Region 1 Furbearer Report
2022

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Introduction

The harvest of furbearer species in northwest Montana is a historical economic and recreational activity that has shaped traditions in the region. The popularity of fur harvesting is reflected by a steady increase in statewide trapping license sales since the middle 1940's, with a peak of over 6000 licenses sold in 2011 (Figure 1). Correspondingly, fur harvest has exceeded 50,000 animals harvested annually since 2005, with fur harvest in northwest Montana (TD1) comprising 7% of the overall estimated statewide fur harvest (Figure 2). The following species are classified as furbearers and require a trapping license for harvest: beavers, bobcats, fishers, martens, otters, mink, muskrats, and swift fox. Lynx and wolverines are protected by law with no open trapping season in Montana. The purpose of this report is to summarize harvest and monitoring data for furbearer species in northwest Montana (TD1).

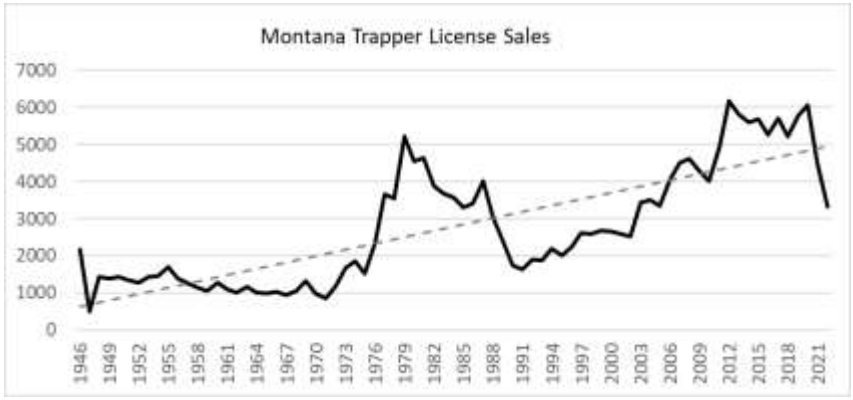


Figure 1. Annual trapper license sales in Montana (1946-2022)

Fishers

Background.— Fishers (*Pekania pennanti*) in the Northern Rocky Mountains (NRM) of Montana, including northwest and west central Montana, and Idaho are considered a distinct population segment (DPS). While unverified, it is believed that unregulated fur trade in the late 1800s and early 1900s nearly eradicated Montana's fisher populations (Powell 1993). By the 1920s, fishers were presumed extirpated, and the statewide trapping season was closed in 1930 (Weckworth and Wright 1968). To restore fishers to what was perceived to be their historical range, provide trapping opportunity, and to control porcupines, animals were translocated to various mountain ranges across the western part of the state (Weckworth and Wright 1968; Roy 1991; Figure 3). In 1959-1960, the first translocations of fishers were initiated with animals from British Columbia. Nine fishers were released in the northwest corner, 15 fishers were released in the Swan Valley, and 12 fishers were released into south-western Montana (Weckworth and Wright 1968). Additional translocations occurred between 1989 and 1991, when 110 fishers (32 from Minnesota and 78 from Wisconsin) were released into the Cabinet Mountains (Roy 1991; Heinemeyer 1993). A third release of 61 fishers occurred in 1996 and 1998, just north of Montana's border in British Columbia. Some of these animals appeared to have moved into northwestern Montana, as one marked individual was captured by a Montana trapper in 1996 (Montana Fish, Wildlife & Parks, unpublished data).

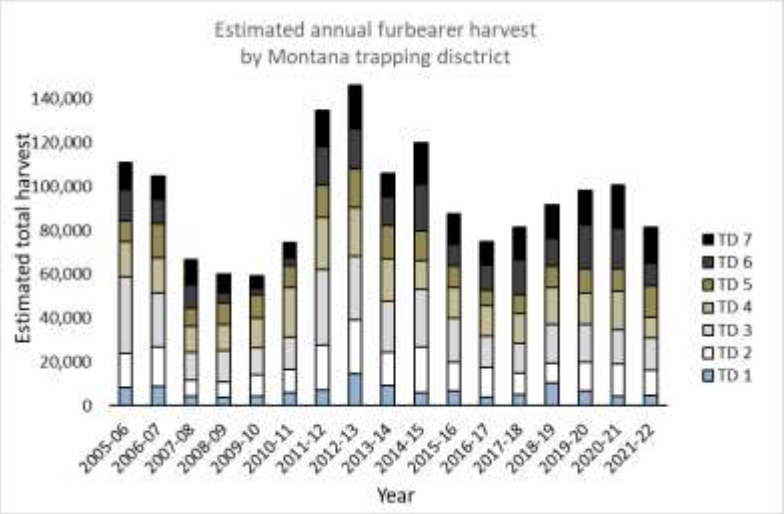


Figure 2. Estimated Montana furbearer harvest (2005-2021).

Following the 1958-1961 transplants, fishers appeared to have established populations in the eastern portion of northwest Montana, and a trapping season with a quota of 10 fishers was reopened in 1983 in northwest Montana; however, by 1990, fishers were again nearly absent from the 1959-1960 reintroduction areas, and fishers appeared to only persist in the Cabinet Mountains, where they were released in 1989-1991. In response to a perceived decline in fisher numbers throughout the region, the annual trapping quota was reduced to five in 1995 and then to two in 1997. The annual quota of 2 was maintained until 2016, when the quota was decreased to 1 fisher per year, and

Figure 3. Location of previous fisher translocations.

trapping was only permitted in the Cabinet Mountains. Between 1979 and 2018, 81 fishers (37 females, 41 males, 3 unclassified individuals) were harvested in northwest Montana, and in 2019, the trapping season quota was reduced to zero (Figure 4). Since 2019, 3 fishers have been incidentally caught during the trapping season in Lincoln and Sanders counties.

Fisher Occupancy in the Cabinet Mountains.— In winter 2017-2018, we completed a pilot project to estimate occupancy and detection probability of fishers in the Cabinet Mountains (Coltrane and Inman 2021). This monitoring effort was designed to provide initial estimates and to advise a larger multi-state monitoring effort for fisher to be completed in the following winter. In addition, this was the first comprehensive monitoring of fishers in the Cabinet Mountains of Montana using baited camera/DNA stations.

We deployed a total of forty-two monitoring stations (Figure 5) in 21 randomly selected grid cells from 11 December 2017 to 31 March 2018 for a total of 3,993 trap nights. We detected fishers at 7 out of 21 cells, which resulted in a 0.43 (*SE* = 0.15, 95% *CI* = 0.19 – 0.71) probability that fishers occupied a grid cell. Detection probability was low (0.25 ± 0.08) but increased slightly throughout the sampling periods. Genetic analysis revealed a minimum population count of 4-6 individual fishers in the study area, but all individuals successfully identified were males and of midwestern genetic origin. Our results support anecdotal evidence from the West Cabinet Mountains of Idaho that suggested fishers may be present within the study area but at low abundance (Lucid et al. 2019).

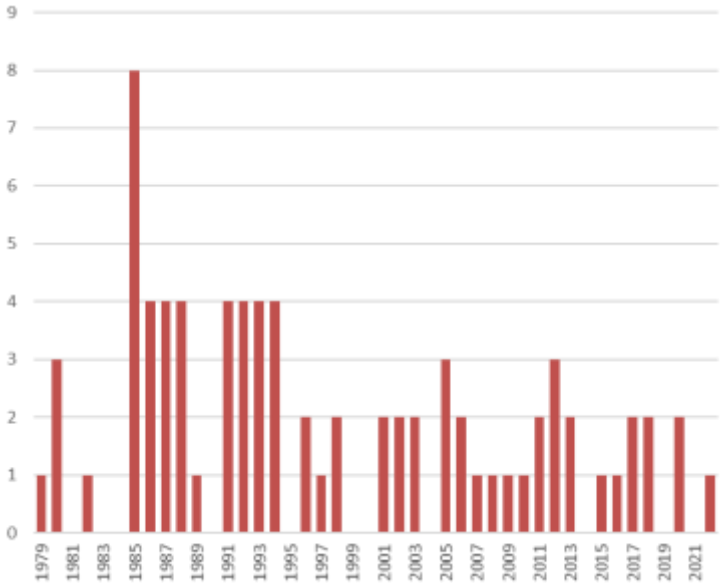


Figure 4. Fisher harvest and incidental take in TD1 (1979-2022)

During winter 2018-2019, in partnership with Idaho Department of Fish and Game, we conducted a large-scale, multi-state baited remote camera and hair snare study to assess the current distribution of fishers across their Northern Rocky Mountain range (Krohner et al. 2021). The objective was to determine the current distribution of NRM fishers and to provide a baseline occupancy estimate and sampling framework that that would allow biologists to monitor changes in fisher distribution and occupancy over time.

Using the methods developed in the 2017-2018 pilot study (Coltrane and Inman 2021), we deployed 175 baited camera and hair snare stations across MFWP Regions 1 and 2. Results indicate that in Montana,

Figure 5. Fisher monitoring station.

the probability of fisher occupancy in wet forest habitat was 0.17 (95 % *CI* = 0.05-0.36) and 0.06 (95% *CI* = 0.03-0.10) in dry forest habitat, with an overall detection probability of p = 0.55 (95% *CI* = 0.44-0.65). While predicted occupancy for wet habitat, such as in the Cabinet Mountains, was lower than predicted by the 2017-2018 study, it was within the range of the confidence intervals for the initial estimate.

In addition to standard occupancy analyses, Kroner et al. (2021) explored a spatial occupancy model to identify core areas with high and low predicted occupancy across the Northern Rocky Mountains. The spatial analysis estimated a similar detection probability at p = 0.53 (95% *CI* = 0.46-0.60) and predicted 2 core areas with higher predicted fisher occupancy: a large area in the Idaho Nez-Perce-Clearwater National Forests and a smaller area in the Cabinet Mountain Range of Idaho and Montana (Figure 6).

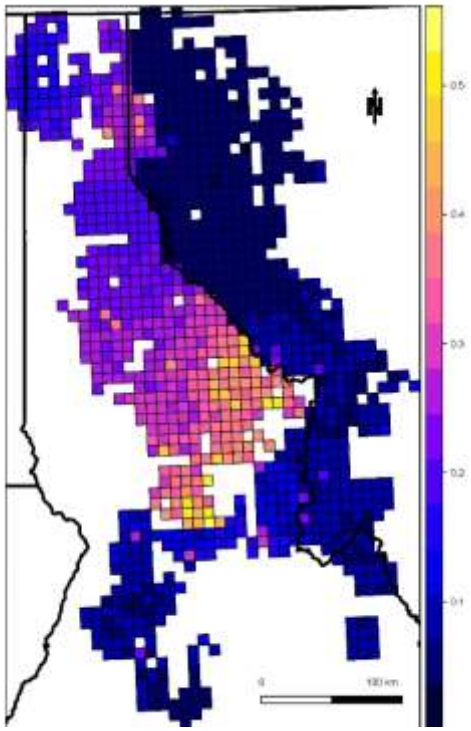


Figure 6. Results from a spatial fisher occupancy model across 7.5-km x 7.5-km grid cells in Montana, Idaho, and northeastern Washington USA, winter of 2018–2019. Warmer colors indicate a higher probability of occupancy, while cooler colors indicate a lower probability of occupancy. (Krohner et al. 2021)

The results of the 2017-2018 and 2018-2019 monitoring effort suggest fisher numbers in northwest Montana are low. Both of these efforts found that the probability of fishers occupancy in the Cabinet Mountains was markedly lower than has been reported for other populations (New York: Linden et al. 2017 and Sierra Nevada Mountains: Zielinski et al. 2013). In comparison, mean occupancy of fishers 3 years post reintroduction on the Olympic Peninsula ranged from 0.08 to 0.24 over 4 years of monitoring; it was speculated that low occupancy may have indicated incomplete colonization of the area (Happe et al. 2020). Our studies were completed 25 years post-reintroduction of fishers to the Cabinet Mountains. Because colonization of the West Cabinet Mountains of Idaho appears to have originated from the reintroduction (Lucid et al. 2019), it appears colonization across the contiguous mountain range was successful and that the observed low occupancy is not a reflection of incomplete colonization. Therefore, our findings support those of Lucid et al. (2019), which indicate that the fisher population in the West Cabinet Mountains of Idaho and Montana is small and physically and genetically isolated from the nearest adjacent population of fishers in Idaho.

Fisher Den Box Initiative.— In the summer of 2019, in conjunction with Montana Fur Harvesters, Montana Trapper's Association, and US Forest Service, we began a project to attempt to increase fisher denning habitat in the Cabinet Mountains. Habitat availability for fishers in Montana, and specifically the Cabinet Mountains, is not well understood, but Idaho models suggest the Cabinet Mountains

provide the most suitable habitat in Montana. Fisher home ranges in Idaho commonly occur in mesic areas and contain large diameter trees (up to 6 feet in dbh) conducive to cavities that provide secure denning and resting sites (e.g., western red cedar) (Sauder 2014, Sauder and Rachlow 2015). These trees are often most numerous in drainage bottoms but are also found upslope on hillsides as soil and moisture conditions allow. It appears cavities can be a limiting factor for fisher populations since fishers are obligate cavity users. Historic timber management and large-scale fires may have reduced available denning trees, which may limit fisher distribution and population viability. In British Columbia, where hydro-electric development, insect infestations, timber harvest, and large-scale fires had decreased the availability of den trees, artificial den boxes were found to be used by fishers (Davis 2016). Using a den box design from British Columbia, 31 den boxes were constructed and deployed in 2019 and an additional 20 den boxes were constructed and deployed in 2020. With approval from the Forest Service, individuals from Montana Fur Harvesters, Montana Trapper's Association, and USFS placed den boxes at previously selected locations within modeled fisher habitat in the Cabinet Mountains. Corrugated collars fixed with gun brushes were placed beneath the boxes to collect genetic material.

Since winter 2019-2020, we have been monitoring den boxes with remote Reconyx Hyperfire 2 cameras. We deploy cameras and long call lure by February 15 each winter and retrieve cameras and any genetic material by mid-June. We did not observe fishers at any den boxes during winter 2019-2020, at 1 den box in winter 2020-2021, and at 8 den boxes during winter 2021-2022 (Figure 7). To date, we have not observed any actual denning activity at any den boxes. We continue to monitor den boxes this winter (2022-2023). Future monitoring efforts will be determined based on results from this winter.

Figure 7. Fisher checking out a den box in the Cabinet Mountains, Montana (Winter 2021/2022).

Fisher Genetic Sampling.— In conjunction with the occupancy monitoring and fisher den box projects, we have been collecting genetic samples to identify individual fishers. Since 2018, 15 individual fishers (11 males and 4 females) have been identified in the cabinet mountains. All individuals were of mid-western origin, and therefore decedents of past translocation efforts.

Future Efforts and Management Recommendations.— In winter 2023-2024, we will be using a modified sampling frame developed by Krohner et al. (2021) to re-evaluate occupancy of fishers in the Northern Rocky Mountain Range of Idaho and Montana. This effort will include intensive sampling of the Cabinet Mountains in Montana to generate a stand-alone occupancy estimate for this area. Results will inform future management decisions concerning fishers in northwest Montana. Potential management actions could include quota management and/or translocation.

There are no anticipated changes to the fisher regulations or quotas for the upcoming 2023 trapping season.

Martens

Background.— Martens (*Martes americana* and *M. caurina*) are important harvestable furbearer species across the boreal forests of North America, and their value on the landscape far exceeds their monetary worth. In Montana, marten trapping provides an entry point to learn the art of trapping, and many experienced trappers also consider martens an important target species. However, there are gaps in our knowledge about their status and distribution across Montana.

The current distribution of martens across Montana includes a legacy of local extirpations in some mountain ranges, such that martens remain rare or absent in several ranges where they historically roamed. Within occupied range, habitat associations of martens in the Rocky Mountains generally include an emphasis on older forests with dense canopy cover and complex, multi-aged understories with coarse woody debris (Koehler and Hornocker 1977, Burnett 1981, Kujala 1993, Thompson 1994, Tomson 1999, Wilbert et al. 2000, Mowat 2006). Martens appear sensitive to habitat fragmentation; even at low levels, fragmentation can negatively impact marten abundance (Hargis et al. 1999). Clearcut logging is particularly detrimental to marten persistence (Soutiere 1979, Snyder and Bissonette 1987, Thompson and Harestad 1994).

A preliminary model for marten habitat was developed in 2019 through collaboration between MFWP and the Montana Natural Heritage Program (MNHP 2019). This model showed promise for predicting habitat and was used to support reintroduction of martens in the Little Belt Mountains (MFWP 2020). Incorporating additional habitat covariates directed specifically at marten ecology, in combination with additional species detections, accounting for potential sampling biases, and detailed evaluation of local selection patterns may improve the fit of this model.

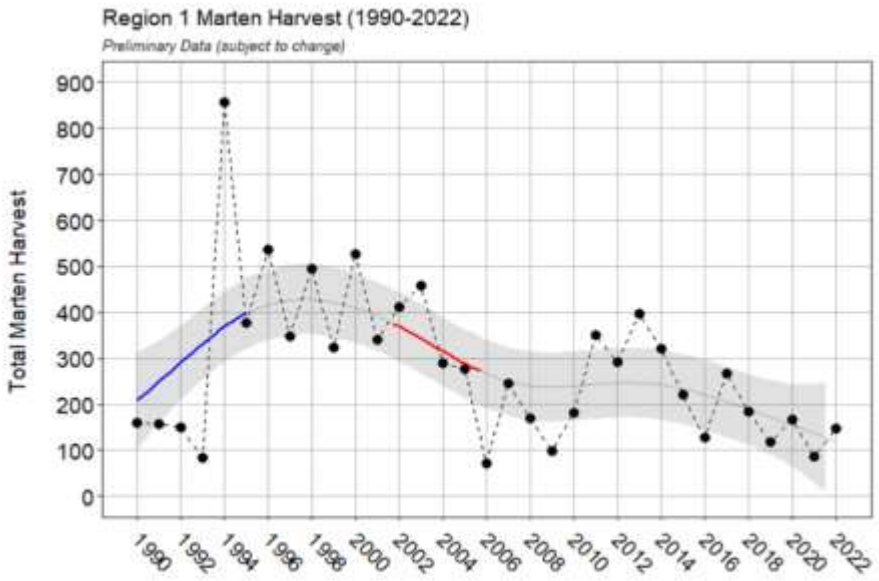


Figure 8. Marten Harvest in TD1 (1990-2022). Black points and dashed line show actual harvest. Solid grey line and shaded area depict the fitted non-linear trend and associated 95% Confidence Interval. Colored lines indicate regions of significant change in the slope of the trend line

MFWP's renewed interest in restoring martens to previously occupied portions of their range places particular emphasis on understanding the identity and distribution of marten species. Marten across North America were once divided into 2 distinct species (American marten [*M. americana*] and Pacific marten [*M. caurina*]), yet evidence of potential hybridization within Montana was used to reduce these to subspecies-level distinctions (Wright 1953). Recent morphometric and genetic studies have revived this question and settled again upon characterizing 2 distinct species, whose ranges overlap in Montana (Dawson and Cook 2012, Colella et al. 2018). Although spatial sampling in Montana has remained

sparse, a recent study in Idaho (Lucid et al. 2020) found a distinct species divide between martens sampled on either side of the Clark Fork River Valley. In fact, martens on either side of this river are at least as genetically different as martens across all of Canada, from British Columbia to the island of Newfoundland (Lucid et al. 2020). Thus, there may be substantial differences in spatial distribution and genetic variation of each marten species, and a zone of hybridization, across Montana's occupied habitat. Preliminary analysis of marten genetics in Montana did indicate spatially grouped assemblages of both species, as well as hybrids, and these data were used to guide source population selection for the Little Belt reintroduction (MFWP 2020).

Harvest Management.— Martens can be legally trapped in TD1 from December 1 to February 15. Prior to 2019, there was no quota on martens in TD1. While there is still no overall quota in TD1, in 2019 a personal quota of 10 martens/trapper was established. All harvested martens are required to be presented for sealing within 10 days of the close of the season.

Harvest and Population Status.— Marten populations fluctuate in distribution and abundance over time (Flynn and Schumacher 2008, Jensen et al. 2012), including within Montana (Weckworth and Hawley 1962). However, scant data are available to biologists at Montana Fish, Wildlife and Parks (MFWP) for monitoring temporal variation in population distribution and status. Trapper harvest data are the primary source of information for monitoring populations, and those data indicate concerning declines in harvest at both regional and statewide scales. Declines are particularly notable in Northwest Montana, which supported the highest annual harvest among regions during the late 1990s, but harvest has decreased by roughly 60% in recent years (Figure 8). Furthermore, the number of martens harvested per trapper and trapper success rate, based on a questionnaire, also have declined in TD1 over the past several decades (Figures 9 and 10). In response to these concerning indications of population decline, MFWP restricted marten harvest in TD1 to a quota of 10 martens/trapper in 2019. The rationale behind this restriction, was to help limit the number of martens being harvested out of individual drainages, as trappers tend to target 1 to 2 drainages; however, unlike and overall quota, this restriction would not limit trapper participation. This represents the only current numerical restriction on marten harvest across the state. Anecdotal evidence supports the idea that declines in harvest are the result of fewer martens on the landscape, yet furbearer harvest statistics also can be influenced by sources of variation other than actual population fluctuations, including fur market prices (Allen et al. 2020, Bauder et al).

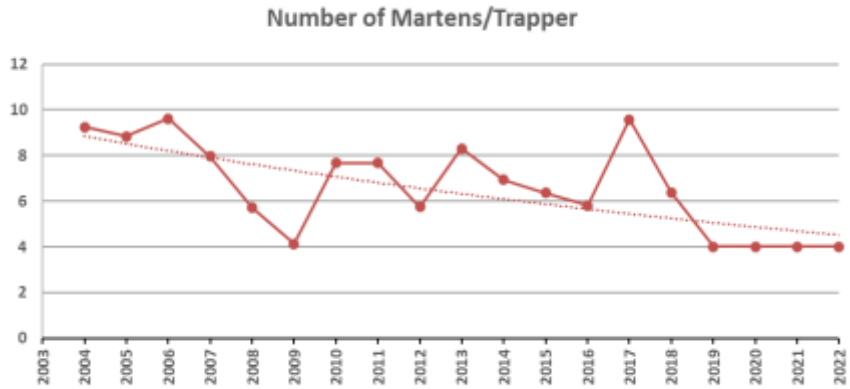


Figure 9. Average number of martens harvested per trapper in TD1.

During the 2022 trapping season, 147 martens (56 females and 91 males) were harvested in Region 1 (Figure 8). Most of these martens were trapped in Flathead County (79), followed by Lincoln (58) and Sanders (3) counties. Thirty trappers harvested martens in Region 1, with an average of 4.9 martens/trapper. Only three trappers reported a harvest of 10 martens.

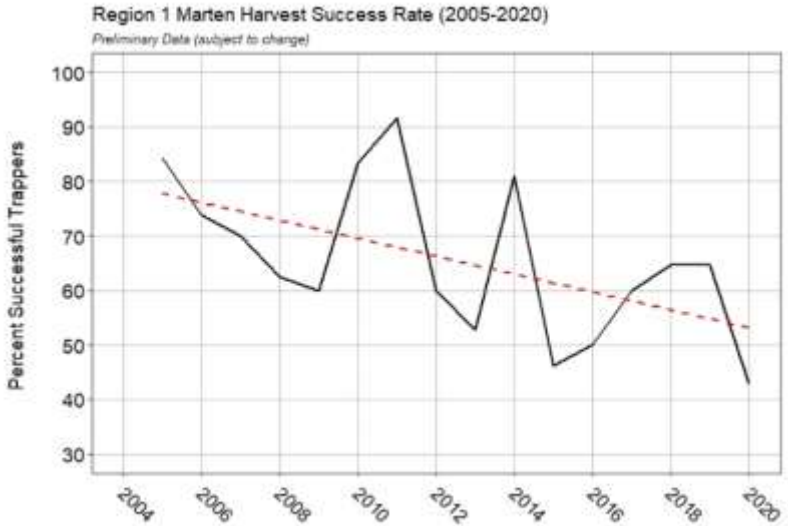


Figure 10. Trapping success rate in TD1.

Future Efforts and Management Recommendations.— In 2022, FWP approved a research project to study martens across their range in Montana. This project is a collaborative effort between Montana State University and FWP Regions 1-3. The objectives of this project include developing 1) a predictive habitat model for marten at the statewide scale, 2) assessing marten species identification and distribution statewide, and 3) developing and evaluating occupancy monitoring (in the field and via simulation) as a means of monitoring marten over space and time. The goals of this project are to address information gaps and develop a monitoring methodology for martens that can be applied within a statewide monitoring framework. This will enhance FWP's ability to evaluate marten population status, inform marten harvest decisions, restore marten populations via translocation where needed, and evaluate the impact of management activities, such as marten harvest or large-scale habitat changes, on marten populations.

Mandatory tagging was paused in 2020 due to covid; however, this regulation was reinstated in 2022. There is no anticipated change in marten quota or regulations for the 2023 trapping season.

River Otters

Background.— With hundreds of rivers, creeks, and lakes, Northwest Montana is characterized by habitat that supports a seemingly healthy population of river otters (*Lontra canadensis*). While once trapped to rarity, today, river otters are common throughout the region. To date, utilizing harvest data has been the primary means of monitoring river otter populations throughout Montana. In TD1, harvest data is the only information we have to monitor river otters, and with limited quotas and corresponding harvests, the amount of data does not provide substantial information to fully understand the dynamics of otters in Northwest Montana, nor the impact of harvest on population status.

Figure 11. Otter harvest (legal and incidental) and quota (blue line) in TD1 (1988-2022)

Harvest Management.— River otters can be legally harvested in TD1 from November 1 through April 15; however, harvest is managed through a quota system and rarely extends the full season length. Currently, the overall quota for river otters in TD1 is 40, with a personal quota of 4 otters/trapper. Trappers are required to report harvest within

24 hours of take and bring the carcass in for tagging and mandatory jaw submission for aging within 10 days of the close of the season. These harvest data, along with effort data from the annual trapper questionnaire are currently the only information biologists have to evaluate otter populations and manage harvest.

Harvest and Population Status.— Typically, trappers target otters early during the trapping season when lakes are ice-free, and as a result, the quota is quickly filled in most years. Occasionally, otters are taken incidentally to beaver trapping after the quota has been filled, but typically, this does not exceed 1 to 2 otters annually. Otter harvest has increased steadily since the late 1980's, in response to increased annual quotas (Figure 11). In the 2022-2023 season, 41 otters were legally harvested in TD1, and an additional 6 otters were killed incidentally or illegally. Most otters taken were from Flathead County (17), followed by Lincoln (11), Sanders (11), Lake (7) and Missoula (1) counties. Since the late 1980's, the distribution of harvest has expanded across the region, potentially indicating an increase in otter abundance (Figure 12).

Future Efforts and Management Recommendations.— Currently, there are no proposed projects to monitor otter populations on the landscape; however, we are currently looking into a stream-based occupancy approach being utilized by Idaho Fish and Game to estimate otter occupancy in Idaho.

In 2021, the overall otter trapping quota was increased from 28 to 40 otters, with a personal quota of 4 otters per trapper. There is no anticipated change in otter quota for the upcoming 2023 trapping season.

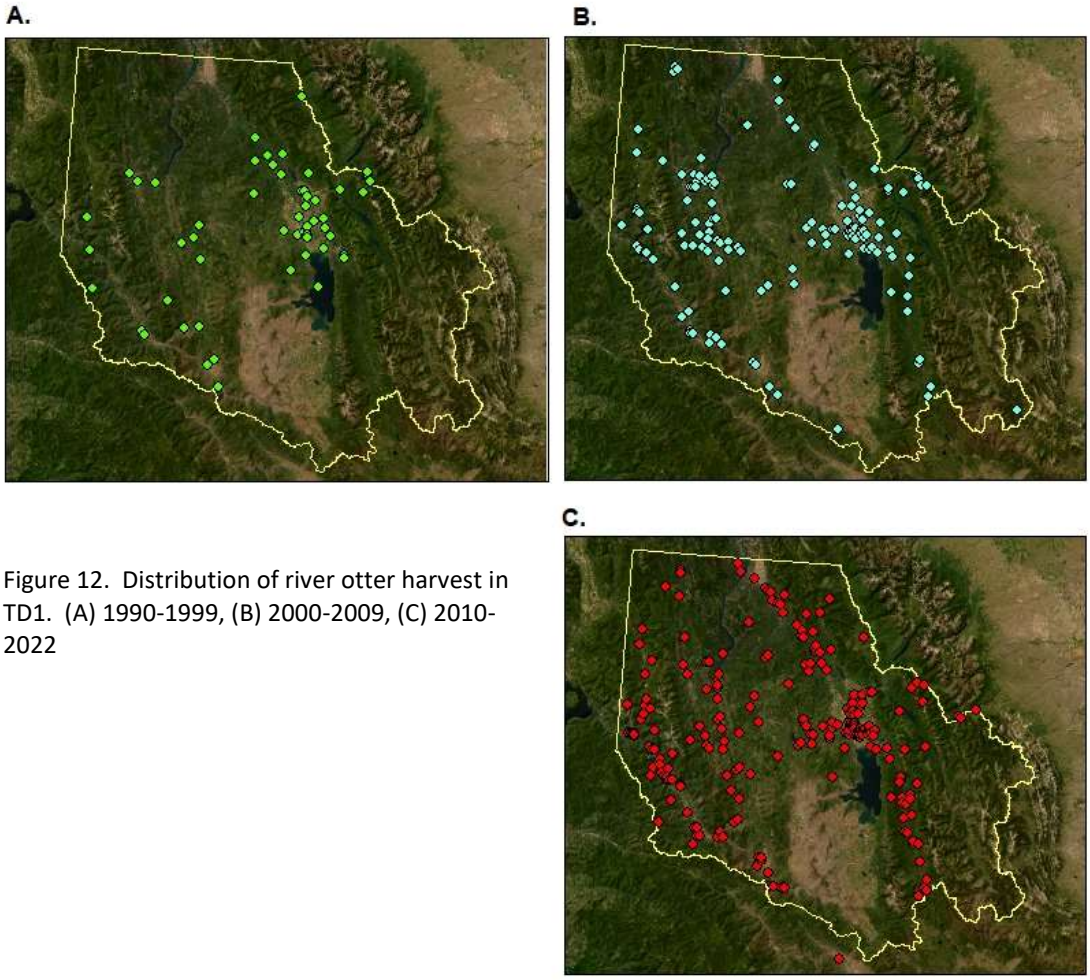


Figure 12. Distribution of river otter harvest in TD1. (A) 1990-1999, (B) 2000-2009, (C) 2010-2022

Bobcats

Background.— Bobcats (*Lynx rufus*) are one of three species of cats found throughout Northwest Montana, and one of the most coveted furbearer species targeted by trappers. While bobcats seem to be found throughout the region and have been readily documented during monitoring for other species, actual distribution is unknown. FWP contracted the development of an integrated population model (IPM) to evaluate harvest impacts and assist in quota establishment; however, the data input into the model is limited to harvest data. Information on occupancy, survival and production would help with the predictive capacity of the IPM.

Harvest Management.— In TD1, bobcats are harvested from December 1 through February 15 by trappers and hound hunters. The season is regulated by an overall regional quota and a personal quota of 4 bobcats/trapper or hound hunter. Quotas are established and evaluated annually with the goal of maintaining a stable bobcat population while maximizing harvest opportunity. Harvested bobcats must be reported within 24 hours of take, and the hide must be tagged and the bottom jaw submitted to FWP for aging within 10 days of the close of the season. These harvest data (sex and age of cats taken) are used to evaluate the impact of harvest on population growth rate and status. In addition to harvest data, anecdotal information from trappers, weather conditions, fur prices, season length, trapping effort and data collected incidentally to other monitoring programs are used to help assess bobcat population status each year. To date, there have been no efforts to directly investigate population dynamics or abundance of bobcats on the landscape.

Annual Harvest and Quotas.— In part, bobcat harvest reflects annual quotas. Throughout the 1990's, we maintained an annual harvest quota of 150 bobcats in TD1 (Figure 13). This quota was exceeded yearly, and in 2000, the quota was increased to 200. Between 2000 and 2005, the quota was met once and exceeded the remaining years. At that time, the biologists and bobcat trappers agreed that the population could withstand additional harvest pressure, and the quota was raised to 250 in 2006 and to 275 in 2013. After a record harvest of 300 bobcats in 2013, harvest began to decline, and the target quota was only achieved again in 2018. In 2016, bobcat harvest began to decline significantly (Figure 13). This decline in harvest continued through the 2022 trapping season, and since 2019, quotas have not been met (Figure 13). After the 2021 season, the quota was decreased to 225. In 2022, 207 bobcats (105 males and 100 females) were harvested.

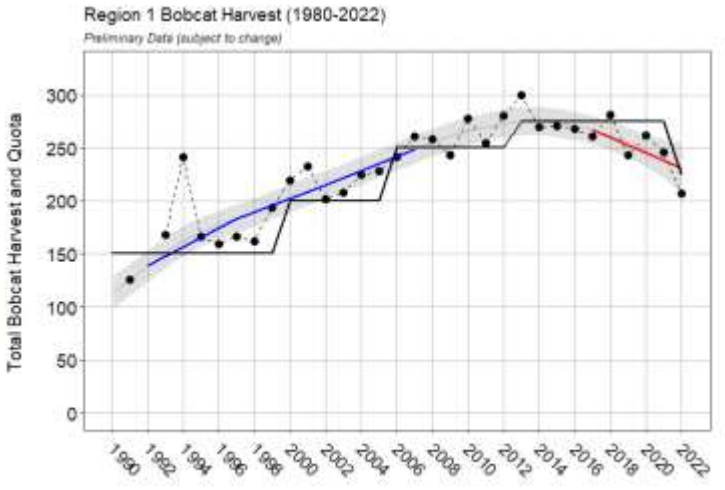


Figure 13. TD1 bobcat harvest and quota (solid black line). Black points and dashed line show actual harvest. Solid grey line and shaded area depict the fitted non-linear trend and associated 95% Confidence Interval. Colored lines indicate regions of significant change in the slope of the trend line.

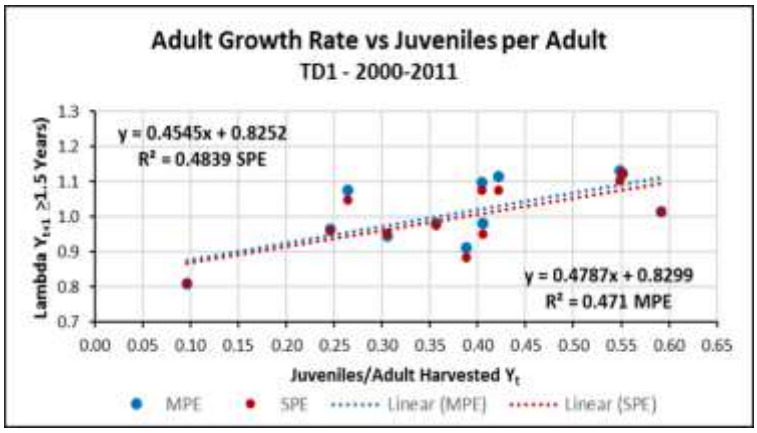


Figure 14. Bobcat juvenile/adult ratio in relation to adult growth rate for TD1.

Harvest data includes total number of individuals harvested, as well as sex and age of individuals. These demographic data can provide insight into population status. Biologist often use juvenile/adult ratios to evaluate population recruitment, with a "high" ratio indicating a recruitment level that would support population growth. This relationship between the ratio of harvested juveniles to adults is useful in evaluating population growth only if harvest is not selective among individuals. For example, if trappers choose to release juveniles or smaller-bodied bobcats, the harvest becomes selective for older or larger-bodied individuals. This selectivity results in a harvest that is not reflective of the actual population demographics, and therefore selective harvest can invalidate the use of a juvenile/adult ratio to inform recruitment. Currently, we do not have an estimate of selectivity in annual bobcat harvests in TD1, and we currently assume any selection is not significant. Previous analysis indicates that in TD1, a juvenile/adult ratio of 0.35 indicates a stable growth rate (λ = 1; FWP unpublished data; Figure 14). A ratio below 0.35 suggest a declining population growth rate, whereas a ratio above 0.35 suggests an increasing population growth rate. The juvenile/adult ratio has fluctuated over time, but between 2016 to 2020, the estimated ratio was below 0.35, suggesting a decreasing population growth rate during that period (λ < 1; Figure 15). Recent estimates (2021 and 2022) suggest that currently the population may be experiencing a level of recruitment that supports growth.

Trapping Effort and Season Length.— Data concerning trapping effort can help interpret harvest data, as well as inform biologists about wildlife populations. FWP collects trapping effort annually through a trapper questionnaire; however, response rate is typically low. From the trapper questionnaire, we can estimate the average number of bobcat trappers, their success rate, as well as catch per unit effort (the number of bobcats harvested per 1000 trap nights). In TD1, bobcat trappers have fluctuated from less than 100 to over 200 since 2005 (Figure 16). The most recent data estimate over 200 bobcat trappers in TD1, and these trappers experience a success rate of approximately 50%. Catch per unit effort has decreased since 2005, suggesting that it requires more effort to harvest a bobcat now compared to in 2005 (Figure 17).

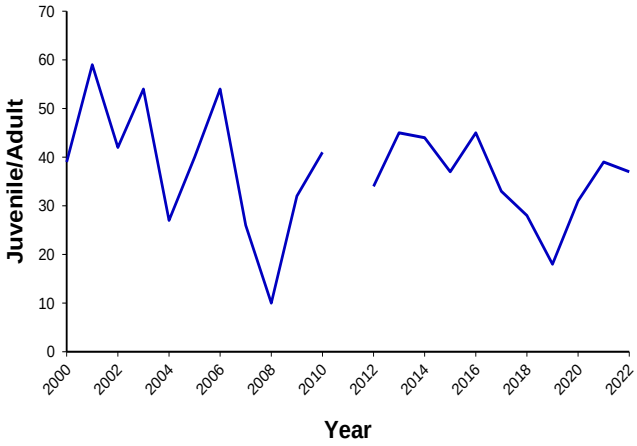


Figure 15. Annual bobcat juvenile/adult ratio for bobcats in TD1 (2000-2022).

Another piece of information that biologists often use to help evaluate population status is how long it takes to close a trapping season based on available quota. Weather, fur prices, as well as other economic factors may influence trapping effort; however, in general, if the season consistently closes quickly, the thought is that the target species is most likely abundant. Closing the season quickly can be indicative of numerous bobcats on the landscape available for harvest, if harvest effort remains constant. In TD1, the available period for bobcat harvest is 77 days. From 1990-1996, average season length was 74 ± 7 days; however, from 2000-2019, average season length was 26 ± 7 days, with the season often closing before the end of December (Figure 18). Since 2020, season length averaged 69 ± 14 days, with no season closures in 2021 and 2022. This period of prolonged trapping season has coincided with a significant decline in bobcat harvest and not meeting quotas, even with the recent decrease in quota to 225 bobcats.

Figure 16. Number of bobcat trappers and success rate in TD1 (2005-2020).

Integrated Population Model.— In 2019, FWP contracted the development of an integrated population model (IPM) to assist in the management of bobcats within regions. The IPM incorporates various data sources into a predictive model that allows biologist to assess the impact of varying harvest levels on population status. Currently, the bobcat IPM relies heavily on harvest data to reconstruct bobcat populations, restricting the predictive value of the model to only 1 year in the future. Due to limited input data, the variance surrounding these predictions can be quite large; however, the IPM provides a framework in which other data, such as abundance, survival, and production, can be incorporated, thus strengthening the predictive value of the model and the reducing the uncertainty surround predictions. In TD1, we use the IPM to predict the impact of varying harvest levels on population abundance and growth rates. By assessing varying levels of harvest on population status, we can recommend annual quotas that will help ensure a sustainable harvest of bobcats.

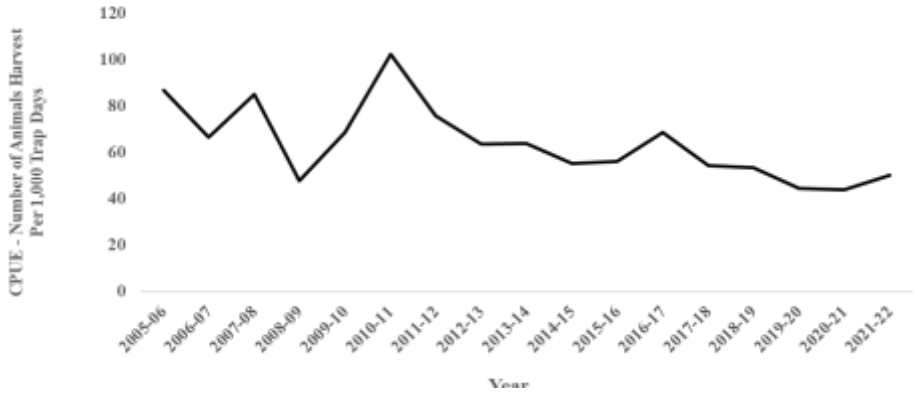


Figure 17. Catch per unit effort for bobcat trapping in TD1 (2005-2021).

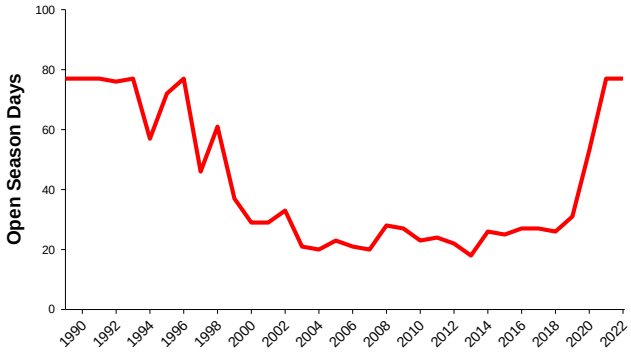


Figure 18. The number of open season days per year for bobcat harvest in TD1 (1990-2022).

According to the IPM, the bobcat population in TD1 has fluctuated around 1200 individuals since 2017 (Figure 19), while simultaneously, the harvest has significantly decreased, and the annual quota of 275 was not typically reached (Figure 13). Exploring the impact of various quotas, we found that by maintaining a quota of 275, would result in a decrease in population growth (Figure 20); however, reducing the quota to 225 should have a positive impact on population growth rate (Figure 20). These models were used to help guide the harvest quota reduction for the 2022 trapping season to 225 individuals.

Conclusions and Management Recommendations.— We consider a suite of data to evaluate the population status of bobcats in TD1 and to recommend harvest quotas that maintain a sustainable and stable population. Based on the information presented, it appears that a harvest quota of 275 exceeded sustainability and resulted in a potentially negative population growth rate. We recommend maintaining a harvest quota of 225 for several seasons with annual evaluation in order to re-establish a positive growth rate with a sustainable harvest. The collection of additional data, such as abundance or occupancy, as well a survival and production data would help inform the IPM and increase the model's predictive power and reduce variance surrounding those predictions.

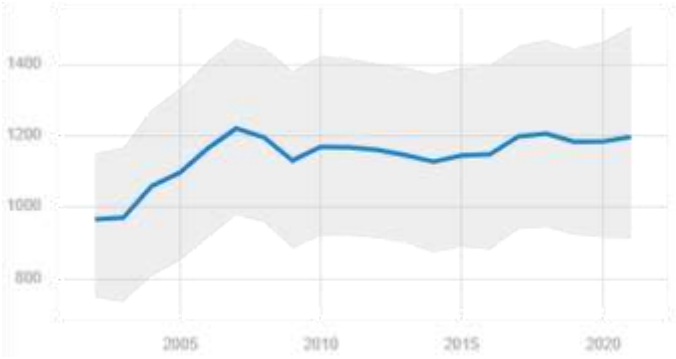


Figure 19. Estimated population size for bobcats in TD1 based on the IPM reconstruction model (2021). Shaded grey area shows the 95% Confidence Interval around the population estimate (blue line).

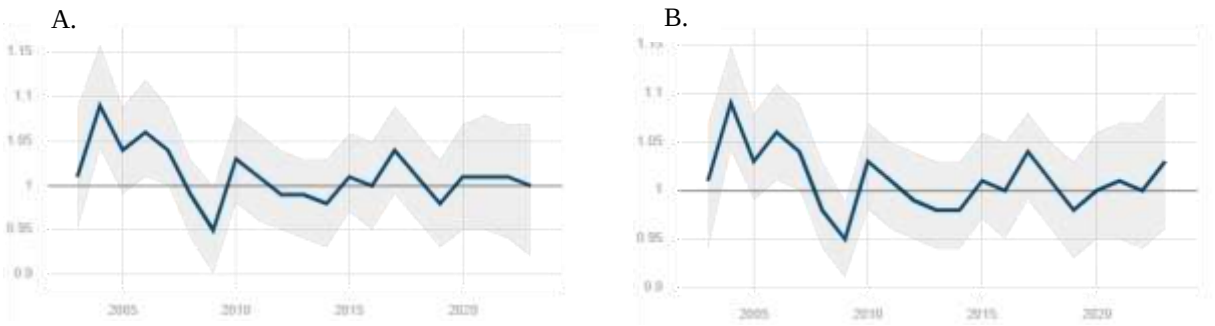


Figure 20. Predictive model of the impact of harvest of 275 (A) and 225 (B) on population growth rate for bobcats in TD1. Grey shaded regions indicate variance around the estimate.

Beavers

Background. (Provided by Torrey Ritter, R2 Nongame Biologist) **—** Prior to European colonization of North America, most low-gradient streams in western Montana were heavily modified by beaver (*Castor canadensis)* activity, as were substantial portions of eastern Montana streams. Beavers built dams, cut vegetation, dug channels, and flooded vast areas, resulting in broad wetland complexes. Stream systems filled entire valley bottoms and formed diverse mosaics of ponds, backwaters, side channels, and dense thickets of emergent and woody riparian vegetation. These systems slowed and stored snowmelt as it left the mountains and provided productive and abundant habitat for Montana's fish and wildlife species.

By the late 1800's, the fur trade had significantly reduced beaver numbers throughout Northwest Montana. The historical combination of the fur trade and subsequent overgrazing of western rangelands by settlers led to extensive degradation of beaver-modified stream systems. Across thousands of miles of streams, stream incision and over-widening has led to a landscape that has lost much of its water storage capacity, and some of the most biologically rich habitats in the West have been diminished to a fraction of their former size and complexity.

While beaver numbers in Northwest Montana have increased throughout the region since their decimation in the late 1800's and early 1900's, their numbers most likely do not reflect pre-European colonization. Regardless, many waterways throughout Northwest Montana support beavers and trapping beavers is a popular recreational activity. With the expansion of human development, beaver conflicts are also prevalent throughout the region.

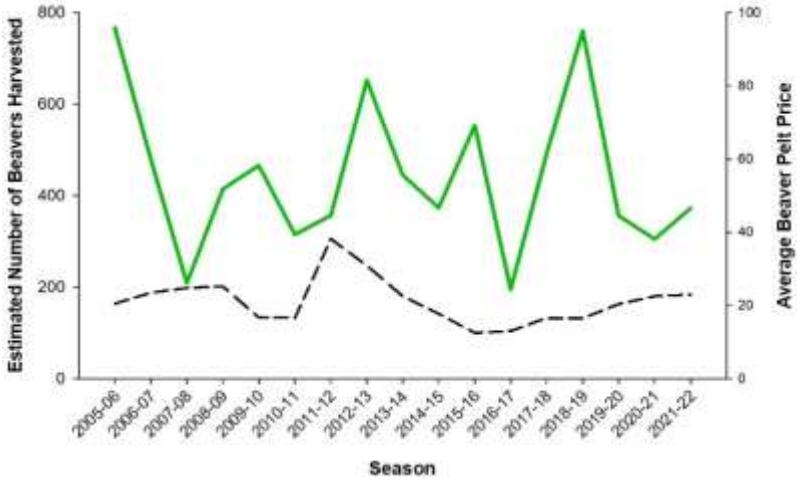


Figure 21. Annual estimated beaver harvest (green line) in TD1 and statewide pelt prices (dotted line, 2005-2021).

Harvest Management.— Trapping season for beavers in TD1 is from November 1 through April 15. There is no reporting requirement. Outside of the trapping season, FWP issues depredation permits for nuisance beaver removal. Currently, beaver removals on depredation

permits are not documented. All information on beaver harvest is collected in the annual trapper harvest questionnaire.

Estimated Harvest and Fur Prices.— Beaver harvest is estimated from data collected by the annual trapper questionnaire, and data only exist since 2005. The response rate for this questionnaire is approximately 30%. Since 2005, estimated, annual beaver harvest in TD1 has fluctuated from over 750 to 200 beavers (Figure 21). In 2021-2022 season, trappers harvested an estimated 350 beavers in TD1. In general, fur prices can impact trapping effort; however, weather, winter ice conditions, economics and beaver numbers also impact harvest. Since 2005, auction prices in Montana have averaged $21.25 ± $6.45 per beaver pelt (Figure 21). This relatively consistent price for pelts most likely does not influence trapping effort, rather, the overall low economic value of pelts may influence trapper effort.

Management Recommendations and Restoration Efforts. (Provided by Torrey Ritter, R2 nongame biologist)— While the impacts of western colonization paved the way for a thriving agricultural economy, the West now faces a burgeoning human population, a warmer and drier climate, significant reductions in key plant and animal species, and increasing demand for water resources, bringing the importance of healthy, intact stream systems to the forefront of water and wildlife conservation efforts. Beavers are key architects in wetland restoration.

Reestablishing beavers to areas of their former range can help restore degraded stream systems to benefit plants, wildlife, fisheries, and humans. The primary benefits of beavers for Montana streams include increased landscape-scale water storage, improved late-season streamflow, greater ecosystem resilience to disturbances, enhanced floodplain connectivity, and the creation and maintenance of abundant and diverse fish and wildlife habitats. Because much of the long-term stream restoration work is delegated to the beavers themselves, restoring beavers and beaver-modified habitats has the potential to take stream restoration from small-scale projects to landscape-scale restoration that can make a significant impact on some of the most pressing problems facing western communities tolerance for beavers on the landscape. “Beaver restoration” includes:

- Changes to land management that results in changes to habitat that allows beavers to recolonize areas of their historical range.
- Beaver mimicry involves people building their own beaver-related structures to mimic the effects of beavers without having beavers on-site.
- Encouraging natural colonization of historical habitats through direct habitat manipulations to specific sections of streams that provides the conditions for natural recolonization.
- Beaver transplants as a form of conflict management and to reestablish beavers in areas they have been unable to recolonize on their own or into relatively empty habitats.

FWP is ramping up efforts to plan to implement these various forms of beaver restoration in the future. Efforts include:

- Coordination and support for trained beaver conflict specialist positions. These are contract positions supported by non-profit organizations with direct coordination and oversight from FWP nongame biologists. The first program in FWP Region 2, started in 2019, has been highly successful. A new specialist is coming on board in Region 3 in 2023, and we are hopeful a specialist will be hired out of Great Falls (Region 4) in the next few years. These specialists mostly focus on non-lethal measures to control beaver impacts, but also coordinate with trappers to remove beavers when non-lethal measures are not appropriate or desired for the situation.

- Habitat restoration projects on WMAs and on federal and private lands that seek to restore beaver-modified habitats and allow beavers to expand and succeed in areas of their former range where the probability of conflict with people is low.
- Beaver Restoration Assessment Tool (BRAT). This mapping program provides estimates of beaver dam capacity across all streams in the state and also provides a model of conflict potential based on proximity of streams to human infrastructure. It is essentially a map of historic beaver habitat on the landscape.
- Beaver dam census. Using aerial imagery, contractors will mark every visible beaver dam in the state. This will provide valuable information and beaver dam density and distribution across the state and will allow for more data-driven beaver population estimation and subsequent management options. In combination with the BRAT, the beaver dam census opens up a wide range of research, monitoring, restoration, and conflict management project opportunities.
- Beaver Restoration White Paper. This is a large document working its way through FWP's review process right now. The overarching goal of the document is to outline the settings and situations where beaver restoration can, and should, be implemented to achieve the benefits of beavers while discussing the limitations or pitfalls of restoration that can limit the use of these techniques.
- Montana Beaver Working Group. This is a group made up of representatives from local, state, and federal agencies as well as non-profits, private landowners, and a few trappers. The group works to advance beaver restoration and conflict management in the state by coordinating across entities and seeking common goals and messaging related to beavers and beaver restoration.

Muskrats and Mink

Background.— Muskrats (*Ondatra zibethicus*) are a semi-aquatic rodent found throughout most of North America. They are a common occurrence throughout the water bodies in Northwest Montana, and are a popular species for new and seasoned trappers alike. Unfortunately, over the past 50 years, muskrat harvests throughout their range have experienced steep declines. While no single cause has been implicated in the declines, numerous pathogens and pollutants have been associated with muskrat mortalities. The body of literature on muskrats is sparse, and no one has conducted monitoring or research on muskrats in Montana.

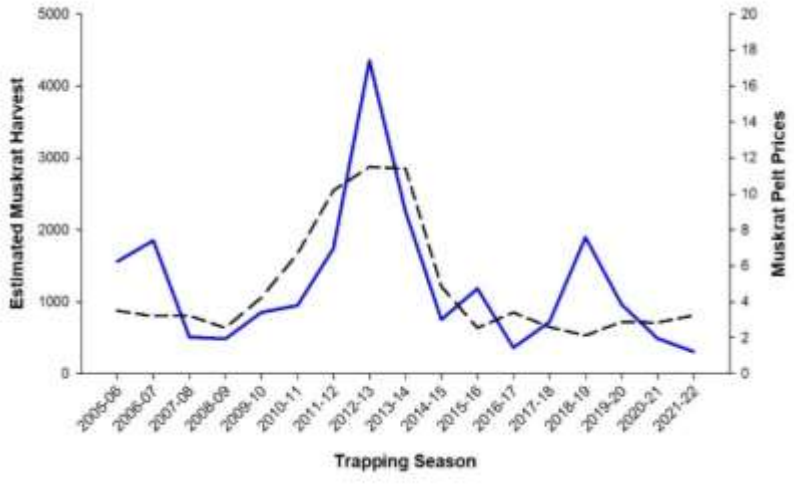


Figure 22. Estimated muskrat harvest (blue line) in TD1 and state pelt prices (dashed line)(2005-2021)

The American mink (*Neogale vison*) is one of 9 species of mustelids found in Northwest Montana. They are highly associated with water bodies and prey mainly on aquatic vertebrates and invertebrates. Since males are very territorial, it is rare to spot more than one mink at any location along a waterway. Mink pelts are highly prized in the fur industry for clothing, but fur

farming provides most mink pelts for the garment industry. Very little is known about mink throughout Northwestern Montana.

Harvest Management.— Trapping season for muskrats and mink in TD1 is from November 1 through April 15. There is no reporting requirement for either species. Outside of the trapping season, FWP issues depredation permits for nuisance muskrat removal. Currently, muskrat removals on depredation permits are not documented. All information on muskrat and mink harvest is collected in the annual trapper harvest questionnaire. Unfortunately, questionnaire data are only available from 2005 forward, limiting our understanding of long term harvest trends.

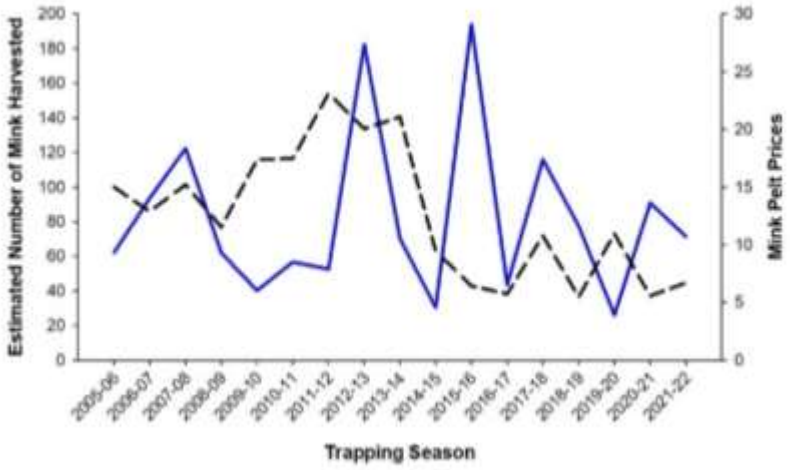


Figure 23. Estimated mink harvest (blue line) and statewide pelt prices (dashed line).

Estimated Harvest and Fur Prices.— Muskrat harvest has fluctuated since 2005 and has experienced numerous declines (Figure 22). Unfortunately, historical data on muskrat harvest do not exist, and we can not evaluate recent harvest levels over a longer timeframe. Pelt prices since 2005 have averaged $4.79 ± $3.19 per pelt (Figure 21); however, a spike in pelt prices ($10-$11) in 2011-2013 may have resulted in increased muskrat harvest during those 3 years.

Mink harvest since 2005 has fluctuated dramatically with no apparent relationship to fur prices (Figure 23.)

Management Recommendations and Future Efforts.— We do not anticipate any regulatory changes for the 2023 trapping season for muskrat nor mink. Monitoring muskrat populations have been discussed, but no proposal has been written. Additional research and discussions need to be had concerning what we should be assessing for muskrat health or population status monitoring.

Lynx

Background.— Canadian lynx (*Lynx canadensis*) are a mesocarnivore found throughout the boreal forests of western Montana (Olsen et al. 2020). Within the lower-48 states, lynx are considered a distinct population segment (DPS; USFWS 2017) and were listed as threatened under the Endangered Species Act in 2000. This listing was due to the lack of regulatory mechanisms on federal lands to protect lynx and their habitat, which are potentially impacted by timber harvest, wildfires, and recreation.

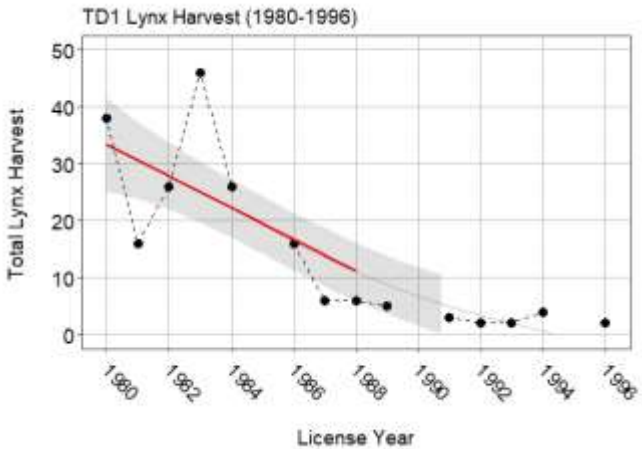


Figure 24. TD1 lynx harvest prior to federal listing. Black points and dashed line show actual harvest. Solid grey line and shaded area depict the fitted non-linear trend and associated 95% Confidence Interval. Red line indicates regions of significant change in the slope of the trend line.

Harvest and Management.— Prior to 2000, lynx harvest was legal in TD1; however, harvest declined precipitously since 1980 (Figure 24). Once lynx in Montana were listed, trapping was prohibited. Trappers must report any lynx that are captured incidentally and released within 24 hours to FWP, and injured lynx must be reported immediately. In 2015, Montana established Lynx Protection Zones (LPZs) as part of a settlement agreement, to help mitigate incidental lynx captures during legal trapping of other species (Figure 25). The LMZs regulate trap and snare use, as well as baits and attractants to reduce the chance of capturing lynx.

Figure 25. Lynx Protection Zone (LMZ) in Northwest Montana (red outline).

Future Efforts.— In 2024-2025, the USFWS will re-evaluate designated lynx critical habitat within the LPZ's. To help inform this effort, FWP will be evaluating lynx distribution and occupancy in Montana during the winter of 2023-2024. The objectives of this project will be to 1) create a sampling framework that can be used to determine trend in lynx occupancy over time in Montana, 2) acquire a more detailed understanding of current lynx distribution in core lynx habitat and the Greater Yellowstone Ecosystem (GYE), 3) estimate lynx occupancy in Montana with focus on core lynx habitat areas. This work will also form a baseline of lynx occurrence across western Montana from which to evaluate any changes in occupancy that might be due to landscape level

habitat changes or anthropogenic disturbance. We will monitor 90 sites across modeled lynx habitat to achieve these objectives (Figure 26).

Wolverines

Background.— Wolverines (*Gulo gulo*) are a rare mesocarnivore typically associated with remote mountainous terrain. Once widely distributed as far south as the mountainous regions of Colorado and California in western North America, wolverines were extirpated from the lower 48 states by 1920 (Aubrey et al. 2007, Swartz et al. 2007). Expansion from Canada has repopulated northern western states, but their status has been highly debated. Due to their wide-ranging nature and low densities, there has been ongoing concern about the impact of habitat fragmentation, climate change, and anthropogenic disturbance on the long-term persistence of wolverines in the lower 48 states (USFWS 2017). They were first petitioned to be federally listed in 1994, and legal deliberations are ongoing (USFWS 1995, USFWS 2010, USFWS 2017).

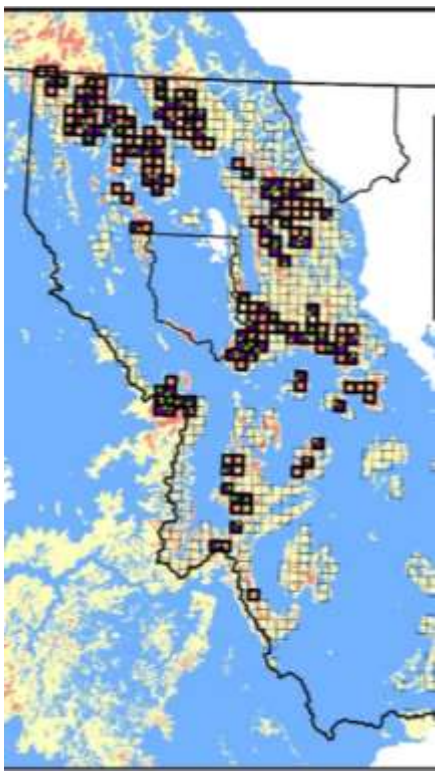
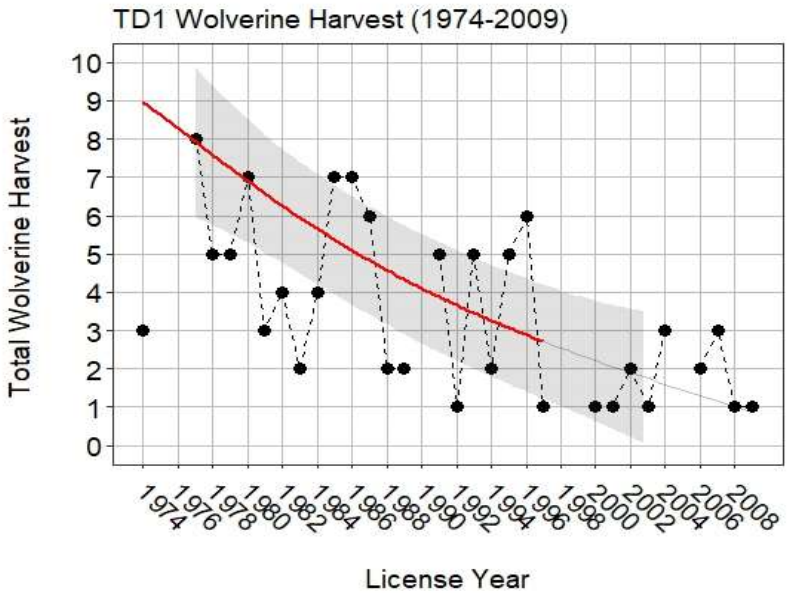


Figure 26. Location of monitoring cells within modeled lynx habitat in Montana.

Harvest and Management.— Wolverines were legally harvested in Montana until 2013, when trapping of wolverines was closed due to population concerns and lack of information regarding their distribution and abundance. From 1974 to 2009, harvest experienced a significant decline (Figure 27). Since 2009, only 3 wolverines have been killed incidental to legal trapping activities.

Distribution and Occupancy.— During the winter of 2016-2017, FWP collaborated with state wildlife agencies in Idaho, Wyoming and Washington to collect information on wolverines across their suspected range in the western United States (Lukacs et al. 2020). The objectives of this effort was to 1) determine the wolverine distribution, 2) identify distribution gaps where restoration efforts could be directed, 3) develop a monitoring framework that could be used to evaluate changes in distribution, occupancy and genetics, and 4) provide baseline data that can be used to evaluate the impacts of landscape, climatic, or anthropogenic changes on wolverine occupancy and genetics over time. We deployed 633 baited, camera monitoring stations in preselected cells with modeled wolverine habitat to determine occupancy and detection probability. They used hair snares to collect genetic material at each monitoring station. Overall, they demonstrated that all blocks of predicted wolverine habitat were indeed occupied by wolverines, but occupancy varied across the region. Montana had the highest probability of occupancy (ψ = 0.6), with the Northern Continental

Divide Ecosystem having the highest probability of occupancy in the state and the region (ψ = 0.8-1.0; Lukacs et al. 2020). This study successfully provided a repeatable monitoring framework to evaluate changes in the wolverine population status and distribution over time, and in the winter of 2021-2022, we repeated this multi-state effort. Results from the recent monitoring are still pending.



Management Recommendations and Future Efforts. Monitoring of wolverine occupancy and distribution is ongoing. The most recent survey was conducted in winter 2021-2022. The intent is to repeat the multi-state occupancy monitoring every 5 years to evaluate any population change. The next monitoring effort will be conducted in winter 2026-2027.

There are no anticipated changes in regulations concerning wolverines at this time.

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