STATE OF WASHINGTON November 2013

Implementation Plan for Reintroducing Fishers to the Cascade Mountain Range in Washington

by Jeffrey C. Lewis

This report should be cited as:

Lewis, J. C. 2013. Implementation plan for reintroducing fishers to the Cascade Mountain Range in Washington. Washington Department of Fish and Wildlife, Olympia. 29 pp.

Cover photos and illustration: fisher photo was provided by Jessica Hoffman and photo of Mt. Rainier was provided by Tammy Schmidt. Black and white illustration on title page provided by Derek Stinson.

IMPLEMENTATION PLAN FOR REINTRODUCING FISHERS TO THE CASCADE MOUNTAIN RANGE IN WASHINGTON

Jeffrey C. Lewis

Washington Department of Fish and Wildlife
Wildlife Program
600 Capitol Way North
Olympia, WA 98501-1091

4 November 2013

Table of Contents

LIST OF FIGURES

ACKNOWLEDGEMENTS
Financial support for the development of this report was provided by the US Fish and Wildlife Service and Washington Department of Fish and Wildlife. The plan has benefited greatly from discussions with and input from Harriet Allen, Keith Aubry, Marg Evans, Patti Happe, Gretchen Gerber, Kurt Jenkins, Kristin Mansfield, Malcom McAdie, Helen Schwantje, Irene Teske, Ken Warheit and Randy Wright. A number of individuals reviewed a draft version of the plan and provided thoughtful and constructive comments; they include Roger Andracik, Keith Aubry, Penny Becker, Elly Boerke, Roger Christophersen, Dave Graber, Patti Happe, Brian Kertson, Kurt Jenkins, Roger Powell, Zach Radmer, Mason Reid, Karen Thompson, Rich Weir, and Gary Wiles. Marg Evans provided cost estimates for obtaining, housing, husbandry and transport of fishers.

EXECUTIVE SUMMARY

The goal of this implementation plan is to outline a successful approach for reestablishing fisher populations in the Cascades Recovery Area, as outlined in the Fisher Recovery Plan for Washington. With successful reintroductions and population growth, fishers released in the southwestern and northwestern Cascades will become connected, self-sustaining meta-populations. This outcome would allow for a down-listing of fishers from endangered to sensitive status in the state and it would represent a significant improvement in fisher conservation status for Washington and for the fisher's west coast population.

The fisher (*Pekania pennanti*) is a mid-sized carnivore in the weasel family (Mustelide) that occurs only in the temperate and boreal forests of North America. Because of their valuable pelt, fishers were trapped intensively throughout much of their range. Over-exploitation of fisher populations in the late 1800s and early 1900s caused a widespread contraction of the fisher range in North America and the loss of fishers from most of the U.S. and much of southern Canada. Population declines prompted the closure of fisher trapping seasons in many states in the early 1900s, however these season closures came too late to protect many fisher populations. Beginning in the 1940s, wildlife managers and resource managers began reintroducing fisher populations to restore a valuable furbearer, a valuable predator of porcupines, and a missing member of the carnivore community. The fisher is among the most successfully translocated carnivore species, owing to the fact that most fisher populations were extirpated as a result of over-exploitation rather than loss of habitat.

Fishers historically occurred throughout the forested areas of Washington State including most of western Washington, the Selkirk Mountains of northeastern Washington, and the Blue Mountains of southeastern Washington. A decline in fisher harvests in the early 1900s prompted the newly established Washington Department of Game to close the fisher trapping season in 1934 to protect fishers and promote recovery. Despite this closure, fishers did not recover within the state. Carnivore surveys conducted throughout the state in the 1990s detected the presence of many carnivore species, however no fishers were detected within their historical range in the state.

A fisher status review completed in 1998 indicated that a reintroduction was the only way to recover fishers in the state. Following the status assessment the Washington Fish and Wildlife Commission included the fisher on the list of state endangered species in 1998. A feasibility assessment by Washington Department of Fish and Wildlife (WDFW) in 2004 concluded that fishers could be successfully reintroduced on the Olympic Peninsula, the southwestern Cascades, and the northwestern Cascades. The assessment indicated that the factors that contributed to fisher extirpation no longer exist (fisher trapping, incidental capture, predator and pest control campaigns) or are greatly diminished (habitat loss and fragmentation). In 2006, WDFW developed a recovery plan for the fisher. The recovery plan identified three recovery areas (Olympic, Cascade and Selkirk), and outlined recovery tasks that included the reintroduction of fishers in the Olympic and Cascades Recovery Areas. Reestablishment of fishers in these two recovery areas would be required to down-list the fisher from state endangered to state sensitive status.

The translocation of 90 British Columbia fishers to the Olympic Peninsula from 2008 to 2010 was the first step toward fisher recovery. To take the next step toward recovery, WDFW, the National Park Service and other partners are proposing to reintroduce approximately 160 fishers

from British Columbia to the Cascades Recovery Area in two stages. The first stage of the project will be the reintroduction of ≥80 fishers to a reintroduction area located in the southwestern portion of the Cascades Recovery Area over a 2-3 year period, beginning in the fall 2014. Each fisher will be equipped with a radio-transmitter and we would monitor released fishers over a 3-4 year period beginning in the fall of 2014. The second stage of the project will be the reintroduction of ≥80 fishers to a reintroduction area located in the northwestern portion of the Cascades Recovery Area over a 2-3 year period, which could begin the year after fisher releases were completed in the southwestern Cascades. Monitoring efforts in the second stage would follow the approaches outlined for the first stage.

The monitoring program is designed to allow biologists to adaptively manage the reintroduction to increase the likelihood of success, and to determine if the reintroduction has succeeded at reestablishing a self-sustaining population. Movements, survival, and home range establishment of fishers will be monitored immediately upon release. Confirming reproduction will become a focus of the monitoring program during the denning season (March to June). The reintroduction will be considered initially successful if there is evidence that a reproductive population has become established within the first 3-4 years of a reintroduction. The long-term success of the reintroduction will be indicated by the persistence of a self-sustaining population as determined by monitoring efforts conducted between years 5 and 10 after the initial releases.

This plan outlines the process and considerations for 1) coordinating efforts with the Province of British Columbia for obtaining fishers, 2) capturing, transporting, housing and husbandry of fishers, 3) veterinary care and the preparation of fishers for reintroduction, 4) the process for crossing the US-Canada border with fishers, and 5) releasing and monitoring fishers. The plan provides a brief outline of how monitoring efforts could be expanded into formal research of the biology and ecological relationships of fishers in the Washington Cascades ecosystem. It also outlines a strategy for public outreach about fisher reintroductions in the Cascades Recovery Area and presents a timeline for project activities.

Cost of a reintroduction in each area is estimated at $550,000 if completed in 3 years, or at $750,000 if completed in 4 years; consequently, the total cost for reintroductions in both project areas is estimated as $1,100,000-1,500,000 over 6-8 years. WDFW has sufficient funding to conduct year 1 activities in the southwestern Cascades reintroduction area, but will need additional funding to complete the reintroduction project in this area. Additional funding from the National Park Service ($470,000) has been awarded to North Cascades and Mount Rainier National Parks to support this project and these funds may be available in 2016.

The completion of all or part of this project is dependent on obtaining sufficient funding to complete essential tasks and on the continued availability of fishers from the Province of British Columbia. Provincial officials have indicated their willingness to assist us in obtaining fishers for Washington reintroductions.

INTRODUCTION

Background and Purpose

The fisher (*Pekania pennanti*) is a mid-sized carnivore in the weasel family (Mustelidae) that occurs only in the temperate and boreal forests of North America (Powell 1993). The fisher once occurred throughout much of the forested area of Washington, including most of western Washington, northeastern Washington, and the Blue Mountains of southeastern Washington (Lewis et al. 2012). The population decreased dramatically after the mid-1800s as a result of over-trapping, predator- and pest-control campaigns, poaching, incidental capture in traps set for other species, and loss and fragmentation of older forest habitats (Lewis and Stinson 1998, Aubry and Lewis 2003, Lofroth et al. 2010). The decline in the population, as reflected in declining harvests in Washington, prompted the newly established Washington Department of Game to close the trapping season for fishers in 1934. The season was closed to protect remaining individuals and promote fisher recovery.

Concern for the lack of fisher observations in the 1980s and 1990s prompted Washington Department of Fish and Wildlife (WDFW), the U.S. Forest Service (USFS), National Park Service (NPS), and other organizations to conduct surveys for fishers and other carnivores in Washington (Seaman and Houston 1984, Lewis and Stinson 1998, Christophersen et al. 2005, Happe et al. 2005). These surveys employed remote-camera and track-plate stations throughout forested habitats in Washington from 1990 to 2003 to detect carnivores of interest, and while many species were detected, no fishers were detected.

Following surveys in the 1990s, WDFW conducted a status review of the fisher in Washington in 1997-1998 (Lewis and Stinson 1998). The status review concluded that fishers were extremely rare or extirpated from Washington and recommended that they be classified as endangered in the state. Based on the findings of the fisher status review, the Washington Fish and Wildlife Commission listed the fisher as endangered in the State of Washington in 1998 (WAC 232-12-014). The status review noted that reintroductions would be required to recover fishers in the state.

In 2002, WDFW, in partnership with the Northwest Ecosystem Alliance (now Conservation Northwest; CNW), initiated a study to evaluate the feasibility of successfully reintroducing fishers in Washington. The assessment was limited to the Cascade Mountains and Olympic Peninsula of western Washington. The assessment followed recommendations provided by the International Union for Conservation of Nature (IUCN 1995) for feasibility assessments, which included determining: 1) if the causes of the decline in population size have been alleviated or no longer exist, 2) if suitable habitat, prey and source populations exist, and 3) if there is adequate support for a successful reintroduction. The feasibility assessment concluded that the reasons for the decline in the fisher population in Washington either no longer existed (i.e., over-trapping, mortality from predator- and pest-control campaigns) or had been alleviated (i.e., loss of older forest habitat, incidental or illegal capture; Lewis and Hayes 2004). The most significant cause of the decline, over-trapping, is no longer an issue for fisher conservation in Washington, because the fisher has protected status as a state-listed endangered species, and the use of body-gripping traps is prohibited in the state. The assessment also concluded that there was an adequate amount and configuration of suitable habitat to support fishers on the Olympic Peninsula and in the Cascade Mountain Range and foothills; that there was a diverse prey base;

and that there were suitable and available source populations of fishers in British Columbia and western Alberta.

In 2004, the US Fish and Wildlife Service (2004) found that the fisher was warranted for listing as threatened or endangered within its west coast range (western Washington, western Oregon, California), but a listing was precluded by higher priority listing actions, and consequently the west coast distinct population segment of fishers was recognized as a candidate for listing. A recovery plan developed for fishers in Washington (Hayes and Lewis 2006) outlined a recovery strategy that included the translocation of fishers to the Olympic and Cascades Recovery Areas (Figure 1). Reestablishment of fishers in these recovery areas would result in the down-listing of fishers from “endangered” to “sensitive” status in Washington (Hayes and Lewis 2006). Recovery of fishers in the Selkirk Recovery Area is expected through fisher immigration from Idaho.

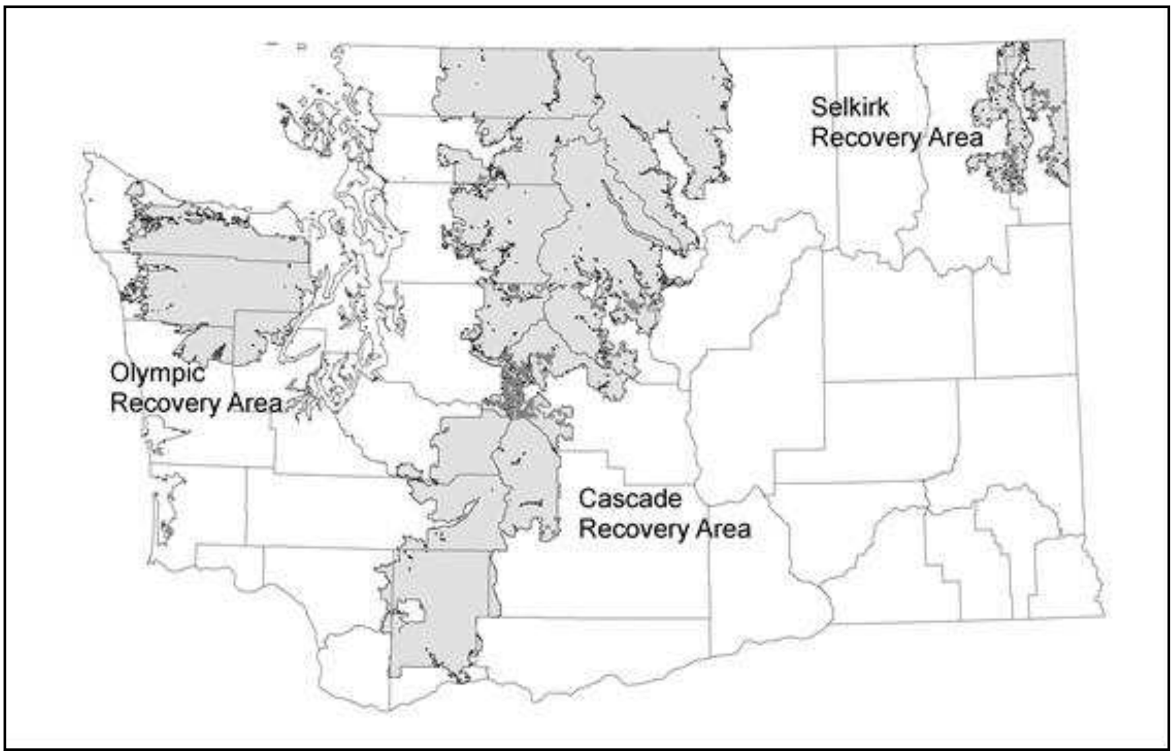

Figure 1. Fisher recovery areas in Washington (from Hayes and Lewis 2006). The narrow isthmus in the center of the Cascades Recovery Area is used to divide the recovery area into northern and southern portions.

From 2008 to 2010, 90 fishers were translocated from central British Columbia to the Olympic Recovery Area as the first step toward fisher recovery in Washington (Hayes and Lewis 2006, Lewis and Happe 2008, Lewis et al. 2010, 2011). Having translocated fishers to the Olympic Recovery Area, WDFW and its partners are initiating the next phase of fisher recovery, which is the reintroduction and reestablishment of fishers in the Washington Cascades. The greatest amount of high-quality habitat in the Cascades ecosystem was found on the west side of the range, predominantly on lands managed by Mt. Baker-Snoqualmie and Gifford-Pinchot National

Forests, and in North Cascades National Park Service Complex and Mount Rainier National Park. High-quality habitat was also found on Washington Department of Natural Resources lands, as well as on tribal and private lands (Lewis and Hayes 2004).

In an effort to implement this plan, the NPS is partnering with WDFW to reintroduce fishers to North Cascades National Park Service Complex and Mount Rainier National Park. Restoration of native plant and animal species is one of the management goals of the NPS (National Park Service 2006) and fisher reintroductions in North Cascades and Mount Rainier National Parks are consistent with this goal. As a federal agency proposing an action on federal lands, the NPS initiated an environmental assessment (EA) pursuant to the National Environmental Policy Act (NEPA) in March 2013 to analyze the potential effects of proposed fisher reintroductions on NPS lands in the Cascades. The EA process is expected to be completed by the summer of 2014.

As the agency responsible for the largest area of federal land in the Washington Cascades, the US Forest Service recognizes WDFW as the agency responsible for managing wildlife on National Forest lands in Washington. Consequently, fisher reintroduction and monitoring activities that occur on the Mt. Baker-Snoqualmie, Gifford Pinchot and Okanogan-Wenatchee National Forests will be conducted under the auspices and supervision of WDFW and are not the responsibility of the US Forest Service. The restoration of the fisher to the National Forest lands of the Washington Cascades, however, is consistent with the mission of the US Forest Service.

Our long-term goal is to re-establish self-sustaining fisher populations in both the southern and northern portions of the Cascades Recovery Area, and for these populations to grow in size and extent until they become a large continuous population.

If the Pacific Northwest Regional Director of the NPS approves action on NPS lands, WDFW, the NPS and their partners will implement the reintroduction of fishers in the Cascades when financial and logistical support is in place. Without NPS approval, WDFW will seek to implement the reintroduction outside of the National Parks.

Support and Funding

Under the scope of this implementation plan, WDFW, NPS and partners will implement fisher reintroductions in the Washington Cascades. WDFW will be the state-wide lead in the fisher reintroduction program, and will provide overall project management. For implementation and monitoring on the National Parks, NPS and WDFW will be joint leads. The agencies will coordinate with the other major landowners in the area, including USFS, WDNR, Native American tribes and private landowners regarding fisher releases, fisher movements and monitoring objectives.

WDFW and NPS are also seeking funding and collaborative partnerships to conduct the reintroduction and monitoring programs. Conservation Northwest will be a project partner, and will provide financial, administrative and logistical support. Support may also be available from the U.S. Fish and Wildlife Service (USFWS) and WDNR. The U.S. Geological Survey and the USFS's Pacific Northwest Research Station may collaborate with WDFW and NPS in designing and implementing a research program to investigate the ecological relationships and demography of fishers released in the Cascades Recovery Area. Seattle City Light and Washington's National Parks Fund have also expressed an interest in supporting the project. Additional potential cooperators include Native American tribes, private landowners, the Washington State

Trappers Association, the Washington Forest Protection Association, zoos, and other non-governmental conservation organizations.

Cooperation would be required from agencies and individuals to obtain, house and transport fishers from British Columbia to Washington. These cooperators include officials from British Columbia provincial ministries, USFWS, U. S. Department of Agriculture, and Washington State Department of Agriculture, as well as the British Columbia Trappers Association, captive wildlife facility managers and caretakers, veterinarians, and border-crossing inspectors.

WDFW is responsible for developing this implementation plan and assisting the NPS with the environmental assessment. We expect that additional support will be available through the assistance of project partners.

LESSONS LEARNED FROM PREVIOUS FISHER TRANSLOCATIONS

Translocations are the intentional release of animals in the wild to reestablish, augment or establish a population (Griffith et al. 1989). A reintroduction is an attempt to reestablish a population where it no longer exists within its historical range; an introduction is an attempt to establish a population outside its historical range; and an augmentation is an attempt to add individuals to an existing population (IUCN 1987, Nielsen 1988).

At least 38 fisher translocation projects have been conducted in 7 Canadian provinces and 15 US states from ~1900 to present. Fishers were translocated to control porcupines, to restore a valuable furbearer, and to re-establish a native member of the carnivore community. Among reintroductions, 77% (20 of 26) were successful, whereas 100% of 5 augmentations were successful and none of the 3 introductions was successful. Reintroduction success was greater in eastern North America (89%; 17 of 19 succeeded) than in the West (43%; 3 of 7 succeeded; Lewis et al. 2012). Success was defined as the establishment of a self-sustaining fisher population after the completion of a translocation. For most successful translocations, success was obvious due to abundant sightings, road-kill mortalities, and incidental captures in traps set for other species. Failure was often harder to document because the complete loss of a reintroduced population may take many years, and the absence of a fisher population can be difficult to confirm. Unfortunately, failed translocations frequently had the least documentation available to evaluate the factors associated with their outcome.

Several analyses of fisher translocations have been conducted recently that identified factors associated with translocation success. These factors included 1) the number of females released, 2) the number of males released, 3) the geographic location of the translocation (i.e., eastern vs. western North America), and 4) the proximity of the source location to the release location (Lewis et al. 2012; see Appendix A for a data summary of factors that may influence translocation success). Powell et al. (2012) found that the number of release sites was also related to translocation success for martens and fishers. They found that the likelihood of success increased as the number of release sites increased from 1 to 5, and that success was relatively constant with the use of >5 sites. Protection from trapping or incidental capture, the completion of a prior feasibility study, and an associated post-release monitoring program were not found to influence translocation success (Lewis et al. 2012), however these actions will be part of reintroductions in the Washington Cascades.

Our goal is to increase the likelihood of success of fisher reintroductions in the Cascades Recovery Area by incorporating findings and management recommendations from these recent analyses (Lewis et al. 2012, Powell et al. 2012) as well as findings from the Olympic translocation project (Lewis and Happe 2008, Lewis et al. 2010, 2011). While our goal is to release a large founder population (e.g., ≥80 fishers) with specific composition targets (55-60% females, a large proportion young adult females, a large proportion large adult males), the unpredictable nature of fisher captures may only allow us to obtain our targeted population size. Consequently, our ability to improve the likelihood of translocation success will focus on modifications that we can make in the translocation and monitoring process, as follows:

1) **Minimize the duration of captivity to reduce stress and injuries**. The duration of captivity may be negatively associated with fisher survival and successful reproduction; we will modify our program to reduce the average duration of captivity, based on the average of 21 days for the Olympic reintroduction project. To reduce stress and the number of injuries to captured fishers, we will be providing additional handling instructions to trappers that participate in the program.
2) **Release the target population of fishers over few years (e.g., 2 years) at ≤5 release sites.** This approach is expected to increase mating opportunities and successful reproduction by creating population densities in the recovery area that facilitate mate acquisition. This approach would also reduce costs by reducing the number of years required to monitor released fishers. Poor capture success or poor survival, however, may necessitate a third year of captures and releases.
3) **Emphasize the release of fishers before January**. Females released in November or December have a greater amount of time to locate suitable den sites within a suitable home range prior to the birthing season (April to early May) and the breeding season (~1 March to ~30 June) (A. Facka et al., unpublished data). Females released before January would have recovered from the stress of captivity before implantation of fertilized eggs (February-April) and active gestation (March-early May) occur, which is likely to improve reproductive success.
4) **Use VHF implant transmitters.** The equipment used to monitor reintroduction success is not expected to directly influence reintroduction success, however a reintroduction can be adaptively managed more effectively if sufficient, high-quality data are available. Collar-antenna breakage was a common problem during the Olympic fisher reintroduction project. Antenna breakage reduced signal transmission distance, which limited our ability to locate many individuals. Implant transmitters have several advantages over collars, which include: 1) antenna breakage is not an issue, 2) there are no risks of mortality or injury associated with a collar, and 3) signal power can be increased because the size of the transmitter's battery can be increased without the total weight of the transmitter exceeding 4% of the fisher's weight. We will also explore the possibility of testing new satellite-telemetry collars on as many as 5 males in the first year to determine if these collars have potential as an alternative to VHF telemetry in subsequent release years. Satellite-telemetry collars have the potential to 1) increase data acquisition, 2) reduce overall monitoring costs, and 3) reduce risks to biologists by reducing the need for aerial telemetry.

OBTAINING FISHERS FOR REINTRODUCTION

A genetic assessment of potential source populations identified fishers from British Columbia, California, and western Alberta as suitable for reintroduction in Washington, and that fishers from British Columbia were the most closely related to fishers that historically occurred in Washington (Warheit 2004). Because of their protected status, fishers from California are not available for translocation to Washington. WDFW requested the assistance of the British Columbia Ministry of Forests, Lands, and Natural Resource Operations (BCFLNRO), and they have agreed to help us obtain fishers for translocation to Washington.

Assistance from BCFLNRO includes the designation of a provincial coordinator to communicate and coordinate translocation activities within the province and to coordinate with WDFW's project leader. The provincial coordinator and WDFW project leader will provide oversight and establish approaches for obtaining, holding, and transporting fishers to Washington. The WDFW project leader will develop service contracts with project contractors for project tasks. WDFW's goal will be to employ the same contractor who served as the capture coordinator and captive facility manager for the Olympic fisher reintroduction project. Protocols for capturing, handling, transporting, and caring for fishers in captivity were developed by Evans (2008, 2009, 2010) for the Olympic fisher translocation project (Lewis and Happe 2008, Lewis et al. 2010, 2011); these protocols will be used in the Cascades fisher translocation project and are outlined in the sections below. The care, use, and handling of fishers during this project will meet or exceed the animal care guidelines of the American Society of Mammalogist's (Gannon et al. 2007) and those reviewed and approved by WDFW's Wildlife Science Division for the Olympic fisher reintroduction (Lewis and Happe 2008).

Capture

WFDW will work with the BCFLNRO coordinator and other staff to determine how and where fishers would be captured for translocation. Assistance will be necessary from the provincial wildlife veterinarian to coordinate the inspection and approval of captured fishers for translocation, which may include the assistance of local, private veterinarians (H. Schwantje, pers. comm.). BC veterinarians will also assist in the preparation of fishers for reintroduction.

Fishers will be captured by licensed BC trappers. Following the Olympic translocation project, WDFW will hire a capture coordinator to coordinate and oversee fisher capture efforts. The capture coordinator will explain the capture goals, techniques, and necessary equipment to interested trappers; assist and communicate with participating trappers as necessary; and obtain captured fishers from trappers for temporary placement in the captive facility. A payment schedule will be developed that provides sufficient financial incentive for trappers to provide fishers for translocation. The WDFW project leader and capture coordinator will be responsible for paying trappers for fishers deemed acceptable for translocation (see Appendix B for suitability criteria). The capture coordinator will be responsible for obtaining or constructing holding units used for transporting and housing fishers. The capture coordinator will also assist in the handling and care of fishers held in captivity.

Fishers will be captured using box (cage-type) traps. BCFLNRO has stored a supply of WDFW's box traps (~75) at their Williams Lake, BC office, and these traps would be used to capture fishers for reintroductions in the Washington Cascades; additional box traps will be purchased, as necessary. Traps provided to BC trappers will be equipped with a wooden box (61 x 31 x 25 cm) attached to the end of the trap to provide protection from the weather and to minimize disturbance (Seglund 1995). The attached wooden box is made of plywood but has an interior lining of formica to prevent the fisher from biting and clawing at the box and possibly injuring itself or escaping. A supply of traps with attached wooden boxes will be provided to participating trappers. The capture coordinator will also provide participating trappers with fisher transport boxes (40 x 40 x 90 cm; Figure 2) to safely hold fishers during transport to the captive facility and to Washington. During transport from the trap-lines to the holding facility, fishers will be provided food (e.g., meat scraps or cat food) and water inside their transport box.

Transfer and Holding in Captivity

Fishers are expected to spend from 1 to 3 weeks in captivity. Length of time in captivity will be determined by how many animals have been captured and are available for transport to Washington. For example, fishers will not be transported to Washington until there are 5 or more that could be shipped at one time. Consequently, some individuals will spend more time in captivity than others.

Housing. The WDFW project leader will be responsible for securing a facility to hold captured fishers in British Columbia and for employing captive-wildlife specialists to staff the facility. The facility used to house and care for fishers prior to transport to Washington will be centrally located in the area where most fisher captures are likely to occur. The captive facility will provide a secure, enclosed space (e.g., barn, outbuildings) suitable for quarantining individual fishers; it will have a capacity for up to 20 housing units for fishers (Figure 2); and will be subject to minimal disturbance. The facility will be staffed by at least one on-site, captive wildlife specialist. The specialist(s) will be responsible for transferring captured animals to housing units; providing food, water, and medical care; handling fishers as necessary; coordinating with and assisting veterinarians with health inspections/certifications and medical treatments; and assisting in preparing fishers for transport and release.

When a fisher is captured, the trapper and the capture coordinator will arrange a meeting place and time to transfer the fisher. The coordinator will then deliver the fisher to the captive facility. The fisher will be moved from the transport box into a 2-chambered housing unit that has an attached wire run (Figure 2), where an individual fisher is kept until it is transported to Washington. The housing unit is easily cleaned and manipulated to isolate a fisher in one chamber while cleaning the unit or providing food or water. Bedding of hay or wood shavings and a litter box are provided in the housing unit. Structures such as brush, logs and plastic buckets are also placed in the wire run to allow for chewing and climbing, and to provide additional resting sites (LaBarge 1987, Frost and Krohn 1994, Evans 2008).

Care. Captive fishers will be fed once each day, and water will be provided ad libitum. Captive fishers can be fed a variety of foods including venison or ground beef, mice or rabbits, mink or ferret chow, eggs, and nutritional supplements (Frost and Krohn 1994, Fontana et al. 1999, Mitchelltree et al. 1997). Evans (2008, 2009, 2010) provided captive fishers with salmon, chicken, eggs, and meat obtained from deer, beaver, rabbit, and squirrel carcasses that were donated by trappers and local biologists. Fishers will be provided generous daily portions of a variety of these foods (e.g., 400 g for females, 550 g for males) to encourage weight gain.

Figure 2. The 2-chambered housing unit is a 61 x 61 x 122 cm plywood box that is attached to a wire cage (61 x 122 x 152 cm) and placed on a stand (Evans 2008). A fisher transport box (40 x 40 x 90 cm) is shown on the floor below the housing unit.

Health Evaluations, Medical Treatments, and Preparation for Reintroduction

Evaluations of health and physical condition, medical treatments, and reintroduction preparations require each fisher to be chemically immobilized. To minimize the stress and risk associated with chemical immobilization and handling, each individual fisher will be immobilized only once. All evaluation, treatment and preparation procedures will be conducted at that time (see protocol in Appendix C), with the exception of those individuals that require additional medical attention. Cooperating veterinarians will conduct examinations, medical treatments, and surgeries, and will be assisted by project biologists and captive wildlife specialists. Veterinary examinations are required to determine if individual fishers are suitable for translocation (i.e., healthy, no debilitating injuries, sound teeth and feet). An examination is also required before a veterinarian can issue a health certificate, which is required for each fisher being transported from British Columbia to Washington.

Health and Physical Condition. Fishers brought to the captive facility will be examined to evaluate their health and physical condition. The evaluation will include confirming the individual's sex; obtaining weight and morphological measurements; and identifying wounds, deformities, and evidence of disease or ectoparasites. Age will be estimated for each individual through evidence of tooth wear, sagittal-crest height, teat size, baculum length, and the number of cementum annuli of an extracted premolar. Female reproductive status is difficult to determine until active gestation begins (March to April) or birthing has occurred (i.e., March to early May). Because most releases will likely occur before active gestation begins, we will assume that adult females (i.e., those estimated as $\geq$1 year old at time of capture) are potentially pregnant until post-release monitoring data indicate otherwise. Physiological condition and disease exposure will be assessed by evaluating blood chemistries and antibody titers.

Medical Treatments. Individual fishers will be isolated to prevent disease transmission. They will be treated for wounds, injuries or infections, and will be vaccinated for rabies and distemper (Appendix C). Ivermectin and Droncit treatments will be provided for endoparasite infestations, and flea and tick treatments will be provided as necessary.

Preparing Fishers for Reintroduction. To monitor fishers after they are released, each fisher will have a VHF transmitter surgically implanted into its abdomen by a licensed veterinarian; each transmitter will have an expected lifespan of $\geq$24 months and an incorporated mortality-sensor. Each fisher will also be marked with a passive integrated transponder (PIT) tag, which is a small cylindrical tag that is inserted under the skin behind the ear. The PIT tag allows individuals to be identified by a unique identification code programmed into the tag, which can be read when an electronic receiver is passed over the tag (i.e., when re-captured alive or found dead). We will collect DNA samples (i.e., hair sample and ear punch) to genotype each fisher. Fishers can then be identified if they are recovered, recaptured, or if a hair sample is collected at a hair-snare station. Lastly, each fisher will be photographed (i.e., photos of the teeth, chest or abdominal blaze) to allow identification of individuals by any unique physical characteristics.

Requirements for Importation to Washington

A number of tasks are involved with successfully importing wild animals to Washington from British Columbia. These serve to meet federal, state and provincial requirements and include completing health certifications, obtaining permits, permit processing by federal authorities, border-crossing inspections by customs and USFWS inspectors, and notifications. During importation, inspections are expected to include only visual inspections of fishers in their transport units; no additional handling or chemical immobilization is expected.

Canadian Provincial Requirements. Fishers captured in British Columbia are required to be inspected by a veterinarian accredited by the Canadian Food Inspection Agency. After having been inspected, fishers deemed suitable for transport and reintroduction in Washington will be individually listed on a health certificate. A possession and export permit is also required from the BCFLNRO.

Washington State Requirements. The Washington State Department of Agriculture (WSDA) requires that an accredited and licensed veterinarian inspect each animal. WSDA will grant an importation permit for those individuals free from infectious and communicable diseases, and permanently and individually marked, as certified by the veterinarian. The inspection and certification will be designed to meet the requirements of all state, provincial or federal agencies requiring inspection of captured fishers. Upon completion of the health certificate, a WSDA agent will provide an importation permit number over the phone, which is then written on the health certificate.

Canadian Federal Requirements. Canadian customs agents (or Port Officer) will require prior notification by the WDFW project leader that a shipment of fishers is leaving Canada. Before departure, a Canadian customs agent may inspect the fishers, their holding units and associated paperwork, and question personnel accompanying the fishers.

U.S. Federal Requirements. U.S. Customs agents will also require prior notification that a shipment of fishers is arriving in the U.S. Before entry into the U.S., agents will likely inspect fishers, their transport boxes and associated paperwork, and question personnel transporting the fishers. The USFWS requires prior notification of the expected port of entry (by land or air) as well as a declaration of importation (completed USFWS form 3-177) for live animals and tissues being transported into the U. S. A USFWS agent will review paperwork and inspect fishers to confirm humane transport. No CITES permits are required for fishers.

CASCADES RECOVERY AREA AND REINTRODUCTION AREAS

The Cascades Recovery Area (Figure 1) includes lands administered by the North Cascades and Mount Rainier National Parks, and the Mount Baker-Snoqualmie, Okanogan-Wenatchee and Gifford Pinchot National Forests, which collectively comprise most of the Cascade Mountain Range in central Washington. Within Washington, the Cascade mountain range extends along a north-south axis from the Canadian border with northern Whatcom and Okanogan Counties south for approximately 370 km to the Columbia River in southern Skamania County (Hayes and Lewis 2006).

The Cascades Recovery Area is characterized by highly dissected and glaciated mountainous terrain, extensive conifer forest, and numerous river drainages that ultimately empty into Puget Sound or the Columbia River. Elevations within the recovery area range from 84 m (277 ft) at the town of Concrete to 4392 m (14,410 ft) at the peak of Mount Rainier. While the high peaks of Mount Adams (3743 m), Mount Baker (3286 m) and Mount Rainier tower above much of the recovery area, Steven's Pass (1238 m; 4062 ft), Snoqualmie Pass (921 m; 3022 ft), and White Pass (1372 m; 4501 ft) cross the Cascade crest at elevations below treeline and are more indicative of higher-elevation landscapes that could support fishers.

Four highways cross the Cascade Recovery Area in an east-west direction including state highways 20, 2, and 12, and US Interstate 90. Highways 20 and 2 cross the northern portion of the recovery area, whereas highway 12 crosses the southern portion of the recovery area. Interstate 90 crosses the Cascades at Snoqualmie Pass, which coincides with the narrow isthmus of federal land that separates the northern and southern portions of the recovery area. I-90 is a large, heavily-used highway corridor that is centrally located in the Cascades and it has received considerable attention for its potential to limit successful wildlife passage (Washington Wildlife Habitat Connectivity Working Group 2010).

The western portion of the recovery area (i.e., west of the Cascade crest) is dominated by a temperate Mediterranean climate, with warm-dry summers and cool-wet winters, whereas the eastern portion is dominated by a temperate-continental/Mediterranean-continental climate, with warm-dry summers and cold winters (Peel et al. 2007). On the west side of the Cascades, lower elevations of the recovery area are dominated by western hemlock (*Tsuga heterophylla*) and Douglas-fir (*Pseudotsuga menziesii*) forests, whereas the mid-elevations are dominated by Pacific silver fir (*Abies amabilis*) and subalpine forests are dominated by mountain hemlock (*Tsuga mertensiana*) and subalpine fir (*Abies lasiocarpa*). Treeline is found at approximately 6000 feet (1800 m) in elevation. On the east side of the Cascades, mid-elevation forests are dominated by grand fir (*Abies grandis*) and Douglas-fir, whereas subalpine forests are dominated by subalpine fir, Douglas-fir and Engelmann spruce (*Picea engelmannii*) (Franklin and Dyrness 1973, Kruckeberg 1991).

Cascades Reintroduction Areas

Two reintroduction areas have been identified for reestablishing fishers in the Washington Cascades: the southwestern and northwestern Cascades reintroduction areas (Figure 3). The selection of reintroduction areas was based on 3 primary considerations; reintroduction areas must be 1) large areas dominated by federal land ownership, 2) areas with large amounts and dense concentrations of high-quality habitat (Lewis and Hayes 2004), and 3) areas that include few large highway corridors (Figures 4 and 5). The southwestern and northwestern reintroduction areas were chosen because they met these criteria and were deemed capable of supporting self-sustaining populations of fishers. A number of candidate release sites have been identified in each reintroduction area (Figures 4 and 5). Candidate release sites were selected to allow the release of fishers in interior portions of a reintroduction area that are 1) dominated by suitable habitat, 2) $\geq$10 km away from highway corridors (with few exceptions), and 3) accessible by vehicle during all or part of the release season (November to February).

Southwestern Cascades Reintroduction Area. The southwestern Cascades reintroduction area also contains large landscapes dominated by high-quality fisher habitat (Figure 4). Because this area is less dissected by high-elevation ridges as compared to the northwestern Cascades area, it contains larger expanses of continuous, high-quality habitats for fishers (Figures 3-5). The southwestern reintroduction area consists of Mount Rainier National Park, most of Gifford Pinchot National Forest, and the southernmost portions of the Mount Baker-Snoqualmie and Okanogan-Wenatchee National Forests. The area boundary also includes smaller areas managed by WDNR as well as tribal, county, municipal and private landowners. The southwestern reintroduction area was the highest ranking reintroduction area in the Cascades ecosystem (Lewis and Hayes 2004) and is expected to support a large, self-sustaining population of fishers that may ultimately provide dispersers to other suitable areas within the region (northwestern and northeastern Cascades of Washington, southwestern Washington, northern Cascades of Oregon). Nine candidate release-sites have been identified in the reintroduction area (Figure 4)

Northwestern Cascades Reintroduction Area. The northwestern Cascades reintroduction area contains large landscapes dominated by high-quality fisher habitat. Much of this habitat occurs in the low and mid-elevation landscapes of river drainages and is distributed in a dendritic pattern across the reintroduction area because these habitats are separated by the high-elevation ridges and mountains that characterize the North Cascades Ecosystem (Figure 5). The Mount Baker-Snoqualmie National Forest and North Cascades National Park Service Complex make up the bulk of the reintroduction area (Figure 5), which also includes lands managed by WDNR, as well as tribal, county, municipal, and private landowners. The northwestern Cascades area ranked third among the three areas identified as suitable for successfully reintroducing fishers in western Washington (after the Olympic and southwestern Cascades reintroduction areas; Lewis and Hayes 2004). Despite its lower ranking, the northwestern Cascades area is expected to support a relatively large, self-sustaining population of fishers that may ultimately provide dispersers to other suitable areas within the region (e.g., northeastern and southern Cascades, southern British Columbia). Six candidate release-sites have been identified within the interior of the reintroduction area (Figure 5).

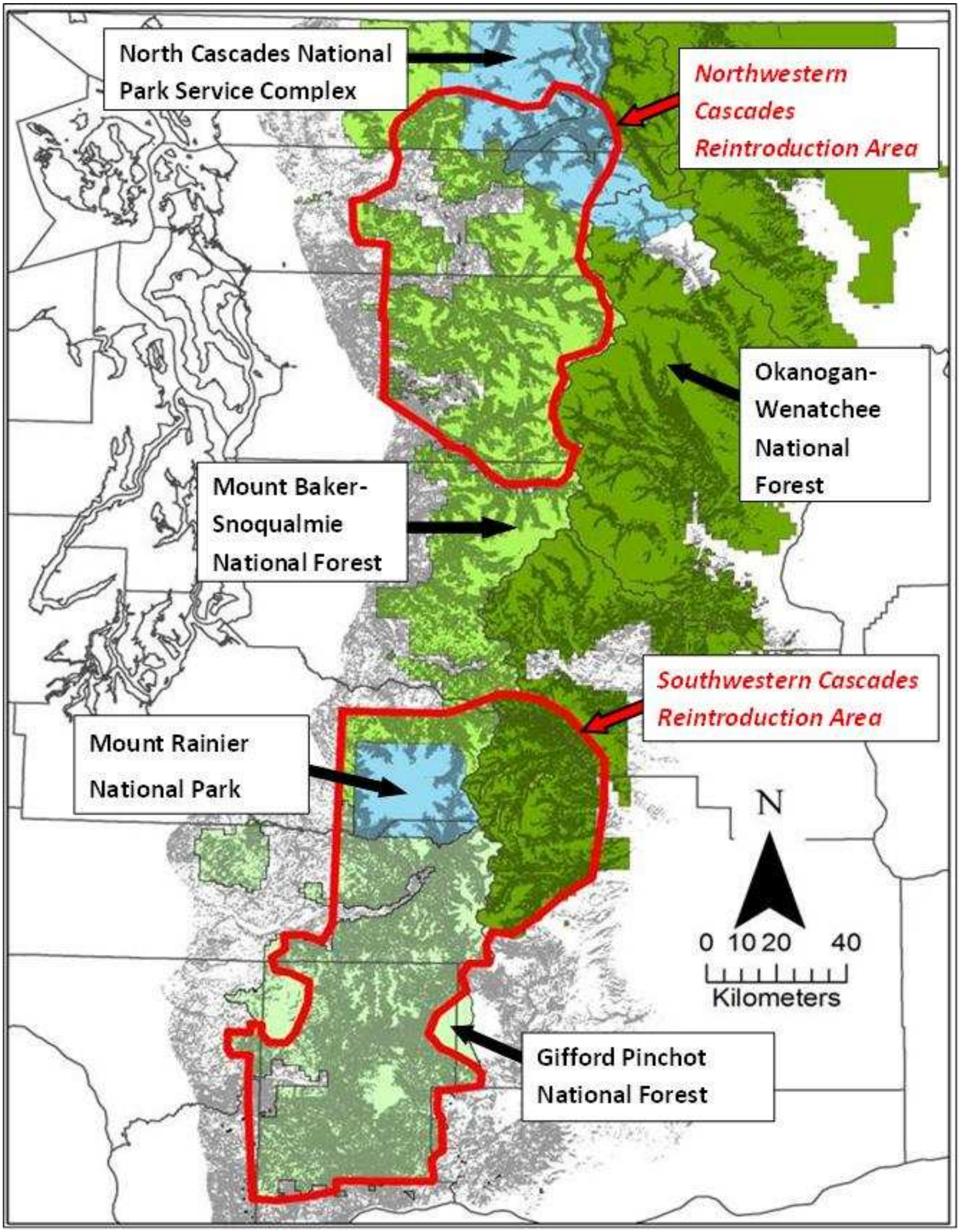

Figure 3. The northwestern and southwestern Cascades reintroduction areas for fishers within the Cascades Recovery Area. The gray shading represents high-quality fisher habitat (Lewis and Hayes 2004) and federal lands are indicated with black arrows.

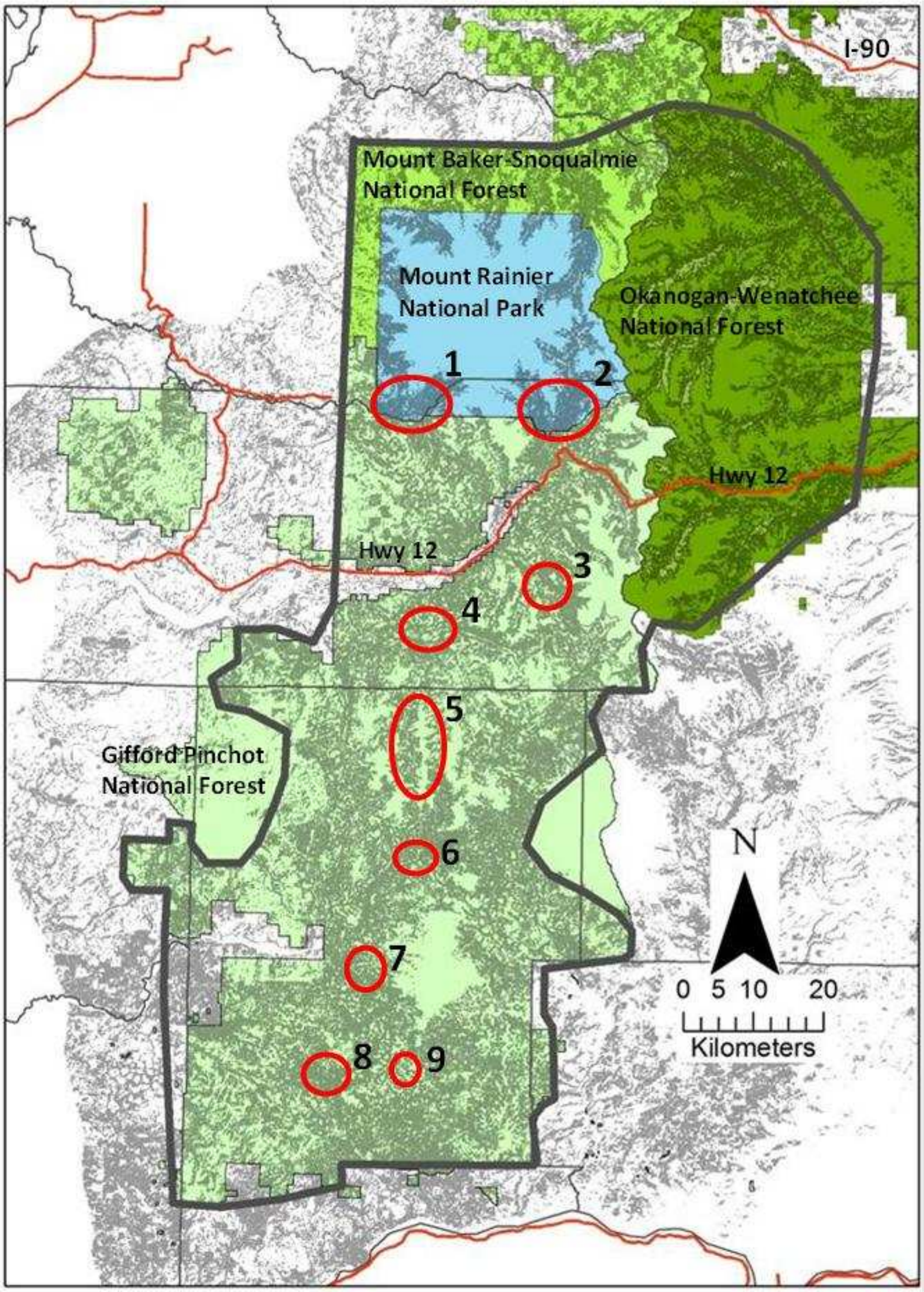

Figure 4. The southwestern Cascades reintroduction area is outlined in gray. Nine candidate release sites (red ovals) are located within the reintroduction area and include upper Nisqually River (1), Ohanapecosh (2), Johnson Creek snow-park (3), Cispus (4), Yellow-jacket and McCoy Creeks (5), Lewis River horse camp (6), upper Wind River snow-park (7), Trapper Creek Wilderness (8), and Black Creek (9). The gray shading represents high-quality fisher habitat (Lewis and Hayes 2004).

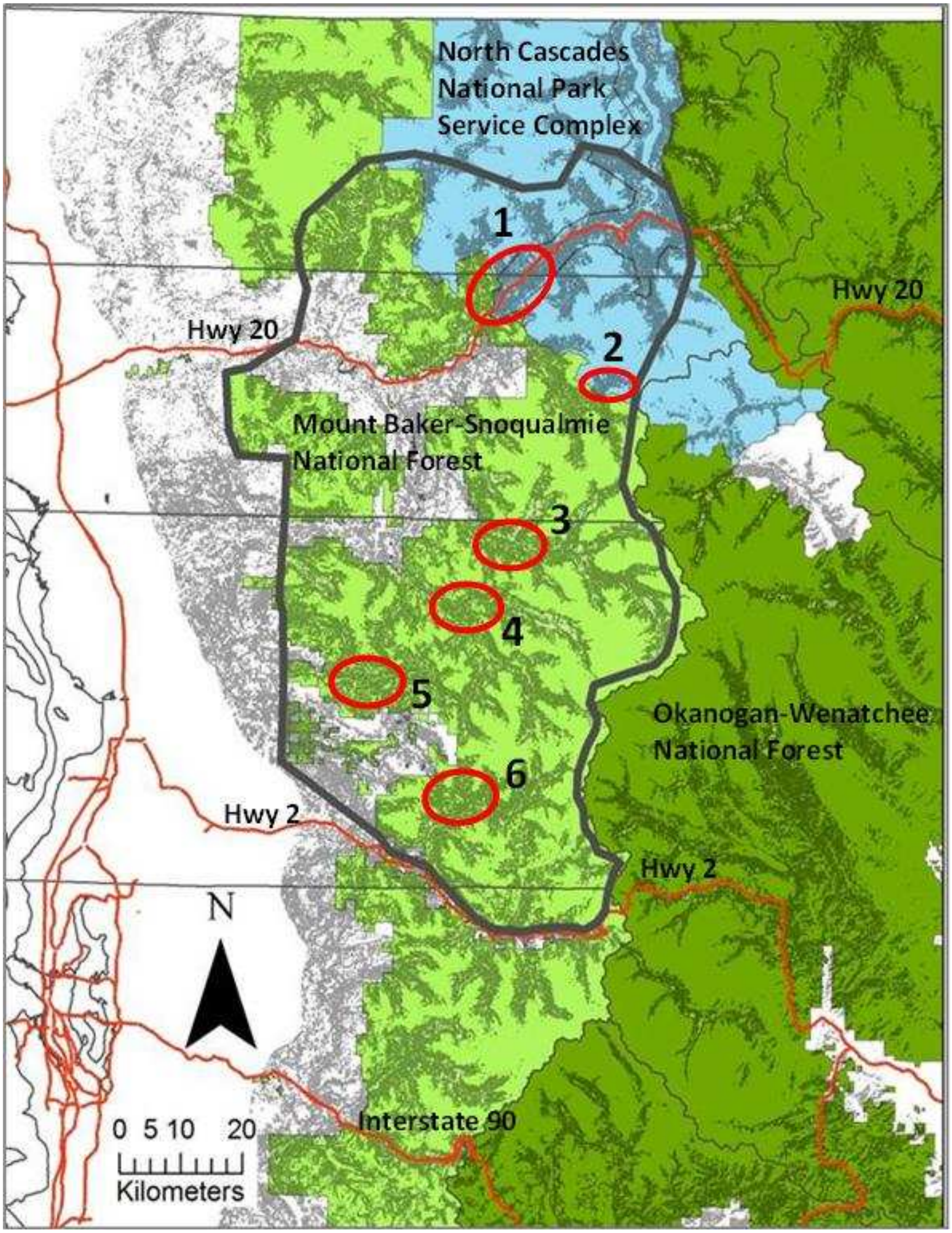

Figure 5. The northwestern Cascades reintroduction area is outlined in gray. Six candidate release sites (red ovals) are located in the reintroduction area and include middle Skagit/lower Ross Lake Recreation Area (1), north fork Cascade River (2), middle Suiattle River (3), Sauk River and White-Chuck River confluence (4), south Boulder River Wilderness (5), and middle Skykomish River (6). The gray shading represents high-quality fisher habitat (Lewis and Hayes 2004).

RELEASING FISHERS IN THE WASHINGTON CASCADES

Founder Population

The Cascades fisher reintroduction project will include the release of approximately 160 fishers into the southwestern and northwestern reintroduction areas over a period of 6-8 years, and these releases will occur in two stages.

The first stage will be the release of ≥80 fishers in the southwestern reintroduction area (Figure 4) over a 2-year period (~40 fishers per year). Each fisher will be equipped with a radio-transmitter with a ≥2-year lifespan. Fishers will be released in years 1 and 2 of the project and their movements and behaviors will be monitored in years 1-3. To meet our founder population objectives, fisher captures will be conducted for a third year if 1) a minimum of 80 fishers is not obtained in years 1 and 2, or 2) fisher survival in years 1 or 2 is <50%. In the event that capture efforts are required in year 3, we will also expand our fisher monitoring efforts to include a 4th year (years 1-4).

The second stage of the reintroduction will be the release and monitoring of ≥80 fishers in the northwestern reintroduction area (Figure 5), and this second stage will follow the approach and contingencies outlined above for stage 1 in the southwestern reintroduction area. Fishers will not be released in the northwestern reintroduction area before the completion of fisher releases in the southwestern reintroduction area.

The target founder population size of ≥80 fishers in each reintroduction area is based on the success of previous fisher translocations and the findings of population modeling. Nine of 10 translocations that released ≥60 fishers were successful, and all four that released >100 were successful (Lewis et al. 2012). Population modeling for the Cascades reintroduction areas indicated that populations that started with 60 or 100 females resulted in larger resident population sizes, and were established more quickly, than populations that started with 30 females (Lewis and Hayes 2004).

Given the unpredictability of fisher capture success, we cannot be highly selective of the sex-ratio and age-composition of the founder population. However, ideally, our goal would be to acquire a founder population that has a female-biased sex ratio (55-60% females) and a relatively large proportion of young adult females (1-2 year olds) and large adult-males (i.e., >2 years old and ≥4.5kg; Lewis et al. 2012, Lewis, Happe, and Jenkins, unpubl. data). Adult females are especially important to obtain for translocation because they can be pregnant and can give birth shortly after being released, thereby immediately contributing to population growth. Moreover, their fetuses may possess unique genotypes (i.e., fetuses could be sired by males not present in the founder population), thereby expanding the genetic diversity of the founder population. Large adult males make up a small portion of a fisher population but are important for successful reproduction, and therefore, they are important for translocation success (Lewis et al. 2012). Large adult males from British Columbia are characterized by a body mass >4.5kg, a well-developed sagittal crest (>5mm in height), and >2 years of age (Lewis, Happe, and Jenkins, unpubl. data).

A founder population that approximates our target composition may be attainable if capture success is high. Limited capture success may enable us to obtain the target population size but not an optimal sex-ratio or age-composition of founders.

If funding or fisher availability from British Columbia are limited, we may be able to conduct only stage one of the reintroduction project (i.e., the southwestern Cascades portion). Fishers from western Alberta may be available as an alternative source population if the availability of fishers from British Columbia is limited.

Release Process

Most translocations have employed hard releases, i.e., releasing fishers immediately upon arriving at a release site (Appendix A). However, several translocations have used soft releases, whereby fishers are temporarily housed at the release site prior to release and attractants are placed at release sites (e.g., food, fisher scent) to encourage acclimation and fidelity to the reintroduction area (see Davis 1983). While soft releases have been employed in a number of fisher translocations (Rego 1989, Roy 1991, Heinemeyer 1993, Proulx et al. 1994, Weir 1995) and may be valuable when translocating other species at risk, the type of release (i.e., hard vs soft) was not an influential factor for explaining the success of fisher translocations (Lewis et al. 2012). Because soft releases are more expensive and have not prevented extensive post-release movements by fishers, hard releases will be employed in the Cascades reintroduction areas.

During the Olympic fisher translocation project, fishers were released at 21 different release sites within Olympic National Park over 3 years. Releasing fishers at this many release sites may have impeded reproductive success by distributing individuals too widely and making it difficult for them to find mates. In the Olympic Recovery Area, we observed breeding season movements of females away from established home ranges; this behavior had not been previously reported for fishers. These movements indicated that these females were not being found in their home ranges by males during the breeding season and that they left their home ranges to find mates. Releasing founder individuals at fewer release sites (e.g., ≤5) within a recovery area is likely to improve mate acquisition and reproductive success in the first 2-3 years of the project by concentrating potential mates in fewer areas. Given the ability of fishers to move extensively following release we do not expect crowding and competition to present difficult challenges for released fishers. Consequently, we would release fishers at 3-5 release sites in each reintroduction area within the Cascades Recovery Area. When possible, fishers will be released in groups that include ≥1 adult female and ≥1 large adult male. The size and composition of the group released will be dictated by the age and sex of recently captured fishers and the goal of minimizing the duration of captivity.

Many translocation projects have released fishers during the fall and winter months (Appendix A). The dates of releases were generally associated with the timing of trapping seasons, when commercial trappers are in the field seeking furbearers and can serve as an effective work-force for capturing fishers (i.e., fall and winter; see Berg 1982). Pre-release processing and transport was minimal (~24 hours) for some translocations (Dodge 1977), but could take several weeks or even months depending on the objectives or constraints of the program (Proulx et al. 1994, Fontana et al. 1999, Serfass et al. 2001, Lewis and Happe 2008). One priority for Cascades fisher reintroductions is to maximize the proportion of the founder population that is released in November or December and to minimize the proportion captured and released in January or February. Prioritizing releases in November and December is expected to improve reproductive success (see Lessons Learned from Previous Fisher Translocations section above).

The timing of releases, number of fishers released, and release locations will vary depending on fisher availability, and the findings of monitoring efforts of previously released fishers. For example, we would use fisher occupancy patterns and reproductive success to inform our release strategy in subsequent years, and determine if additional individuals should be released in a specific area or if certain release areas should not be used.

MONITORING

Reintroduction monitoring has two general purposes: to allow biologists to adaptively manage the reintroduction to increase the likelihood of success, and to determine if the reintroduction has succeeded at reestablishing a self-sustaining population. Many of the earliest translocations used incidental observations to evaluate success retrospectively; for example, fishers were released and only informal information (e.g., incidental captures, road kills) was available to indicate if a reintroduced population had persisted. More intensive monitoring, however, can indicate when a reintroduction is not succeeding before it is too late to make mid-course adjustments to improve the likelihood of success (i.e., adaptive management).

Monitoring in reintroduction areas will be conducted in 2 phases. Phase 1 will involve the active telemetry monitoring of radio-transmittered fishers. Phase 1 monitoring will begin as soon as fishers are released in years 1 and 2, and will continue until year 3, when transmitters reach their expected lifespan. At the end of this 3-year period, the reintroduction will be considered initially successful if there is evidence of a reproductive population within the reintroduction area as indicated by 1) home range establishment by ≥50% of fishers that survive until the fall of their first year following release and, 2) documented reproduction by one or more females in years 2 and 3. Phase 1 monitoring will be extended to year 4 if fisher releases are necessary in year 3 to meet founder population objectives.

Because the long-term success of a reintroduction (i.e., the persistence of a self-sustaining population) cannot be determined within 4 years, phase 2 of the monitoring program will follow the active telemetry monitoring phase (phase 1). With adequate funding, phase 2 monitoring will be conducted between years 5 and 10 following the first releases in a reintroduction area. The goal of phase 2 monitoring is to determine the distribution and abundance of resident fishers. It will involve a multi-year deployment of a sampling grid of hair-snare and remote-camera stations across areas where fishers may have become established within or outside the Cascades Recovery Area, following the methodology described by Jenkins and Happe (2013). Managers can use this information to assess the status of a reintroduced population and to determine if any action is needed to support a reestablished population (e.g., an augmentation could be employed to fortify a small, vulnerable population).

A number of tools and levels of monitoring intensity can be employed at various stages in the monitoring program. Project managers will be responsible for implementation planning and will evaluate project success throughout the translocation and monitoring phases of the project. Release and monitoring approaches may be modified during the reintroduction based upon the findings of ongoing monitoring, the availability of suitable Argos-satellite collars, and available funding.

Phase 1 Monitoring Objectives

Phase 1 monitoring of reintroduced fishers, and the population as a whole, will focus on obtaining information on four biological measures: survival, movements, home range establishment, and reproduction. These measures will provide essential information to determine if a reproductive population has become established.

Survival and Movements. An initial focus of the monitoring project will be to determine if released fishers, especially females, survive to establish home ranges and reproduce. Telemetry will be used to relocate fishers and to track movements and survival. Newly released fishers may wander extensively as they explore the reintroduction area, and maintaining frequent contact with fishers will make it easier to relocate those that travel large distances from their release site. A mortality signal function will be incorporated into each transmitter to identify mortality events soon after death and allow a prompt investigation of the cause of mortality. We will use telemetry data to characterize post-release movement patterns and use of habitats and landscapes. We will also use these data to evaluate and modify release and monitoring approaches.

Home Range Establishment. After a period of exploration following their release, individual fishers are expected to establish a home range. Home range establishment will be indicated by the consistent use of a distinct geographic area, based on telemetry relocations. The establishment of a home range is an indicator of reintroduction success, because it indicates that the area is meeting the needs of that individual and may be suitable for reproduction. Home range establishment is especially important for females because pregnant females need a suitable den site within a suitable home range to successfully raise kits, and females that establish home ranges prior to the breeding season are more likely to be found by breeding males.

Reproduction. Successful reproduction is essential for reintroduction success. In previous studies (e.g., Aubry and Raley 2006, Lewis et al. 2010, 2011), reproduction was documented by tracking the movements of adult females to den sites and observing behaviors consistent with birthing and kit-rearing. Reproduction can be confirmed by remote-camera photographs of females with kits or of females revisiting a suspected den site in April/May; the collection of hair with hair-snares to genetically identify new individuals (i.e., offspring); the capture of new animals; or the recovery of dead animals without PIT tags, transmitters, or known genotypes.

Monitoring Tools

Telemetry. Telemetry will be the main tool used to monitor fishers during the reintroduction (phase 1 monitoring); however, the number of locations obtained for each fisher will be limited by 1) the cost of flying, 2) suitable conditions for flying, and 3) access for ground telemetry activities. Given potential limitations on data collection, our objective will be to get ≥1 location per week for individual fishers. Where access is limited, it may only be possible to obtain ≥2 locations per month for fishers via aerial telemetry. Beginning in February, emphasis will be placed on tracking adult females until their reproductive status is determined. Where access allows, den sites will be investigated on foot to confirm reproduction.

Genetic Sampling. All released fishers will be genotyped through the collection of DNA via ear punches, blood samples, and hair samples. Released individuals (or their offspring) can then be identified and confirmed as alive at a specific time and place through the use of hair-snares

(Mowat and Paetkau 2002) placed within a reintroduction area or the larger recovery area. Genetic sampling can provide information on the survival, location, movements, reproductive success, mate selection, offspring, and parentage of individual fishers. It can also be used to estimate population size (Mowat and Paetkau 2002), which is a valuable measure of reintroduction success. Genetic sampling may be used as an additional monitoring technique during phase 1 monitoring and would be an essential component in phase 2 monitoring.

Remote Cameras. Camera stations are effective for detecting the presence of fishers. Remote cameras will be used during phase 1 of the monitoring program to detect repeated female visitation at suspected den sites and the presence of kits. Remote cameras will also be used with hair-snares in a sampling grid of detection stations deployed in phase 2 of the monitoring program.

Incidental Observations. Fisher presence has been detected incidentally when 1) fishers were captured in traps set for other species, 2) fishers were killed by vehicles, 3) fishers were detected at remote camera stations set for others species, 4) an abundance of sightings of fishers or fisher tracks was observed, or 5) evidence of porcupine predation was observed. Incidental observations could be valuable in indicating the success of a Cascade reintroduction, but because of their informal and unpredictable nature, they cannot be structured into an active monitoring program. However, incidental observations are useful when targeting areas for more intensive monitoring efforts.

RESEARCH OPPORTUNITIES

Translocations provide valuable opportunities to conduct research (Seddon et al. 2007, Armstrong and Seddon 2008). Fisher demography and ecological relationships in Washington are not well-understood due to the long-term absence of fishers in this part of their historical range. With additional funding, reintroduction monitoring efforts can be expanded to investigate fundamental research questions that may provide valuable insights for the management of fisher populations in Washington.

Multi-Scale Resource Selection

Fishers have been shown to select habitats across multiple spatial scales (Weir and Harestad 2003, Raley et al. 2012). Consequently, an investigation of resource use and selection is important for identifying landscape, home range and stand-scale attributes that are essential for the persistence of a reintroduced fisher population. Telemetry monitoring to evaluate movements, survival, and home range establishment can be expanded to identify used and available habitat and landscape attributes for an evaluation of resource selection. An investigation of resource selection will be particularly important for fishers occupying landscape mosaics unique to the Washington Cascades.

The establishment of home ranges is an important behavior to monitor during the reintroduction and could be expanded to evaluate characteristics of home ranges of reestablished fishers. This information is a necessary precursor for investigating multi-scale resource selection and developing an understanding of fisher densities and the carrying capacity in the Cascades Recovery Area. Because obtaining location data for fishers can be logistically difficult and expensive, additional research funding may be required to obtain an adequate number of locations to reliably evaluate home ranges and resource selection.

Demography

Evaluating demographic measures of the reintroduced population will be important for determining the success of the reintroduction and the status of the population. Mark-recapture and genetic sampling techniques could be used to estimate population sizes at various times throughout the recovery process. Monitoring efforts to track the survival status of released fishers are essential for evaluating reintroduction success and would contribute to a larger investigation of factors that influence survival as well as the estimation of sex- and age-specific survival rates. Monitoring efforts could also be expanded to determine fecundity, including rates of pregnancy of reproductive-age females, and litter size and sex-ratio. This information would be used to determine the population's rate of change (lambda) and indicate if the reintroduction is likely to establish a self-sustaining population.

Population Genetics

A monitoring program may include genetic surveys (i.e., DNA collection and analysis) to track survival and reproduction. Alternatively, this program could be expanded to evaluate the genetic diversity of a reintroduced population of fishers, which could be genetically or demographically isolated for some period of time in the Washington Cascades. An expanded investigation could include evaluations of effective population size, individual reproductive success, likelihood of inbreeding depression, landscape connectivity, and the need for population augmentation to increase genetic diversity.

Food Habits

Any ecological investigation of a carnivore is incomplete without basic study of the prey it uses, and the Cascades Recovery Area is likely to support a unique prey assemblage for fishers. Locating individuals at rest sites and den sites will enable the collection of fisher scats and the identification of prey remains that can be used in describing food habits. The contents of gastro-intestinal tracts from recovered fisher carcasses can also be used to describe food habits. Collectively, these data would identify important prey species used across seasons and regions within the Cascades Recovery Area.

PUBLIC OUTREACH

WDFW will engage the public throughout the reintroduction planning process and during implementation. Opportunities for engaging the public include providing presentations and obtaining feedback at public meetings and schools, meeting with county commissioners, responding to inquiries about fishers and the reintroduction project, assisting groups that are interested in raising funds for the project, seeking funds from granting organizations, interacting with project partners and prospective partners, and coordinating with the USFWS on opportunities presented by a possible fisher listing under the ESA. WDFW will also engage the public by providing fisher conservation planning reports, fisher natural history information, reports and updates from the Olympic and Cascades fisher reintroduction projects, fisher photos and video clips, and other information on the Department's fisher web page (http://wdfw.wa.gov/conservation/fisher/). Outreach would also include media releases for, and participation in fisher releases.

WDFW and the NPS also have several opportunities to engage the public through the NEPA planning process being led by the NPS to assess the impacts of a fisher reintroduction on Mount Rainier and North Cascades National Parks. Public scoping would be completed to inform an environmental assessment (EA) of impacts and would include press releases, media interviews, website information (posted on NPS web sites), mailings (postal mail and email), and displays at NPS visitor centers and the Washington State Fair. The release of the EA would also include a public notification and review period, which would likely include all the above methods of public communication as well as public meetings and presentations.

Presentations would summarize the history of fishers in Washington, fisher biology, fisher management and conservation, and describe the proposal to reintroduce fishers in the national parks and national forests of the Washington Cascades. These public involvement processes would provide members of the public with an opportunity to learn more about the fisher and enable them to engage in the planning process to reintroduce fishers to the North Cascades and Mount Rainier National Parks.

Conservation Northwest is a project partner that provides valuable outreach to the public through the information they provide on fishers and fisher recovery in Washington on their web page. Conservation Northwest is also engaging with the public as they seek funding for fisher reintroductions in the Cascades.

BUDGET AND TIMELINE

A budget for reintroductions has been developed which outlines the estimated costs for obtaining, transporting, releasing, and monitoring fishers over a 3-year period (Appendix C) and a 4-year period (Appendix D) in one reintroduction area. The cost of these activities has been estimated at approximately $550,000 for 3 years and at approximately $750,000 for 4 years. WDFW currently has $137,000 in funding to support year 1 of a reintroduction in the southwestern Cascades reintroduction area. North Cascades National Park has $55,000 that it can dedicate to a reintroduction in the northwestern reintroduction area. In addition, North Cascades and Mount Rainier National Parks have been awarded $470,000 from the NPS to support fisher reintroductions in the Cascades; a portion of which may be available as soon as 2016. NPS and WDFW will be providing in-kind contributions of staff time and logistical support for the reintroduction that are not included in the budget. Additional sources of funding will be pursued.

Proceeding with fisher reintroductions is contingent upon the availability of fishers and adequate funding. If these requirements are met, a reintroduction of fishers to the southern Cascades reintroduction area would begin in the fall of 2014. Fishers will be captured during the trapping season in British Columbia, which extends from November 1st to February 15th, and therefore, captured fishers could be released in Washington as soon as mid-November 2014. A timeline provided below summarizes the timing of the planned events associated with fisher reintroductions in the Cascades Recovery Area. Additional monitoring and research activities, over additional years, may be added to this timeline if additional funding becomes available.

Timeline

Southwestern Cascades Reintroduction – 3-year implementation scenario

Year 1

- November 2014 to February 2015 – capture, hold, transport, and release approximately 40 fishers at selected sites within the reintroduction area
- November 2014 to December 2015 – monitor released fishers
- March 2015 to June 2015 – emphasize monitoring of females to confirm reproduction

Year 2

- November 2015 to February 2016 – capture, hold, transport, and release approximately 40 fishers (to allow the release a total of ≥80 in years 1 and 2) at selected sites within the reintroduction area
- November 2015 to December 2016 – monitor fishers released in years 1 and 2
- March 2016 to June 2016 – emphasize monitoring of females to confirm reproduction

Year 3

- January 2017 to December 2017 – continue monitoring fishers released in year 2
- March 2017 to June 2017 – emphasize monitoring of females to confirm reproduction

Southwestern Cascades Reintroduction – 4-year implementation scenario

In the event that ≥80 fishers are not released in years 1 and 2, or in the event that fisher survival is <50% in years 1 or 2, reintroduction project implementation will follow the 4-year timeline listed below.

Year 1

- November 2014 to February 2015 – capture, hold, transport, and release captured fishers at selected sites within the reintroduction area
- November 2014 to December 2015 – monitor released fishers
- March 2015 to June 2015 – emphasize monitoring of females to confirm reproduction

Year 2

- November 2015 to February 2016 – capture, hold, transport, and release captured fishers at selected sites within the reintroduction area
- November 2015 to December 2016 – monitor fishers released in years 1 and 2
- March 2016 to June 2016 – emphasize monitoring of females to confirm reproduction

Year 3

- November 2016 to February 2017 – capture, hold, transport, and release captured fishers at selected sites within the reintroduction area
- January 2017 to December 2017 – monitor fishers released in year 2 and 3
- March 2017 to June 2017 – emphasize monitoring of females to confirm reproduction

Year 4

- January 2018 to December 2018 – continue monitoring fishers released in year 3
- March 2018 to June 2018 – emphasize monitoring of females to confirm reproduction

Northwestern Cascades Reintroduction – 3-year or 4-year implementation scenario

Implementation within the northwestern reintroduction area would not be initiated until at least one year after the completion of fisher releases in the southwestern reintroduction area. Consequently, project initiation in the northwestern reintroduction area could begin no sooner than November 2016. Implementation within the northwestern reintroduction area would follow a similar 3-year or 4-year timeline as outlined for southwestern Cascades reintroduction. For example, a reintroduction in the Northwestern Cascades reintroduction area could begin in November 2016 and be completed by December 2019, following a 3-year implementation scenario.

LITERATURE CITED

Armstrong, D. P. and P. J. Seddon. 2008. Directions in reintroduction biology. Trends in Ecology and Evolution 23:20-25.

Aubry, K. B., and J. C. Lewis. 2003. Extirpation and reintroduction of fishers (*Martes pennanti*) in Oregon: implications for their conservation in the Pacific states. Biological Conservation 114:79-90.

_____, and C. M. Raley. 2006. Ecological characteristics of fishers (*Martes pennanti*) in the southern Oregon Cascade Range, update: July 2006. U.S. Forest Service, Pacific Northwest Research Station, Olympia, Washington. 31 pp.

Berg, W. E. 1982. Reintroduction of fisher, pine marten and river otter. Pages 159-175 *in* G. C. Sanderson, editor. Midwest furbearer management. North Central Section of The Wildlife Society, Bloomington, Illinois.

Christophersen, R. G., R. C. Kuntz II, and J. F. McLaughlin. 2005. A survey of forest carnivore species composition and distribution in North Cascades National Park Service Complex, Washington. National Park Service, North Coast and Cascades Network, NPS/PWR-NCCN/NOCA/NRTR-2005-01.

Davis, M. H. 1983. Post-release movements of introduced marten. J. Wildl. Manage. 47:59-66.

Dodge, W. E. 1977. Status of the fisher (Martes pennanti) in the conterminous United States. Unpubl. report submitted to U. S. Dept. of the Interior. On file with author at WDFW office, Olympia.

Evans, M. 2008. Cariboo-Chilcotin to Washington fisher translocation, 2007-2008 annual report. Washington Dept. Fish and Wildlife, Olympia. 15 pp.

_____. 2009. Cariboo-Chilcotin to Washington fisher translocation, 2008-2009 annual report. Washington Dept. Fish and Wildlife, Olympia. 21 pp.

_____. 2010. Cariboo-Chilcotin to Washington fisher translocation, 2009-2010 annual report. Washington Dept. Fish and Wildlife, Olympia. 27 pp.

Fontana, A. J., I. E. Teske, K. Pritchard, and M. Evans. 1999. East Kootenay fisher reintroduction program, 1996-1999. Ministry of Environment, Lands, and Parks, Cranbrook, British Columbia.

Franklin, J. F. and Dyrness, C.T. 1973. Natural vegetation of Oregon and Washington. Gen. Tech. Rep. PNW-GTR-008. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 427 p.

Frost, H. C. and W. B. Krohn 1994. Capture, care, and handling of fishers (*Martes pennanti*). Maine Agricultural and Forest Experimental Station, Tech. Bull. 157. Univ. of Maine, Orono.

Gannon, W. L., R. S. Sikes, and The Animal Care And Use Committee. 2007. Guidelines of the American Society of Mammalogists for the use of wild mammals in research. Journal of Mammalogy 88(3): 809-823.

Griffith, B., J. M. Scott, J. W. Carpenter, and C. Reed. 1989. Translocation as a species conservation tool: status and strategy. Science 245:477-480.

Happe, P. J., K. F. Beirne, C. E. Cantway, D. J. Manson, and D. W. Smith. 2005. Olympic National Park forest carnivore inventory conducted during the winters of 2001-2002 and 2002-2003. NPS/PWR-NCCN/INV-2005-001, Olympic National Park, Port Angeles, Washington.

Hayes, G. E., and J. C. Lewis. 2006. Washington State recovery plan for the fisher. Washington Department of Fish and Wildlife, Olympia, WA. 62pp. (available at: http://wdfw.wa.gov/wlm/diversty/soc/fisher/).

Heinemeyer, K. S. 1993. Temporal dynamics in the movements, habitat use, activity, and spacing of reintroduced fishers in northwestern Montana. Thesis, University of Montana, Missoula, Montana.

IUCN. 1987. IUCN position statement on translocation of living organisms: introductions, reintroductions, and re-stocking. Available at: *www.iucn.org/themes/ssc/pubs/policy/transe*.

_____. 1995. IUCN/SSC Guidelines for re-introductions. Forty-first meeting of the IUCN Council, Gland, Switzerland. May 1995, 6 pp. Available at: www.iucn.org/themes/ssc/pubs/policy/reinte.

Jenkins, K. J., and P. J. Happe. 2013. Sampling design and field protocols for non-invasive fisher surveys on the Olympic Peninsula, Washington. U.S. Geological Survey, Olympic Field Station, Port Angeles, WA.

Kruckeberg, A. 1991. The Natural History of Puget Sound Country. University of Washington Press.

LaBarge, T. 1987. Notes on the management of fisher at Burnet Park Zoo. Anim. Keeper's Forum 14:404-414.

Lewis, J. C. and G. E. Hayes. 2004. Feasibility assessment for reintroducing fishers to Washington. Washington Department of Fish and Wildlife, Olympia. 70 pp. (available at: http://wdfw.wa.gov/wlm/diversty/soc/fisher/).

_____ and D. W. Stinson. 1998. Washington State status report for the fisher. Washington Department of Fish and Wildlife, Olympia, Washington.

_____ and P. J. Happe. 2008. Olympic fisher reintroduction project: 2008 progress report. Washington Department of Fish and Wildlife, Olympia. (available at: http://wdfw.wa.gov/wlm/diversty/soc/fisher/).

_____, P. J. Happe, K. J. Jenkins, and D. J. Manson. 2010. Olympic fisher reintroduction project: 2009 progress report. Washington Department of Fish and Wildlife, Olympia. (available at: http://wdfw.wa.gov/wlm/diversty/soc/fisher/).

_____, P. J. Happe, K. J. Jenkins, and D. J. Manson. 2011. Olympic fisher reintroduction project: 2010 progress report. Washington Department of Fish and Wildlife, Olympia. (available at: http://wdfw.wa.gov/wlm/diversty/soc/fisher/).

_____, R. A. Powell, and W.J. Zielinski. 2012. Carnivore Translocations and Conservation: Insights from Population Models and Field Data for Fishers (Martes pennanti). PLoS ONE 7(3): e32726 (available at: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0032726)

Lofroth, E. C., C. M. Raley, J. M. Higley, R. L. Truex, J. S. Yaeger, J. C. Lewis, P. J. Happe, L. L. Finley, R. H. Naney, L. J. Hale, A. L. Krause, S. A. Livingston, A. M. Myers, and R. N. Brown. 2010. Volume I - Conservation Assessment for Fisher (Martes pennanti) in South-central British Columbia, Western Washington, Western Oregon, and California. USDI Bureau of Land Management, Portland, OR.

Mitcheltree, D. H., T. L. Serfass, M. T. Whary, W. M. Tzilkowski, R. P. Brooks, and R. L. Peper. 1997. Captive care and clinical evaluation of fishers during the first year of a reintroduction project. Pages 317-328 in G. Proulx, H. N. Bryant, and P. M. Woodard, eds. Martes: taxonomy, ecology, techniques and management. Provincial Museum of Alberta, Edmonton, Alberta, Canada.

Mowat, G., and D. Paetkau. 2002. Estimating marten Martes Americana population size using hair capture and genetic tagging. Wildl. Biol. 8:201-209.

National Park Service. 2006. Management policies: the guide to managing the National Park System. National Park Service, Washington, D. C. (www.nps.gov/policy/mp/policies.html)

Nielsen, L. 1988. Definitions, considerations, and guidelines for translocation of wild animals. Pages 12-51 in Nielson, L. and Brown, R. D. (eds.), Translocation of wild animals. Wisconsin Humane Society and Caesar Kleberg Wildlife Research Institute, Milwaukee, Wisconsin 333 p.

Peel M. C., Finlayson B. L. and McMahon T. A. 2007. Updated world map of the Köppen-Geiger climate classification, Hydrol. Earth Syst. Sci. 11:1633-1644.

Powell, R. A. 1993. The fisher: Life history, ecology, and behavior. Second edition. University of Minnesota Press, Minneapolis, Minnesota.

_____, J. C. Lewis, B. G. Slough, S. M. Brainerd, N. R. Jordan, A. V. Abramov, V. Monakov, P. A. Zollner, and T. Murakami. 2012. Evaluating Translocations of Martens, Sables, and Fishers: Testing Model Predictions with Field Data. Chapter 6, pages 93-137, in K. B. Aubry, W. J. Zielinski, M. G. Raphael, G. Proulx, and S.W. Buskirk, eds. Biology And Conservation of Martens, Sables, and Fishers: A New Synthesis. Cornell Univ. Press. Ithaca, NY.

Proulx, G., A. J. Kolenosky, M. Badry, R. K. Drescher, K. Seidel, and P. J. Cole. 1994. Post-release movements of translocated fishers. Pages 197-203 *in* S. W. Buskirk, A. Harestad, and M. Raphael,editors. Martens, sables, and fishers: biology and conservation. Cornell University Press, Ithaca, New York.

Raley, C. M., E. C. Lofroth, R. L. Truex, J. S. Yaeger, and J. M. Higley. 2012. Habitat ecology of fishers in western North America: a new synthesis. In press in Biology and conservation of martens, sables, and fishers: a new synthesis. K.B. Aubry, W.J. Zielinski, M.G. Raphael, G. Proulx, and S.W. Buskirk, editors. Cornell UniversityPress, Ithaca, New York, USA.

Rego, P. W. 1989. Wildlife investigation: fisher reintroduction, 10/1/88-9/30/89. Project number W-49-R-14 performance report. Connecticut Dept. Envir. Protect., Wildl. Div., Burlington. 7 pp.

Roy, K. D. 1991. Ecology of reintroduced fishers in the Cabinet Mountains of northwest Montana. Thesis, University of Montana, Missoula.

Seaman, D. E., and D. B. Houston. An evaluation of techniques to determine the status of fisher in Olympic National Park. Unpubl. report. Olympic National Park, Port Angeles, WA. 9pp.

Seddon, P. J., Armstrong D. P., and Maloney R. F. 2007. Developing the science of reintroduction biology. Conserv Biol. 21(2):303-312.

Seglund, A. E. 1995. The use of rest sites by the Pacific fisher. Thesis, Humboldt State University, Arcata, California. 66pp.

Serfass, T. L., R. P. Brooks, and W. M. Tzilkowski. 2001. Fisher reintroduction in Pennsylvania: Final report of the Pennsylvania fisher reintroduction project. Frostburg State University, Frostburg, Maryland.

USFWS (US Fish & Wildlife Service) (2004) Endangered and threatened wildlife and plants: 12-month finding for a petition to list the west coast distinct population segment of the fisher (Martes pennanti). Federal Register 69(68):18770-18792.

Washington Wildlife Habitat Connectivity Working Group (WHCWG). 2010. Washington Connected Landscapes Project: Statewide Analysis. Washington Departments of Fish and Wildlife, and Transportation, Olympia, WA.

Warheit, K. I. 2004. Fisher (*Martes pennanti*) control region sequences from Alberta, and re-analysis of sequences from other regions in North America: recommendations for the reintroduction of fishers in Washington. Draft report submitted to Fisher Science Team. Washington Department of Fish and Wildlife, Olympia, Washington.

Weir, R. D. 1995. Diet, spatial organization, and habitat relationships of fishers in south-central British Columbia. Thesis, Simon Fraser Univ., Burnaby, British Columbia.

_____ and A. S. Harestad. 2003. Scale-dependent habitat selectivity by fishers in south-central British Columbia. J. Wildl. Manage. 67:73-82.

APPENDICES

Appendix A. Comparison of eight factors used to evaluate the success of 31 fisher translocations in North America (1947-1998). Translocations included only reintroductions and augmentations; data from three introductions were not included.

Factor	Successful Translocations N = 25	Failed Translocations N = 6
Mean number (± SE) of fishers released[a]	58.2 ± 9.9, range: 12-190	22.5 ± 8.4, range: 4-60
Mean sex-ratio of released fishers	55% females; 45% males	55% females; 45% males
Release dates	72% in Fall and Winter	83% in Fall and Winter
Mean number (± SE) of years that releases occurred	3.8 ± 0.4	1.7 ± 0.4
Proximity of source population[a]	20 (80%) used the closest stock, 2 (8%) used the closest and a distant stock, 2 (8%) used a distant stock, 1 (4%) used unknown stock	6 (100%) used the closest stock
Hard vs. soft release[b]	18 (72%) used hard, 2 (8%) used hard and soft, 2 (8%) used soft only, and 3 (12%) release unknown	6 (100%) used hard
Protection from commercial trapping for fishers	19 (76%) protected, 4 (16%) unprotected, 2 (8%) unknown	4 (66.7%) protected, 1 (16.6%) unprotected, 1 (16.6%) unknown
Protection from incidental capture	5 (20%) protected, 18 (72%) unprotected, 2 (8%) unknown	4 (66.7%) protected, 2 (33.3%) unprotected

[a] This factor has a meaningful influence translcation success, per the findings of Lewis et al. (2012).

[b] Hard releases involve the immediate release of animals upon arrival at the release site. Soft releases involve temporarily housing the animal at the release site to acclimate them to the site, and providing food and scent near the release site to encourage individuals to stay near the release site, post-release.

Appendix B. Veterinary tasks and information to document when inspecting and processing fishers for translocation.

1) Date, time, location, names of vets and assistants
2) Identify individual fisher with a letter/number code (e.g., F01, M02)
3) Determine sex and estimate age based on tooth wear, teat, sagittal crest, baculum measurements
4) Morphological measurements – weight; length of tail, hind foot, ear, total; neck circumference; and chest circumference.
5) Conduct complete physical examination
6) Determination of suitability for reintroduction – individuals meet following minimum criteria:
   a. no broken bones
   b. > 2 intact canines
   c. no debilitating wounds or injuries
   d. no missing limbs
   e. no feet with >1 missing toe
   f. no apparent disabilities
   g. no fishers that appear in poor condition
   h. no diarrhea
   i. no ocular or nasal discharge
   j. no significant unexplained hair loss
   k. no excessive tooth wear indicative of advanced age
   l. no heavy external parasite infestations
7) Conduct implant surgery on suitable fishers
   a. Chemical immobilization provided by project veterinarian.
   b. Drugs, dosages, times for injection, induction, reversal, recovery will be recorded
   c. Monitor pulse, temperature, respiration, and capillary refill time
8) Treatment of minor injuries and wounds
9) DNA sample(s) – ear punch and hair sample
10) Blood sample
   a. Clot tube for serum
   b. EDTA or heparin tube for whole blood
11) Fecal sample – refrigerate
12) Ectoparasites – collect and place in alcohol
13) PIT tagging
14) Vaccinate for Rabies (Imrab-3) and Distemper (Purevax ferret vaccine)
15) Endoparasite treatment – Ivermectin and Droncit
16) Ectoparasite treatment – flea powder, Frontline or Revolution, if necessary
17) Photograph individuals – face, teeth, ventral markings, wounds, injuries, abnormalities
18) Give reversal, if indicated
19) Monitor recovery and reactions to vaccinations
20) List suitable individuals as certified

Appendix C. Proposed budget for a 3-year reintroduction project in one fisher reintroduction area in the Washington Cascades.

	Year 1		Year 2		Year 3	
Cost of Coordinator's Time (@ 35 US$/hr)	**Hours**	**Cost**	**Hours**	**Cost**	**Hours**	**Cost**
Trapper coordination and preparation	70	2,450	50	1,750		
Fisher transport	180	6,300	180	6,300		
Set up of facility and take down	40	1,400	40	1,400		
Husbandry: feeding, care, cleaning, maintenance	400	14,000	400	14,000		
Documentation and Final report	40	1,400	40	1,400		
Subtotal		**25,550**		**23,450**		
Cost of Coordinator's Expenses	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Building/obtaining equip. (boxes, runs, stands)	35 sets	3,500	5	500		
Fisher Transfer travel costs ($0.88/mi.)	5500 mi.	4,840	5500 mi.	4,840		
Supplies (i.e., food, litter, bedding)		180		180		
Facility rental - 3 months @ $500/month		1,500		1,500		
Office expenses		250		250		
Subtotal		**10,270**		**7,270**		
Other Provincial Expenses	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Veterinarian expenses: time, travel, supplies		4,000		4,000		
Ministry expenses (Permit and processing)		100		0		
Trapper payments: @ $500/fisher	40	20,000	40	20,000		
Subtotal		**24,100**		**24,000**		
Transport to and from BC	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Mileage ($0.56/mile)	2200	1,122	2200 mi.	1,122		
Per diem ($60)	16 staff-days	960	16 staff-days	960		
Salary ($33/hr)	16 staff-days	4,224	16 staff-days	4,224		
Subtotal		**6,306**		**6,306**		
Monitoring Equipment	**Number**	**Cost**	**Number**	**Cost**	**Number**	**Cost**
Transmitters – Holohil AI-2HM implants ($290 ea)	45	13,050	45	13,050		
Pit tags - 90 sterile packages	90	640	available	0		
Radio receivers, antennas, cables (3 sets avail.)	2 sets	1,500	available	0		
Field gear- tents, radios, etc	available	0	available	0		
Subtotal		**15,190**		**13,050**		
Monitoring Expenses	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Personnel						
Wildlife Biologist (Lead; $5812/mo)	8 mo.	46,496	8 mo.	46,496	6 mo.	34,872
Wildlife Biologist (Asst.; $4200/mo)	8 mo.	33,600	8 mo.	33,600	6 mo.	25,200
Transportation - vehicle rental and expenses	1	4,200	1	4,200	1	4,200
Aerial Telemetry flight time ($250/hour; 4-6 hrs/wk, 45 wks)	225 hrs	56,250	270 hrs	67,500	180 hrs	45,000
GIS support						2,000
Genetic Analysis - Genotyping (~$50/fisher)	40	2,000	40	2,000		
Subtotal		**142,046**		**153,296**		**111,272**
Yearly Grand Totals	**Year 1**	**217,062**	**Year 2**	**222,372**	**Year 3**	**111,272**
3 -Year Grand Total						**550,706**

Appendix D. Proposed budget for a 4-year reintroduction project in one fisher reintroduction area in the Washington Cascades.

	Year 1		Year 2		Year 3		Year 4	
Cost of Coordinator's Time (@ 35 US$/hr)	**Hours**	**Cost**	**Hours**	**Cost**	**Hours**	**Cost**	**Hours**	**Cost**
Trapper coordination and preparation	70	2,450	50	1,750	50	1,750		
Fisher transport	140	4,900	140	4,900	140	4,900		
Set up of facility and take down	40	1,400	40	1,400	40	1,400		
Husbandry: feeding, care, cleaning	300	10,500	300	10,500	300	10,500		
Documentation and Final report	40	1,400	40	1,400	40	1,400		
Subtotal		**20,650**		**19,950**		**19,950**		
Cost of Coordinator's Expenses	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Building/obtaining equip. (boxes, runs, stands)	35 sets	3,500	5	500	5	500		
Fisher Transfer travel costs ($0.88/mi.)	5500 mi.	4,840	5500 mi.	4,840	5500 mi.	4,840		
Supplies (i.e., food, litter, bedding)		180		180		180		
Facility rental - 3 months @ $500/month		1,500		1,500		1,500		
Office expenses		250		250		250		
Subtotal		**10,270**		**7,270**		**7,270**		
Other Provincial Expenses	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Veterinarian expenses: time, travel, supplies		4,000		4,000		4,000		
Ministry expenses (Permit and processing)		100		0		0		
Trapper payments: @ $500/fisher	30	15,000	30	15,000	30	15,000		
Subtotal		**19,100**		**19,000**		**19,000**		
Transport to and from BC	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Mileage ($0.56/mile)	2,200	1,122	2200 mi.	1,122	2200 mi.	1,122		
Per diem ($60)	16 staff-days	960	16 staff-days	960	16 staff-days	960		
Salary ($33/hr)	16 staff-days	4,224	16 staff-days	4,224	16 staff-days	4,224		
Subtotal		**6,306**		**6,306**		**6,306**		
Monitoring Equipment	**Number**	**Cost**	**Number**	**Cost**	**Number**	**Cost**	**Number**	**Cost**
Transmitters – Holohil AI-2HM implants ($290 ea)	45	13,050	45	13,050				
Pit tags - 90 sterile packages	90	640	available	0	available	0		
Radio receivers, antennas, cables (3 sets avail.)	2 sets	1,500	available	0	available	0		
Field gear- tents, radios, etc	available	0	available	0	available	0		
Subtotal		**15,190**		**13,050**		**0**		
Monitoring Expenses	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**	**Amount**	**Cost**
Personnel								
Wildlife Biologist (Lead; $5812/mo)	8 mo.	46,496	8 mo.	46,496	8 mo.	46,496	6 mo.	34,872
Wildlife Biologist (Asst.; $4200/mo)	8 mo.	33,600	8 mo.	33,600	8 mo.	33,600	6 mo.	25,200
Volunteers (5-10)		0		0		0		0
Transportation - vehicle rental and expenses	1	4,200	1	4,200	1	4,200	1	4,200
Aerial Telemetry flight time ($250/hour; 4-6 hrs/wk, 45 wks)	225 hrs	56,250	270 hrs	67,500	270 hrs	67,500	180 hrs	45,000
GIS support								2,000
Genetic Analysis - Genotyping (~$50/fisher)	30	1,500	30	1,500	30	1,500	0	
Subtotal		**138,546**		**149,796**		**149,796**		**111,272**
Yearly Grand Totals	**Year 1**	**213,562**	**Year 2**	**218,872**	**Year 3**	**205,822**	**Year 4**	**111,272**
4 -Year Grand Total								**749,528**