

**Non-Game Enhancement Project
(COL-F20-W-3014-DCA)
2019-20 (F20) Activity Report
1 April 2019 to 31 March 2020**



Prepared for: Fish & Wildlife Compensation Program

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Prepared with financial support from the Fish & Wildlife Compensation Program, on behalf of its program partners BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations and Public Stakeholders

Date: 11-Sept-2020

Executive Summary

F20 Non-game Enhancement completed 7 projects on 6 different non-game species. Townsends Big-eared Bat maternity roost monitoring was completed in the East Kootenay. Fencing at a Highway underpass was maintained to reduce Badger Mortality in the East Kootenay. Lewis Woodpecker nest sites were monitored in the West Kootenay with a total of 15 nest sites documented. The summit Lake Western Toad project included Highway surveys, tagging 431 toads, installing over 600 m of Animex toad fencing, and the annual Toadfest public event. Turtle nesting areas were maintained and monitored at Argenta and Elizabeth Lake. Turtle production was very low at both sites in 2019. This was largely due to predation at Elizabeth Lake.

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1. Introduction

In the Columbia Region, annual and ongoing fish and wildlife projects are delivered with support from the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) through a Letter of Agreement (LoA). The Non-game Enhancement Project is one such project delivered by FLNRORD staff, contractors and partnerships.

Non-Game Enhancement includes a group of long-term enhancement projects developed to benefit populations of non-game species and to enhance their habitats. Species that benefit from project actions include amphibians, reptiles, mammals and birds that are provincially or federally listed at risk and have been impacted by reservoir habitat losses. Non-game enhancement projects focus on critical habitat features that are important for each species reproduction and/ or survival including roosting, denning and nesting habitat and highway crossings infrastructure to reduce species mortality. Ongoing monitoring and maintenance of these habitat features and inventory and monitoring of the species that use them is required to ensure they continue to provide long term benefits.

The Non-Game Enhancement Project includes the coordination, oversight and implementation of a wide variety of projects on non-game species that are impacted by reservoir habitat losses. Eight diverse projects were implemented in 2019-2020 including the following:

1. EK Townsend's Big-eared Bat Roost Restoration and Monitoring
2. Badger Highway Crossing Structure Maintenance
3. Loon Platforms, Whatshan Reservoir
4. Lewis Woodpecker monitoring
5. Western Toad mortality mitigation and population monitoring
6. Turtle nest site maintenance and monitoring Elizabeth lake
7. Turtle nest site maintenance and monitoring Argenta
8. Nest box monitoring and maintenance.

2. Goals and Objectives and Linkage of FWCP Action Plans and specific action(s)

Eight Non-game enhancement projects address different priority actions across a number of different action plans. The primary action addressed is identified for each project in Table 1.

Table 1: List of Projects and Priority actions addressed for F20 Non Game Enhancement Projects.

Project	Objective	Primary action addressed
1. EK Townsend's Big-eared Bat Roost Restoration and Monitoring	Monitor and maintain Townsend's big-eared bat maternity roosts near Cranbrook.	COLUPD.SOI.SB.26.01 Support for BC Bat initiatives-P1 Support the conservation of bat species present in the Columbia Region. Examples include baseline data knowledge gaps (including monitoring/inventory), Whitenose Syndrome response, habitat protection and restoration, and outreach and stewardship.
2. Badger Highway Crossing Structure Maintenance	Maintain Badger crossing structures at highway mortality locations in the East Kootenay	COLUPD.SOI.SB.21.01 Support strategies and initiatives outlined in the SARA and BC Recovery Strategy for American Badger that relate to compensation for dam impacts. Where possible, link project work to the connectivity of this species across ecosystems and collaborate with recovery team specialists.
3. Loon Platforms, Whatshan Reservoir	Monitor and maintain nesting islands installed in Whatshan Reservoir	COLRLL.ECO.ME.33.01 Conduct effectiveness monitoring and evaluation of FWCP habitat-based projects.
4. Lewis Woodpecker monitoring	Monitor known Lewis's woodpecker nest sites in the West Kootenay. Establish and monitor Wildlife Habitat Areas.	COLUPD.SOI.SB.22.01 Lewis's Woodpecker Conservation-P1 Support strategies and initiatives outlined in the SARA Recovery Strategy for Lewis's Woodpecker that relate to compensation for dam impacts. Where possible, link project work to the connectivity of this species across ecosystems and collaborate with recovery team specialists.
5. Western Toad mortality mitigation and population monitoring	Continue on going population assessment of Western Toads at Summit lake. Construct maintain and monitor highway fencing at crossing sites. Support Western Toad Festivals 10 th year	COLSLK.SOI.HB.20.01 Connectivity of breeding and overwintering sites for Western Toad populations-P1 Maintain/enhance Western Toad populations in small lakes by working with the Province of B.C., partners and public to improve connectivity between breeding and overwintering sites.

6. Turtle nest site maintenance and monitoring Elizabeth lake	Control vegetation and monitor use of alternate nest sites created for turtles at Elizabeth Lake, Cranbrook.	COLWRA.SOI.ME.38.01 Monitor wildlife use of created/restored habitats-P1 Monitor fish and wildlife species use of improved wetland and riparian habitat that was created or restored with support from the FWCP (i.e. past projects).
7. Turtle nest site maintenance and monitoring Argenta	Improve and maintain existing turtle nesting area at Argenta by the placement of more nesting material, signage, and better protection from vehicles.	Wetland Riparian/ COLWRA.SOI.ME.38.01 Monitor wildlife use of created/restored habitats-P1 Monitor fish and wildlife species use of improved wetland and riparian habitat that was created or restored with support from the FWCP (i.e. past projects).
8. Nest box monitoring and maintenance	Monitor, maintain nest boxes; includes nest boxes installed for waterfowl, Lewis Woodpecker and Vaux's Swift.	COLUPD.ECO.ME.18.01 Effectiveness monitoring of past projects-P1 Monitor wildlife use of created/restored habitats-P1 Monitor and evaluate the effectiveness of previous FWCP upland and dryland ecosystems projects (for monitoring of species see Action #32 below). Include an approach for adaptive management, information sharing and collaboration among agencies and the public stakeholders to increase the efficacy of conservation actions.

3. Study Area

Non-Game Enhancement projects occur at several locations throughout the West and East Kootenay (Figure 1).

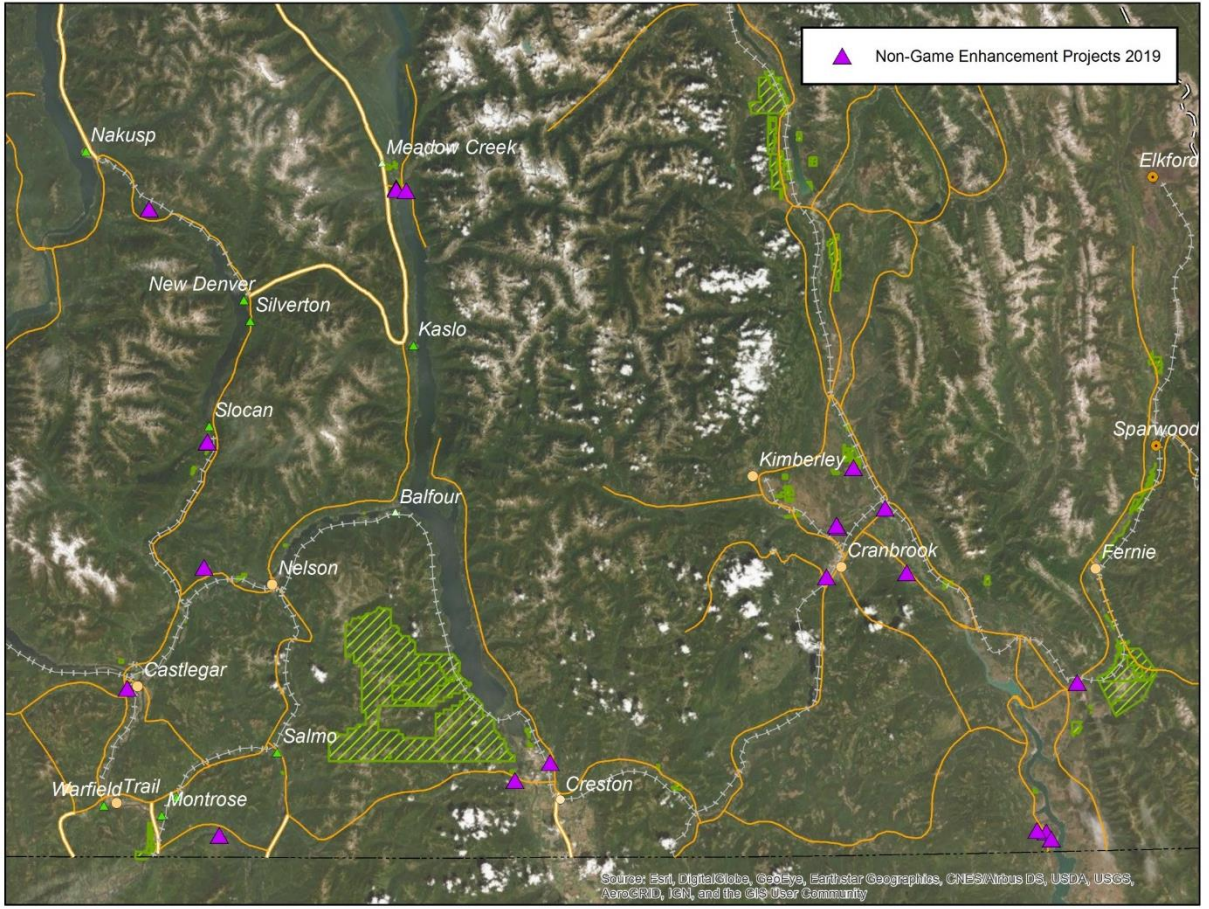


Figure 1: Non-Game Enhancement Project location map.

4. Methods Results and Outcomes

As the eight projects included in Non-Game Enhancement are diverse, the methods and results for each project are briefly summarised here. Please refer to the specific project report references for more detail. All project data, spatial study areas and reports are available on SIWE http://a100.gov.bc.ca/pub/siwe/search_reset.do

4.1 East Kootenay Townsends Big-eared Bat Roost restoration and Monitoring

Townsend's Big-eared bat maternity roost investigations were completed in the East Kootenay at 6 roost sites and three newly constructed sites, in mid July 2019. These investigations were completed in order to observe if Townsend's Big-eared bats were present or absent, provide an estimate of abundance, and document if any maintenance to the roosting structures is necessary. Sites monitored included Cherry Creek, St. Eugene Mission, Fort Steele, Bull River, Elko, Newgate 1,2,3 and 4, and hibernacula in the Bull and St. Mary's River. During the 2019 summer the Earl Ranch buildings were removed. One of the new sites is a modified shed roost made especially for bats and was placed on the northeast corner of the Earl Ranch Conservation Property. Overall Bat numbers were stable compared to previous surveys. Positive findings include a group of maternal females using the constructed bat roost at Wycliffe 2 for a third year. Another encouraging detection was Townsend's Big-eared bats having some minimal use in the new Earl Ranch built roost. In addition, one new cave has been located during routine ungulate flights. This cave is located close to Stoddart Creek and will be investigated during the 2020 season.

Deliverable reference- Lewis and Ingham (2019)

4.2 Badger Highway crossing maintenance

In the late fall of 2010, a badger fence with connections to two underground culverts was constructed north of Cranbrook in the Mayook area alongside the highway. A low-profile fence was placed for approximately three hundred meters along each side of the right of way in an area heavily used by badgers, determined from a previous telemetry study. This fence was tied into two existing dry culverts that went beneath the highway, providing a safe travel corridor and reduce highway mortality for these free ranging badgers. Sand was placed at each end of the culverts to detect tracks for monitoring purposes. Several days are required each year to keep this fence functioning and maintained for this long-term project. This fence was completely removed and newly replaced during the 2019 summer.

Deliverable reference- Lewis (2019)

4.3 Loon Platform monitoring and maintenance Whatshan Lake

Loon Platform monitoring did not occur in 2019 due to lack of contractor bids on this project.

4.4 Lewis Woodpecker nest monitoring in the West Kootenay

Lewis' Woodpeckers are federally listed as a Threatened species (SARA schedule 1). This species is a rare breeder in the West Kootenay region with a small regional population.

Monitoring of Lewis' Woodpeckers in the West Kootenay has been ongoing since they were first noted nesting in the Pend D'Oreille following the 2007 wildfire.

The objectives of the 2019 field work were to monitor historic nest trees for current activity and to find new nest trees/sites in the PDO and Upper Slovan River areas.

Known nest trees were monitored from 29 - 30 June and 06 - 07 July 2019. To determine if nest trees were active in 2019 known nest trees were observed from a distance of 100-400 m for at least 20-40 minutes. The condition of the historic nest trees (down or still standing) were also noted. If new LEWO nests were discovered in the area, the new nest tree's location was marked with a GPS and its characteristics recorded (e.g., species, decay class, diameter a breast height, height, cavity height and aspect).

In 2019 a total of 15 nest sites were located, the highest total since the project began. Nine nest sites were in the Pend D'Oreille Valley and Six nest sites were in the Upper Slovan Valley. During these surveys other listed species documented included Common Nighthawks and Yellow-breasted Chats.

A total of 48 LEWO nest trees have been documented as a result of these surveys from 2008-2018. Since 2013, 19 of these 48 nest trees are no longer suitable for nesting.

Deliverable reference- Dulisse (2019)

4.5 Summit Lake Toads

Summit Lake hosts a significant breeding population of western toads (*Anaxyrus boreas*). The western toad is federally listed as Special Concern by the Committee on the Status of Endangered Wildlife in Canada. Substantial numbers of adult and juvenile toads (toadlets) are killed by vehicle traffic every year on Highway 6 as adults move to and from the lake for breeding and toadlets leave the lake for upland habitat.

This ongoing project was initiated in 2010 to assess road mortality on long-term western toad population trends. The objectives are to estimate the location, timing, direction and severity of highway mortality; increase the efficacy of three underpass tunnels; and investigate and outline potential remedial measures. In 2011, we began efforts to identify breeding distribution and

adult abundance using mark-recapture techniques and through the 2019 field season, we have continued to document nocturnal adult migration locations.

In 2019, breeding activity timing was similar to 2017 and 2018, extending from 03 – 10 May. As in most years, the most significant activity was observed at three breeding sites used every year. Eggs began hatching at approximately 13 May and free-swimming tadpoles were observed between 01 June and 22 July. Toadlet migration began during the first week of August and was observed until 02 September 2019.

Since 2011, of a total of 2,230 adult western toads were observed on the highway during surveys, 43% were alive and 57% had been killed by vehicular traffic. All live adults were observed at night. Dead adults were recorded during nocturnal surveys and during follow-up morning highway passes. It should be noted that these numbers very much underestimate of the total number of adult toads killed on the highway. For example, each season from 2017 - 2019, we only surveyed on seven out of approximately 193, or 3.6 % of the total available migration nights between 15 April and 25 October.

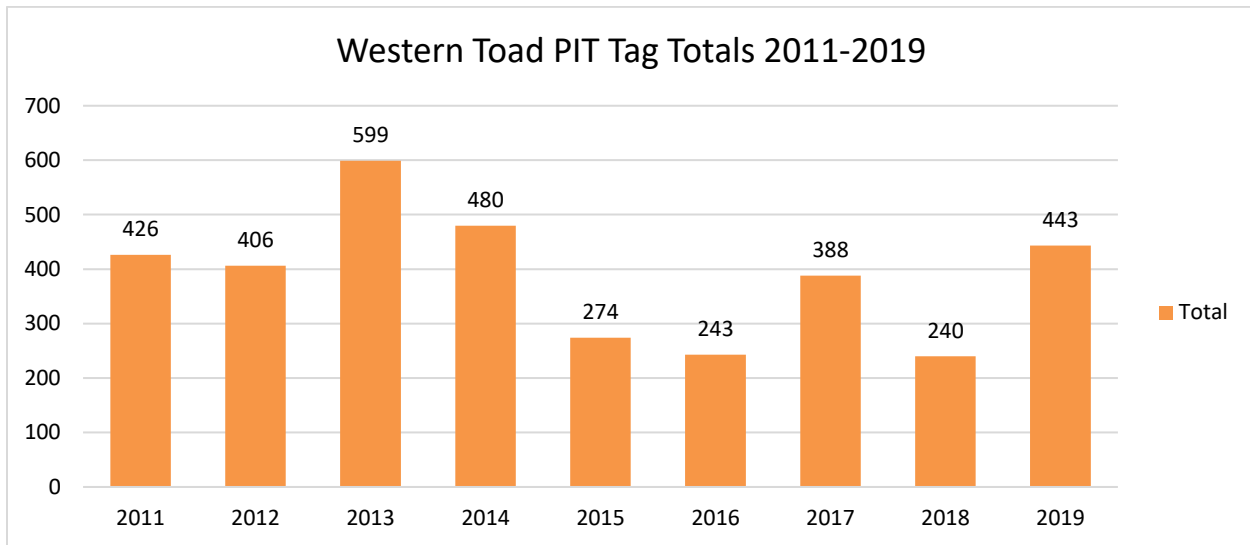
Since 2011, we have PIT-tagged 3,531 adult western toads (24% females and 76% males). Most of the PIT-tagging effort has been focused on adults at the breeding areas in the spring. The 2011 – 2020 mark recapture data will be analysed after the 2020 field season.

In 2014, the BC Ministry of Transportation, Highways and Infrastructure installed a concrete toad tunnel under Highway 6 at Summit Lake—migrating toads continue to use this underpass and the plastic underpass to the west, which was installed in 2006. In 2019, we installed 622 m of new Animex wildlife fencing. Since 2015, we have recorded high use of both underpasses by adult and juvenile western toads.

In 2015, we installed two independent camera trap systems: one in the concrete underpass and another in the west culvert (plastic) underpass. Although coverage has been intermittent due to technical challenges, the cameras have captured a total of 621 adult toads in both underpasses. In addition to the western toad, the camera systems recorded an additional 20 vertebrate species using the underpasses including long-toed salamander, common garter snake, North American deer mouse, western jumping mouse, vole spp., shrew spp., red squirrel, yellow-pine chipmunk, yellow-bellied marmot, ermine, long-tailed weasel, American marten, striped skunk, American mink, raccoon, Pacific wren, song sparrow, pine siskin and white-winged crossbill.

This season, in an attempt to document in-stream and riparian movements of non-larval western toads, we initiated a Fyke net monitoring program at nine locations within the Summit Lake project area. This live-trapping program resulted in the capture of 12,947 toadlets and 14 adults. These data indicate toadlets and adults are using streams and riparian areas as migratory travel corridors.

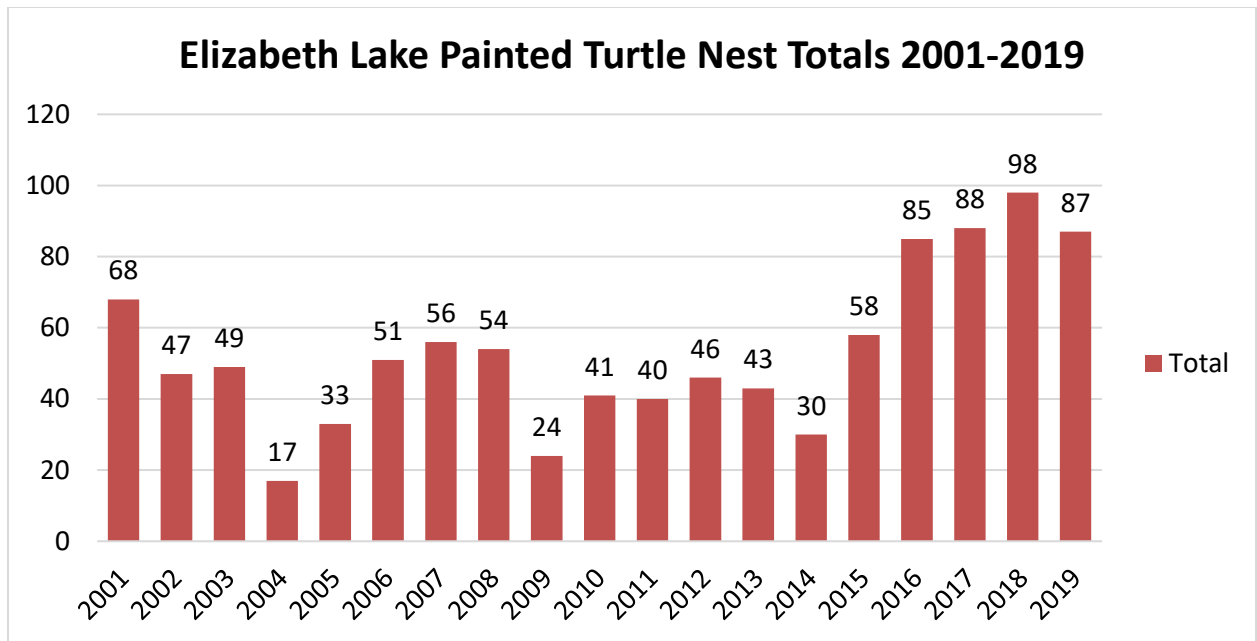
In 2019, an estimated 500 people attended the tenth annual Toadfest event and a record 21,305 toadlets were moved across the highway. Public interest in this annual event remains high and since 2011, over 3,000 participants have moved an estimated 76,941 toadlets across Highway 6 at Summit Lake Provincial Park.



Deliverable reference- Dulisse et al. (2019)

4.6 Elizabeth Lake Painted Turtle Nesting Area

Western Painted Turtles have been monitored at Elizabeth Lake near Cranbrook for over 20 years. Nesting beds were constructed and fencing installed to prevent substantial mortality of adult turtles observed in the 1990's. The project is completed through project partners at the Rocky Mountain Naturalists whom provide local stewards to maintain and monitor this nesting area. Nest site monitoring in 2019 began on May 20th and continued through to July 19th for a total of 61 days in which there were 30 site visits. The first turtle nest was recorded on May 31st and the last turtle nest occurred on July 15th. There was a total of 29 visits to the nesting area with highest single day count of 11 occurring on June 17. This season 99% of the previous year's nesting's had been predated by skunks. Ninety-one nests were predated in the fall of 2018 and another eight nests were predated in the spring of 2019. Of the 673 turtle eggs laid only 13 turtle hatchlings were estimated to have survived. A Predation deterrent cage trial was set up this year with 3 different predation cage designs to combat and mitigate predation by skunks on nests. A trapper was hired to trap and remove nest predators. The Rocky Mountain Naturalists hosted a very successful "Turtle Day" on May 2, with support from the Fish and Wildlife Compensation Program, BC Hydro, the Province of BC, the Columbia Basin Environmental Education Program and the City of Cranbrook.



Deliverable reference- McGlynn, Ross and Manley (2020)

4.7 Argenta Painted Turtle Nesting area

A small population of Western painted turtles (*Chrysemys picta*) resides along the Argenta Slough and uses banks and gravel surfaces alongside the Argenta Road for nesting. The Fish and Wildlife Compensation Program (FWCP) has monitored the annual nesting activities of these turtles since 1997.

In 2019 turtle monitoring was consistent with methods used in the past several years. Nests laid the previous year were frequently checked in April and May for emergence of hatchlings. Well after emergence, the nests were excavated with a trowel, egg shells counted, and un-hatched egg counted and examined. Beginning in mid May, the nesting area and road edges in the vicinity were visually examined and carefully walked-through/along at least once every 24 hours noting signs of turtle nesting activity in exposed substrates. Turtle nests located within the protected nest sites were covered with metal grates to protect them from predation as soon as they were discovered. Frequent checking for nests continues for at least a week after the last nest of the season has been observed. In 2019 nest checks stopped around August 15.

Most hatchlings emerged from the eight successfully protected 2018 turtle nests between May 4 and May 10. Examination of the nests after emergence indicated ~ 65% hatching success,

with no obvious explanation for hatch failures. One nest had hatched during a warm period in September 2018.

Turtle nesting activity in 2019 began May 30. Between May 30 and June 6 there were a total of 11 nest efforts in the nest area. There was an active skunk present during the first few weeks of turtle nesting activity. After many attempts it was successfully live trapped (June 9) and taken up the Lardeau River. No further skunk activity was observed at the nest site after June 9 in 2019. Despite early nest efforts, the nest site was checked daily but there were no signs of further activity until July 7 when one nest with eggs was laid. After that date no more activity was observed.

Deliverable reference - Herbison (2019).

4.8 Nest Box monitoring and maintenance

Vaux's Swifts are small aerial insectivores that nest and roost in large hollow wildlife trees, and may use old brick chimneys. In 2008, 24 nest boxes were installed for Vaux Swift at 4 different locations in the West Kootenay. These nest boxes are monitored and maintained annually since their installation.

Monitoring consists of observing boxes for 40 minutes during the late nestling stage when broods can easily be heard begging when adults enter the nest box to feed them. This typically occurs in the last 7 to 10 days of July. Swift Nest box maintenance was completed in the Nelson, Castlegar, Creston and Lower Duncan areas again this season. Existing boxes were cleaned and structurally modified with removable doors so impending checks and cleans will be more straightforward and easier. Maintenance is performed by having a tree climber climb the tree to check for nesting evidence or use by other species.

In 2019- 1 active Vaux Swift was documented at the Merry Creek trail site near Castlegar. This nest box has been used 4 times since 2008.

6. Discussion and Recommendations

Non-game project work continued the ongoing monitoring and maintenance of important habitat features that has been ongoing for many years on these projects. Project work is completed efficiently thanks to partnerships with local organisations and local contractors. Some projects require daily attention during the nesting season so these can only be successfully maintained with dedicated local personnel.

Most of these projects have been ongoing for upwards of 10-20 years. Even with annual maintenance additional work replacing fencing or structures is required to keep projects functioning. Fencing located near roads at turtle nest areas or near road crossing locations has a limited lifespan due to impacts of snow plowing and sand and gravel deposition.

Turtle nesting areas like the ones at Elizabeth Lake and Argenta have been successful at reducing adult road mortality. However concentrating nesting turtles can lead to impacts from nest predators like racoons and skunks. With nest sites located in a concentrated area a predator can have a significant impact in a short amount of time. Ongoing monitoring, nest protection and predator removal are needed for project success.

7. Acknowledgements

This project was prepared with financial support Fish & Wildlife Compensation Program on behalf of its partners, BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations, and Public Stakeholders to conserve and enhance fish and wildlife in watersheds impacted by BC Hydro dams. We would like to thank all identified above. Also, we would like to thank all branches of the FLNRORD that contributed to the delivery, including the Habitat section, and Natural Recourse Officers. FLNRORD would like to Acknowledge the many biologists contractors and project partners that have initiated and maintained Non-Game projects. We would like to recognize the following individuals and groups that have made significant contributions to these projects; BC Parks staff and contractors, Brenda Herbison, Greg Ross and Katrin, Rocky Mountain Naturalists, Art Gruenig, Dave Lewis, Thomas Hill, Jakob Dulisse, Anna Lamb-Yorski, Ministry of Transportation, YRB.

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