Monitoring Reproductive Trends Across Wet and Dry Seasons for Species at Risk

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. In 2016 the Recovery Strategy for Common Nighthawk (Chordeiles minor) in Canada was completed indicating a need for increased research and understanding of the species. The Fish and Wildlife Enhancement Trust funded the study “Anthropogenic Effects on Common Nighthawks (Chordeiles minor) in Chadburn Lake Park” in 2017. The study showed a higher rate of detection in the Long Lake Recreational Area then in other locations in the park. In 2018 the Fish and Wildlife Enhancement Trust funded the study “Habitat Selection of Common Nighthawks During Breeding Season in Long Lake Recreation Area”, to determine if nighthawks were selecting the unique old growth forest in the area. Four nesting sites were found, three of the nesting sites were successful, one failed due to predation. In 2018, COSEWIC reassessed the nighthawk as Special Concern but estimated a 10 percent reduction in mature individuals. In 2019 a Nesting Success Trend Assessment of Common Nighthawks in Chadburn Lake Park was funded by the Fish and Wildlife Enhancement Trust. Determining trends in nest selection is a tool to inform the development and establish critical habitat. Heavy smoke and a colder spring showed at 75% lower detection rate and only one successful nest that produced two fledglings. 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 made it the 9th wettest season that the City of Whitehorse had ever experienced. Many areas faced washouts, erosion, water damage and flooding. Nighthawks are ground nesters with little protection around the nest and heavy rain can be detrimental. Although four individual birds were observed using the area throughout the study, the typical nesting and territorial behavior was not observed. In 2020 no nests were located in the study area, and previous nesting sites were not utilized. The heavy rain and cool summer in the region are considered a major factor in the decline of Common Nighthawk nesting activity that was observed during the 2020 study.

Project Activities

Common Nighthawk Surveys

The survey followed the guidelines and protocols set out in 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). These survey methods and the route in the Long Lake Area have been used since 2017 to ensure comparable data collection and analysis. The transect starts before the recreation site and ends 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 records all Common Nighthawks seen and heard within survey location. The locations and activity were documented. Once surveys were complete the researcher returned to area and completed nest searches to locate the habitat the nighthawks were utilizing. Due to Covid-19 in the 2020 season the surveyor worked alone to ensure safety and to follow the protocols set out by the Chief Medical Officer.

Rain Interruption During Common Nighthawk Surveys

Following the survey guidelines some surveys had to be canceled after initiated because they no longer followed the criteria set in the protocols due to rain and wind. The increased rainfall in 2020 required many surveys to be delayed or restarted. The surveys were completed after weather system passed and the right conditions were acquired. This required more visits to the survey area to ensure accurate data collection that could be compared to previous years.

2020 Nest Searches

Once the nighthawks were detected during the survey, location and other data were recorded. 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 required care as to not disturb nighthawks while looking for the nesting sites and is labor intensive. Recording any data that might be associated with the bird’s activity and possible nest location is recorded. The area is narrowed down to possible nest location and then observed and revisited throughout the study to determine if a nest is established and successful.

Common Nighthawk Nest Locations from Previous Studies

All nest sites that were confirmed in previous years were visited and survived to determine if the area was being utilized by the nighthawks in 2020. The site and surrounding area were searched to determine if the site itself as well as the encompassing areas was revisited by the nighthawk pair.

Habitat Data Standards

Habitat descriptions in the past 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 May to observe nesting site and damage caused by heavy rain and went until mid-August. Survey nights were sometimes canceled and restarted which was required to adhere to the survey protocol. Total of 4 Common Nighthawk individuals were recorded over the study period in the Long Lake Recreation site. The surveys were extended similarly to 2019 to confirm the absence of breeding activity.

As observed in 2019 the songbird activity was noticeably less active during the surveys. Fewer detections were recorded at all stops for all bird species. After extra surveys were completed in the study area due to weather related protocol restrictions there was still less activity then was found in 2017 and 2018. It was determined that activity across the entire original survey area had decreased in 2020 and 2019.

The individual birds that were observed showed no territorial behavior that had been witnessed in previous years when approaching nesting sites. Comparing the four years of research shows a downward trend in overall nighthawk activity and nesting. In 2018, twenty-three detections were recorded which has declined to eight detections in 2020. 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 2019 forest fires and poor air quality coupled with cooler weather was believed to be part of the reason for the decrease in detection and nesting. In 2020 the record-breaking rain and subsequent cool weather is thought to have had impact on the nighthawk breeding and nesting activity. This troubling trend is indicating that unusual weather in the north is having an increasing impact on nighthawks and their ability to reproduce.

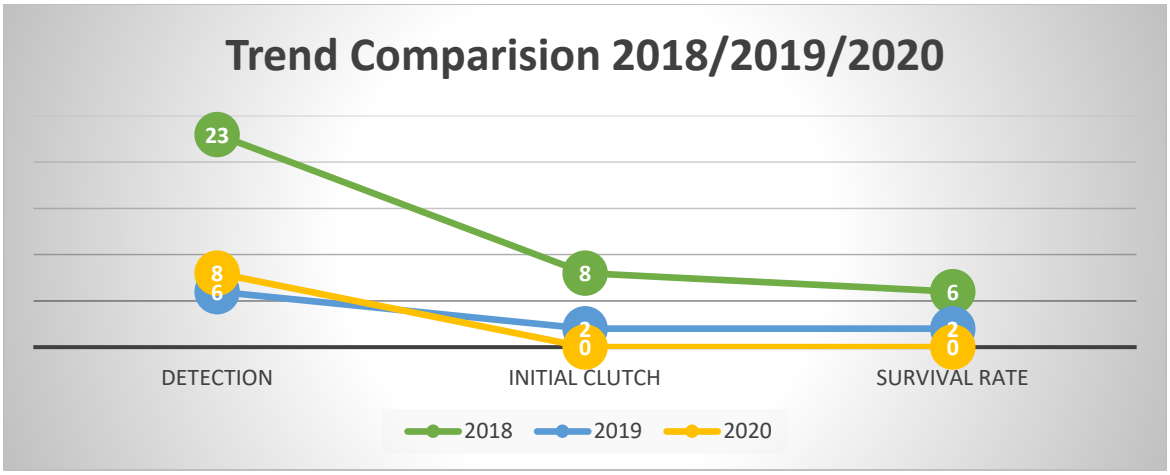

Figure 1: Trend Comparison for 2018/2019/2020 of Common Nighthawk activity

All surveys were completed an hour before sunset and were completed no later than thirty minutes after. In 2020, 79% 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 availably of insects in that study year.

Nest Search Activity

Nest searches were carried out in order to determine if they were nesting in the Long Lake area. The overall nighthawk activity in 2020 was similarly to the low level that was found in 2019. Additional searches and larger search areas was monitored to determine if the lack of detection was due to the cryptic nature of the bird or the decreased presence of breeding pairs.

Fever detections and increased nest searches did not result in nighthawk nest locations being found. Multiple surveys monitored four nighthawks using the area. The four nighthawks did not show previously observed nesting behavior or territorial behavior recognized in prior years. The Long Lake nesting site that had nesting activity in 2019 and 2018 were monitored and the search area expanded.

The area sustained overland damage from heavy rains and run off. It could not be determined if the nighthawks had established nests and then they failed or if they never established nests. In previous years, the nighthawks would get territorial when approaching a nesting area showing agitation and aggressive behavior. This would indicate researchers needed to observe from a distance to not disturb the nest or the breeding pair. This behavior was not observed, nor was the sounds of hatchlings heard in the area. It was concluded that neither pair produced hatchlings in the spring/summer season of 2020.

Habitat Descriptions for Nesting Areas

In 2018 and 2019 nests were located up slope from the Long Lake shore and were classified as white spruce-lichen-grass community. This area experienced increased rainfall in 2020 compared to previous years. Erosion was observed around the area where nesting had been established in previous years. The nest micro sites that were located in previous years showed less leaf litter and small debris due to increased water flow on forest floor. These sites were far more water saturated then observed in the prior years. 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. Although the area had less impact from precipitation no nests were observed.

Insect Population

Insect populations were higher in the Whitehorse region in the spring and summer of 2020. The increase rainfall created good habitat for insects to reproduce. Larval development for mosquitoes occurs with water accumulations from snowmelt and precipitation in ponds and depressions. These water bodies can include stagnant ponds, marshes, non-flowing ditches, depressions anything that can hold water for several weeks or months. The increased rainfall increased the breeding grounds for many insect species. The mosquito control program run by the City of Whitehorse reported contract staff seeing five to seven times higher amount in the samples they collect throughout the season. The contractors feel this season could be the highest levels in the last 10 to 20 years. This indicates that nighthawks had a consistent food source throughout the 2020 breeding season.

Seasonal Weather Differences and Impacts on Recruitment

Temperature

Different factors were considered to understand the decline the Common Nighthawk activity 2020. A review of the temperature was completed, and it was determined that the average range among the four survey years were consistently lower in 2020. Every month the seasonal average in 2020 was lower than previous years. This might be due to the continuous cloud cover and lack of sun that did not allow typical warming throughout the day. The cooler temperature was not drastically different from previous years, but it might have been a contributing factor in the decline of the breeding and nesting activity.

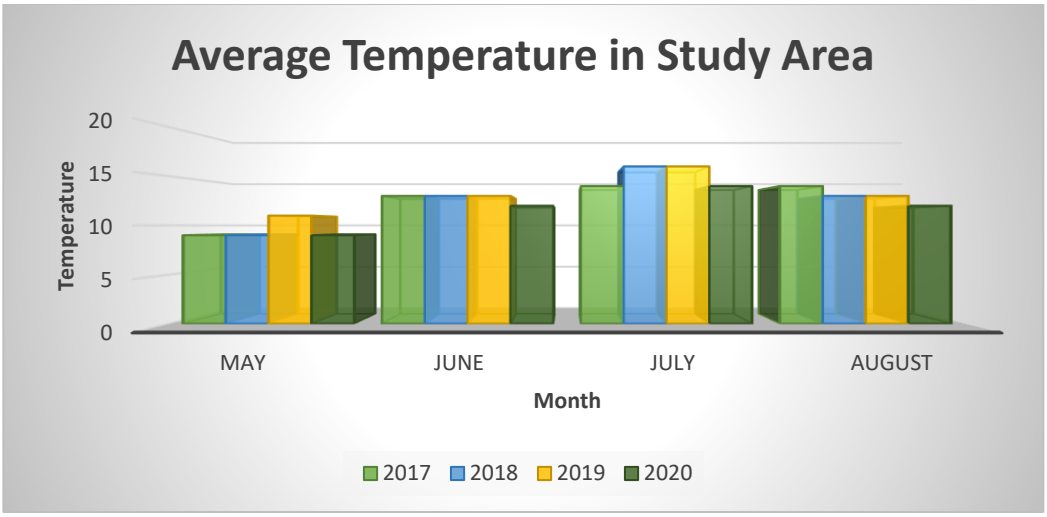

Figure 2: Average Temperature for 2018/2019/2020 in Whitehorse, Yukon.

Precipitation Across Yukon and Northwest Territories

In 2020 the Yukon and the Northwest Territories experienced record-breaking rainfall in many of the regions and towns. The Yukon was almost always in the path of rainfall due to low pressure reaching from Alaska through to Alberta. In Figure 3, you can see the overall rain accumulation for the summer 2020 across both the Yukon and Northwest Territories. Some of these totals were record breaking from previous years.

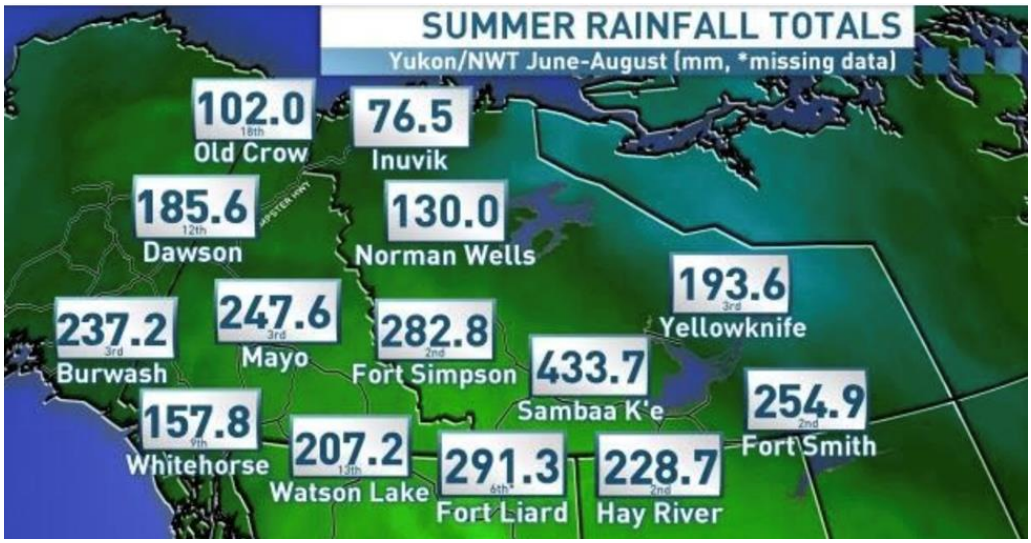

Figure 3: Total summer rainfall totals for the Yukon and Northwest Territories created by CBC for 2020.

The low-pressure system that was observed in 2020 added many record-breaking days to individual communities. This weather system brought rainy and grey conditions across the entire territory saturating vegetation and bringing cooler overcast weather. As shown in Figure 4, Whitehorse have its ninth-rainiest year with 157.8 mm of rain accumulation in one season.

Figure 4: Highest rainfall totals for communities in the Yukon and Northwest Territories created by CBC for 2020

Precipitation in Long Lake Recreation Study Site

In 2020 the precipitation in May was almost five times higher at 26.8mm than both 2017 and 2018 which only saw an average of 5 mm. The 26.8mm that fell in 2020 was almost double the rainfall in 2019. June rainfall in 2020 was slightly lower than the last two years but not as low as in 2017. The rain increased again in July dropping 18.1 mm more rain than 2019 and 49.8 mm more precipitation then in 2018. Overall, the Yukon experienced many daily rain records being broken. By the end of the summer 2020 came close to record-breaking wet summer across all communities. The impact of the heavy and continuous rain was observed during nest searches with saturated ground, runoff and erosion on slopes and hills.

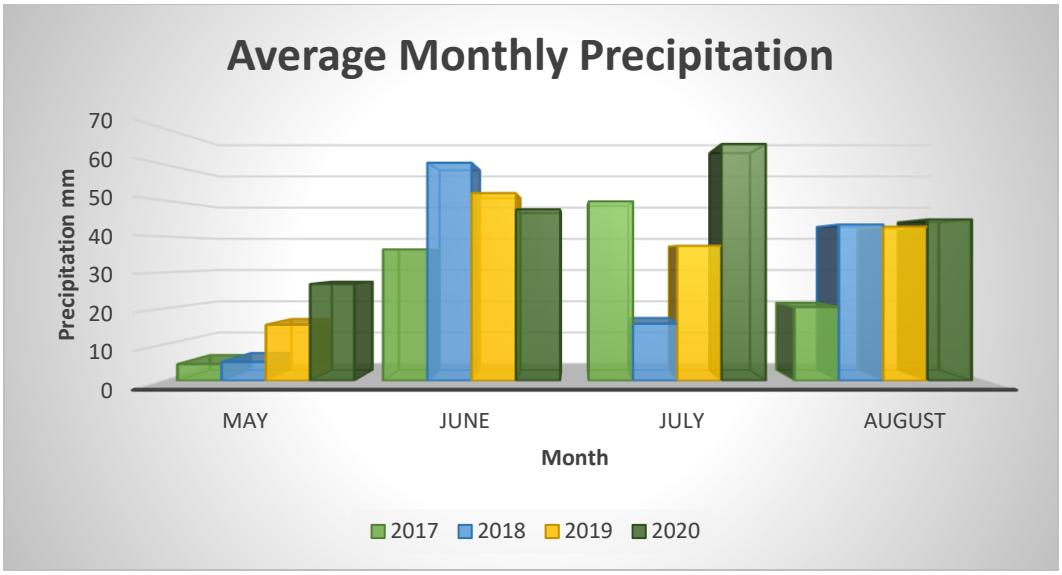

Figure 5: Average Monthly Precipitation for the City of Whitehorse in years 2017,2018,2019 and 2020.

Forest Fires

Meteorologist with Yukon Wildland Fire Management stated at the beginning of the 2020 fire season, that most regions in the Yukon experienced a large snow loads over the winter. Increased snow cover on the ground keeps the fire danger low at the start of the season contributing to favorable conditions later in the season. The combination of heavy snow load from the winter and the high precipitation in 2020 made the forest fire risk decrease greatly. This was a drastic change from the 2019 fire season where 177 wildfires burned across the territory, totalling 2,800 square kilometres. The forest fire rating for the Yukon remained low for the majority of the 2020 season and did not impact the Long Lake Recreation area. Smoke and poor air quality were not contributing factors which was observed in 2019.

Protection and Enhancement

The 2020 survey showed a continuing decrease in Common Nighthawk activity in the Long Lake Recreation area. In 2019, a 75% decrease in nesting activity was observed and this trend continued to decline to 100% loss of nest establishment in 2020. Nighthawk nests were not located during the 2020 survey. Four nighthawks were observed throughout the survey period, but no nests were detected. The researcher observed saturated ground and erosion at sites that had been previously been nesting locations. Record rainfall and cool weather was determined to be a possible contributing factor to the drop-in nesting activity.

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 we are discovering that this species needs support and research to ensure the Yukon's population is not following the national trend. It is important we are increasing understanding of how this population within the territory is 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 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. These concerns over extreme weather and potential impacts were observed in the 2019 and 2020 breeding season in Long Lake. We are observing the decline of nighthawks since the start of the research in 2017 in the Long Lake area. 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.

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 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 10% increase in the human population in the last ten years in the Yukon and increased mining and exploration means understanding habitat use and impacts in 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 weather, human population increase and overall land use.

Future Considerations

Continuing to monitor the Common Nighthawk breeding and nesting activity would give insight into the declining trend and monitoring possible recovery. The declining activity and nest success that has been observed in the last 5 years is especially concerning given the nighthawks current national rankings. The route established and monitored since 2017 has created a database that instrumental in monitoring the species and possible recovery. The repeated use of the Long Lake Recreation area has been observed in the research since 2017 by the nighthawks. Nighthawks have not been observed utilizing the surrounding areas or habitat for mating and nesting activity. This indicates the study area and habitat is significant to the Yukon population of nighthawks. A growing dataset showing critical habitat makes a compelling case to make efforts to protect areas deemed critical for nighthawks.

Unusual and extreme weather in the area has correlated with the decline in nesting activity and fledgling survival. Forest fires, smoke and poor air quality appear to be connected to the decline in activity and nesting success. High precipitation and localized flooding and increased ground water is felt to be linked the lack of nesting and fledglings in 2020. The increasing unpredictable weather and nighthawk's ability to adapt should be factored into land use planning and development. By continuing to establish connections with habitat use and critical habitat this demonstrates that protections are required. By collecting yearly data, land planners and regulatory agencies can use data to establish requirements from developers with similar habitat markers. This is how protection of the species is promoted in Alberta and Saskatchewan. Proponents must survey areas prior to development if habitat fits the criteria that has been established as nighthawk habitat. Understanding that extreme weather is difficult for nighthawks to adapt to makes it clear that ensuring the critical breeding and nesting habitat is available will help the species recover.

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 is suggested to increase knowledge of this species at risk within the Territory. 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 with organizations such as orienteering and mountain biking 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.

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.

Communications

This project was funded by the Fish and Wildlife Enhancement Trust. The project was also supported by the Kwanlin Dun First Nation and The City of Whitehorse and the Yukon Department of Environment. All partners will receive a completed report for their records.

The information collected has been shared with the Biodiversity Biologist that also sitting member of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for the Yukon Government.

The information will be submitted to the Yukon Conservation Data Centre within the Yukon Government, which is a member of a network of data centers from around the world. This database maintains and distributes information on Yukon species and maps the known localities of those that are of conservation concern. Environment Yukon will be encouraged to use these results in their management planning, environmental assessments, and public outreach programs relevant to nighthawk conservation.

The City of Whitehorse staff will again be offered a presentation on this year's study results. There will be suggested mitigations that can be taken as park development commences in the study area. These presentations offer an update and act as a reminder that this species is still utilizing the area and is still declining across Canada.

The Kwanlin Dun First Nation Lands and Resources Section will receive an update on the results from 2020 study. This information will assist in their managing of the nighthawk on their traditional territory and can be used in their broader eco land mapping projects they are working on.

The Fish and Wildlife Enhancement Trust will be acknowledged as the main supporter of the project and the logo and name will be included on all presented materials associated with this study, findings and information shared.