to evaluate the potential contributions of intervening properties to facilitate dispersal and/or expansion of free-ranging subpopulations beyond recovery emphasis areas.

3.3 – Monitor and manage the molecular diversity of free-ranging subpopulations.

3.3.1 – Obtain tissue and/or non-invasive (e.g., fecal pellet) samples of released and free-ranging pygmy rabbits, as necessary, to assess and monitor the genetic and, as feasible, epigenetic characteristics of all known free-ranging subpopulations.

Any remaining and/or reestablished free-ranging subpopulations will be sampled for genetic and, as feasible, epigenetic monitoring purposes. Initially, efforts will be made to sample all released and any recaptured animals over the first three years (i.e., 2011 – 2013). Based on initial results, an appropriate subset of animals will be identified and reevaluated for future efforts. The molecular diversity of free-ranging subpopulations will be evaluated for changes over time to determine if, and to what extent, they may become differentiated from the historical, founding captive, and/or founding wild populations, or if any subpopulations may become differentiated from one another.

3.3.2 – Identify the range(s) of desired molecular characteristics for free-ranging pygmy rabbit subpopulations and implement management measures to adjust molecular profiles, as appropriate.

**Action 4: Reestablish free-ranging Columbia Basin pygmy rabbit subpopulations within**

**their historical distribution.**

4.1 – Continue to manage established recovery emphasis areas.

Two high priority recovery emphasis areas have been established and are currently being managed to accommodate initial reintroduction efforts for the Columbia Basin pygmy rabbit (see Reintroduction). These areas are comprised of lands under WDFW, non-governmental organization, and private ownership or management authority. Other areas, as feasible and considered necessary, will be added (also see action 6.5).

4.1.1 – Continue to pursue conservation agreements with parties interested in implementing management measures for pygmy rabbits on their properties and/or including their properties within one or more established recovery emphasis area(s).

4.1.2 – Through annual review and, as appropriate, revision, ensure that all management measures prescribed by existing conservation agreements are active and adequate to accommodate Federal recovery efforts for the Columbia Basin pygmy rabbit.

Of several potential sites evaluated (see Reintroduction), the two currently identified recovery emphasis areas have the highest quality habitat, supported pygmy rabbits in the recent past, and have various other management advantages that would facilitate pygmy rabbit conservation (e.g., controlled recreation, reduced disturbance, exclusion fencing, predator and fire abatement measures, existing road management).

4.2 – Prepare release sites at recovery emphasis areas for reintroduction and/or augmentation of captive-bred and translocated wild pygmy rabbits.

4.2.1 – Monitor predators at release sites and, as feasible (e.g., contingent on conservation agreement conditions), implement interim predator control measures to minimize loss of naïve animals (also see actions 5.1 and 6.3).

Monitoring and, as feasible, implementing appropriate measures to control predators will be one of the biggest challenges of initial release efforts. Principal predators of concern include coyotes (*Canis latrans*), weasels (*Mustela* spp.), badgers (*Taxidea taxus*), ravens (*Corvus* spp.), and various raptor species. It may be feasible and effective to control only one or two key predators, or to simply monitor their abundance, during initial release efforts. Various measures have previously been implemented at the established recovery emphasis areas to help address predators (see Predator Control). Weasels have been observed in and around pygmy rabbit burrows in the past, and have successfully preyed upon newly released pygmy rabbits in Idaho. Coyotes were observed bedding directly adjacent to active Columbia Basin pygmy rabbit burrows at the last known occupied site in southern Douglas County. As feasible, preventive control will be

conducted prior to and through the first breeding season. Further evaluation of predation effects by predator species and survival / habitat relationships (e.g., key contributing habitat features) of newly released pygmy rabbits within the Columbia Basin will be conducted to determine the efficacy of any initial, and possible need for continuing, predator control measures at recovery emphasis areas.

4.2.2 – Monitor for disease vectors at release sites and, as feasible, implement measures to reduce the risk of infection and transmission in free-ranging Columbia Basin pygmy rabbits.

Monitoring for diseases at reintroduction sites will be undertaken prior to release efforts, as feasible. The presence of significant disease vectors at a release site may preclude immediate release of captive-bred or translocated wild pygmy rabbits to the area. As available, preventive measures (e.g., flea treatments) would be taken if indicated by monitoring results.

4.2.3 – Provide supplemental features at release sites (e.g., pre-release pens, artificial burrows) to improve the survival of naïve animals, as necessary.

Pre-release pens and supplemental feeding were used in experimental releases of Idaho pygmy rabbits, and may be used to acclimate pygmy rabbit release groups at Columbia Basin release sites. Artificial burrows have been used successfully in the conservation of a number of fossorial species, including black-footed ferrets (*Mustela nigripes*), giant kangaroo rats (*Dipodomys ingens*), prairie dogs (*Cynomys* spp.), and burrowing owls (*Athene cunicularia*). Provision of artificial burrows also appeared to increase survival of pygmy rabbits during experimental releases in Idaho, and they will be provided at recovery emphasis areas for releases of pygmy rabbits within the Columbia Basin.

4.3 – Conduct reintroduction and augmentation efforts at the highest priority recovery emphasis area(s) (also see action 3.3).

4.3.1 – Identify, secure, and release an appropriate number and type of pygmy rabbits needed to support reintroduction and augmentation objectives.

The appropriate number and type of captive-bred and translocated wild pygmy rabbits needed for reintroduction and augmentation efforts will be estimated from ongoing population viability analyses, past studies of captive-bred pygmy rabbits released under experimental conditions, availability of animals based on capture and translocation logistics, and, ultimately, from post-release monitoring efforts in the Columbia Basin. A Reintroduction and Genetics Management Plan (WDFW 2011) has been developed and will guide release efforts. This plan will help define the appropriate makeup for release groups, seasonal timing for releases, and post-release monitoring actions, as well as other general release procedures (e.g., provision and configurations of temporary holding and/or breeding pens,

artificial burrows, supplemental feeding, predator control).

4.3.2 – Augment free-ranging subpopulations with translocated wild Columbia Basin pygmy rabbits from other occupied sites, as appropriate (see Survey and Capture), to help maintain appropriate molecular and/or demographic characteristics in the wild.

In the event that one or more large, free-ranging subpopulations are located during future surveys, the molecular make-up of the subpopulation will be evaluated and appropriate management measures undertaken (e.g., translocation, protection) to maximize the overall molecular diversity of the Columbia Basin pygmy rabbit and to otherwise accomplish the near-term recovery objectives that have been identified.

4.4 – Monitor the survival and movements of all captive-bred and translocated wild pygmy rabbits released within the Columbia Basin.

4.4.1 – As feasible considering equipment and workforce availability, all or an appropriate proportion of adult pygmy rabbits released within the Columbia Basin will be fitted with radio transmitters to monitor their movements, habitat use patterns (see action 6.1.1), and causes of mortality.

Radio-transmitters have been used successfully for pygmy rabbit research over a number of years and throughout the range of the species, including the experimental releases in Idaho. Risk of mortality or injury due to the use of transmitters is low. Radio-telemetry monitoring is the primary means by which movements, habitat use patterns, and mortality factors of pygmy rabbits within the Columbia Basin can be assessed.

4.4.2 – Track and manage Columbia Basin pygmy rabbits that may disperse beyond recovery emphasis areas (also see action 7).

Newly released Columbia Basin pygmy rabbits will likely continue to disperse beyond recovery emphasis areas. Appropriate measures will be implemented to contact and pursue conservation agreements with land owners and managers of intervening properties. Initially, workloads will be prioritized to address intervening properties within 8 kilometers (5 miles) of the recovery emphasis area(s) used for initial reintroductions, other as-yet unsurveyed properties that contain “survey habitat” (see Glossary) and that have the greatest potential to still harbor free-ranging Columbia Basin pygmy rabbits, and areas that may act as dispersal corridors between occupied sites. As resources and workloads allow, pursuing conservation agreements for other intervening properties within the historical distribution of the Columbia Basin pygmy rabbit will be addressed.

4.5 – Continue to investigate, identify, and address existing constraints or management needs of recovery emphasis areas and, as feasible (i.e., contingent on conservation

agreement conditions), intervening properties that support additional occupied habitats or identified dispersal corridors of pygmy rabbits released within the Columbia Basin (also see actions 5, 6, and 7).

- 4.6 – Continue to assess and identify the appropriate sizes, number, distribution, and configuration of free-ranging subpopulations necessary to delist the Columbia Basin pygmy rabbit pursuant to the Act, and define criteria that would demonstrate that threats to the population are sufficiently ameliorated (also see actions 5, 6, and 7).

Areas that are of sufficient size and that contain appropriate shrub steppe habitat and soil conditions that would be considered capable of supporting a viable subpopulation of Columbia Basin pygmy rabbits are relatively rare. To be consistent with the identified recovery strategy, potential sites would also need to represent willing public or private conservation management authority and flexibility to support long-term conservation efforts for the Columbia Basin pygmy rabbit. Other considerations include current information gaps, such as appropriate density estimates and other population modeling parameters, future effects of diseases and predation, and the habitat use, seasonal movement, and dispersal behaviors of newly released pygmy rabbits. Current management direction emphasizes protection and enhancement of habitats at established recovery emphasis areas and, as feasible, maintaining habitat conditions and implementing appropriate protection measures on intervening properties. Additional recovery emphasis areas will be identified, prioritized, and formally established, and/or appropriate intervening properties will be protected as the information base concerning the Columbia Basin pygmy rabbit improves, and as feasible through appropriate conservation agreements, in order to meet the identified near-term recovery objectives and reclassification criteria.

- 4.7 – Update the Reintroduction and Genetics Management Plan, as necessary, to account for survey and monitoring results and development of adaptive management measures.

There will be a semi-annual iterative planning process of refining the numbers and types of animals to be released each year, as well as release techniques and post-release monitoring strategies. Other information needs include evaluating potential effects of pre-release pens, supplemental feeding, seasonality and timing of releases, predator control, and differing make-up of release groups. Ongoing investigations will lead to an increasingly consistent, effective approach to reestablish subpopulations of pygmy rabbits within the Columbia Basin.

To the extent appropriate (see Recovery Implementation), all recovery actions and sub-actions that we currently consider necessary to advance Federal recovery of the Columbia Basin pygmy rabbit, in addition to the above updated actions, are included in a revised Implementation Schedule, below.

## V. RECOVERY IMPLEMENTATION

The Implementation Schedule that follows lists the actions and estimated annual costs associated with the current recovery program for the Columbia Basin pygmy rabbit, and will be a guide for meeting the recovery goals, objectives, and criteria outlined in the 2007 Draft Recovery Plan and this Amendment. Parties with authority, responsibility, or expressed interest to implement a specific recovery action are identified in the Implementation Schedule. The listing of a party in the Implementation Schedule does not require, nor imply a requirement, that the identified party has agreed to implement the action(s) or to secure funding for implementing the action(s). However, parties that are willing to participate may benefit by being able to demonstrate that their management planning efforts and funding requests will contribute to a recovery action identified in a Federal recovery plan, and are therefore considered necessary for the overall coordinated effort to recover the Columbia Basin pygmy rabbit. Also, section 7(a)(1) of the Act directs all Federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species.

The following Implementation Schedule lists only those actions from the current recovery program that require funding. Various action statements identified in the 2007 Draft Recovery Plan and this Amendment represent general recovery activities that do not lend themselves to specific funding estimates, rely on future adaptive management measures to refine them, and/or their costs and associated workloads are incorporated into a higher-order action of the same priority. As such, these actions are not repeated in the Implementation Schedule, but are described in the Recovery Program sections of the 2007 Draft Recovery Plan and this Amendment. In addition to the cost estimates provided, the Implementation Schedule assigns priorities to the identified actions, lists which of the five listing factors will be addressed by the proposed actions, estimates the duration of the actions, and identifies likely responsible parties for implementing the actions.

Except for the discussion addressing Estimated Costs of Recovery Actions (see following), all other Recovery Implementation discussions from the 2007 Draft Recovery Plan, including Definitions of Action Priorities; Listing, Reclassification, and Delisting Factors; and Action Duration and Responsible Parties, remain unchanged.

### **Estimated Costs of Recovery Actions**

The following Implementation Schedule provides the estimated annual costs of implementing the near-term recovery actions from 2011 to 2015 and, as feasible, an estimated cost for the time period from 2016 to 2020. Estimates for recovery actions are based on average costs of similar actions implemented to date for a variety of recovery activities (e.g., captive breeding, genetics management, reintroduction, monitoring, habitat management, stakeholder involvement).

Estimated overall cost by year:

2011: \$392,000

2012: \$240,000

2013: \$244,000  
2014: \$129,000  
2015: \$174,000  
2016–2020: \$335,000

Total estimated cost to implement near-term recovery actions: \$1,514,000.

### Amended Implementation Schedule for Columbia Basin Pygmy Rabbit Draft Recovery Plan

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments	
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020		
1	1	C, E	Manage the captive breeding program for the Columbia Basin pygmy rabbit.	1 year	WDFW, USFWS, WSU, OZ, NWT	150	150							Feasibility and need for continuing captive breeding and husbandry efforts will be re-evaluated fall 2011.
3	1	C, E	Survey for and monitor free-ranging Columbia Basin pygmy rabbits.	10 years	WDFW, USFWS	*	*	*	*	*	*	*	*	*Cost estimates incorporated by sub-actions. Long-term survey and monitoring needs will be re-evaluated in 2015.
3.1	1	C, E	Search for any remaining wild subpopulations.	5 years	WDFW	25	5	5	5	5	5			
3.3	1	C, E	Monitor and manage the molecular diversity of free-ranging subpopulations.	10 years	WDFW, USFWS	95	20	15	15	10	10	25		

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
4	1	A, E	Reestablish free-ranging Columbia Basin pygmy rabbit subpopulations within their historical distribution.	10 years	WDFW, USFWS, WSU, OZ, NWT, Land Owners and Managers of Recovery Emphasis Areas	*	*	*	*	*	*	*	*Cost estimates incorporated by sub-actions. Funding needs for reintroduction, augmentation, and post-release monitoring efforts will be reevaluated in 2013.
4.1	1	A, E	Continue to manage established recovery emphasis areas.	10 years	WDFW, USFWS, WSU, OZ, NWT, Land Owners and Managers of Recovery Emphasis Areas	65	5	10	15	5	5	25	
4.2	1	A, E	Prepare release sites at recovery emphasis areas for reintroduction and/or augmentation of captive-bred and translocated wild pygmy rabbits.	3 years	WDFW, USFWS, WSU, OZ, NWT, Land Owners and Managers of Recovery Emphasis Areas	110	50	30	30				

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
4.3	1	A, E	Conduct reintroduction and augmentation efforts at the highest priority recovery emphasis area(s).	3 years	WDFW, USFWS, WSU, OZ, NWT, Land Owners and Managers of Recovery Emphasis Areas	110	50	30	30				
4.4	1	A, E	Monitor the survival and movements of all captive-bred and translocated wild pygmy rabbits released within the Columbia Basin.	5 years	WDFW, USFWS, WSU, OZ, NWT, Land Owners and Managers of Recovery Emphasis Areas	150	30	30	30	30	30		
5	1	A, B, C	Protect free-ranging Columbia Basin pygmy rabbits.	10 years	USFWS, WDFW, other Federal Agencies, Conservation Agreement Participants	*	*	*	*	*	*	*	*Cost estimates incorporated by sub-actions. Needs for continuing active protection measures will be reevaluated following initial releases.
5.1	1	A, B, C	Evaluate and address, as feasible, the potential effects of predators on free-ranging Columbia Basin pygmy rabbits.	3 years	USFWS, WDFW, other Federal Agencies, Conservation Agreement Participants	21	7	7	7				

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
6.2	1	A, E	Protect habitats at recovery emphasis areas and, as feasible, intervening properties.	10 years	WDFW, USFWS, Land Owners and Managers of Recovery Emphasis Areas	100	10	10	10	10	10	50	
7	1	A, D, E	Pursue conservation agreements for the Columbia Basin pygmy rabbit with land owners and managers of intervening properties within the population's historical distribution.	10 years	USFWS, WDFW, other Federal Agencies, Prospective Conservation Agreement Participants	*	*	*	*	*	*	*	*Cost estimates incorporated by sub-actions. The need to develop and implement new conservation agreements will increase through the first few years following initial releases, then decline as intervening properties are addressed. Long-term needs will be reevaluated in 2015.

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
7.1	1	A, D, E	Develop Site Plans under the existing SHA and issue associated Permits to non-Federal and non-WDFW land owners and managers of eligible properties whose ongoing management may provide a conservation benefit for recovery efforts, yet whose land use practices may also result in incidental take of free-ranging Columbia Basin pygmy rabbits.	10 years	USFWS, WDFW, other Federal Agencies, Prospective Conservation Agreement Participants	225	25	50	50	25	25	50	
7.4	1	A, D, E	Continue to coordinate recovery efforts with various Federal agencies pursuant to the requirements of section 7 of the Act and, as opportunities arise, develop and implement conservation agreements to address Federal conservation initiatives for the Columbia Basin pygmy rabbit.	10 years	USFWS, other Federal Agencies	35	5	5	5	5	5	10	
9	1	A, C, E	Secure funding for Columbia Basin pygmy rabbit recovery efforts.	10 years	USFWS, WDFW, other Federal Agencies, Stakeholders	50	5	5	5	5	5	25	Continuing efforts to secure long-term funding will be re-evaluated in 2015.

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
10	1	A, B, C, D, E	Revise the Federal Recovery Plan to facilitate implementation of adaptive management measures considered necessary to achieve the phased recovery strategy.	10 years	USFWS, WDFW, other Recovery Team Members and Stakeholders	8		2	2	2	2		Continuing needs to revise Recovery Plan will be evaluated in 2015.
3.2	2	C, E	Monitor free-ranging subpopulations and document their status.	7 years	WDFW, USFWS	35				5	5	25	
4.5	2	A, E	Continue to investigate, identify, and address existing constraints or management needs of recovery emphasis areas and, as feasible, intervening properties that support additional occupied habitats or identified dispersal corridors of pygmy rabbits released within the Columbia Basin.	10 years	" "	65	10	10	10	5	5	25	

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments	
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020		
4.6	2	A, E	Continue to assess and identify appropriate sizes, number, distribution, and configuration of free-ranging subpopulations necessary to delist the Columbia Basin pygmy rabbit pursuant to the Act, and define criteria that would demonstrate that threats to the population are sufficiently ameliorated.	2 years	USFWS	20						10	10	Costs incurred 1 year in 5.
4.7	2	A, E	As necessary to account for survey and monitoring results and development of adaptive management measures, update the Reintroduction and Genetics Management Plan.	3 years	WDFW, USFWS	6	2	2	2					
5.2	2	A, B, C	Identify and minimize effects of human activities on Columbia Basin pygmy rabbits at recovery emphasis areas and, as feasible, intervening properties.	3 years	USFWS, WDFW, other Federal Agencies, Conservation Agreement Participants	9	3	3	3					

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
6	2	A, E	Manage habitats at recovery emphasis areas to support stable, self-sustaining subpopulations of free-ranging Columbia Basin pygmy rabbits.	10 years	WDFW, USFWS, Land Owners and Managers of Recovery Emphasis Areas	*	*	*	*	*	*	*	*Cost estimates incorporated by sub-actions.
6.1	2	A, E	Continue to investigate and refine estimates of the quantity and quality of habitats needed to support a viable subpopulation of free-ranging Columbia Basin pygmy rabbits.	5 years	WDFW, USFWS, Land Owners and Managers of Recovery Emphasis Areas	19	5	5	5	2	2		The need to continue investigating and refining habitat estimates will be reduced as subpopulations become reestablished. Long-term needs will be re-evaluated in 2015.
6.2.1	2	A, E	Monitor changes in habitats through remote sensing, ground surveys, and mapping.	2 years	WDFW, USFWS	30					15	15	Costs incurred 1 year in 5.
6.3	2	A, E	Continue to investigate and, as available, implement enhancement and restoration measures to improve habitat quantity and quality for Columbia Basin pygmy rabbit subpopulations at recovery emphasis areas.	4 years	WDFW, USFWS, Land Owners and Managers of Recovery Emphasis Areas	40		10	10	10	10		The need to continue investigating and implementing habitat enhancement and restoration measures will be evaluated in 2015.

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
6.4	2	A, E	Document methods, treatments, timing, and results of all habitat enhancement, restoration, and protection projects undertaken for free-ranging Columbia Basin pygmy rabbits and maintain those records to facilitate long-term habitat monitoring.	9 years	WDFW, USFWS, Land Owners and Managers of Recovery Emphasis Areas	9		1	1	1	1	5	
6.5	2	A, E	As necessary to achieve near-term recovery objectives, continue to identify, assess, and prioritize potential recovery emphasis areas and, as appropriate, formally establish and provide recommendations to address habitat management needs at these sites.	2 years	USFWS, WDFW, other Federal Agencies, Prospective Conservation Agreement Participants	50					25	25	Costs incurred 1 year in 5. The need for identifying and formally establishing potential future recovery emphasis area(s) will be reevaluated in 2015.
7.2	2	A, D, E	Develop and provide guidelines and technical assistance to interested land owners and managers to address management practices that could potentially affect free-ranging Columbia Basin pygmy rabbits.	10 years	USFWS, WDFW, other Federal Agencies, Prospective Conservation Agreement Participants	26	5	5	2	2	2	10	

Action Number	Priority Number	Listing Factor(s)	Action Description	Action Duration	Responsible Parties	Cost Estimates (\$1,000 units)							Comments
						Total	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016-2020	
7.3	2	A, D, E	Assist interested non-Federal and non-WDFW land owners and managers with developing new HCPs, or otherwise assist with participation in existing HCPs, with regard to management practices that may result in incidental take of free-ranging Columbia Basin pygmy rabbits.	10 years	USFWS, WDFW, FCCD, Prospective Participants to HCPs	16			2	2	2	10	
8	2	A, D, E	Exchange information with stakeholders and the general public to address concerns and increase support for Columbia Basin pygmy rabbit recovery efforts.	10 years	USFWS, WDFW, other Federal Agencies, Stakeholders	50	5	5	5	5	5	25	Long-term information exchange and outreach needs will be re-evaluated in 2015.
2	*	*	*	*	*	*	*	*	*	*	*	*	Now incorporated into actions 1, 3, and 4.
<b>Total Costs</b>						1,514	392	240	244	129	174	*335	*Cost estimates for final 5-years of near-term actions will be re-evaluated in 2015.

## **VI. GLOSSARY**

One glossary term from the 2007 Draft Recovery Plan requires updating and one new term is added due to the available new information and changes to the overall recovery strategy to be implemented. The term that requires updating addresses what the definition of a Columbia Basin pygmy rabbit encompasses with respect to the Recovery Program embodied by the 2007 Draft Recovery Plan and this Amendment. The new term addresses the definition of epigenetics as used in this Amendment. The updated and new terms are as follows:

**Columbia Basin Pygmy Rabbit** – Includes any intercross or translocated wild pygmy rabbits, as well as their naturally reproduced progeny, that are considered essential due to demographic and molecular management considerations for recovery planning.

**Epigenetics** – The expression of heritable and non-heritable individual characteristics due to influences of the environment that are not differentially encoded within the genomes of closely related organisms.

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