

Drivers in the Decline of Reproductive Success for Species of Special Concern

For the Fish and Wildlife Enhancement Trust

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Executive Summary

Common Nighthawk (*Chordeiles minor*) was listed as a Threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2007. A Recovery Strategy for Common Nighthawk was created in 2016 in Canada, which indicated that increased research on the species was needed to understand the decline. The Fish and Wildlife Enhancement Trust (FWET) funded the study “Anthropogenic Effects on Common Nighthawks (*Chordeiles minor*) in Chadburn Lake Park” in 2017. The study did show a higher rate of detection in the Long Lake Recreational Area. In 2018 the FWET funded the study Habitat Selection of Common Nighthawks During Breeding Season in Long Lake Recreation site. Four nesting sites were found, three of which produced fledglings. COSEWIC reassessed the nighthawk as Special Concern in 2018. Its status under the Species at Risk Act will possibly be updated to reflect that in the future. A Nesting Success Trend Assessment of Common Nighthawks in Chadburn Lake Park was funded by the FWET 2019. Overall bird activity decreased and only one nesting pair was located and was successful in reproduction. The cold weather and high frequency of fire and smoke in the region were thought to be a contributing factor. In 2020 the Enhancement Trust funded the study “Monitoring Reproductive Trends Across Wet and Dry Seasons for Species at Risk”, to determine if the nighthawk would re-emerge in area. The spring and summer of 2020 broke many daily records of rainfall across the Yukon. This heavy rain caused the study area to have washouts, erosion, water damage and flooding. Nighthawks are ground nesters with little protection around the nest and heavy rain can be detrimental. In 2020 no nests were in located the study area, and previous nesting sites were not utilized. This In 2021 the study, Drivers in the Decline of Reproductive Success for Species of Special Concern was completed to understand what factors might be contributing the too continual decline in nighthawk activity and reproduction. Record breaking snowfall in the winter of 2021, along with a delayed spring left persistent snowpack in the forest and caused wide ranged flooding when it melted. Only two male nighthawks were observed using the breeding area and no nesting pairs were recorded. The overall detection rate of nighthawks was lower through the study period. The area produced no Common Nighthawk fledglings in 2021.



Project Activities

Common Nighthawk Transect Surveys

The survey followed the same guidelines and protocols that have been used since 2017 study on Anthropogenic Effects on Common Nighthawks in a High Use Recreation Area. These were researched in 2017 as the best practices for studying nighthawks. They were derived from the Saskatchewan Ministry of Environment. 2015, Common Nighthawk Survey Protocol. Which is aligned with the Government of Alberta. 2013, Sensitive Species Guidelines for Common Nighthawk (*Chordeiles minor*). One survey transect was completed in the focus area of the Long Lake Recreation Site. The same transect has been used since 2017 to allow for comparability between the study years. The transect started before the recreation site and ended after to ensure the areas that had bird detections in the previous study were included. The observer stopped at predetermined locations evenly spaced across the study area to complete Point Counts with Call Playback surveys. During each survey observer recorded all Common Nighthawks using visual identification and vocal detection within survey location. The locations and activity were documented. Once surveys were complete researchers returned to area and completed nest searches to locate the habitat the nighthawks were utilizing. Due to Covid-19 in the 2021 season the surveyor worked alone to ensure safety and to follow the protocols set out by the Chief Medical Officer.

Additional Common Nighthawk Surveys

As was the case in previous years, extra surveys were added in 2021 when the decrease in nighthawk activity was observed in the Long Lake Recreation area. The original survey transects from 2017, that included Grey Mountain and Chadburn Lake were surveyed during breeding season on subsequent nights. These additional surveys were completed to get a greater understanding if the decrease was isolated to Long Lake or the general location was having less activity. Additional survey showed a decrease in nighthawk activity as well as songbird activity then in previous years. The increased hours investigating surrounding areas increased data to determine if the decrease activity was localized. After repeated survey years there is a noticeable decline over the entire Chadburn Lake Park.

2021 Nest Searches and Observations

Nighthawks' detections were recorded during surveys and locations were to be documented. Upon completion of the transect line the researcher returned to the detection location and searched forested area using the visual and vocal presence of the nighthawks to narrow down the nest location. This practice requires a great deal of care as to not disturb the possible nest site. If a nest location is determined the sites are recorded using GPS and broad site descriptions are completed. These include habitat observations and the description of the possible nesting site. Any observations of the nesting activity at that time are to be recorded. The site is then revisited on subsequent

days to ensure the location is a nesting site. Once nesting activity is confirmed the location are to be revisited multiple times to observe activity and the success of the nest.

Common Nighthawk Nest Locations 2018

The four nest sites that were located and monitored in 2018 were visited by researcher. These nesting sites and the surrounding area were monitored to determine if the site itself as well as the encompassing areas was revisited by nighthawks during breeding season.

Habitat Data Standards

Habitat descriptions in the past studies in the Long Lake Area are a smaller scale site description created by Yukon Energy Mines and Resources. These have been completed for the nesting location in later summer once the nighthawks had vacated the area to reduce risk of disturbance.

Results

Common Nighthawk Detection Data

Field work started in mid-May to determine the overall condition of the transect stops and previous nesting sites. The high snowpack in 2021 led to a cooler spring which led to persistent snow in the forest for a longer duration the witnessed in previous years. This meant that many of the sites still had snow cover in May and into June in shady areas. The surveys started in the first week of June to align with the previous studies. Some surveys were canceled or postponed due to the cooler weather, rain and wind conditions but were resumed when the weather met the criteria. All survey nights adhered to the survey protocol used in previous years.

Two male Common Nighthawks were recorded over the study period. Both were observed visually and through the “peent” noise and flying overhead with the occasional vertical dives to create their wing-boom. Neither of the males appeared to have attract a mate in 2021. In previous years when observing the male, the female would respond to the “pneet”. The male would also respond by staying in a specific area by circling overhead. The males and females communicated actively through the dusty hours of the survey. If the researcher was near the nest area during nest searchers the male would show more aggressive behavior. None of this behavior was observed during the 2021 surveys while monitoring the nighthawks.

The additional survey hours and transect did not increase nighthawk detection in the Long Lake Recreation area or the other two transects. Songbird activity had noticeably

decreased as was the case in 2019 and 2020. The decreased activity was observed throughout the survey season of 2021.

Over the last three years of research the Common Nighthawk have continued to show a declining trend with regards to breeding and nesting activity. In 2018, twenty-three detections were recorded which has declined to eight detections in 2020 to six detections in 2021. Four nests were recorded and observed in 2018 and six young hatchlings were identified. By 2020 no nests were located, and no hatchlings were observed. In 2021 only male Common Nighthawks were observed in the study area. This decrease of activity is alarming considering the overall decline in the species being observed across Canada and the United States.

All surveys were completed an hour before sunset and were completed no later than thirty minutes after. In 2021, 82% percent of the detections occurred in the hour before sunset. This detection rate throughout the study years has fluctuated from 75% to 91%. Some factors that might contribute to these differences could be the availability of insects in the study year and how early or late the snow melt occurred.

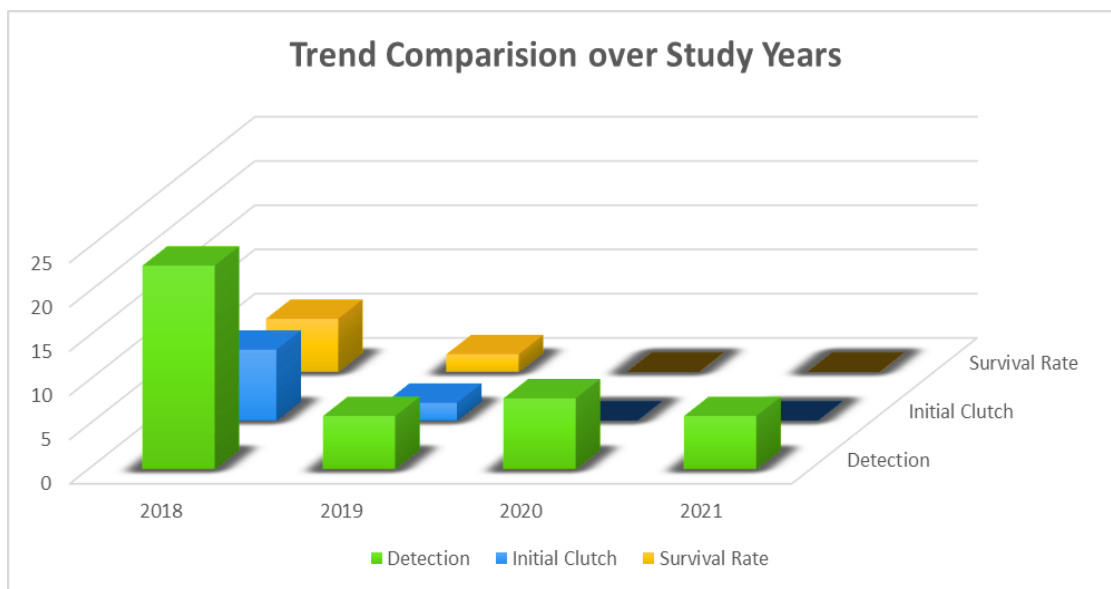


Figure 1: Trend Comparison over Study Years 2018-2021

Nest Search Activity

Nest searches were carried out using the same protocol that was used in the previous years of study. The overall activity has shown a steady decline over the last three years so additional surveys and searches were completed in 2021 using the same protocols as previous years. The extra searches and surveys did not increase detections of nighthawks.

The researcher observed two male nighthawks using the area. The nighthawks did not show previously observed nesting behavior or territorial behavior recognized in prior years. The known nesting sites were visited on multiple occasions to confirm they were not utilized in the 2021 breeding season. No activity or territorial behavior was observed during these visits.

The nesting sites were under snow for a greater amount of time than in previous years. The large snowfall that occurred in 2021 left the forest with patches of snow, ice and wet ground for a prolonged period compared to other years. This might be a contributing factor to the decrease in nesting nighthawks in the area.

Habitat Descriptions for Nesting Areas

During the 2021 survey season no female nighthawks were observed or heard during the surveys. Males appeared to be without mates and were not showing the territorial behavior that has been observed in previous years. After searching the known nesting locations and locations below the male activity no nesting sites were located. Habitat plots were not completed as they normally would be due to the lack of activity. The researcher visited the sites to determine any external factors that would have led to the decline in use. The sites were compared to previous years data collection to determine if the site was no longer viable as a nesting location.

The sites showed less leaf litter and small woody debris due to increased water flow on forest floor. These sites were water saturated like 2020 observations. Some patches of snow were still located in pockets of the forest. The other sites where nests have been found in previous years that are dominated by Pine-Lichen forests were higher in elevations and did not experience the same level of water impact that the lower site did. The higher sites did have patches of ice in shaded areas of the forest. Neither the lower Spruce Lichen-Grass sites or the higher Pine-Lichen habitat showed signs of nesting activity. It was determined that given regular spring these sites still had enough of the features to make them viable as nesting sites compared to the original sites that were utilized.

Insect Population

Insect populations were higher in the Whitehorse region again in 2021. This was also observed in 2020 due to the wetter weather that Whitehorse has experienced over the last two years. Larval development for mosquitoes occurs with water accumulations from snowmelt and precipitation in ponds and depressions. The left-over moisture due to the later snowpack melt also creates breeding ground for mosquitoes longer into the season. The increased flooding also increased the breeding area for the larva. Mosquitoes control measures that were within the city were unable to cover the additional flooded areas. These flooded water bodies included stagnant ponds, marshes, non-flowing ditches,

depressions anything that can hold water for several weeks or months. This indicates that nighthawks had a consistent food source throughout the 2021 and 2020 breeding season.

Seasonal Weather Differences and Impacts on Recruitment

Temperature

Different factors were examined to understand the decline the Common Nighthawk activity in 2021. A review of monthly temperatures was completed over the last 5 years in the study area. It was determined in 2021 the study area had a cooler spring then any of the previous years. After May the average monthly temperature from June to August was higher then in previous years of study. This cooler May temperature and high snowpack from the winter might have been a contributing factor in the decrease in breeding and nesting activity. Although it warmed up later in the season this notably cooler spring and snowpack could have decreased food availability and contributed to a decrease in nesting site. The temperature could also have interrupted mating behavior.

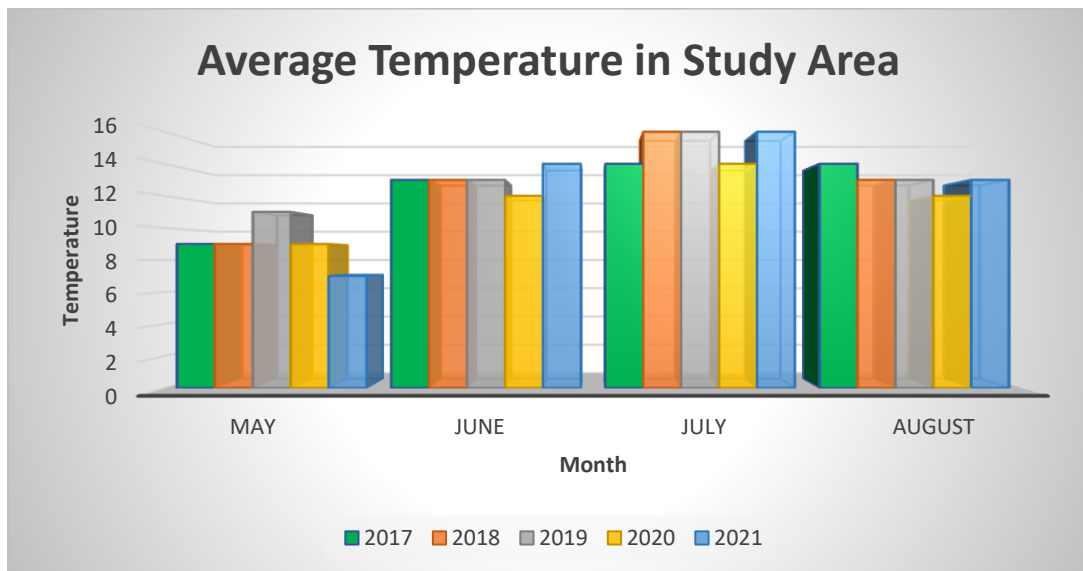


Figure 2: Average Temperature in the Long Lake Recreation Site over 5 years

Precipitation and Snowpack in 2021

In March of 2021 snow surveys completed by the Yukon Government showed southern Yukon was reporting wetter than normal conditions. March was also colder then normal across the entire territory. April in the Yukon is considered a dry month with regards to precipitation, but Whitehorse was significantly wetter due to a heavy snowfall early in April

and then rain on April 29th and 30th. Figures 3 and 4 show the precipitation in the Yukon from the Yukon Department of Environment for month of April.

The City of Whitehorse registered 70cm of snow on the ground on April 4th. This is considered the most snowfall on record in the city for that day by almost 300 percent of normal. For reference the snowpack usually peaks around 30cm at this time of year. This increased snowpack followed by a cool spring led to a delayed snowmelt. In June the Whitehorse area experienced a heatwave that caused the snowpack to melt at an accelerated rate causing major flooding and erosion in the Southern Lakes region and Lake Laberge south of Whitehorse.

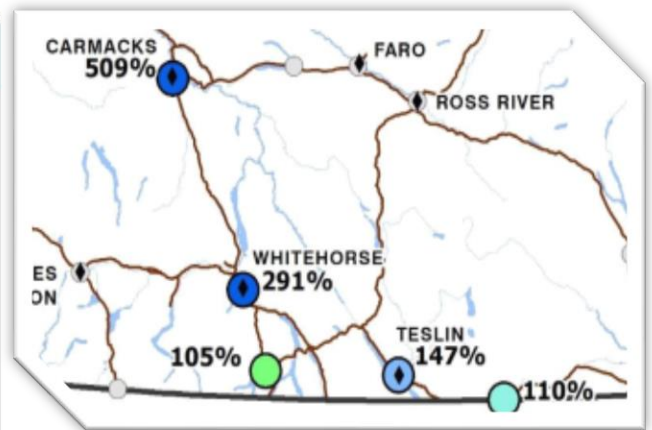
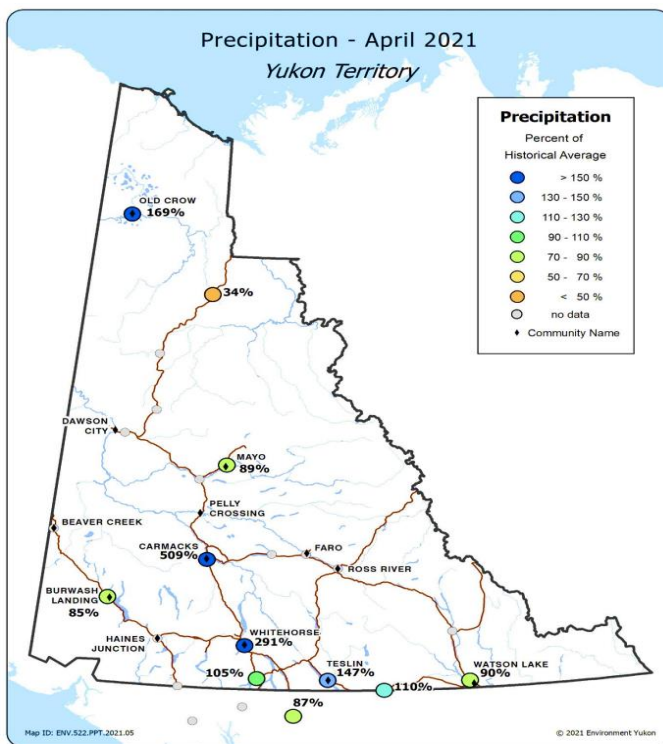


Figure 4: Zoomed in map of Southern Yukon precipitation in April 2021.

Figure 3: Yukon Map of Precipitation in April 2021 from the Department of Environment.

Precipitation in Long Lake Recreation Study Site

In 2021 the precipitation in May was higher than the first three years of the study but not nearly as high as in 2020. Considering the record-breaking snowfall, the decreased rain from the previous year was beneficial for flooding and damage. In June the rain was remarkably lower than any of the other years studied. This was welcome due to the late snowpack melt and flooding that had started in the region. The precipitation was in the normal range for July that had been documented in past years, but the snowpack and melt continued to cause flooding in localized areas of southern Yukon. In August the

precipitation increased by almost 25 mm that had been documented from previous years of study. This led to widespread flooding in southern Yukon. In 2021 the sites did not experience the record-breaking rainfall that was observed in 2020. The record-breaking snowfall and delayed snow melt due to a cooler spring resulted in similar impacts to the nesting sites. The saturated ground and runoff caused erosion on slopes and hills. The persistent snowpack caused snow and ice to remain in areas that were generally dry in previous years of study.

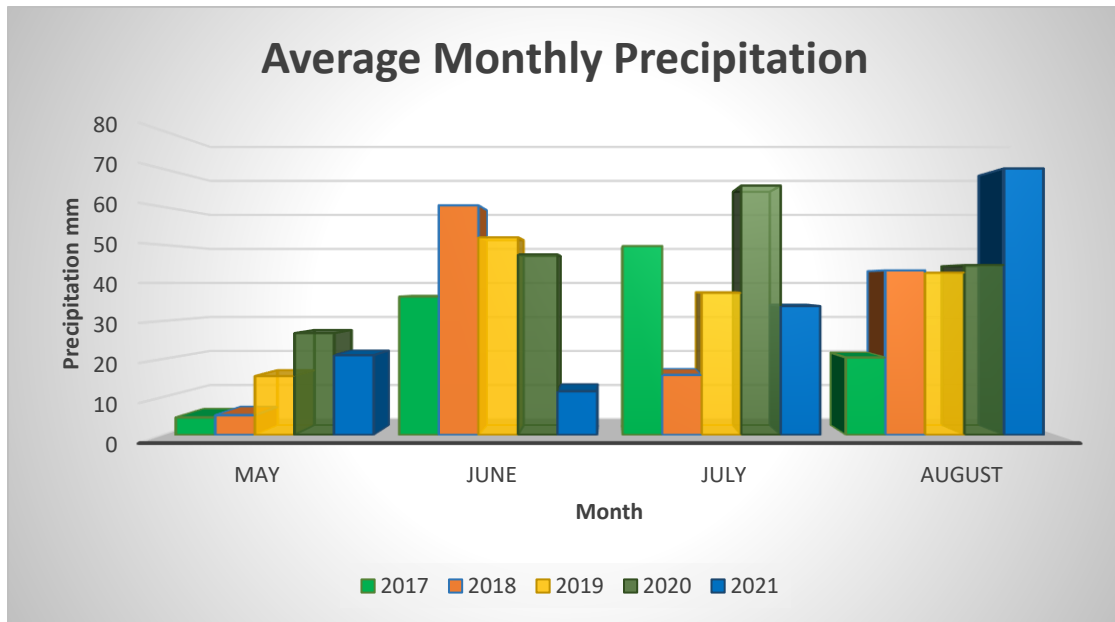


Figure 5: Average Monthly Precipitation by month for 2017,2018,2019,2020 and 2021

Forest Fires

The lower rainfall in the month of June and July did cause forest fires in parts of the Yukon in 2021. On July 1 much of southern Yukon was in considered extreme fire conditions. There was a fire in the Lake Laberge area that caused local smoke but nothing like was experienced in the 2019 fire season. These conditions and lighting strikes accounted for fires in the early part of July in southern Yukon. Conditions in the Yukon remained within normal range stayed manageable for fire crews. The air quality and normal levels. Increased snow cover on the ground kept the fire danger low at the start of the season contributing to favorable conditions later in the season. The heavy snow load from the winter and the later spring melt made the forest fire risk decrease greatly in 2021. Smoke and poor air quality were not contributing factors which was observed in 2019.

Protection and Enhancement

In 2017 Common Nighthawks were observed utilizing the area of Long Lake Recreation Site. In 2018 four mating pairs were observed and monitored in the area and produced 6 hatchlings. This was very welcomed research as Common Nighthawks were considered a species at risk as were declining in numbers across Canada and the United States. Since 2019 the region has experienced regional weather events each year. These events have also showed a steady decline of nighthawk presence and breeding activity. In 2019 the Long Lake Recreation area experienced high forest fire activity and thick smoke throughout the southern Yukon. This led to a 75% decrease in nesting activity that was observed in the previous year. In 2020 record rainfall saturated the ground and increased erosion throughout the study area. These conditions are more difficult for a ground nester that doesn't build a very robust nest which the pairs observed have no nesting activity. In 2021 the region experienced record-breaking snowfall in the winter. This along with a very late cool spring and snowpack and ice remaining in forested areas for longer durations led to no nesting pairs returning to the area. Only two solo males were observed throughout the study area and no females' nighthawks were observed or recorded.

The Fish and Wildlife Enhancement Trust has funded the research to better understand the breeding and nesting activity of Common Nighthawks. In learning more about this species vulnerabilities we are discovering that nighthawks need support and research to ensure the Yukon's population is not following the national trend. This research increases understanding of how this population within the territory is fairing compared to the national decline.

Studying the reproductive success in the region adds to the population information within the Yukon and across Canada. Collecting and adding to the database on how this species is being impacted by adverse weather is important to understand possible mitigation. The research is showing how impactful these weather events can have on this ground nesters. Although we cannot change the weather, we can take action to support optimal conditions when the weather barriers are not an issue. This research has led to the City of Whitehorse creating a Species at Risk Mitigation and Management Measures Document. This informs City of Whitehorse employees how to operate equipment and personal in the area when it is breeding season and what to do if they come in contact with a breeding pair and an active nest.

The Committee on the Status of Endangered Wildlife in Canada has stated concerns over the effects of changing climates and human activity in reducing food and nest-site availability. As we have witnessed in the last few years increasing frequency of severe or extreme weather events is also impacting this species by reducing its productivity and ability to reproduce. We are observing the decline of nighthawks since the start of the research in 2017 in the Long Lake area and each decline corresponds to a climatic change in the area and the subsequent reaction. Any data that can be added to a long-term database to monitor a species listed by COSEWIC within the Yukon Territory is valuable. If Common Nighthawk data shows a continuing decline the status could change from Special Concerned back to Threatened which could help mitigate a declining trend and add resources where they might be required.

The data is available to be utilized by current research projects in the region. Kwanlin Dun First Nations are working on Heritage and Ecosystem Conservation project. Adding data regarding critical habitat for nighthawks allows land planners and land designations to be informed. Understanding habitat use, success and risks can be added to the broader mapping work being completed.

The data collected is also added yearly to the Yukon Conservation Data Centre which gathers, manages, analyzes and shares information on Yukon species. This database is important to inform COSEWIC as well as other researchers working within Yukon.

The increase in the human population in the Yukon and increased mining and exploration means understanding habitat use and impacts is essential to recovery of this species. Development is taking place and establishing critical habitat is essential to protection of vulnerable species. Monitoring a species at risk is key to understand ways to decrease impacts from climate change, weather, human population increase and overall land use.

Future Considerations

In the last five years the Long Lake Recreation Area went from a high concentration of breeding Common Nighthawks and high recruitment to no breeding pairs. This has corresponded with three unusual weather years in southern Yukon. In 2019 a high concentration of forest fires led to increased local smoke and poor air quality in the region. In 2020 record breaking rainfall saturated the ground, increased erosion in the study site and kept temperatures cooler than average. In 2021 the increased snowpack in the region by 300% and the cooler spring led to persistent snowpack in the forest and increased flooding which led to saturation of the ground and increased erosion.

Although it would be ideal to monitor the study area each year to determine if the Common Nighthawks can recover to its previous breeding pairs and hatchling success it is not always possible to fund yearly research. It has been determined that completing a follow up study in 2025 would allow researchers to monitor the nighthawks to determine if the declining trend has changed. This will allow for some years to recover and return to the area and determine if the site can reestablish as a breeding ground for the nighthawk. Returning to the study area in three years will also help understand if the last three years has a short-term impact on the breeding population or these weather events have caused long-term impacts. A repeated study will answer questions around activities in the area and critical habitat designations.

The Common Nighthawk population would benefit from areas within the southern lake region having survey transects completed during breeding season. This will determine if there are other pockets of habitat are actively being used. Areas around larger centers are becoming more popular as Yukon's populations grows and determining nighthawk use beforehand can be helpful to decreasing disturbance during breeding season. These include future development areas, trail system development and fire suppression management areas. Proponents understanding the breeding behavior and timing can greatly increase the nighthawk's ability to co-exist with other activities that are being

conducted.

Data sharing with the Conservation Data set with Yukon Government, City of Whitehorse and the Kwanlin Dun First Nations helps inform and protect the species. Increasing the greater awareness of the breeding population in the area is also important to decrease possible detrimental impacts.

Public education initiatives in classrooms are suggested to increase knowledge of this species at risk within the Yukon and urban areas. By increasing awareness of Common Nighthawks in the general public more support and recognition can be used to educate the public on the perils these birds are facing. It also will help organizations such as orienteering, hiking groups and mountain bikers that might come into contact with a nesting pair during breeding season. This outreach in classrooms is generally found to inform households and educate other members of the family on outings and during activities. It also might increase the detection of nighthawk activity that is not currently known.

The Species at Risk Mitigation and Management Report 2018 created for the City of Whitehorse to help mitigate any negatives impacts should be reviewed in the future to ensure updated recommendations as more data is collected and national protocols change. This will help the city develop the areas in the least impactful way.

