# Inventory of Fisher Populations and Reproductive Dens in the Bridge River Watershed

## FWCP-Coastal Project # 10W.BRG.01

March 31, 2011


Prepared by

Larry R. Davis, MSc, RPBio.

and

Richard D. Weir, MSc, RPBio.

Davis Environmental Ltd.

ARTEMIS WILDLIFE CONSULTANTS

## EXECUTIVE SUMMARY

Flooding of the Bridge River Valley by the Carpenter and Downton reservoirs likely removed many of the large, cavity-bearing trees that fishers (*Martes pennanti*) may have used for reproductive dens. This affected the supply of critical denning structures and the sustainability of fisher populations in this watershed. To assess and potentially mitigate the footprint impacts of these reservoirs on fishers and their reproductive habitat, baseline information on the fisher population and the abundance and distribution of cavity-bearing trees is needed. We conducted winter track count transects in 48-20 km² grid cells spread throughout the assessment area to determine if fishers are sufficiently widespread to warrant future habitat restoration efforts.

We conducted 1415 km-days of track transects in the Gun, Tyaughton, and Yalakom watersheds over 4 survey sessions between December 2010 and March 2011. We encountered 72 fisher, 92 American marten (*Martes americana*), and 14 wolverine (*Gulo gulo*) tracks along 680 km of transects. Fishers were well distributed across the assessment area, with detections in 50% of the cells surveyed. Fisher tracks were generally more frequent along riparian areas in lower elevation Interior Douglas-fir habitats and in southern portions of the assessment area above Carpenter Lake. Fishers may be more common in these areas because shallower snow depths lower the cost of locomotion and large diameter cottonwood in riparian areas provide potential reproductive denning habitat. Based on the cell size used for this study, we estimate that 10 – 20 fishers may occur within the assessment area, which is in the range of other fisher populations studied in BC. These results suggest that the density of fishers is sufficiently high to warrant further population and habitat inventory. We recommend that a more rigorous mark-recapture inventory of fishers be conducted during winter 2011-12, which will build on the solid foundation that was achieved during the first year of this program.

We also implemented a targeted communication and extension strategy during outreach events and over the course of fieldwork. This outreach program focused on disseminating information about fishers, the project, and FWCP-Coastal's role. Most of our outreach activities occurred during the course of fieldwork, while participating in the "Salmon In The Canyon" festival, in presentations about the project at a community meeting in Lillooet, liaising with the local newspaper to produce an article, promoting the project with government personnel who participated in fieldwork, and engaging local trappers in discussions on fisher habitat. We identified FWCP-Coastal as the funding agency responsible for the work in all cases. Future work on this project should continue to engage community members and decision-makers by providing them with information and stewardship tools. The anticipated outcome of this program is a change in behaviour of land managers to conserve or restore reproductive habitats for fishers in the Bridge River area.

## Contents

Executive Summary ..... i
Introduction ..... 4
Objectives ..... 5
Assessment Area ..... 5
Methods ..... 5
Results ..... 7
Discussion ..... 13
Communication and Extension ..... 14
Recommendations ..... 16
Acknowledgements ..... 16
References ..... 17
Appendix 1. Track transects conducted between December 7 – 13th 2010 in the Bridge River Watershed, British Columbia. Red transects were those with fisher detections. ..... 19
Appendix 2. Track transects completed between January 16 – 25th 2011 in the bridge river watershed, British Columbia. Red transects were those with fisher detections. ..... 20
Appendix 3. Track transects completed between February 14 – 20th 2011 in the Bridge River Watershed, British Columbia. Red transects were those with fisher detections. ..... 21
Appendix 4. Track transects completed between March 7 – 12th 2011 in the Bridge River Watershed, British Columbia. Red transects were those with fisher detections. ..... 22
Appendix 5. Financial Statement ..... 23
Appendix 6. Performance Measures ..... 24
Appendix 7. FWCP-Coastal Recognition ..... 25

## Tables

Table 1. Environmental conditions and survey intensity during each sampling session in the Bridge River watershed, British Columbia between December 2010 and March 2011. ..... 9
Table 2. Proportion of cells with detections of fishers in the Bridge River watershed, British Columbia between December 2010 and March 2011. ..... 10

## Figures

Figure 1. Location of assessment area in the Bridge River watershed. .....6

Figure 2. Snow-track survey intensity (km-days) conducted in each grid cell between December 2010 and March 2011 in the Bridge River watershed, British Columbia. .....8

Figure 3. Survey effort, fisher detections, and area in each biogeoclimatic subzone surveyed between December 2010 and March 2011 in the Bridge River watershed, British Columbia. ....10

Figure 4. Detections of fishers and wolverines during snow-track surveys conducted between December 2010 and March 2011 in the Bridge River watershed, British Columbia. .....11

Figure 5. Fisher detections during surveys completed between December 2010 and March 2011 in the Bridge River watershed, British Columbia. Red cells were those with fisher detections, yellow cells had no detections, and white cells were not surveyed. .....12

## Photographs

Photograph 1. Marten tracks using the 2 foot lope-pattern gait. .....7

Photograph 2. Walking gait of a fisher detected near Marshall Lake. .....8

## INTRODUCTION

Fishers (*Martes pennanti*) are forest-dependent carnivores of the weasel family that are an important component of healthy ecosystems. Several aspects of the ecology of fishers, including their use of rare structural elements found primarily in late-successional forests, make them susceptible to changes to the forested landbase resulting from hydro-electric development, forest-harvest activities, and oil and gas development. As such, fishers are considered a species at risk under the Identified Wildlife Management Strategy and are blue-listed (S2S3) in British Columbia. Fishers are a high priority for conservation efforts, as they are considered rank 2 under Goal 3 of the provincial Conservation Framework: Maintain the diversity of native species and ecosystems.

Fishers are also the largest obligate tree-cavity user in North America, requiring trees that have cavities >30 cm inside diameter as reproductive dens during the rearing period (Weir and Corbould 2008). In British Columbia, reproductive dens are most frequently found in large-diameter black cottonwood or balsam poplar trees (Weir and Corbould 2008, Weir 2009), which are most common in late-successional floodplain ecosystems. Fisher also use lodgepole pine, trembling aspen, and Douglas-fir in dry regions of the province (Davis 2009). The development of trees that support suitable cavities for fishers is uncommon and these critical habitat elements are likely rare across the landscape.

At a broad scale, the Gun, Tyaughton, and Yalakom watersheds of the Bridge River drainage are rated as having medium to high capability for fishers (Lofroth 2004). Flooding of the Bridge River Valley by the Carpenter and Downton reservoirs likely removed many of the large, cavity-bearing trees that fishers may have used for reproductive dens. This affected the supply of critical denning structures for the fisher population that occurs in the area immediately surrounding these reservoirs. Furthermore, the ability of the landscape to support sustainable populations of fishers may have been reduced because fewer quality cavity-bearing trees may occur on upland sites in the surrounding Gun, Tyaughton, and Yalakom watersheds. Recent large wildfires in the assessment area may have further reduced the availability of denning structures. The net effect of these impacts on the population of fishers is unclear because the availability of alternate reproductive dens occurring outside of the reservoir footprint is unknown. Additionally, the removal of many denning opportunities may have affected recruitment rates within the population and therefore the ability of the population to sustain itself. To assess and potentially mitigate the footprint impacts of these reservoirs on fishers and their reproductive habitat, baseline information on the fisher population and the abundance and distribution of cavity-bearing trees is needed.

Information from this project will provide BC Hydro and the St'át'imc Nation with better data upon which to evaluate impacts of hydroelectric and other resource developments on fishers in the Bridge River drainage and identify mitigation options, where necessary and feasible, to retain and recover reproductive habitat for this species. This project provides a unique opportunity to apply the knowledge gained from research funded by other Wildlife Compensation Programs of BC Hydro (e.g., Weir and Corbould 2008) and build upon our base of understanding of fisher ecology.

## OBJECTIVES

The multi-year objectives of this project are to conduct inventories of fishers in the assessment area to ascertain the status of the population and to complete a habitat inventory that will document the distribution and abundance of potential den trees for fishers in areas outside of the footprint to determine if these features are limiting. In this first year of the study, our objectives were to:

1. Conduct winter track count transects in 48-20 km² grid cells spread throughout the assessment area.
2. Assess if sufficient numbers of fishers occur in the assessment area (e.g., >20% of cells with detections) to proceed in 2011-12 with a more rigorous mark-recapture estimate of absolute abundance using non-invasive DNA sampling.
3. Extend the results of this project to a number of groups that play a role in the conservation of fishers and their habitat.

## ASSESSMENT AREA

The 990-km² assessment area lies within the Gun, Tyaughton, and Yalakom drainages to the northwest of Lillooet, BC and occurs within the Southern Chilcotin Range and Central Chilcotin Range ecosections (Fig. 1). The assessment area includes the dry-cold and very dry-cool Montane Spruce (MS) zones; very dry-cold, dry-cool, and dry-cold Interior Douglas-fir (IDF) zones; and very dry-very-cold and dry-very cold Engelmann Spruce-Subalpine Fir (ESSF) zones. These biogeoclimatic subzones were those that were believed to have the potential to support resident fishers. The assessment area encompasses portions of 3 registered traplines and occurs within the traditional territory of the St'át'imc Nation. The assessment area was subdivided into 48-20 km² hexagonal grid cells, which approximated the expected home range size for female fishers in this area. All grid cells contained at least 50% of their area in suitable biogeoclimatic subzones.

## METHODS

We conducted presence/not detected surveys for fishers in the assessment area using track transects completed during winter following Resources Information Standards Committee standards (RISC; Resources Information Standards Committee 1999). We contacted trappers with registered traplines in the assessment area to discuss the survey and solicit information on fisher habitat use. We used this information, along with known broad habitat relationships and that from other interested local residents, to direct sampling effort into areas with potential to support fishers. We attempted to conduct at least 4.5 km of track-encounter transects within each grid cell.

We conducted encounter surveys of fisher tracks in recently fallen snow along transects using snowshoe, snowmobile, and 4x4 truck following accessible roads and trails throughout each hexagonal cell. Potential transect locations were identified using orthophotos of the assessment area that were overlaid with grid cell information. Transects either followed existing roads and trails or were conducted on snowshoe in areas with poor access by following elevation contours through forested habitat. Once in the field, we preferentially located transects in areas with pole-aged or older forest, although snowmobile transects occasionally crossed young clearcut areas.

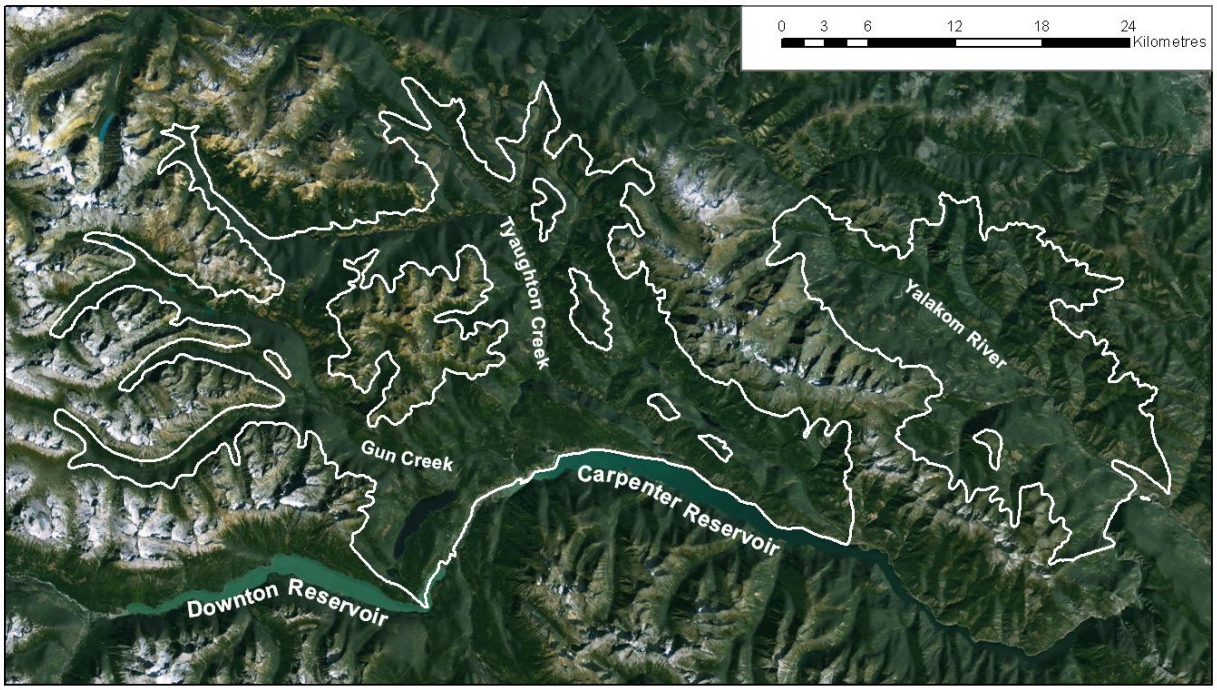



**Figure 1. Location of assessment area in the Bridge River watershed.**

We focused snowmobile surveys to narrow roads and trails that generally had very light traffic. Because fishers have an affinity for riparian areas, most of our survey efforts were concentrated in or adjacent to those habitats. Transects were initiated once sufficient snow had fallen in December 2010.

Map and grid cell data were loaded onto hand held GPS units allowing us to accurately identify our location within grid cells in the field. Observers proceeded to start locations of transects and recorded the grid cell, start location (UTM) and recorded a continuous "track" along the transect using the GPS unit. We recorded the geocoordinates of each fisher, American marten (*Martes americana*) and wolverine (*Gulo gulo*) track that we encountered. Observers received training in track identification and carried reference material to facilitate proper track identification and differentiation. In general, individual fisher tracks are 6 - 7.5 cm wide, whereas marten tracks are 4 - 6 cm wide. Both species have an offset 2-print lope, but fishers often walk while martens rarely use this gait in snow (Photographs 1 and 2). Where identification was in doubt, observers spent time following the trail, photographed the tracks, and estimated their confidence in the identification. For each track that we encountered, we recorded the geocoordinates and distance along transect. At the end of the transect, surveyors recorded the geocoordinates, temperature, snow depth, weather conditions, and date of last significant snowfall.

We tallied the total number of encounters of fisher, marten, and wolverine tracks that crossed each transect line. Because tracks accumulate over time, we scaled sampling distance by time since last snowfall for each transect (i.e., km-day of transect). This provided us with an indication of the probability of detecting fisher tracks in each cell.

## RESULTS

We completed 4 survey sessions of 6 to 9 days each between 7 December 2010 and 12 March 2011. We conducted 1415 km-days of surveys across 680 km of transects during the 4 sampling sessions (Fig. 2). The total length of transects completed varied between 143 km during the first session to approximately 180 km each during the last 3 sessions (Table 1). We surveyed between 32 and 37 cells each session depending on the weather conditions and avalanche hazard. Average snow depth increased from 23 cm in December 2010 to 59 cm in March 2011 and the average temperature was below freezing during each survey, with the coldest temperature in February 2011 (-15°C). Tracking conditions varied from poor to excellent, with frequent new snow during sessions 1, 3, and 4 affecting our ability to conduct effective surveys. Most of our survey effort occurred in the IDF zone (83%), with lesser effort conducted in the MS (14%) and ESSF (3%) zones.


**Photograph 1. Marten tracks using the 2 foot lope-pattern gait.**

**Photograph 2. Walking gait of a fisher detected near Marshall Lake.**

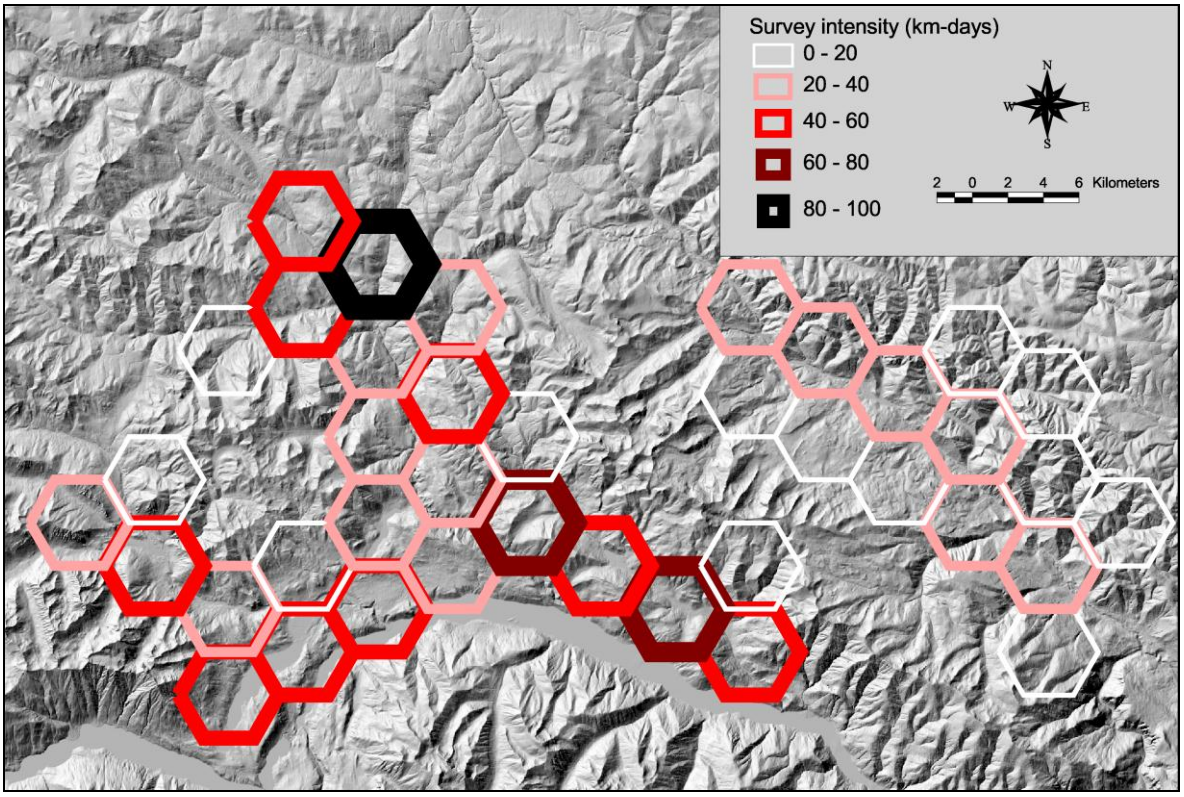



**Figure 2. Snow-track survey intensity (km-days) conducted in each grid cell between December 2010 and March 2011 in the Bridge River watershed, British Columbia.**

**Table 1. Environmental conditions and survey intensity during each sampling session in the Bridge River watershed, British Columbia between December 2010 and March 2011.**

| | Survey session | | | |
|---|---|---|---|---|
| | Dec. 7-13 | Jan. 17-25 | Feb. 15-20 | Mar. 7-12 |
| Mean snow depth (cm) | 23 | 46 | 51 | 59 |
| Mean ambient temperature (range [˚C]) | -1 (-3 - 1) | -3 (-10 - 4) | -5 (-15 - 1) | -2 (-7 - 3) |
| Length of transect completed (km) | 143 | 180 | 181 | 176 |
| Total survey intensity (km-days) | 154 | 517 | 403 | 341 |

We encountered 72 fisher tracks, 92 marten tracks and 14 wolverine tracks during 1415 km-days of surveys (Fig. 3). Most fisher tracks (43 of 72; 60%) were encountered in the dry-cold subzone of the IDF biogeoclimatic zone, although tracks were also encountered in the dry-cold MS (14 of 72; 19%), dry-cool IDF (8 of 72; 11%), very dry-cold IDF (4 of 72; 6%) and dry-very cold ESSF (3 of 72; 4%) zones (Figure 3). Fisher tracks were found in a variety of habitats including riparian cottonwood (*Populus balsamifera var trichocarpa*), Douglas-fir (*Pseudotsuga menziesii*) dominated stands, and spruce (*Picea glauca*) stands. All fisher tracks were encountered in pole-sapling or older aged forest that provided >50% overhead cover (i.e., combined tree and shrub cover). In general, fisher and wolverine tracks were found at lower elevations of the assessment area (i.e., < 1200 m asl), whereas marten tracks were found at a greater range of elevations. Wolverine tracks appeared to follow major drainages and frequent areas with abundant wintering ungulates.

We detected fishers in the majority of cells that we surveyed within the Yalakom, Tyaughton, and Gun Creek watersheds (Figs. 4, 5). In total, we encountered fisher tracks in 20 out of 39 cells (51%) during the 4 survey sessions, although the cells with fisher detections in each session varied ($\bar{x}$= 24% of cells, SD = 7%, $n$ = 4 sessions; Appendices 1-3). We experienced the best tracking conditions during session 2 when a long period between snowfalls allowed tracks to accumulate over 5+ days. These conditions resulted in us encountering the greatest number of fisher tracks during these surveys (Table 2). Latency to detection of fisher tracks averaged 2.33 km on transects with fisher encounters and ranged between 0.19 – 5.9 km. Steep terrain required us to follow major valleys when conducting most transects in order to cover sufficient distance. However, these roads generally paralleled major streams in the area and were located in high-value riparian habitats. Logistic constraints did not allow us to survey some remote and high elevation cells due to poor access and avalanche risk (e.g., cells in the Spruce Lake protected area in the west and high elevation cells on either side of the Yalakom River).

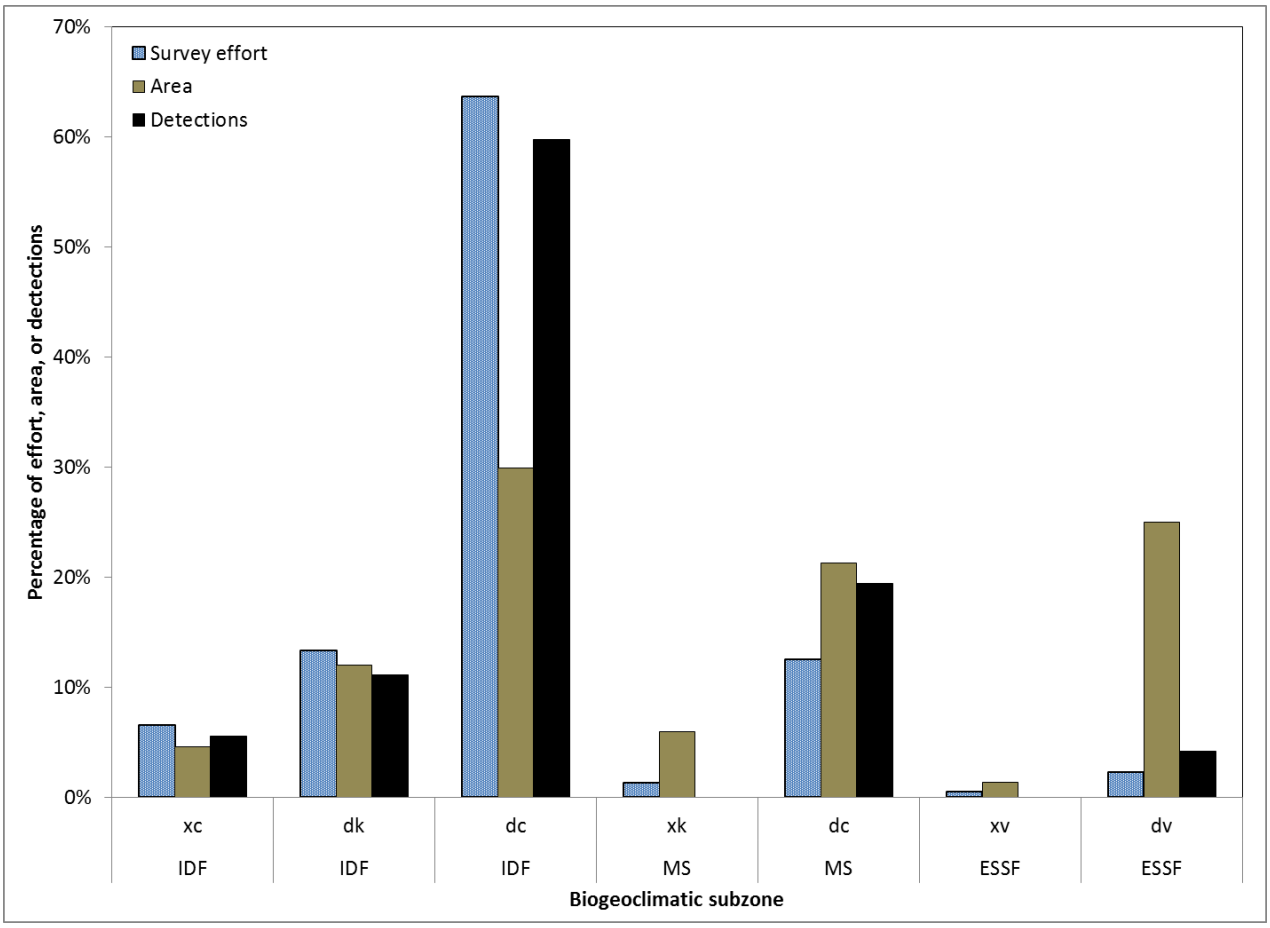



**Figure 3. Survey effort, fisher detections, and area in each biogeoclimatic subzone surveyed between December 2010 and March 2011 in the Bridge River watershed, British Columbia.**

**Table 2. Proportion of cells with detections of fishers in the Bridge River watershed, British Columbia between December 2010 and March 2011.**

| Survey session | Total survey intensity (km-days) | Cells surveyed | Cells with fisher detections | Proportion of cells with fisher detections |
|---|---|---|---|---|
| Dec. 7-13 | 154 | 32 | 5 | 0.16 |
| Jan. 16-26 | 517 | 37 | 12 | 0.32 |
| Feb. 14-20 | 403 | 36 | 7 | 0.19 |
| Mar. 7-12 | 341 | 33 | 9 | 0.27 |

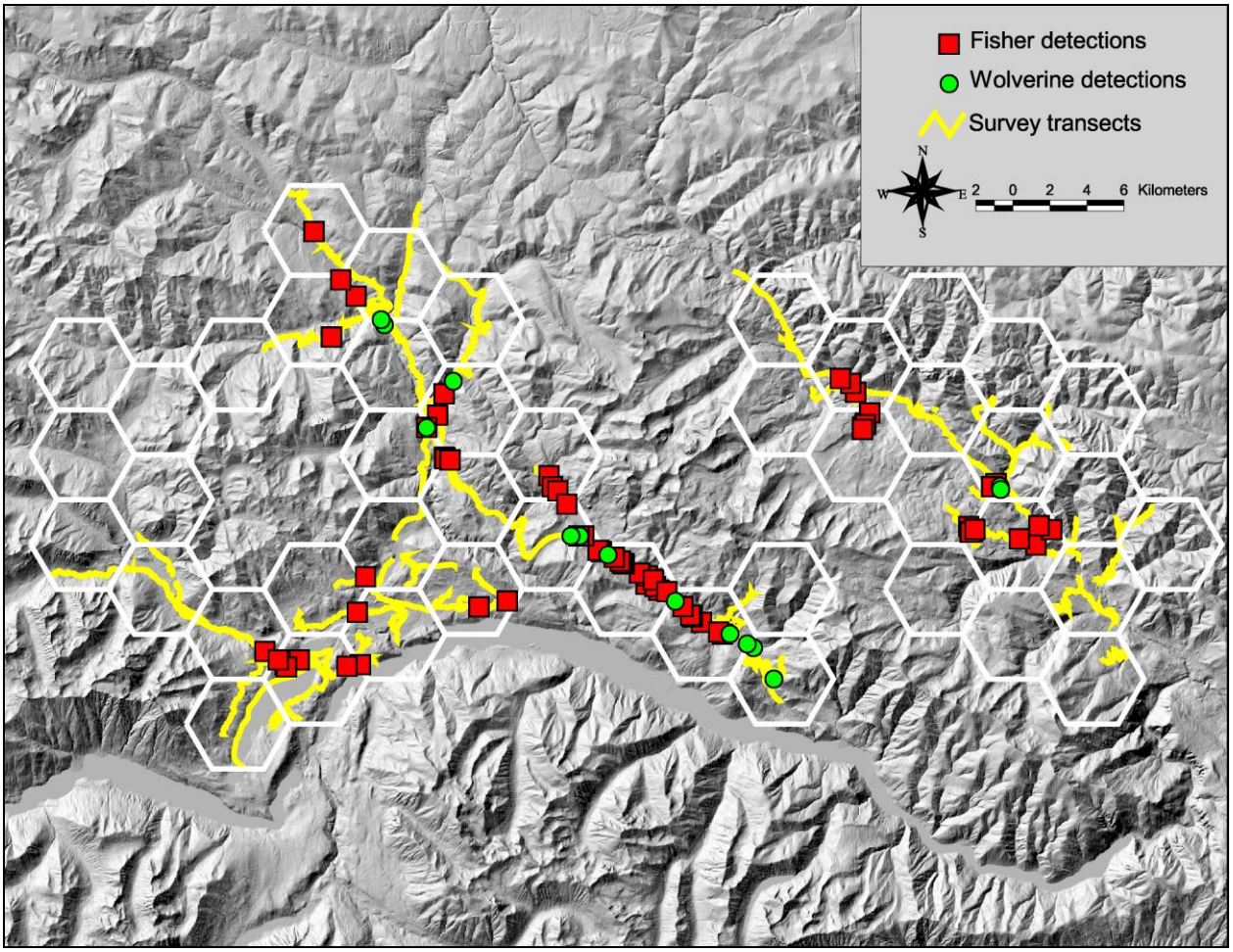



**Figure 4. Detections of fishers and wolverines during snow-track surveys conducted between December 2010 and March 2011 in the Bridge River watershed, British Columbia.**

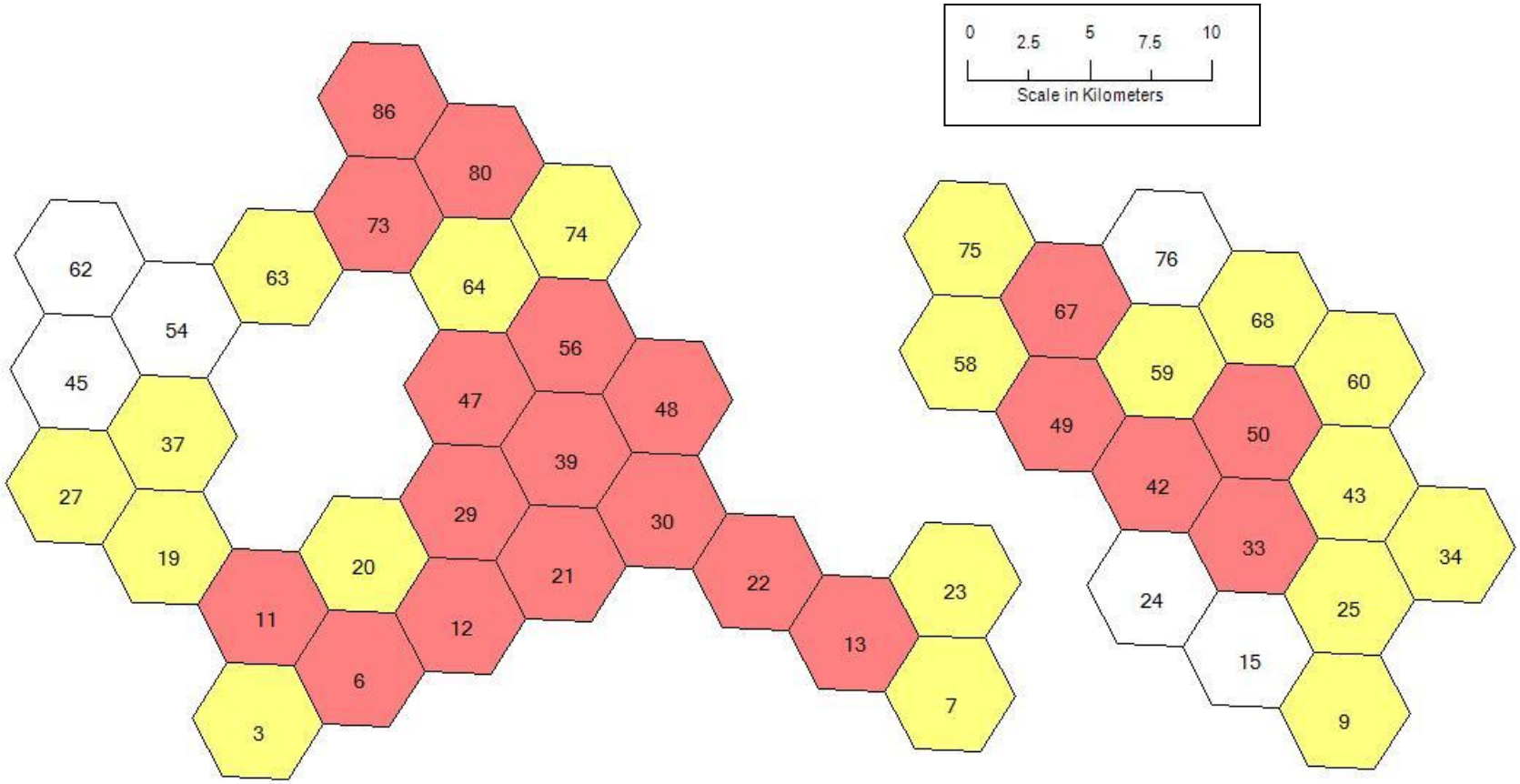



**Figure 5. Fisher detections during surveys completed between December 2010 and March 2011 in the Bridge River watershed, British Columbia. Red cells were those with fisher detections, yellow cells had no detections, and white cells were not surveyed.**

## DISCUSSION

Through considerable effort, our winter track transects verified that fishers continue to occur in at least half of the 20-km² cells that we surveyed in the Yalakom, Gun, and Tyaughton drainages. This survey technique proved to be well suited to provide rudimentary presence/not detected information that can help direct future work. However, the efficacy of this technique is largely reliant upon suitable weather conditions; our surveys were often conducted during periods with frequent new snow, which limited the time available for fishers to move about before surveys were conducted. Poor access to some cells also affected our sampling due to deep snow, steep terrain, and limited access. The deep frequent snow conditions experienced during the winter of 2010/2011 also created high avalanche risk in some cells, which was evidenced by small avalanche tracks we encountered on some survey days.

We detected most fisher tracks along major streams at lower elevations in the Interior Douglas-fir biogeoclimatic zone, which is likely the result of both habitat selection by the animals and a moderate bias in our sampling approach. Our sampling was focused in lower elevation biogeoclimatic zones, which may have increased the relative proportion of fisher tracks detected in these areas. However, IDF zones are believed to support higher densities of fishers than MS or ESSF zones (Lofroth 2004). Fishers are also widely reported to have an affinity for riparian habitats found in these locations (e.g., Buck *et al.* 1983, Jones 1991, Jones and Garton 1994, Weir 1995, Davis 2009). Furthermore, fishers sink deeper into soft snow than marten and avoid areas with deep soft snow (Leonard 1980, Raine 1983), and as such, are probably less likely to occur during winter in higher elevation areas with deep snowpack such as the ESSF and MS zones. We experienced frequent snow during the surveys that increased in depth with elevation, often over relatively short distances due to the steep terrain.

The affinity for lower elevation riparian habitats was also evident at broader scales as well. We encountered fisher tracks most frequently in cells adjacent to low-elevation habitats near Carpenter Lake. We noted that temperatures were generally warmer with a shallower and denser snowpack on south facing slopes above the reservoir. These conditions likely lower the costs of locomotion for fishers and provide warmer microenvironments. Low-elevation habitats in the footprint of the reservoir were also probably high value habitat for fishers prior to flooding due to favorable snow conditions. Furthermore, large-diameter cottonwood trees occur at lower elevations and this high-value denning habitat was likely important to fishers in this area.

Our surveys also showed that fishers were well distributed across the survey area, with detections in at least half of the survey cells. This suggests that this area supports a population of fishers somewhere within the range of other populations studied elsewhere within the province. In British Columbia, home ranges for female fishers vary from about 30 $km^2$ in the Peace River and Chilcotin regions (Davis 2009, Weir et al. in submission) to 50 $km^2$ in wet ecosystems near Williston Lake (Weir et al. 2009). If home ranges of female fishers in the Bridge River watershed are near the small end of this scale, we can estimate that there may be as many as 20.5 female fishers/1000 $km^2$. If they are typical of those found near Williston, there may be as few as 10.3 females/1000 $km^2$. It is important to note that these estimates do not include males whose home ranges tend to overlap with one or more females while female home ranges rarely overlap (Kelly 1977, Powell 1979, Arthur et al. 1989, Weir et al. 2009). A more rigorous mark-recapture

program that provides an estimate of absolute abundance will better quantify the size and distribution of local fisher populations and presents an opportunity to help fill an information gap for this species in BC (Lofroth 2004). Similarly, inventorying the distribution and density of den trees in the assessment area will provide important data on the density of cavity trees in BC and identify opportunities for enhancement of reproductive opportunities for fisher in the Bridge River area.

## COMMUNICATION AND EXTENSION

Our communication and extension objectives for the first year of this project were met at several targeted outreach events and during the course of fieldwork. Our communication program provided many opportunities to engage community members and decision-makers that play a role in the conservation of fishers and their habitats by providing them with information and opportunities to participate in the project. Our outreach program focused on dissemination information about fishers, the project, and FWCP-Coastal's role when we were discussing the project with people we encountered in the assessment area, presenting the project to community meetings in Lillooet, liaising with the local newspaper to produce an article, providing opportunities for government personnel to participate in the project, and engaging trappers in discussions on fisher habitat. In all cases, we identified FWCP-Coastal as the agency responsible for funding the work (Appendix 7).

Work on the project commenced with the development and printing of a project information poster that introduced the project's objectives and proposed activities. This poster was displayed at the "Salmon In The Canyon" festival in Lillooet in August 2010. We also developed and printed 100 project information brochures that were distributed at the information table at the festival, of which 40 brochures were collected by approximately 100 visitors to the display. Interest in the project appeared to be high, with many visitors keen to learn more about fishers and their habitat relationships. FWCP-Coastal was prominently featured as the primary funding source on both of these extension materials.

Further into the project, we held a joint community outreach presentation in partnership with the Lillooet Tribal Council (LTC) and Lillooet Naturalist Society on January 19$^{th}$ 2010 at the Lillooet Friendship Centre to introduce the project to the community. The presentation was well attended (estimated 40 people) and generated much discussion. Representatives from the Lillooet Tribal Council provided information on the St'at'imc involvement in the project and information on fisher ecology from a First Nations perspective including the correct pronunciation for fisher, *Nwanīkin* (nwan-neek-kin), in the St'at'imc language. The ecological importance of the project was promoted by Vivian Birch-Jones of the Lillooet Naturalist Society, especially in the context of other wildlife that use tree cavities. The presentation also resulted in an article on the project in the *St'at'imc Runner* newspaper that acknowledged the role of FWCP-Coastal and its local partnerships.

We further strengthened important partnerships throughout the course of the first year of this project by providing information, training, and opportunities to participate in the project to members of the LTC, BC government, and the local community. This engagement has provided increased local capacity, encouraged the conservation of fisher habitat, identified opportunities for further partnerships, and increased the profile of the project among the areas residents. Evan

Narcisse was contracted through the LTC to work as a technician during the data collection. This project helped the LTC develop capacity in their organization through training in track identification, snowmobile safety, avalanche risk, and data collection techniques. Evan's supervisor, Matt Manuel (LTC), participated in one day of surveys along the Yalakom River in March and is interested in receiving data on animal locations from the project to promote stewardship in St'at'imc territory. Roger Packham (BC Environment, Cariboo Region) and Francis Iredale (BC Environment, Thompson Region) each came out for several days of sampling during the February and March sessions. Francis is interested in partnerships with the project and suggested that BC Environment could move forward on Wildlife Habitat Areas if suitable reproductive locations are found. Ken Walker is a year round resident at Marshall Lake who was extremely interested in the project and came out with us in the field to guide us into a cell that had been difficult to access. Ken also supplied us with information on fisher observations in the area and provided photographs of fishers at his property on Marshall Lake.

Local trappers were engaged by discussing the project with them and asking for their experience with fisher trapping in the area. Stewart Brown (Trapline 0333T005) has only done limited trapping in the last several years and recalled low numbers of captures for both fisher and marten. Stewart would like to be kept informed of the research and may be trapping next winter. Arrangements will be made to meet him in the field next year if possible. Albert Magliocco (Trapline 0332T007) has not been actively trapping for approximately 10 years, but recalled catching fisher at Beaverdam, Retaskit Creek, Nine Mile Ridge, Evelyn Creek, and near Porcupine Ridge in the Yalakom Valley. He would like a copy of any reports generated through this project. Rolf Walitza (Trapline 0332T008) identified the areas around Tyaughton Creek, Taylor Basin, Bonanza Creek, and Marshal Lake as good fisher habitat. He has plans to trap the area heavily next winter as he feels that the hare population will be crashing and it will be a good time to catch lynx. He has expressed interest in the project and would like to be contacted next winter to arrange a meeting out in the assessment area.

The long term goals of this project are to use the information gathered to develop stewardship tools that can be used to better manage fisher habitat and change the behaviour of land managers to conserve or restore reproductive habitats for fishers in the Bridge River area. Work in year 2 of this project will provide baseline data on number of fishers in the project area and the effects of current land management practices on fishers and their habitats. This data is required to develop best management practices that maintain and enhance important habitat components. Work will continue to work with the FWCP-Coastal, First Nations, local residents, government agencies, and the BC Fisher Working Group to develop these stewardship tools and disseminate information. Specifically, we will communicate these products through public meetings, meetings with forest companies (Aspen Planers and BC Timber Sales), press releases (St'át'imc Runner, Bridge River Lillooet News, and BC Trapper magazine), and through the upcoming fisher website that is being hosted by BC Hydro. As in the current year, the Fish and Wildlife Compensation Program – Coastal (Bridge-Coastal Restoration Program) will be explicitly recognized as a major contributor to this project in all stewardship, education, extension, outreach, and restoration products.

## RECOMMENDATIONS

Our surveys identified tracks of fishers in more than half of the cells that we surveyed. Although ours was a low-intensity presence/not detected survey, these results suggest that fishers are likely well distributed throughout the survey area and that density is sufficiently high to warrant further population and habitat inventory. Given these results, we recommend that a more rigorous mark-recapture inventory of fishers be conducted during winter 2011-12. This new information will build on the solid foundation that was achieved during the first year of the program. Furthermore, we recommend that a den tree inventory be conducted to assess the potential den tree species present in the assessment area, densities of potential den trees, and identify opportunities for enhancement and protection of these critical habitat features. Determining the availability of potential den trees may provide locations for wildlife habitat areas and sites where treatments, such as fungal inoculation, would be beneficial to improve the supply of cavity trees. Given that fishers are the largest obligate tree cavity user in North America, completing this inventory will also benefit other species at risk in the watershed that require tree cavities.

Logistic constraints may affect where sampling can occur during future population and habitat inventories. During the course of winter surveys, we noted that several survey cells had poor access and were prone to high avalanche hazard. Relatively good access is required for DNA inventories so that sampling effort can be suitably dispersed and reduce the effect of behavioral responses to traps. Cells located in the Spruce Lake protected area were especially difficult to access, prone to avalanches, and had relatively narrow bands of suitable habitat that was limited to valley bottoms.

Given that results to date suggest that fishers may occur at sufficient densities to warrant future inventory, the project should continue to engage community members and decision-makers that play a role in the conservation of fishers and their habitats by providing them with information and stewardship tools. The anticipated outcome of this program is a change in behaviour of land managers to conserve or restore reproductive habitats for fishers in the Bridge River area. Strategic objectives of the communication and extension program should include, in consultation with FWCP-Coastal, First Nations, and the BC Fisher Working Group, developing information and stewardship tools to provide to groups that make decisions that affect fishers and their habitat within the assessment area. These packages should include information on the effects of current land management practices on fishers and their habitats, Best Management Practices to maintain important habitat components, and enhancement techniques that can be applied to facilitate sustainable populations. These important aspects of the project will build on existing and developing partnerships to help us meet the overarching goal of having a self-sustaining population of fishers in the Bridge River watershed.

## ACKNOWLEDGEMENTS

We wish to acknowledge the help of Breanne Patterson, Lorraine Enns, and Scott Allen from FWCP-Coastal for administering the project. Vivian Birch-Jones from the Lillooet Naturalist Society and Matt Manual from the Lillooet Tribal Council provided support and encouragement. Finally, we thank Evan Narcisse from the Xaxli'p First Nation for his contribution to fieldwork.

## REFERENCES

Arthur, S.M.,W. B. Krohn, and J. R. Gilbert. 1989. Home range characteristics of adult fishers. Journal of Wildlife Management 53: 674-679.

BC Environment. 2006. BC Conservation Data Centre: Conservation Status Report - *Martes pennanti*. http://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AMAJF01020 (accessed 9 May 2011)

Buck, S.G., C. Mullis, and A.S. Mossman. 1983. Final report: Corral Bottom-Hayfork Bally fisher study. Humboldt State University and USDA Forest Service, Arcata, California, USA.

Davis, L.R. 2009. Denning ecology and habitat use by fisher (*Martes pennanti*) in pine dominated ecosystems of the Chilcotin Plateau. Thesis. Simon Fraser University, Burnaby, British Columbia, Canada.

Jones, J.L. 1991. Habitat use of fisher in northcentral Idaho. Thesis, University of Idaho, Moscow, Idaho, USA.

Jones, J.L., and E.O. Garton. 1994. Selection of successional stages by fishers in North-central Idaho. Pages 377-388 *in* S.W. Buskirk, A.S. Harestad, M.G. Raphael, and R.A. Powell editors. Martens, sables and fishers: biology and conservation. Cornell Univ. Press, New York, New York, USA.

Kelly, G. M. 1977. Fisher (Martes pennanti) biology in the White Mountain National Forest and adjacent areas. Dissertation, University of Massachusetts, Amherst, Massachusetts, USA.

Leonard, R. D. 1980. The winter activity and movements, winter diet, and breeding biology of the fisher (*Martes pennanti*) in southeastern Manitoba. Thesis, University of Manitoba, Winnipeg, Manitoba, Canada.

Lofroth, E. C. 2004. Fisher (*Martes pennanti*) British Columbia Population Science Assessment Review December 2004. Unpublished report, Ministry of Environment, Victoria, British Columbia, Canada.

Powell, R. A. 1979. Mustelid spacing patterns: Variations on a theme by Mustela. Zeitschrift für Tierpsychologie 50: 153-165.

Raine, R. M. 1983. Winter habitat use and responses to snow cover of fisher (*Martes pennanti*) and marten (*Martes americana*) in southeastern Manitoba. Canadian Journal of Zoology 61:25-34.

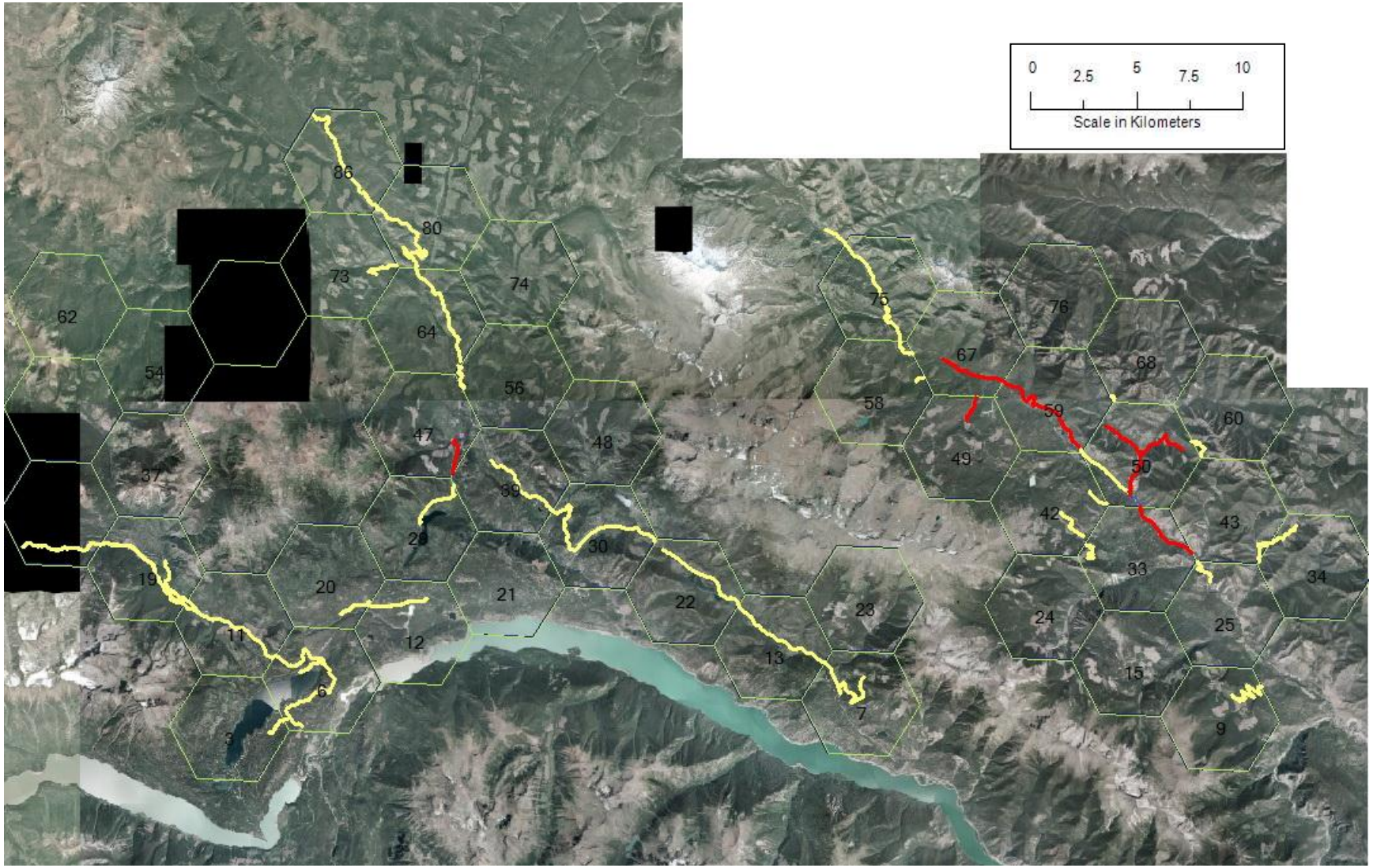
Resources Information Standards Committee. 1999. Inventory methods for medium-sized territorial carnivores: Coyote, red fox, lynx, bobcat, wolverine, fisher and badger. Standards for components of British Columbia's biodiversity number 25. Resources Inventory Committee, Province of British Columbia, Victoria, Canada.

Weir, R.D. 1995. Use of riparian and riparian-associated habitats by fishers. Pages 49-56 *in* K.H. Morgan, and M.A. Lashmar, editors. Riparian habitats: management and research – proceedings. Canadian Wildlife Service, Delta, British Columbia, Canada.

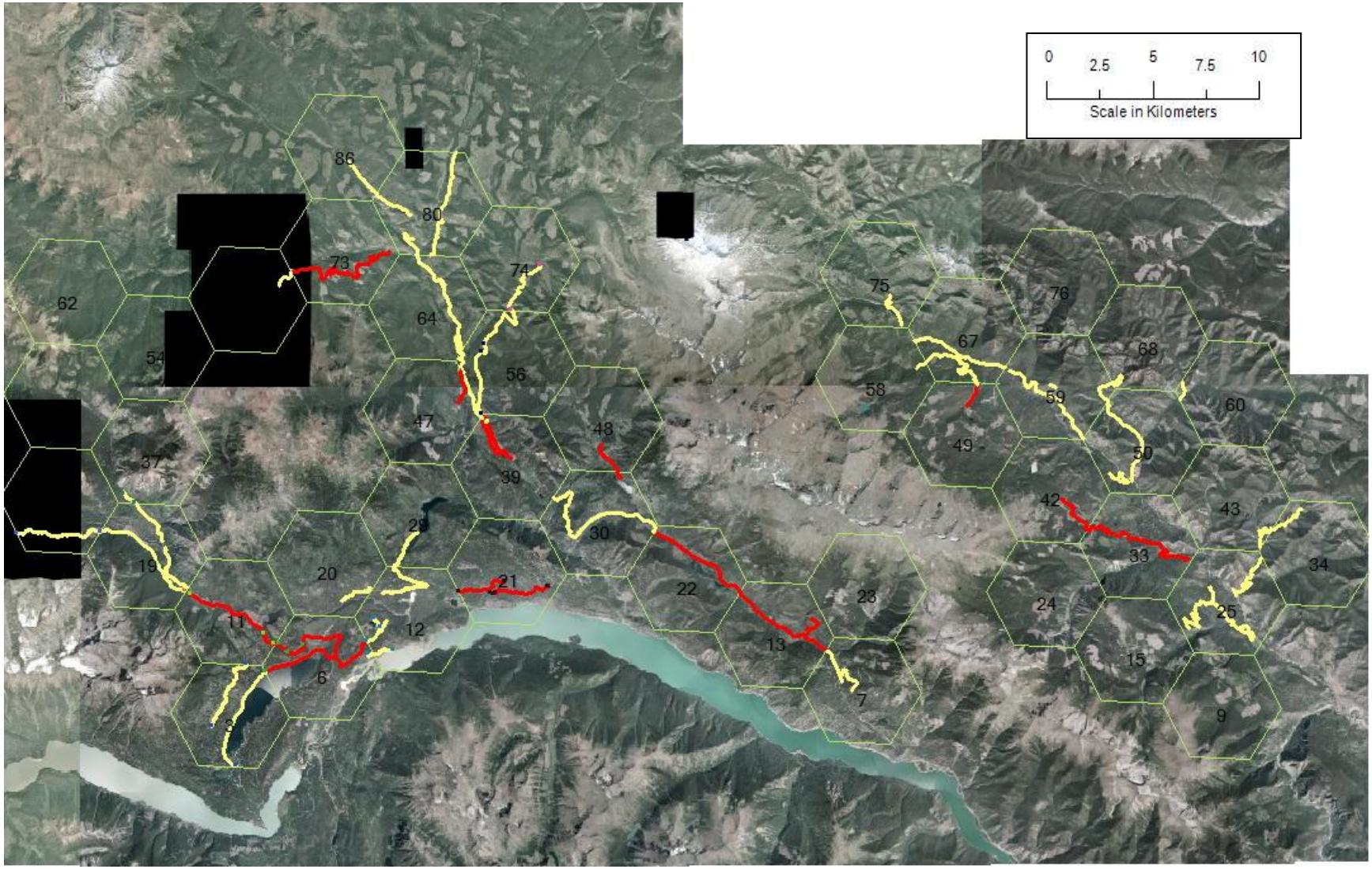
Weir, R. D., and F. B. Corbould. 2008. Ecology of fishers in the sub-boreal forests of north-central British Columbia. Final Report. Report No 315. Peace/Williston Fish and Wildlife Compensation Program, Prince George, British Columbia, Canada.

Weir, R.D., A.S. Harestad, and F.B. Corbould. 2009. Home ranges and spatial organization of Fishers, *Martes pennanti*, in central British Columbia. Canadian Field-Naturalist 123(2): 126-132.

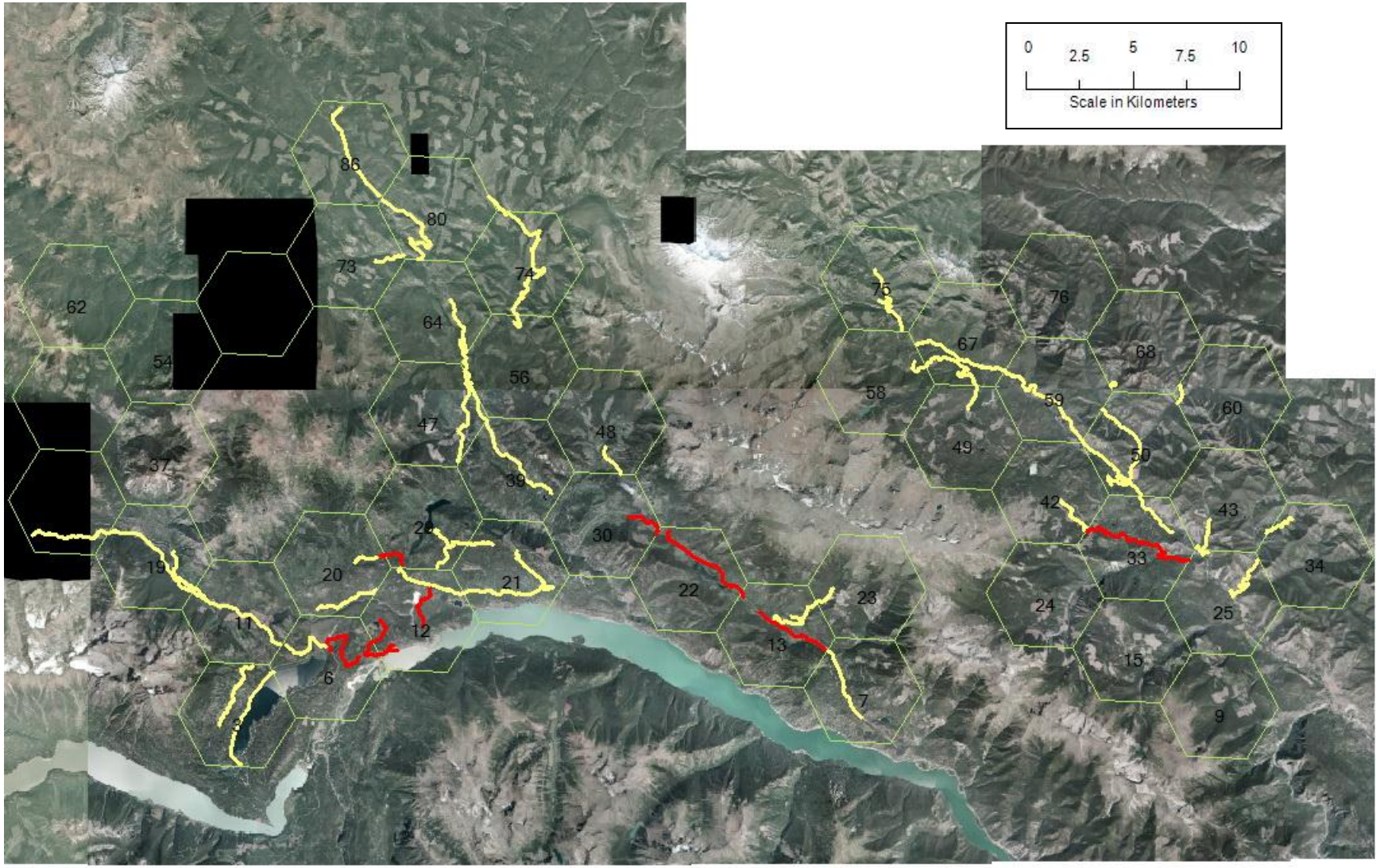
**APPENDIX 1. TRACK TRANSECTS CONDUCTED BETWEEN DECEMBER 7 – 13TH 2010 IN THE BRIDGE RIVER WATERSHED, BRITISH COLUMBIA. RED TRANSECTS WERE THOSE WITH FISHER DETECTIONS.**



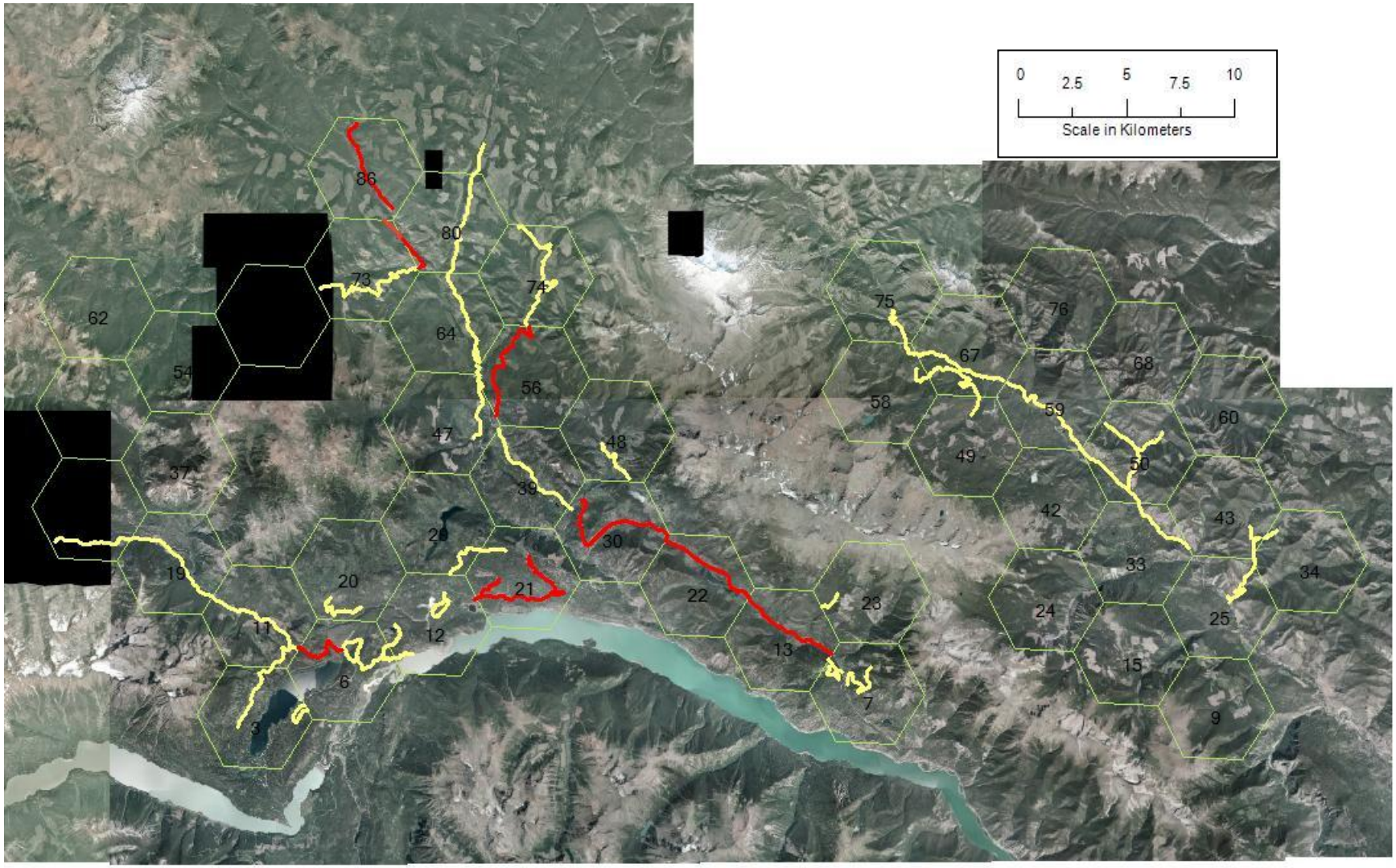
**APPENDIX 2. TRACK TRANSECTS COMPLETED BETWEEN JANUARY 16 – 25TH 2011 IN THE BRIDGE RIVER WATERSHED, BRITISH COLUMBIA. RED TRANSECTS WERE THOSE WITH FISHER DETECTIONS.**



**APPENDIX 3. TRACK TRANSECTS COMPLETED BETWEEN FEBRUARY 14 – 20TH 2011 IN THE BRIDGE RIVER WATERSHED, BRITISH COLUMBIA. RED TRANSECTS WERE THOSE WITH FISHER DETECTIONS.**



**APPENDIX 4. TRACK TRANSECTS COMPLETED BETWEEN MARCH 7 – 12TH 2011 IN THE BRIDGE RIVER WATERSHED, BRITISH COLUMBIA. RED TRANSECTS WERE THOSE WITH FISHER DETECTIONS.**



## APPENDIX 5. FINANCIAL STATEMENT

| | BUDGET | | ACTUAL | |
|---|---|---|---|---|
| | **BCRP** | **Other** | **BCRP** | **Other** |
| **INCOME** | | | | |
| ***Total Income by Source*** | $61,335.00 | $20,800.00 | $58,121.42 | $10,240.00 |
| **Grand Total Income** (BCRP + other) | ***$82,135.00*** | | ***$68,361.42*** | |
| | | | | |
| **EXPENSES** | | | | |
| ***Project Personnel*** | | | | |
| **Senior Biologist (employee)** | $21,600 | $0 | $31,473.56 | $0.00 |
| **St'át'imc Technicians** | $14,250 | $0 | $8,756.25 | $0.00 |
| **Government Biologist** | $0 | $3,000 | $0 | $600.00 |
| ***Materials & Equipment*** | | | | |
| **Field Accommodation** | $4,750 | $0 | $4,000.00 | $0 |
| **Meals** | $1,330 | $0 | $1,105.38 | $0 |
| **Mileage** | $2,300 | $0 | $1,408.50 | $0 |
| **Truck** | $6,000 | $1,500 | $6,000.00 | $500 |
| **Snowmobiles** | $750 | $3,000 | $2,090.46 | $1,500.00 |
| **Snowmobile/ATV trailer** | $0 | $1,000 | $0 | $1,000.00 |
| **Fuel** | $1,575 | $0 | $2,539.21 | $0 |
| **Helicopter charter** | $6,750 | $0 | $0 | $0 |
| **Snowshoes** | $0 | $900 | $0 | $400.00 |
| **Backcountry ski equipment** | $0 | $1,200 | $0 | $0 |
| **Navigation/safety equipment** | $0 | $600 | $0 | $600.00 |
| **Field supplies** | $175 | $0 | $120.98 | $0 |
| **TRIM data** | $0 | $2,750 | $0 | $0 |
| **Orthophotos** | $0 | $4,400 | $0 | $4,400 |
| Administration | | | | |
| **Laptop, software, printer** | $0 | $2,250 | $0 | $1,000.00 |
| **Project information brochure** | $250 | $0 | $112.15 | $0 |
| **Avalanche rescue training** | $555 | $0 | $500.00 | $0 |
| **Map production** | $700 | $0.00 | $14.93 | $0 |
| **Digital cameras** | $0 | $200.00 | $0 | $200.00 |
| **Cell phones** | $350 | $0 | $0 | $40.00 |
| **Grand Total Expenses** (BCRP + other) | ***$82,135*** | | ***$68,361*** | |
| | | | | |
| **BALANCE** (Grand Total Income – Grand Total Expenses) | **The budget balance should equal $0** ***$0.00*** | | *The actual balance might not equal $0** ***$8,357.00*** | |

## APPENDIX 6. PERFORMANCE MEASURES

Because this project did not involve habitat manipulations in its first year, there were no reportable standard "performance measures" as outlined in the report guidelines.

We completed the following:

- 1415 km-days of track surveys in 39 20-km² hexagonal cells throughout the project area
- Detected fisher tracks on 72 occasions
- Attended and presented information on the project at 2 community meetings
- Developed 1 poster, 1 project information brochure, and 1 presentation for community outreach and communication.

## APPENDIX 7. FWCP-COASTAL RECOGNITION

***Project information brochure*** – pg1

- We will also do surveys for potential den trees in these areas in 2011 to see if low numbers of these trees might be limiting the fisher population.

**Three fisher kits cozy up to each other inside a tree cavity.**

### Why is this information helpful?

This data will:

- Help BC Hydro identify and conserve riparian-like reproductive habitats for fishers that occur outside the flooded areas.
- Allow us to estimate the health of the fisher population in the Bridge River watershed.
- Help identify opportunities to compensate for the loss of cavity-bearing trees by creating new cavity trees.

For more information on the project, please contact:

**Richard Weir**
Artemis Wildlife Consultants
Phone: **1 888 223 4376**
Email: rweir@artemiswildlife.com

For updates and recent reports, visit
www.artemiswildlife.com

ARTEMIS WILDLIFE CONSULTANTS

Support for this project is provided by:

- Bridge-Coastal Restoration Program
- Lillooet Tribal Council
- BC Ministry of Environment

BC HYDRO FISH & WILDLIFE
BRIDGE COASTAL RESTORATION PROGRAM

# Fishers in the Bridge River Area

Bridge River Fisher Habitat and Inventory Project

***Project information brochure –*** pg2

**Bridge River Fisher Habitat and Inventory Project**

**F**ishers are members of the weasel family and are valuable furbearers. About the size of a large housecat, they are a secretive creature of the deep woods that are rarely seen by people.

**Range of fishers in BC**

Fishers are rare in most of British Columbia, but they do occur in the Bridge River watershed.

## Fun Fisher Facts

- Despite their name, fishers don't fish and they rarely go into water.
- Fishers are most common in dense forests and frequently use forests along creeks and rivers.
- Fishers are highly carnivorous - snowshoe hares, grouse, squirrels, and small rodents are important foods for fishers.
- Fishers are the only consistent predator of porcupines. They use their lightning-quick speed to attack and retreat before the porcupine has a chance to strike with its quill-laden tail.

## Why worry about fishers?

- Fishers are a species of "Special Concern" in BC because of their diminishing populations.
- Fishers are the largest animal in North America that needs tree cavities for reproductive dens.
- Black cottonwoods are one of the few tree species in British Columbia that commonly form large enough cavities for fishers to use as dens.
- Flooding of the Carpenter and Downton Reservoirs caused the loss of many large cottonwood trees, which may have affected the supply of den trees for fishers.
- This may have affected the number of fishers that could successfully breed in the Bridge River watershed.

**A female fisher gets ready to climb her den tree to get back to her kits.**

## What is the Plan?

The objective of the project is to look for fishers and their denning habitats in the Bridge River watershed.

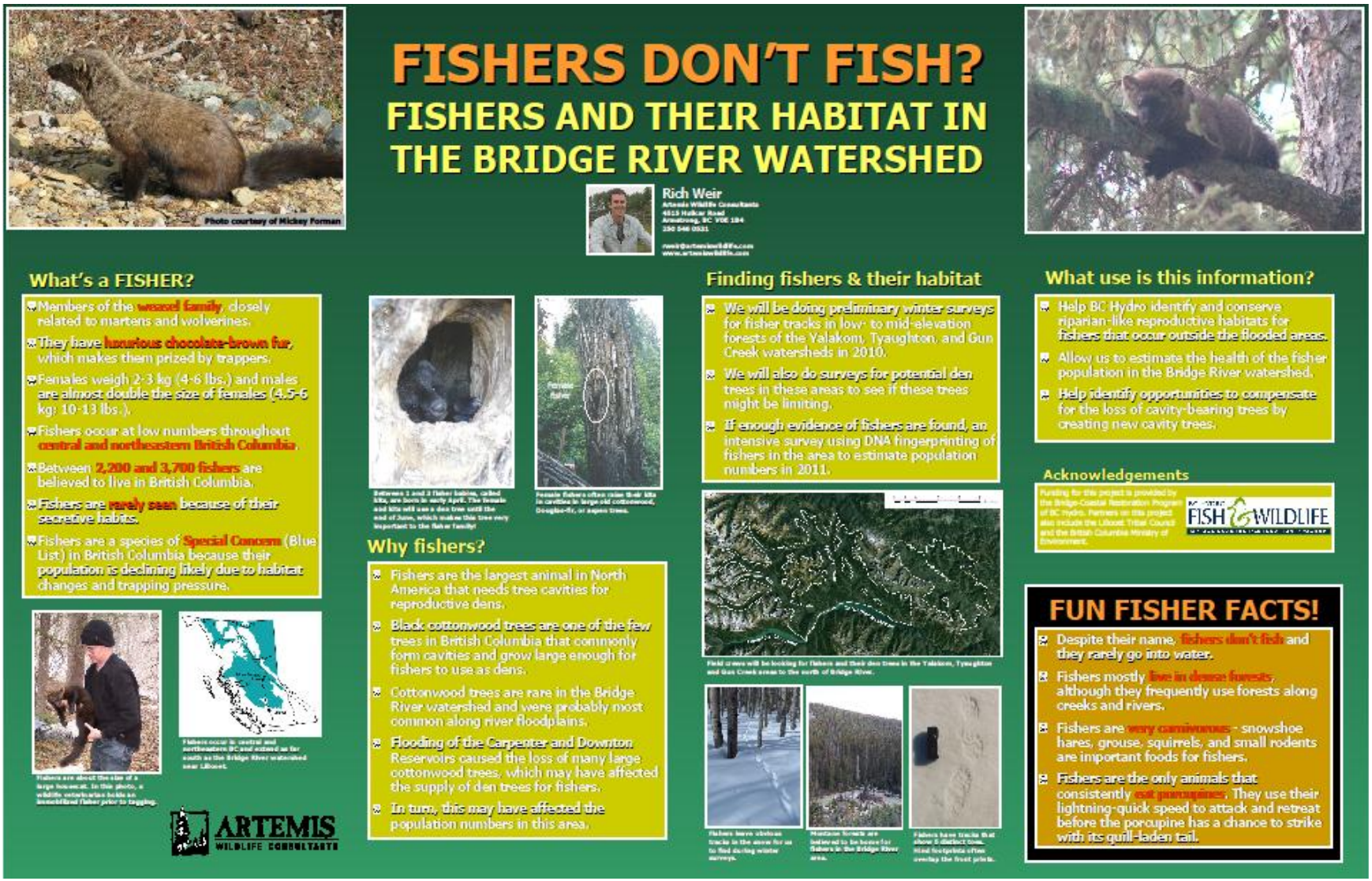
- We will be doing winter surveys for fisher tracks in low- to mid-elevation forests of the Yalakom, Tyaughton, and Gun Creek watersheds in the winter of 2010-11.

**Fishers leave obvious tracks during winter.**

- If enough evidence of fishers is found, an intensive survey using DNA fingerprinting will be conducted to estimate population numbers in 2011.

**Surveys for fishers and their habitat will occur in the Yalakom, Tyaughton and Gun Creek areas in 2010 and 2011.**

## *Project Introduction Poster*



***Joint Lillooet Tribal Council/Lillooet Naturalist Society presentation poster.***

# Lillooet Fisher Community Outreach Event

**When:** Wednesday, January 19th, 2011

**Time:** 7:00pm – 8:00: Fisher presentation,

8:00 – 8:30: Questions, tea and chat

**Where:**

Lillooet Friendship Centre, 357 Main Street

**Admission:** By donation to the Friendship Centre Food Bank

**Who:** Everyone Welcome!

Fisher (Martes pennanti) are a species at risk in British Columbia that are dependent on forest cover, attributes of old forest, and catchable prey. Large, old trees with heart rot cavities are particularly important for reproductive denning and are often impacted by resource development. This project is examining the abundance of fisher in the Bridge River watershed and identifying important reproductive habitats. This information will be used to provide resource managers with information on how to manage for fisher and their habitats. The project is a partnership between Artemis Wildlife Consultants, Davis Environmental Ltd, the Lillooet Tribal Council, the Lillooet Naturalist Society, and the BC Ministry of Environment using funding from the BC Hydro Fish and Wildlife Bridge Coastal Restoration Program. Please join fisher expert Larry Davis as he introduces you to the fascinating world of fishers. Larry will be giving an overview of fisher life history and presenting research on this species from the Chilcotin area of British Columbia.


Lillooet
Naturalist Society

BC HYDRO
FISH & WILDLIFE
BRIDGE COASTAL RESTORATION PROGRAM

## *Article in February 2011 issue of the St'at'imc Runner newspaper.*

Page 6 Tmicw The St'at'imc Runner February 2011

# Fisher of the Forest: Nwaníken

A new study tracks and counts fishers in Bridge River watershed

Not many people see Fishers. They are cat-like in their curiosity, cunning as a weasel (their little cousin), and very shy. Fishers live all over St'át'imc territory and a new study of their numbers is beginning in the Bridge River watershed.

Larry Davis, a biologist based in Williams Lake, has just completed five years studying fishers in Tsilhqot'in. This winter is the first of a three year study to find out more about this animal and how it lives here.

A very furry animal, the fisher is sought after by trappers. Provincially, the population is low and expected to decline in the mid to long term – if low birth rate, habitat loss, and trapping continue as they are now. Reasons for the decline include a naturally low birth rate, effects of habitat loss, and trapping. However, trappers are also some of the advocates trying to protect their habitat. Scientists think there are less than four thousand fishers in BC.

Fishers have dens in trees - in holes in trees such as Douglas-fir, lodge-pole pine, aspen and cottonwood. They like to have several dens in their territory and use them for resting and to have their babies. A male fisher can have a range of 150 square kilometers. Females have smaller ranges, a fifth that size, and keep it to themselves and their kits. They have two or three babies at a time, but not every year, and only live to be about eight years at the oldest.

From nose to tail, this animal is over a meter long. Males are about twice as big and heavy as females. Slinky as it is, like the other members of its weasel family, it can fit into dens that have an opening about ten centimeters wide. The fisher uses an opening in a tree caused by frost cracks, a broken branch, woodpecker holes that provide access into an opening created by heart-rot in the center of the tree. Fisher will use live and dead trees for dens, but usually give birth in their kits in live trees.

Because fishers live where there is an abundance of prey like rabbits, grouse, squirrels and even porcupines, protecting their habitat means protecting other types of wildlife as well. Fisher are one of the few predators known to actively hunt and kill porcupines, and beaver can be a small part of their diet. They need good forest cover because they can't travel easily in deep or soft snow, which is something they have in common with mule deer. Trees also provide the fisher with somewhere to escape from larger predators that try to eat them.

In winter fishers rely on piles of course woody debris, such as slash pile that logging creates. With the shelter from the snow and easy access, fishers can rest inside the piles and get food - the mice and squirrels who also live there.

You can tell their tracks because all five fingers touch the ground. A paw print will be about eight centimeters wide and ten centimeters long. Their loping stride, back feet landing in the same place the front ones do, leaves pairs of tracks about 60 centimeters apart that are slightly offset (one foot in front of the other).

Biologists will be looking to see where they make their dens, and how much habitat there is with enough den. The study will make recommendations to protect those key places. In year two, during winter while the animals aren't moving around as far, they will place traps to get samples for DNA studies that will give the keys to what the population in the Bridge River Valley is. A slim wooden box is screwed in a tree and baited with smelly chicken wings wired inside. On the inside, mouse trap glue boards are fixed, and these will catch hairs off the animals, including the follicle end that provides the tissue to be used to get DNA information.

The new study is being supported by BC Hydro's Bridge Coastal Restoration Program in with Lillooet Tribal Council and BC's Ministry of Environment.

Photos by Larry Davis.
Front page picture, Center for Conservation Biology, Washington