National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

Cascades Fisher Reintroduction Project

Progress Report for March 2017 to February 2018

Natural Resource Report NPS/PWR/NRR—2018/1667

ON THE COVER

Female F001 resting (upper left photo; by Erin Burke, USFS) and visiting a baited camera-station (lower right photo; by Mitch Parsons, University of Washington).

Cascades Fisher Reintroduction Project

Progress Report for March 2017 to February 2018

Natural Resource Report NPS/PWR/NRR—2018/1667

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Contents

Page

Figures....iv

Tables....iv

Abstract....v

Acknowledgments....v

Introduction....1

Progress to Date....4

Monitoring Methods....4

Movements and Home Range Establishment....8

Survival and Mortality....10

Reproduction....11

Research....13

Outreach....13

Presentations....13

Publications....14

Media....14

Fisher Project Website....14

Challenges/Difficulties Encountered....16

Expectations for the Remainder of 2018....16

Literature Cited....18

Appendix A. List of fishers released in the southern portion of the Cascade Recovery Area, and associated morphology, age and release data....20

Figures

Page

Figure 1. A map of the southern portion of Cascade Recovery Area 2

Figure 2. Flight lines for 50 of the 69 aerial telemetry flights conducted to locate radio-transmittered fishers from December 2015 to February 2018. 5

Figure 3. All telemetry locations (n=776; 484 F [white triangles], 292 M [orange circles]) obtained from December of 2015 to February of 2018 for fishers released in the southern portion of the Cascade Fisher Recovery Area in Washington. 6

Figure 4. Telemetry locations collected for Cohort 1 fishers (n=464; left graphic) from December 2015 to February 2018 and for Cohort 2 fishers (n=312; right graphic) from December 2016 to February 2018 7

Figure 5. Most recent locations for 35 fishers detected during aerial telemetry flights from October of 2017 to February of 2018 8

Figure 6. Female F023 was photographed descending her den tree, head first, and carrying a large kit, 1 June 2017. F023's den site was located approximately 26 km (16 miles) south of Randle, Washington in the Gifford Pinchot National Forest. 12

Tables

Page

Table 1. Mean distances between telemetry locations and release sites and between established home ranges and release sites for fishers during their first year following release, by cohort and sex. 9

Table 2. Annual survival rates and number of mortalities for fishers released in the southern portion of the Cascades Fisher Recovery Area from December 2015 to February 2018, by cohort and sex 11

Abstract

Fishers (*Pekania pennanti*) were extirpated from Washington as a result of over-trapping, habitat loss, and predator eradication programs. A mid-sized member of the weasel family, fishers occurred in the coniferous forests of Washington until the early and mid-1900s. We established a partnership between federal, state, and non-profit organizations with the goal to restore fishers to their former range in Washington. This partnership reintroduced 90 fishers from British Columbia to Olympic National Park from 2008 to 2010, and we are now in the third year of a reintroduction project to restore fishers to Mount Rainier National Park (MORA), Gifford Pinchot National Forest (GPNF) and the larger South Cascade Ecosystem. In Year 1 of the project, we released 23 fishers (11 F, 12 M; each with a radio-transmitter) at a single release site on the GPNF. In Year 2, we released an additional 46 fishers (27 F, 19 M; each with a radio-transmitter), with 16 fishers released at one site in MORA and 30 released at one site in GPNF. As of February 2018, we have collected 776 locations of these fishers using aerial telemetry. The majority of the most recent locations of fishers (29 of 35 [83%]) occurred within the boundaries of the recovery area. These location data also indicated that 82% of Cohort 1 females, 42% of Cohort 1 males, 30% of Cohort 2 females and 42% of Cohort 2 males appear to have established a home range in their first year, and that 93% of these home ranges (28 of 30) were established within the recovery area. A 67% survival rate was estimated for Cohort 1 fisher during their second full year in Washington, and the same survival rate was estimated for Cohort 2 fishers during their first year (target objective >50%). Predation, vehicle collision, and injuries with secondary causes, were the most common causes when cause of death could be determined. We documented the first confirmed reproduction of fishers in the South Cascades in 2017, with female F023 photographed with one kit at her den tree. Because the large majority of females (23 of 38) were released as juveniles (10–11 months of age) it was unlikely that a large number of females would reproduce in Years 1 and 2 of the project. However, all surviving females (as many as 26) are now capable of giving birth in the spring of 2018. We could not release fishers in Year 3 due to extensive wildland fire impacts to the source population trapping area. We are now working closely with the government of Alberta, Canada, to begin trapping at a new source population, with intent to reintroduce fishers to the North Cascades beginning in the winter of 2018–2019. In years 4–6 of the project, we aim to release 80 fishers in the North Cascades and an additional 11 fishers in the South Cascades, with continued monitoring across both restoration areas.

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Introduction

Fishers (*Pekania pennanti*) are a mid-sized member of the weasel family (Mustelidae) that historically occurred in the dense coniferous forests of Washington (Powell 1993, Lofroth et al. 2010). Unregulated harvest, loss and fragmentation of habitat, and predator control campaigns beginning in the late 1800s collectively resulted in the decline and extirpation of fishers from Washington by the mid-1900s (Lewis and Stinson 1998). Consequently, the fisher was listed as an endangered species in the state, and recovery actions have been outlined to restore fishers in Washington (Lewis and Hayes 2004, Hayes and Lewis 2006).

Given the success of reintroductions for restoring fisher populations (Lewis et al. 2012), Washington Department of Fish and Wildlife (WDFW), the National Park Service (NPS), and Conservation Northwest (CNW) have partnered to plan, implement, and monitor the success of fisher reintroductions on the Olympic Peninsula (Lewis 2014, Happe et al. 2017) and the Cascade Range in an effort to restore fishers in the largest portions of their historical range in Washington.

Planning for the Cascades fisher reintroduction project began in 2013 with WDFW's Implementation Plan for Reintroducing Fishers to the Cascade Range in Washington (Lewis 2013). Mount Rainier National Park (MORA) and North Cascades National Park Service Complex led the National Environmental Policy Act process and completed a Fisher Restoration Plan / Environmental Assessment in May 2015 (NPS 2015). Project partners worked with the British Columbia Ministry of Forests, Lands and Natural Resource Operations (FLNRO), British Columbia Ministry of Environment (MOE) and the Tsilhqot'in, Secwepemc, and Dakelh First Nations to obtain an approved capture and transport permit for the capture and translocation of up to 160 fishers over five years to Washington. Planning efforts also required contracting with organizations to 1) coordinate trapping efforts with licensed British Columbia trappers, 2) house and care for captive fishers, and 3) provide veterinary services for health inspections and preparing fishers for release. These planning efforts were completed by October of 2015.

Our goal is to re-establish a self-sustaining fisher population in both the southern and northern portions of the Cascade Recovery Area as outlined in the fisher recovery plan for Washington State (Hayes and Lewis 2006). To accomplish this goal, we have the following objectives for each portion of the Cascade Recovery Area:

- **Objective 1**: Capture a founder population of 80 fishers (~40F and ~40M) from central British Columbia (or other appropriate source population) and release them in the southern portion of the Cascade Recovery Area (Figure 1) over 2–3 years, followed by another 80 fishers in the northern portion over 2–3 years.
- **Objective 2**: Release fishers at few (2–3) locations at each of the two portions of the Recovery Area to increase the likelihood of fishers interacting, i.e., finding mates, and learning habitat suitability from previously released fishers.

- **Objective 3**: Release as many fishers as possible before January 1st, so that the stress of the reintroduction process occurs well before the active gestation period of female fishers (from late-February to late-April), which is expected to improve reproductive success.
- **Objective 4**: Monitor post-release movements, survival, home range establishment, and reproduction to evaluate initial success of the reintroduction project during the 3–4 years when we can track fishers with functioning radio-transmitters.

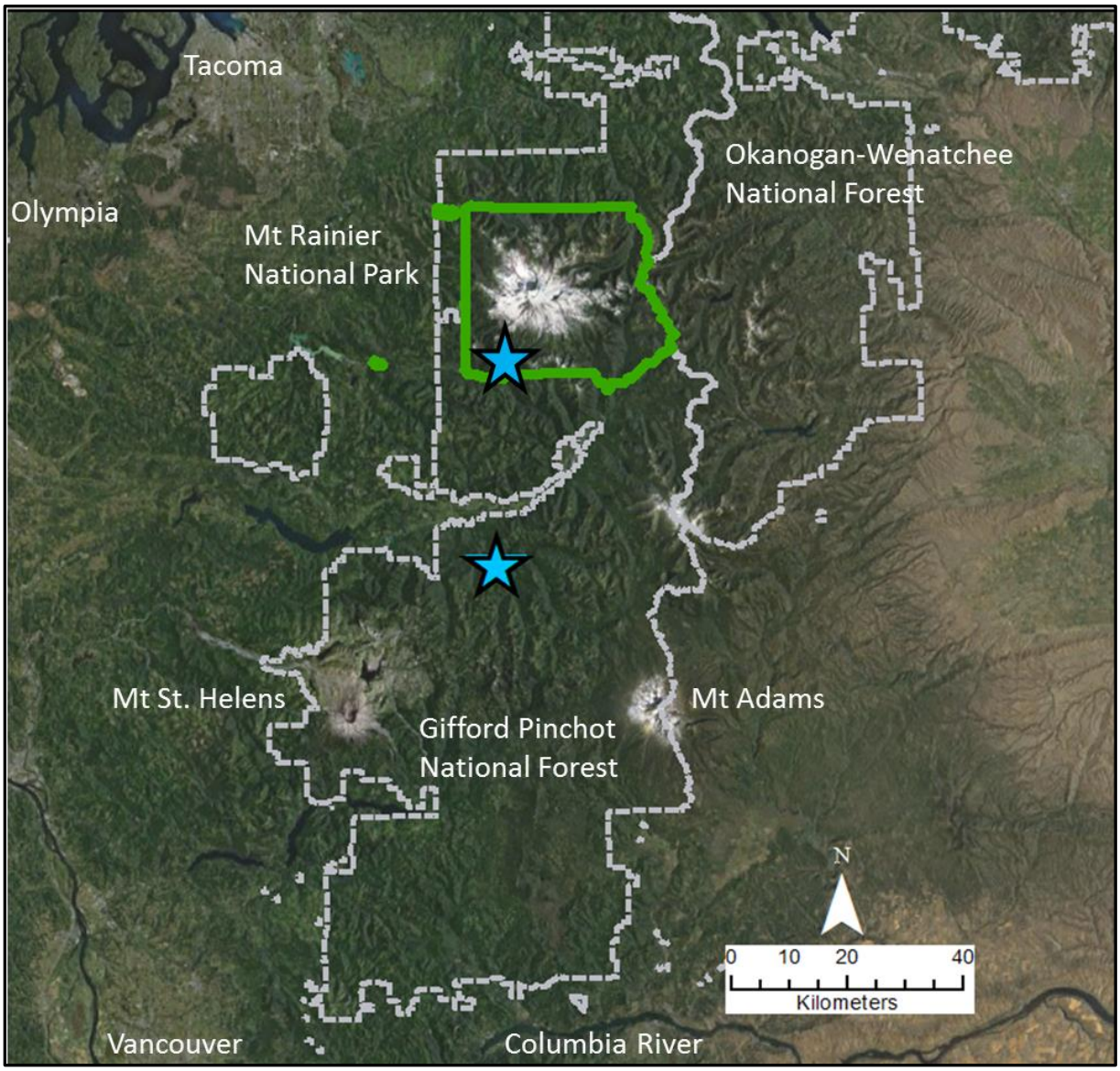

Figure 1. A map of the southern portion of Cascade Recovery Area. The blue stars indicate the two locations where fishers were released during the project. The northern star indicates the Longmire release location in Mount Rainer National Park and the southern star indicates the Cispus Learning Center on the Gifford Pinchot National Forest. In year 1, all 23 of the Cohort 1 fishers were released at the Cispus release site, whereas in year 2, 16 of the Cohort 2 fishers were released at Longmire and 30 were released at Cispus.

In this report we provide a detailed summary of progress of the fisher reintroduction project in the southern Cascade Range in Washington made from March 2017 to February 2018. A detailed summary of the process and methodologies of this fisher reintroduction project was provided in the previous progress report (Lewis et al. 2017).

Progress to Date

Objective 1: Capture a founder population of 80 fishers (~40F and ~40M) from central British Columbia and release them in the southern portion of the Cascade Recovery Area over 2–3 years.

In the first year of the project (December 2015 to November 2016), 23 fishers (11F, 12M) were successfully captured in central British Columbia (Appendix 1), transported to Washington, and released on four occasions from 3 December 2015 to 6 February 2016 near the Cispus Learning Center (Figure 1): in this report these 23 fishers are referred to collectively as Cohort 1. In the second year of the project (December 2016 to November 2017), 46 fishers were captured and transported to Washington (27F, 19M; Appendix 1), and 16 (8F, 8M) were released at the Longmire release site on Mount Rainier National Park and 30 (19F, 11M) were released at the Cispus Learning Center (Figure 1): in this report, these 46 fishers are referred to collectively as Cohort 2. With the total release of 69 fishers to date, we are within 11 animals of meeting our objective of releasing 80 fishers in the southern Cascade Range.

Objective 2: Release fishers at two or three locations to increase the likelihood of fishers interacting, i.e., finding mates, and learning habitat suitability from previously released fishers.

We met this objective by releasing fishers at only two release sites (Figure 1).

Objective 3: Release as many fishers as possible before January 1st to facilitate reproductive success, by conducting the reintroduction process well before the active gestation period of female fishers (Facka et al. 2016).

In Years 1 and 2 of the project, we were able to release 19 of 38 translocated females (50%) before January 1st (Appendix 1). For context, 15 of the 50 females (30%) translocated during the Olympic fisher reintroduction project were released before 1 January (Lewis et al. 2011). This was due to early recruitment of trappers, improved financial incentives, and favorable early-season trapping conditions in the fall/winter of 2016/2017.

Objective 4: Monitor post-release movements, survival, home range establishment, and reproduction to evaluate initial reintroduction success during the 3–4 years when we can track fishers with functioning radio-transmitters.

Monitoring Methods

Aerial telemetry was the primary method used to obtain most of the data to evaluate post-release movements, survival, home range establishment and reproduction. Our goal was to fly approximately five times per month to locate fishers; however, poor flying weather has prevented flying this frequently in all but two months. To date, we have conducted 69 aerial telemetry flights (from 26 December 2015 to 12 February 2018; Figure 2), which included 268 hours of flight time, at a cost of $132,625. During these flights we obtained 776 locations (484 for females, 292 for males; Figures 3, 4 and 5), for an average of 2.65 locations per hour and an average cost of $186.53 per location. During these flights, our objective is to determine fisher locations and survival status (live vs. mortality signal), and we use these data to assess movements between locations and clustering of

locations that may indicate home range establishment. We also used ground telemetry techniques to 1) locate potential fisher den sites and deploy remote cameras at these sites to document reproduction, and to 2) investigate mortality signals and recover dead fishers to determine cause of death.

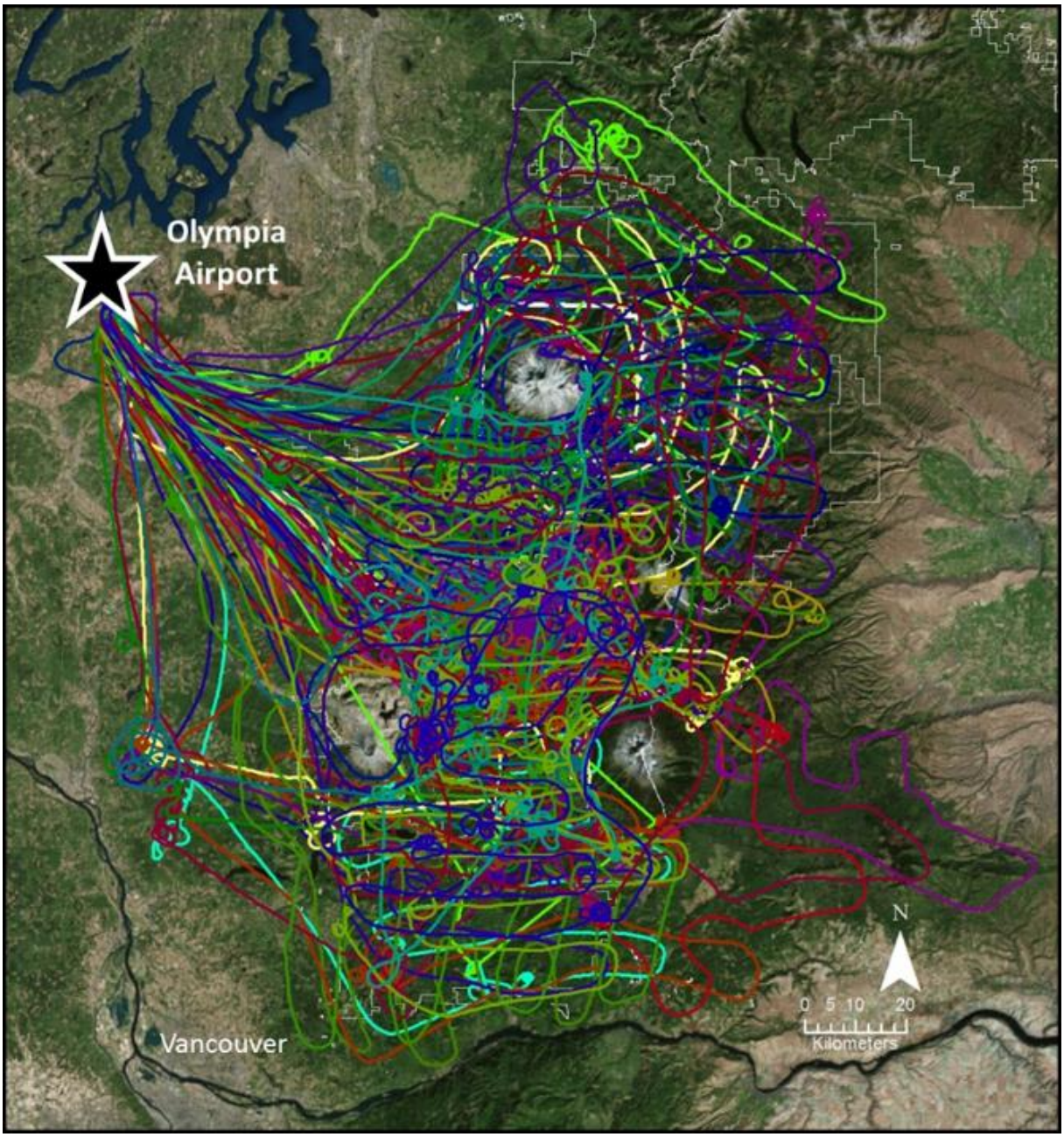

Figure 2. Flight lines for 50 of the 69 aerial telemetry flights conducted to locate radio-transmittered fishers from December 2015 to February 2018.

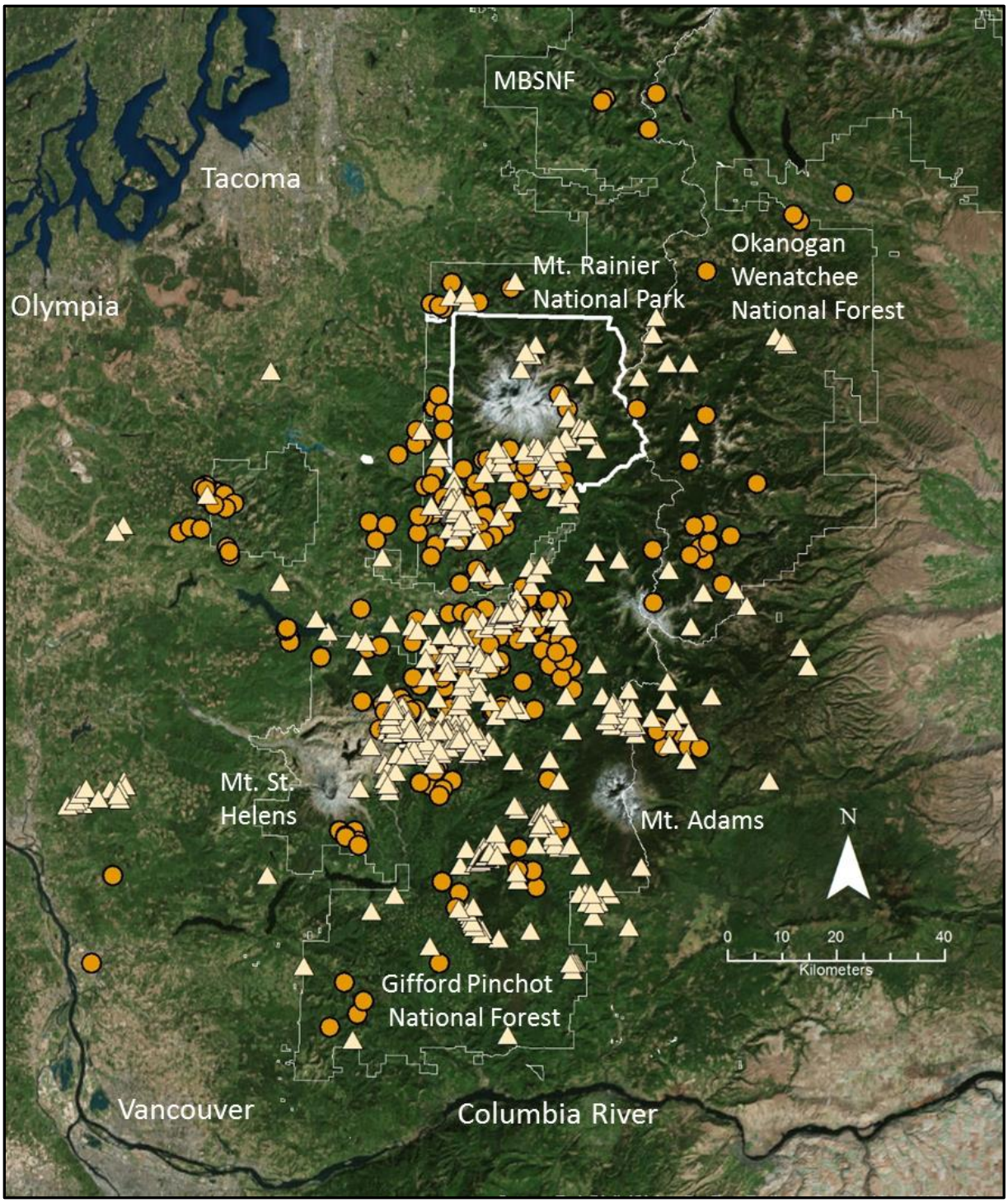

Figure 3. All telemetry locations (n=776; 484 F [white triangles], 292 M [orange circles]) obtained from December of 2015 to February of 2018 for fishers released in the southern portion of the Cascade Fisher Recovery Area in Washington.

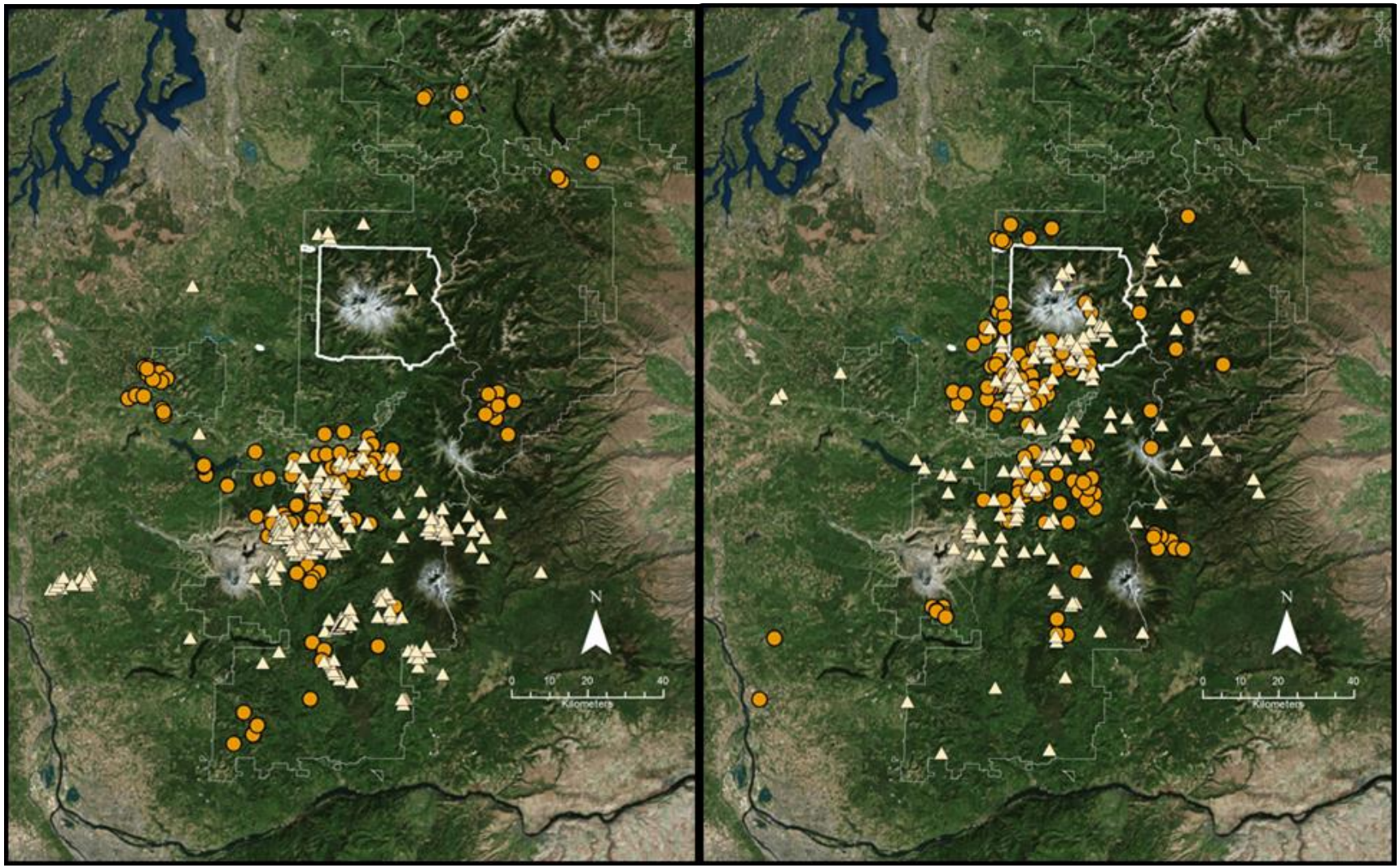

Figure 4. Telemetry locations collected for Cohort 1 fishers (n=464; left graphic) from December 2015 to February 2018 and for Cohort 2 fishers (n=312; right graphic) from December 2016 to February 2018. White triangles indicate locations for female fishers and orange circles indicate locations for males.

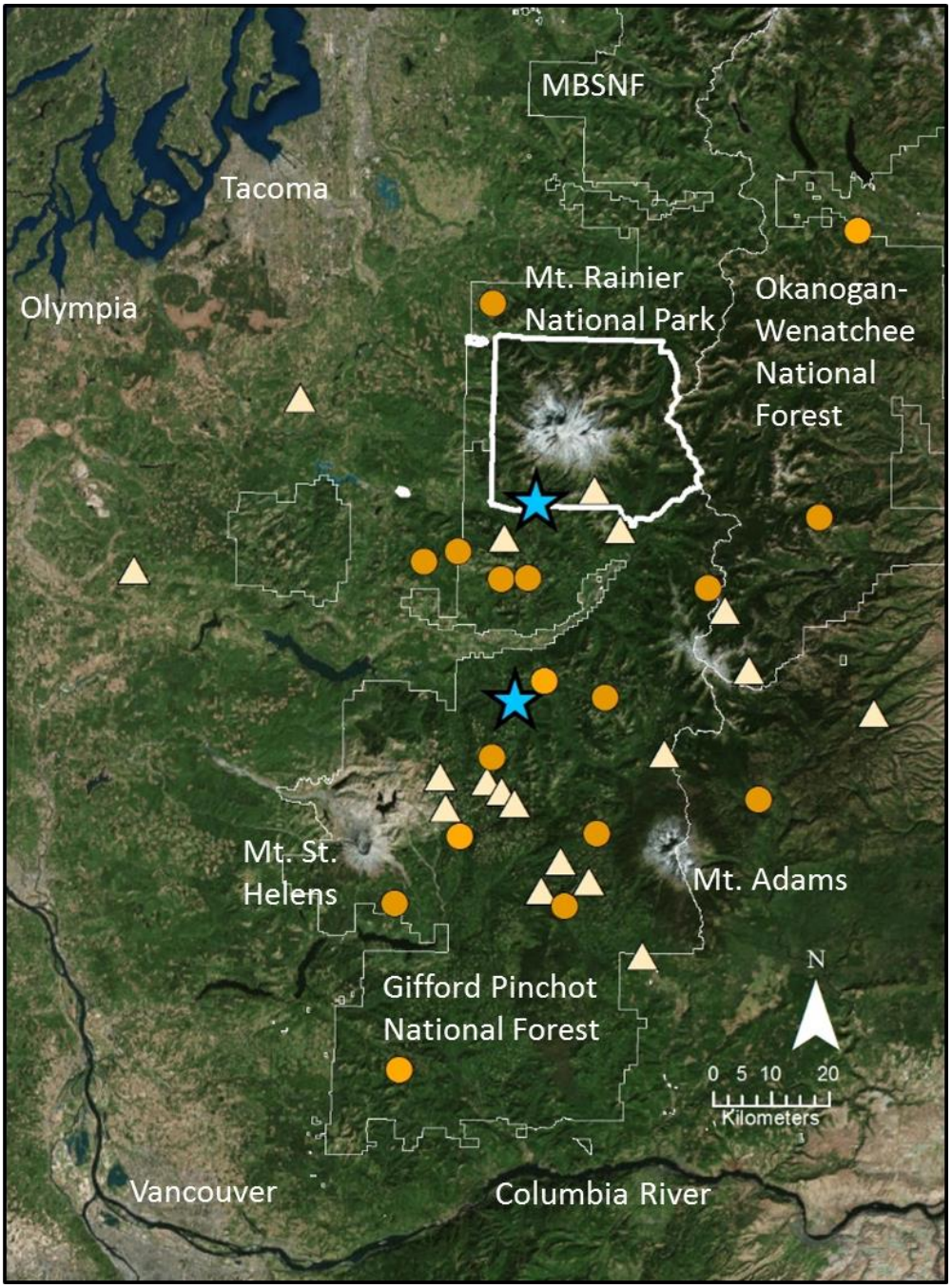

Figure 5. Most recent locations for 35 fishers detected during aerial telemetry flights from October of 2017 to February of 2018. A number of Cohort 1 fishers with transmitters that no longer function (i.e., not located recently) also occupy this portion of the recovery area. White triangles indicate locations of females and orange circles indicate locations for males; release sites are indicated by blue stars.

Movements and Home Range Establishment

One goal of any reintroduction is to release individuals in landscapes dominated by high-quality habitat. Post-release movements and home range establishment by released individuals can be used

as indicators of how individuals perceive the suitability of the habitat within and outside the recovery area. Specifically, we used the proximity of the aerial telemetry locations of fishers to their release site and the proximity of established home ranges to release sites, in the year following release, as indications of the occupancy/suitability of the recovery area.

Our initial analysis of movements indicated that the mean distance to all telemetry locations for Cohort 1 male and female fishers was approximately 25 km from the Cispus release site (Table 1). This mean distance (~25 km) indicates that many fishers used landscapes relatively close to the Cispus release site and the center of the recovery area, avoiding extended movements away from a release site that may pose greater mortality risks. The mean distance to telemetry locations was slightly smaller for Cohort 2 females and substantially smaller for Cohort 2 males as compared to Cohort 1 fishers (Table 1). This shorter distance may be an indication that the presence of previously released fishers (i.e., Cohort 1 fishers) prompted Cohort 2 fishers to remain close to the fishers that occupied areas near the release sites (Table 1). The suitability of the recovery area is also supported by the majority of the recent locations (29 of 35 [83%]) being located within the boundaries of the recovery area (i.e., National Forest and National Park lands; Figure 5).

Table 1. Mean distances between telemetry locations and release sites and between established home ranges and release sites for fishers during their first year following release, by cohort and sex.

Fishers by Cohort and Sex	Data (n)	Mean distance ± SE from release site
Cohort 1 Females (Cispus release)	Telemetry Locations (210)	26.8 ± 1.4 km
Cohort 1 Males (Cispus release)	Telemetry Locations (129)	24.7 ± 1.9 km
Cohort 2 All Females	Telemetry Locations (173)	23.7 ± 1.3 km
Cohort 2 Females (Cispus released)	Telemetry Locations (68)	18.8 ± 1.9 km
Cohort 2 Females (MORA released)	Telemetry Locations (105)	26.9 ± 1.7 km
Cohort 2 All Males	Telemetry Locations (133)	19.6 ± 1.4 km
Cohort 2 Males (Cispus released)	Telemetry Locations (66)	15.2 ± 1.2 km
Cohort 2 Males (MORA released)	Telemetry Locations (67)	23.8 ± 2.4 km
Cohort 1 Females	Home Range Centers (9)	33.0 ± 6.8 km
Cohort 1 Males	Home Range Centers (5)	30.1 ± 8.4 km
Cohort 2 All Females	Home Range Centers (8)	19.7 ± 3.7 km
Cohort 2 Females (Cispus released)	Home Range Centers (5)	24.7 ± 4.7 km
Cohort 2 Females (MORA released)	Home Range Centers (3)	11.4 ± 0.5 km
Cohort 2 All Males	Home Range Centers (8)	20.2 ± 4.8 km
Cohort 2 Males (Cispus released)	Home Range Centers (4)	30.2 ± 6.2 km
Cohort 2 Males (MORA released)	Home Range Centers (4)	10.3 ± 2.5 km

While telemetry locations are informative of general movement patterns, home range establishment provides an additional indication of habitat suitability for reintroduced fishers and we used it as one measure of reintroduction success. For example, home range establishment by ≥50% of individuals

following release and home range establishment relatively close to the release site are positive indicators of habitat suitability and reintroduction success. For Cohort 1 fishers, we identified nine of 11 females (82%) and five of 12 males (42%) with clustered location points indicative of home range establishment. Eight of these nine females (88%) established home ranges within or partly within the recovery area, whereas all five males established home ranges within or partly within the recovery area. We also identified eight of 27 Cohort 2 females (30%) and eight of 19 Cohort 2 males (42%) that appeared to establish a home range in their first year. All eight females and seven of the eight males established their home ranges within the recovery area. Even though a smaller percentage of Cohort 2 fishers appeared to establish home ranges in their first year (in part because nine Cohort 2 females died in their first year), this finding is likely to be an underestimate given the difficulty in getting enough data for each of the 46 Cohort 2 fishers to indicate home range establishment of some individuals. For context, among the fishers released during the Olympic fisher reintroduction project, 27 of 50 females (54%) and 21 of 40 males (46%) established home ranges in their first year (Lewis 2014).

Among the 11 Cohort 1 fishers (9F, 5M) that appeared to establish a home range in the southern Cascade Range, the mean distance from the Cispus release site to the center of a home range was 33.0 km for females and 30.1 km for males, and there was considerable variance among these distances (Table 1). The mean distance to home ranges was shorter for the 17 Cohort 2 fishers (23.1 km for 9 females, 20.2 km for 8 males; Table 1) that appeared to establish a home range in their first year as compared to Cohort 1 fishers. The mean distances to home ranges observed for fishers released in the southern Cascades tended to be smaller than those observed for fishers released on the Olympic Peninsula (i.e., 30.1 km for females; 44.5 km for males [Lewis 2014]), which may be explained in part by the difference in release strategies between the two recovery areas (i.e., fishers were released at 21 dispersed release sites in the Olympic project but at only two in the southern Cascades (Figure 1). Other explanations for differences in distance to home ranges may include prey distribution and availability as well as habitat type. Location data from Cohort 1 and Cohort 2 fishers also show that releasing fishers in Mount Rainier National Park facilitated greater occupancy of the recovery area within the Park and on national forest lands to the south and southwest of the Park (Figure 4).

Survival and Mortality

Our objective to release enough fishers in 2–3 years to establish a self-sustaining population depends on annual survival rates of ≥0.50, especially for females. If survival is <0.50 we would likely need to conduct an additional year(s) of releases to meet our founder population goals.

For Cohort 1 fishers, we observed five mortalities (2F, 3M) the first year; survival rates met or exceeded 0.75 for males and females (Table 2). In Cohort 1's second year, we observed four mortalities (1F, 3M), a high survival rate for females and a moderate survival rate for males. Overall, survival rates for Cohort 1 fishers have been very encouraging. For Cohort 2 fishers, we observed a relatively large number of female mortalities in their first year (9F, 3M), and these resulted in a 0.58 survival rate for females, and a 0.80 survival rate for males, which is above our goal of 0.50 survival in the first year.

Table 2. Annual survival rates and number of mortalities for fishers released in the southern portion of the Cascades Fisher Recovery Area from December 2015 to February 2018, by cohort and sex. Survival rates were estimated following methods described by Pollock et al. (1989).

Cohort	Population segment	Observation period	Number of fishers	Number of mortalities	Annual survival rate (95% CI)
1 - released Winter 2015/2016	Females	Year 1 (Dec 2015–Nov 2016)	11	2	0.80 (0.34 – 1.00)
1 - released Winter 2015/2016	Males	Year 1 (Dec 2015–Nov 2016)	12	3	0.75 (0.38 – 1.00)
1 - released Winter 2015/2016	All fishers	Year 1 (Dec 2015–Nov 2016)	23	5	0.77 (0.59 – 0.95)
1 - released Winter 2015/2016	Females	Year 2 (Dec 2016–Nov 2017)	9	1	0.88 (0.45 – 1.00)
1 - released Winter 2015/2016	Males	Year 2 (Dec 2016–Nov 2017)	9	3	0.45 (0.00 – 0.91)
1 - released Winter 2015/2016	All fishers	Year 2 (Dec 2016–Nov 2017)	18	4	0.67 (0.38 – 0.96)
2- released Winter 2016/2017	Females	Year 1 (Dec 2016–Nov 2017)	27	9	0.58 (0.28 – 0.88)
2- released Winter 2016/2017	Males	Year 1 (Dec 2016–Nov 2017)	19	3	0.80 (0.57 – 1.00)
2- released Winter 2016/2017	All fishers	Year 1 (Dec 2016–Nov 2017)	46	12	0.67 (0.48 – 0.86)

To date, we documented a total of 21 mortalities and recovered the remains or a transmitter (or both) for 17 of these. Of these 17 mortalities, we have determined the cause of death for six recovered fishers, which included predation (females F047 and F052), vehicle collision (female F021), injury/broken-back (female F045), starvation following an injury (female F006), infection of wound following a fight (male M005). Of the remaining 11 fishers, we considered the cause of death unknown for seven fishers and unknown/possible predation for four fishers. Our ability to determine the cause of death has been hindered by the difficulty in locating and recovering fishers shortly after they die and before they decompose, especially in summer.

Reproduction

No reproduction was observed for Cohort 1 females in the spring of 2016. However, we documented reproduction by one female (F023) in May/June of 2017 (Figure 6), and we suspected but could not confirm reproduction by female F001.

Female F023 was released on 6 February 2016 at 10 months of age, and mated with a reintroduced male fisher in April of 2016 at ~1 year of age. When tracking F023 in March, April and May of 2017, we found her using a small, localized portion of her home range, which is consistent with a female fisher whose activity area has localized around a natal den site. We set up trail cameras around a tree we suspected was F023's den site and later confirmed that F023 had at least one kit (Figure 6). Although we would like to have documented more denning activities among our released

females, the young female (F023) successfully give birth is a positive indication that the population could eventually become self-sustaining. Because the large majority of females (23 of 38) were released as juveniles (10–11 months of age) it was unlikely that a large number of females would reproduce in years 1 and 2 of the project. However, all surviving females (as many as 26) are now capable of giving birth in the spring of 2018, and as many as half of these are mature adult females (>2 years old).

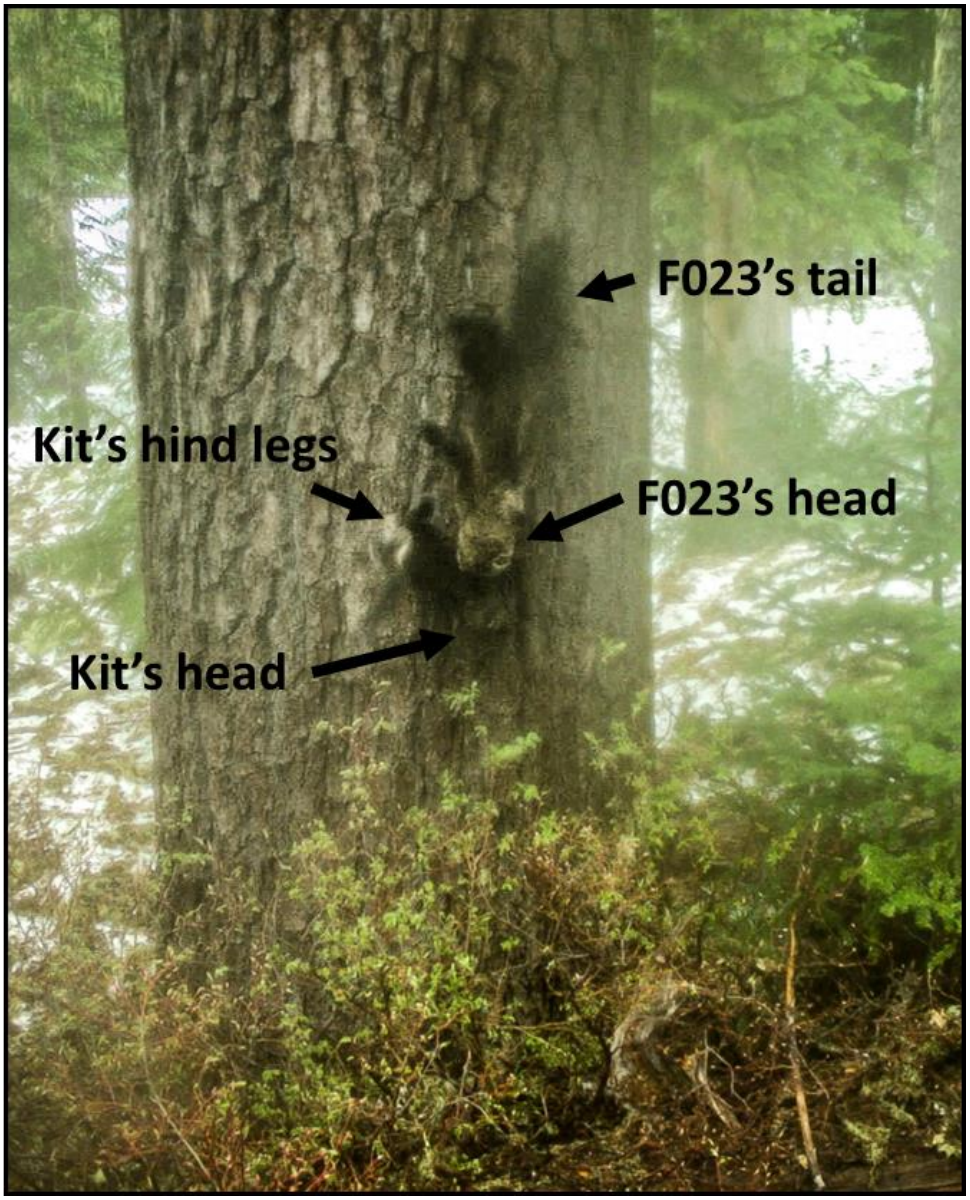

Figure 6. Female F023 was photographed descending her den tree, head first, and carrying a large kit, 1 June 2017. F023's den site was located approximately 26 km (16 miles) south of Randle, Washington in the Gifford Pinchot National Forest.

Research

Several research investigations are associated with the Cascades fisher reintroduction project, and these include studies to assess survival, post-release movements and home range establishment, resource selection, disease exposure, parasite load, and food habits of released fishers, as available funding allows. Many of these studies will utilize telemetry data collected as we monitored released fishers, but other studies will require additional data collection and collaboration with other researchers and graduate students.

One of these studies is investigating how habitat use by fishers in the year following release is influenced by prey and predator densities, and how these densities vary across forest conditions within the southern portion of the Cascade Recovery Area. This work is being done as a collaboration of project partners with University of Washington (UW) graduate student Mitchell Parsons and his Advisor at UW, Dr. Laura Prugh. Mitchell is currently completing his data analysis and writing his master's thesis.

Outreach

The project team has connected with and provided information to our partners, supporters, cooperators, stakeholders, members of the scientific and conservation communities, and the public through various outreach methods, as summarized below.

Presentations

- NPS Ecologist Tara Chestnut gave a presentation titled "Cultural competence in conservation biology: A case study by the Washington Cascades Fisher Restoration Team" at the Annual Joint Meeting of the Oregon and Washington Chapters of the Wildlife Society, and the Society of Northwestern Vertebrate Biology in Portland, OR on February 15, 2018.
- WDFW Biologist Lewis gave a presentation "Reintroducing Fishers in Washington: Progress in the Southern Cascades" at the Annual Joint Meeting of the Oregon and Washington Chapters of the Wildlife Society, and the Society of Northwestern Vertebrate Biology in Portland, OR on February 15, 2018.
- Lewis gave a presentation on "Fishers, Fisher Conservation, Fisher Recovery in Washington" to the Wildlife Seminar at the University of Washington in Seattle, WA on January 22, 2018.
- Lewis gave a presentation "Fishers, Fisher Conservation, Fisher Recovery in Washington" to the "Friends of Mount Adams" in White Salmon, WA on November 9, 2017.
- Chestnut gave a project update presentation to the public at Klondike Gold Rush National Historic Park in Seattle, September 22, 2017.
- Lewis gave a presentation on "Fishers, Fisher Conservation, Fisher Recovery in Washington" to staff at Northwest Trek Wildlife Park in Eatonville, WA on August 31, 2017.

- Mount Rainier Natural Resource Division Chief Kevin Skerl participated in an outreach event to Northwest Trek, August 31, 2017.
- Chestnut gave a project update presentation to the Nisqually River Council on August 18, 2017.
- Chestnut gave a presentation with key talking points to the Mount Rainier National Park interpreters, June 6, 2017.
- Chestnut gave a project update presentation to Washington's National Parks Fund major donors in Mazama, WA June 1-2, 2017.
- Chestnut gave a presentation titled "Restoring a species lost: An update on the Washington Cascades Fisher Restoration Project" at the Society for Northwestern Vertebrate Biology meeting in Arcata, CA, March 1, 2017.

Publications

Lewis, J.C, P.J. Happe, K.J. Jenkins, D.O. Werntz, T. Chestnut and J.I. Ransom. In press. Reintroducing fishers (*Pekania pennanti*) to forest ecosystems in Washington State, USA. Pages 198–203 in Soorae, P. S. (ed.). Global Re-introduction Perspectives: 2018. Case-studies from around the globe. IUCN/SSC Reintroduction Specialist Group, Gland, Switzerland.

Lewis, J.C., T. Chestnut, J.I. Ransom, and D.O. Werntz. 2017. Cascades fisher reintroduction project: Progress report for December 2015 to March 2017. Natural Resource Report NPS/PWR/NRR— 2017/1486. National Park Service, Fort Collins, Colorado. https://www.nature.nps.gov/publications/nrpm/nrr.cfm

Media

Earthfix and Oregon Public Broadcasting (OPB) worked with project biologists to produce a video, which shares information about project activities and the goals and specific objectives of the project. This video aired in February 2018 on the OPB's Oregon Field Guide television program and is available on YouTube at the following link: https://www.youtube.com/watch?v=ahuQ6d8EjMk

The National Park Service and Silver Fox Media worked with project biologists to produce a video that captures the events and people associated with the first fisher reintroduction at Mount Rainier National Park, on 2 December 2016. This video is available on YouTube at the following link: https://www.youtube.com/watch?v=ahuQ6d8EjMk

Dave Werntz and Tara Chestnut interviewed with National Wildlife Magazine journalist Anne Bolan and Tara Chestnut took her on a field trip to check remote cameras set up at Mount Rainier on June 12, 2017.

Fisher Project Website

With the assistance of project partners from the NPS and CNW, Washington Department of Fish and Wildlife provides information on fisher conservation, updates on the Cascades fisher reintroduction project, photos and videos from fisher releases, planning documents and project reports, and a list of the many project cooperators and supporters, on the agency's fisher web-page. The main fisher web page can be found at: http://wdfw.wa.gov/conservation/fisher/.

Mount Rainier National Park, North Cascades National Park Service Complex, and Conservation Northwest also host project websites that provide general and agency specific project information and provide links to the main project website hosted by WDFW. These websites are found at: https://www.nps.gov/mora/learn/nature/washington-fisher-restoration.htm, https://www.nps.gov/noca/learn/nature/washington-fisher-restoration.htm, and http://www.conservationnw.org/fisher.

Challenges/Difficulties Encountered

In the summer of 2017, large wildfires burned 1.2 million hectares of forest covering large expanses of occupied fisher habitat in central British Columbia where fishers have been captured for this reintroduction project. Because of the large loss of fisher habitat, the British Columbia Ministry of Forests, Lands and Natural Resources Operations did not permit fishers captures in the fall and winter of 2017 and 2018 for translocation to Washington (Pynn 2018). Ministry officials also indicated that, because of the severity of the habitat loss in this important part of the fisher's range in British Columbia, additional captures of fishers are unlikely for translocation to Washington in the near future. When assessing the feasibility and suitability of possible source populations, we determined that Alberta fisher populations are suitable for reintroduction to Washington (Lewis and Hayes 2004). With British Columbia fishers no longer available for translocation to Washington, we are assessing the feasibility of obtaining fishers from an Alberta source population in order to meet our founder population objectives in the southern and northern portions of the Cascade Fisher Recovery Area, beginning as soon as the fall and winter of 2018/2019.

In an effort to track released females through three consecutive breeding/denning seasons (denning and breeding coincide during March-June) after they were released, we purchased radio-transmitters with a 30-month life-expectancy. Most fishers of Cohort 1 were released between December 2015 and February 2016, with the expected lifespan of transmitters allowing us to track surviving females until June to August of 2018. While a certain amount of premature transmitter failure is expected, we unexpectedly and repeatedly failed to locate all of our most dependably-located fishers (i.e., those that had established long-term home ranges) well before the 30 months had transpired. Among 12 fishers we regularly located at long-term home ranges, the mean last-location date indicated that the average lifespan for their transmitters was 20.16 months. This shortened lifespan prevented us from obtaining ~10 months of data on the survival, home range characteristics, resource selection, and reproduction of many individuals, and these data are critical for evaluating reintroduction success. We are hopeful that new transmitters purchased and implanted in Cohort 2 females and some Cohort 2 males, will function for 30 months, as intended, and the data provided by these fishers will enable us to better evaluate reintroduction success.

Expectations for the Remainder of 2018

We are now three months into Year 3 of the project (December 2017–November 2018) and in the remainder of Year 3, project partners will continue aerial telemetry flights to obtain location data and to determine the survival status of released fishers. During the spring of 2018, our flights will focus on obtaining locations for females in an effort to document denning and reproductive success in Year 3. We anticipate that many of the 26 surviving females will be denning this spring and providing recruits for a self-sustaining population. To confirm reproduction, we will be deploying remote cameras at suspected den sites and documenting females attending kits. Whenever possible, we will recover any fishers after detecting a mortality signal during our aerial telemetry flights. While the transmitters placed in Cohort 1 fishers apparently had shortened lifespans (~20 months rather than

the expected 30 months) and most/all have stopped functioning, we expect most of the transmitters deployed in Cohort 2 fishers to have ~30 month lifespans, which would allow us to track most surviving fishers until ~July of 2019.

We have recently started investigating the acquisition of fishers from an Alberta source population to continue the reintroduction project in the North Cascades and to complete the releases in the south Cascades (i.e., release ~11 more fishers). Our goal is to secure the necessary provincial and stakeholder support and project infrastructure to develop a framework of operations that would allow us to capture and translocate fishers as soon as the fall and winter of 2018/2019. We are encouraged by the enthusiasm of provincial biologists and stakeholders to assist in a fisher reintroduction, and we are hopeful that we will have fishers in the North Cascades in the near future.

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Appendix A. List of fishers released in the southern portion of the Cascade Recovery Area, and associated morphology, age and release data.

Fisher ID	Sex	Age at Release (y)	Weight (kg)	Capture Date	Release Date	Days in Captivity	Status or Last Date Found
F001	F	1	2.71	5-Nov-2015	3-Dec-2015	28	Not found[a]
F002	F	4	3.12	17-Nov-2015	3-Dec-2015	16	Not found[a]
M003	M	0	4.36	19-Nov-2015	3-Dec-2015	14	Dead
F004	F	2	2.71	20-Nov-2015	3-Dec-2015	13	Dead
M005	M	0	3.70	28-Nov-2015	3-Dec-2015	5	Dead
F006	F	2	2.42	30-Nov-2015	3-Dec-2015	3	Dead
M007	M	3	4.78	30-Nov-2015	3-Dec-2015	3	Dead
M008	M	2	5.09	2-Dec-2015	23-Dec-2015	21	Not found[a]
M009	M	0	2.85	7-Dec-2015	23-Dec-2015	16	Dead
M010	M	2	4.46	9-Dec-2015	16-Jan-2016	38	Not found[a]
F011	F	0	2.08	9-Dec-2015	23-Dec-2015	14	Not found[a]
M012	M	0	3.34	12-Dec-2015	23-Dec-2015	11	Not found[a]
F013	F	4	2.68	12-Dec-2015	16-Jan-2016	35	Not found[a]
M016	M	6	4.97	24-Dec-2015	16-Jan-2016	23	Dead
F017	F	0	2.32	24-Dec-2015	16-Jan-2016	23	Not found[a]
M019	M	2	4.90	8-Jan-2016	16-Jan-2016	8	Not found[a]
M020	M	0	3.68	11-Jan-2016	16-Jan-2016	5	Not found[a]
F021	F	2	3.19	14-Jan-2016	6-Feb-2016	23	Dead
F023	F	0	2.43	17-Jan-2016	6-Feb-2016	20	Not found[a]
M024	M	-	4.02	22-Jan-2016	6-Feb-2016	15	Not found[a]
F025	F	0	2.61	23-Jan-2016	6-Feb-2016	14	Not found[a]
M026	M	0	3.98	28-Jan-2016	6-Feb-2016	9	Dead
F028	F	-	2.76	31-Jan-2016	6-Feb-2016	6	Not found[a]
M029	M	0	3.68	13-Nov-2016	2-Dec-2016	19	Dec 2017
M030	M	1	4.55	14-Nov-2016	2-Dec-2016	18	Oct 2017
F031	F	2	2.87	5-Nov-2016	2-Dec-2016	27	Oct 2017
F032	F	1	2.38	17-Nov-2016	2-Dec-2016	15	Dead
F034	F	2	3.83	17-Nov-2016	2-Dec-2016	15	Aug 2017
M035	M	0	3.63	21-Nov-2016	2-Dec-2016	11	Dead
M036	M	0	3.50	24-Nov-2016	2-Dec-2016	8	Dead
M037	M	0	2.23	25-Nov-2016	2-Dec-2016	7	Feb 2018
F038	F	0	5.02	25-Nov-2016	2-Dec-2016	7	Dec 2016

[a] Despite extensive searching to locate these fishers during recent flights, none were found and we suspect that their transmitters are no longer functioning.

Appendix A (continued). List of fishers released in the southern portion of the Cascade Recovery Area, and associated morphology, age and release data.

Fisher ID	Sex	Age at Release (y)	Weight (kg)	Capture Date	Release Date	Days in Captivity	Status or Last Date Found
M039	M	5	2.31	27-Nov-2016	2-Dec-2016	5	Dec 2016
M040	M	0	3.79	27-Nov-2016	10-Dec-2016	13	Jul 2017
F041	F	2	2.69	27-Nov-2016	10-Dec-2016	13	Oct 2017
F042	F	0	2.55	28-Nov-2016	10-Dec-2016	12	Feb 2018
M043	M	0	3.58	30-Nov-2016	10-Dec-2016	10	Dec 2017
M044	M	0	3.06	1-Dec-2016	10-Dec-2016	9	Sep 2017
F045	F	0	2.54	3-Dec-2016	10-Dec-2016	7	Dead
M046	M	4	5.08	5-Dec-2016	10-Dec-2016	5	Dead
F047	F	2	2.47	6-Dec-2016	10-Dec-2016	4	Dead
M048	M	0	3.76	6-Dec-2016	17-Dec-2016	11	Dec 2017
F049	F	1	2.53	7-Dec-2016	17-Dec-2016	10	Feb 2018
F050	F	1	2.38	7-Dec-2016	17-Dec-2016	10	Jul 2017
F051	F	1	2.74	7-Dec-2016	17-Dec-2016	10	Dec 2017
F052	F	-	2.56	10-Dec-2016	17-Dec-2016	7	Feb 2018
M054	M	1	3.76	11-Dec-2016	17-Dec-2016	6	Feb 2018
M056	M	0	3.17	22-Dec-2016	31-Dec-2016	9	Dec 2017
F057	M	0	2.22	22-Dec-2016	31-Dec-2016	9	Dec 2017
M058	M	0	3.70	22-Dec-2016	31-Dec-2016	9	Jan 2017
F059	F	0	1.95	23-Dec-2016	31-Dec-2016	8	Feb 2018
F060	F	2	2.66	24-Dec-2016	13-Jan-2017	20	Feb 2018
M061	M	0	3.93	24-Dec-2016	13-Jan-2017	20	Feb 2018
M062	M	0	3.82	24-Dec-2016	13-Jan-2017	20	Oct 2017
M063	M	0	3.81	26-Dec-2016	31-Dec-2016	5	Feb 2018
M064	M	0	3.46	26-Dec-2016	31-Dec-2016	5	Feb 2018
F065	F	3	2.71	1-Jan-2017	13-Jan-2017	12	Dead
M066	M	0	3.70	1-Jan-2017	13-Jan-2017	12	Oct 2017
F067	F	0	2.94	4-Jan-2017	13-Jan-2017	9	Sep 2018
F070	F	0	2.58	6-Jan-2017	13-Jan-2017	7	Dead
F072	F	0	2.40	11-Jan-2017	3-Feb-2017	23	May 2017
F073	F	1	2.83	14-Jan-2017	3-Feb-2017	20	Feb 2018
F075	F	0	2.25	17-Jan-2017	3-Feb-2017	17	Feb 2018
F080	F	1	2.44	30-Jan-2017	3-Feb-2017	4	Feb 2018
F082	F	0	2.79	2-Feb-2017	20-Feb-2017	18	Feb 2018
F084	F	0	3.22	4-Feb-2017	20-Feb-2017	16	Sep 2017
F085	F	0	2.19	6-Feb-2017	20-Feb-2017	14	Dead

[a] Despite extensive searching to locate these fishers during recent flights, none were found and we suspect that their transmitters are no longer functioning.

Appendix A (continued). List of fishers released in the southern portion of the Cascade Recovery Area, and associated morphology, age and release data.

Fisher ID	Sex	Age at Release (y)	Weight (kg)	Capture Date	Release Date	Days in Captivity	Status or Last Date Found
F086	F	2	2.61	13-Feb-2017	20-Feb-2017	7	Dead
F088	F	3	2.90	15-Feb-2017	20-Feb-2017	5	Dead

[a] Despite extensive searching to locate these fishers during recent flights, none were found and we suspect that their transmitters are no longer functioning.

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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