NEW GOLD RAINY RIVER MINE
APPENDIX O
MIGRATORY BIRD REPORT

2024 BIRD MONITORING REPORT

PER PROVINCIAL ENVIRONMENTAL ASSESSMENT NOTICE OF APPROVAL CONDITION 5

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2024 BIRD MONITORING REPORT

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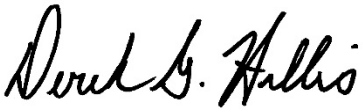

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EXECUTIVE SUMMARY

The Rainy River Mine (RRM) is owned by New Gold Inc. (New Gold). The mine is located approximately 65 km northwest of Fort Frances and 420 km northwest of Thunder Bay, Ontario. It is located off Highway 600 within the Township of Chapple and the District of Rainy River. Construction at the site began in 2015 with commercial operations commencing in 2017. At present, operations at RRM are comprised of open pit and underground mining with ore processed at the Rainy River Mill, located on site. Other mine-related infrastructure includes an underground mine portal, waste rock stockpiles, rock crushing facilities, ore storage facilities, a processing plant, a Tailings Management Area (TMA), watercourse diversions, site drainage works, a fuel tank farm, explosives manufacturing facilities and explosives storage facilities.

Baseline studies commenced at the site in 2009 and continued through to 2015, leading up to the start of construction. Baseline surveys resulted in a thorough understanding of the natural environment local study area (LSA). Site development and project approval through the federal environmental assessment (EA) process required a number of follow-up monitoring programs as part of the commitments made by New Gold. With respect to birds, monitoring programs were designed to verify the accuracy of EA predictions. This report provides the methods, results, and interpretation of the 2024 bird monitoring surveys and places these results in the context of surveys conducted in previous years at the RRM.

Survey data were collected from the LSA in six years between 2014 and 2024. Data from 2014 and 2015 represent baseline conditions. Data from 2016 represent an assessment of the potential effects of construction activities on the bird community. Data from 2018 and 2021, and the current 2024 survey data represent three iterations of post-construction (operations) of the mine. Data from these years assess how RRM operations affect the bird community and how impacts on the bird community relate to predictions made as part of the EA. Survey methods and point count locations remained consistent over time, and results are thus comparable among years.

This report used four metrics to explore variations in bird community structure and potential project-related effects: occupancy rates (% occurrence), abundance (birds/station), density (birds/ha), and richness (species/station). We evaluated differences in bird community metrics at different point count station types (control or impact) and during different RRM phases (background, construction, and operation). Differences were evaluated for species of conservation concern (SCC), species not of conservation concern (non-SCC), and for different avian guilds, based on species habitat preferences.

In 2024, 131 bird species were detected by point count surveys. This was similar to the number of species identified in 2018 and 2021. Similarly, in all operational years, 40% of species identified on point count surveys were species of conservation concern (SCC). This was higher than the proportion of SCC observed on background (31 and 34 %) and construction surveys (24%). In 2024, similar numbers of species were detected at control and impact stations (108 and 117 species, respectively).

Similar SCC and species not of conservation concern (non-SCC) had the highest occupancy rates, abundance, and densities at control and impact stations in 2018, 2021, and 2024. This suggests that the RRM had little impact on which species were the most abundant and widespread during its operations.

Qualitative assessments of temporal changes for SCC and non-SCC with the highest occupancy rates, abundance, and density also suggested that the RRM had little impact on bird community structure. Although Ovenbird, a relatively abundant, forest-dwelling bird, may have experienced negative impacts.

Statistical comparisons between control and impact stations and among RRM phases indicated that impacts on bird community metrics varied by habitat guild. We found evidence of lower forest bird abundance, richness, and density at impact stations compared to controls. Conversely, species preferring edge/shrub/succession, grassland/open country, and wetland/open water habitats had higher occupancy rates, abundance, and density at impact stations relative to control stations. Therefore, species in these guilds may have preferentially occupied and were more abundant in areas that were cleared during RRM construction.

As outlined in the Follow-up Monitoring Program (FMP), the next breeding bird survey will occur in 2027 and will provide additional data to better understand differences and trends observed in 2024 and earlier years.

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1.0 Introduction

1.1 Project Background

The Rainy River Mine (RRM) is owned by New Gold Inc. (New Gold). The RRM is located approximately 65 km northwest of Fort Frances and 420 km northwest of Thunder Bay, Ontario, off Highway 600 (**Figure 1-1**). The RRM lies within the Township of Chapple and the District of Rainy River; it is situated on the traditional lands of Treaty #3 Anishinaabe Communities (AMEC 2011). Exploration on the Rainy River project began in 1967. Fifty years later (in 2017) productions commenced, and New Gold now operates a gold mine that utilizes both open pit and underground mining. At total build out, the site occupies approximately 6,100 ha and will comprise:

- an open pit and underground mine portal,
- waste rock stockpiles,
- rock crushing facilities,
- ore storage facilities,
- a Tailings Management Area (TMA),
- watercourse diversions and site drainage works,
- a fuel tank farm,
- explosives manufacturing and storage facilities,
- a 230-kilovolt transmission line, and
- associated buildings and infrastructure (see **Figure 1-2** for map showing site components).

Baseline data collection for the current development began in 2009 and continued until construction began in 2015. These data allowed for a comprehensive understanding of the flora and fauna both within and around the RRM site footprint (i.e., the local study area [LSA]). Baseline data were also used in an assessment of the potential environmental impacts of the RRM project presented in the Final Environmental Assessment (EA) Report (AMEC 2014), which was submitted to the federal and provincial governments and to Indigenous and public stakeholders for review. Acceptance of the EA was issued in January 2015, construction began in March 2015, and the mine reached commercial production in October 2017.

As part of the EA process, New Gold was required to design and implement of a Follow-up Monitoring Plan (FMP, Amec Foster Wheeler, 2016b). The FMP, in accordance with the Canadian Environmental Assessment Act (CEAA, 2021), outlines a plan to collect data to verify EA predictions of potential impacts of project development on wildlife and wildlife habitat and to monitor and evaluate the effectiveness of habitat rehabilitation efforts.

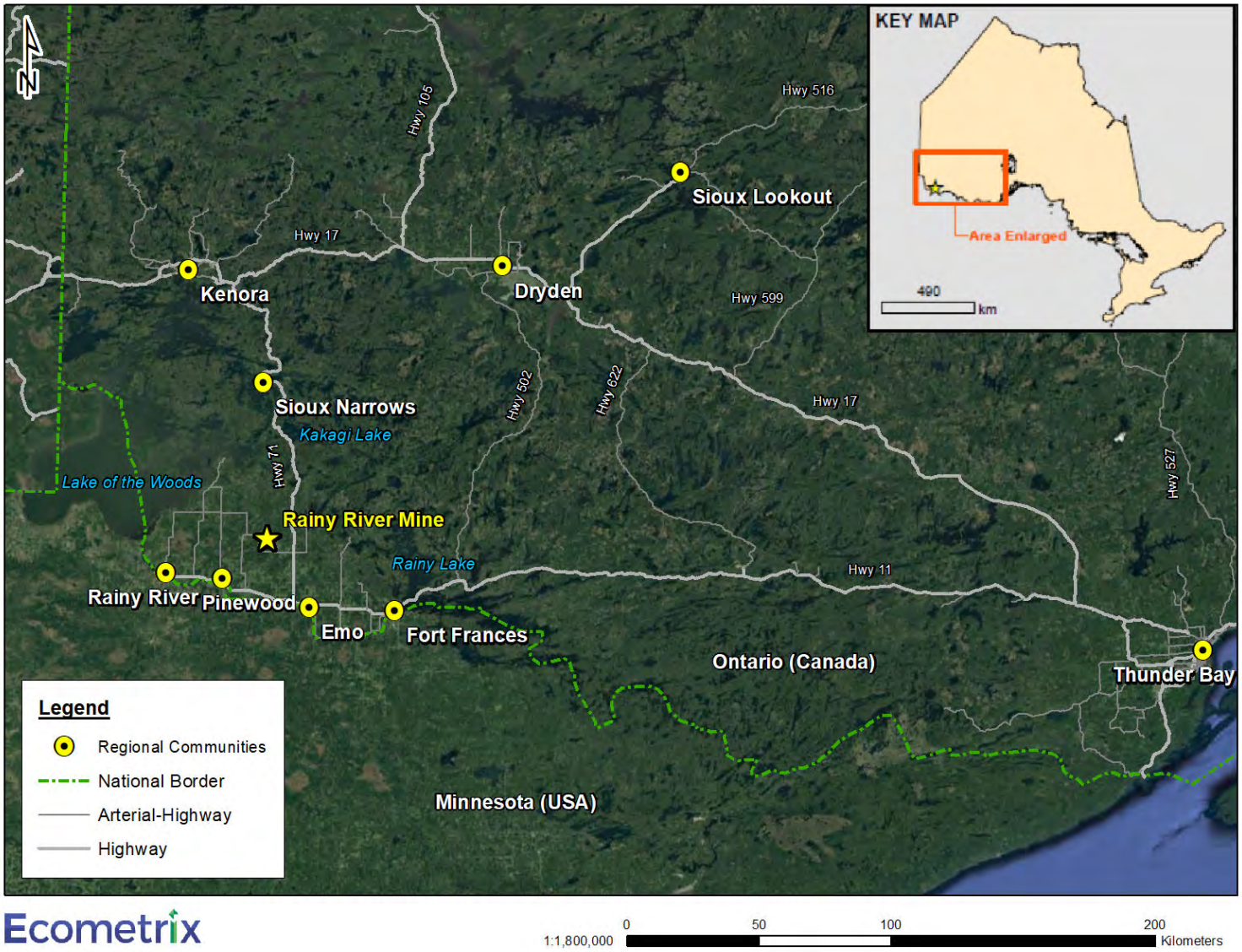

Figure 1-1: Location of the Rainy River Mine

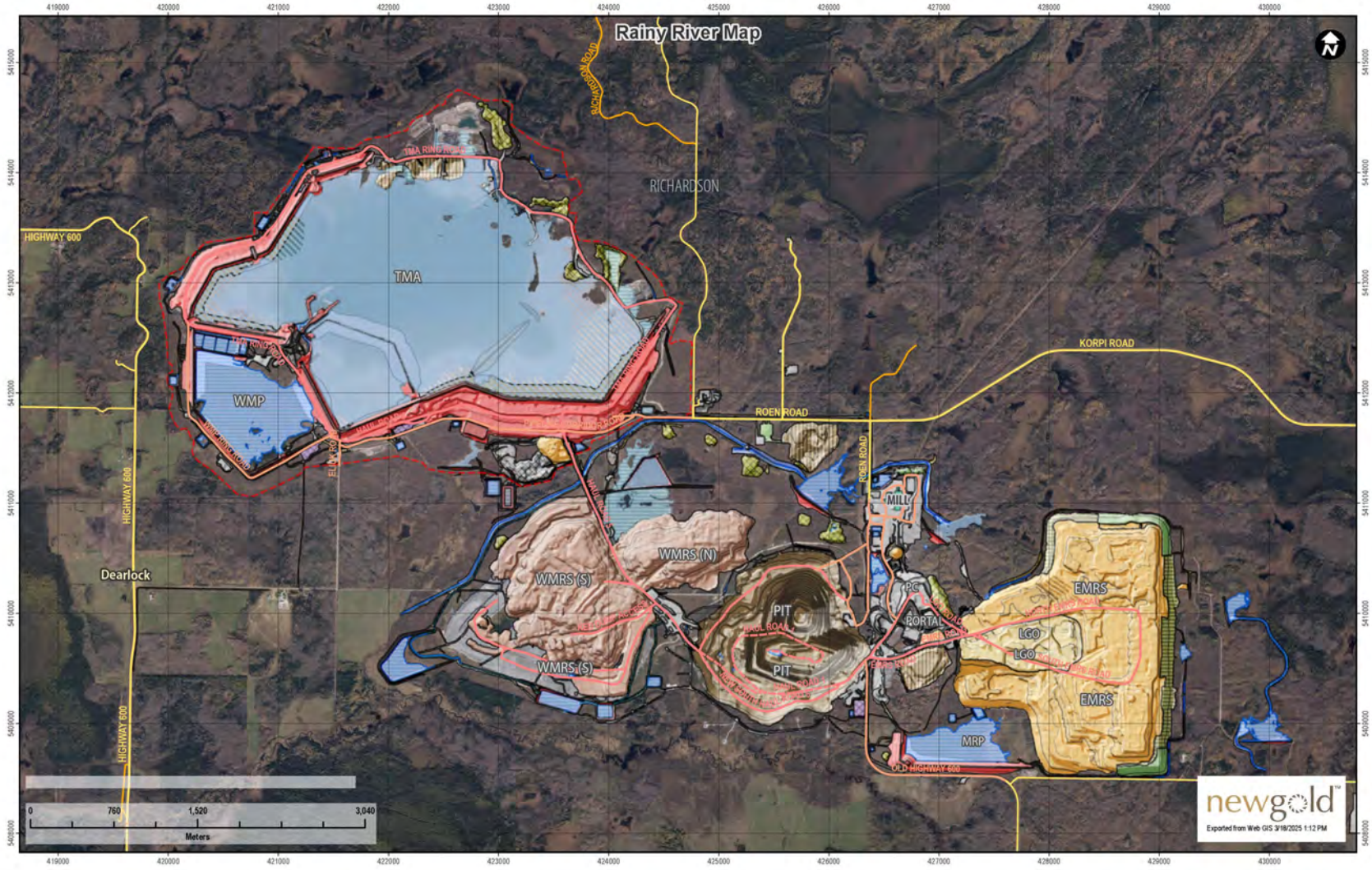

Figure 1-2. Rainy River Mine Site Components

1.2 Objective and Scope

The RRM site covers 4 major habitat types (edge - shrub - successional, forest, wetland - open water, and grassland - open country; see below for additional details) and therefore supports a diverse composition of local flora and fauna. Final EA approval for the RRM came with over 1,400 conditions in the form of both mitigation measures during construction and operations and in the form of monitoring commitments to confirm assumptions reported in the EA documentation and assessment. Monitoring commitments ranged in complexity from simple wildlife logs to rigorous species at risk (SAR) monitoring to meet specific permitting requirements. The RRM Final EA (AMEC 2014) estimated that RRM development would affect approximately 2,170 hectares (ha) of terrestrial habitat. To minimize potential effects, the selected final project footprint was as compact as possible and greatly avoided SAR territories.

This report presents results from the 2024 bird monitoring surveys completed by Aspen Biological Ltd. (Aspen) in conjunction with Ecometrix Incorporated (Ecometrix). Survey data from 2024 were also compared to bird monitoring data collected in previous years. The objective of this report was to assess the potential effects of the RRM on bird species distribution, abundance, density, and richness and to evaluate whether these impacts varied over time. SAR-specific requirements, as outlined in New Gold's current Environmental Site Assessment (ESA; Permit # FF-CC-001-14), were provided by New Gold under separate cover.

2.0 Methodology

The 2024 migratory bird surveys were conducted by Aspen in a consistent manner to surveys conducted as part of the 2014 and 2015 baseline data collection (AMEC 2015) as well as previous FMP studies to evaluate potential construction-related impacts (Amec Foster Wheeler 2016b) and project-related effects on the avian community (Wood 2019). As outlined in the FMP for breeding birds at the RRM, methods followed Environment and Climate Change Canada (ECCC) guidelines for surveys, as outlined in Mining Project Baseline Desktop Assessment and Survey Requirements (Environment Canada [EC] 2014a), Incidental Take of Migratory Birds in Canada (EC 2014b), and General Nesting Periods of Migratory Birds in Canada (ECCC 2024).

2.1 Survey Design

Bird species count data were collected using point count surveys. In 2018, 2021, and 2024, surveys were conducted at 185 long-term monitoring stations (**Figure 2-1**), which covered four available habitat types in the LSA (i.e., edge - shrub - successional, forest, wetland - open water, and grassland - open country). Having consistent survey locations over time allowed for analyses of variations in the response variables (see section 2.2 below) among years and stations.

Point count surveys followed a control-impact design, with 95 control stations and 90 impact (i.e., potentially impacted) stations (Figure 2-1). Stations were classified as either control or impact based on their proximity to the RRM and/or transmission lines. Impact stations were located within 5 km of the RRM and in areas where noise from the mine operation is expected to be greater than the average ambient noise level. Impact stations were also positioned along transmission line right-of-ways (ROWs). Control stations were located at least 5 km from the mine site, where noise from mining operations is expected to be at or below the average ambient noise level. Control and impact stations were established in similar habitats, representative of the variety of habitat types in the LSA. Control and impact station locations were also selected to minimize variations in variables not associated with potential mine-related impacts. However, given that the RRM is in a previously disturbed area with established road networks, birds at control stations are likely experiencing and/or have experienced minor disturbance and anthropogenic influence.

Point count surveys followed standardized protocols designed to target breeding bird species typically associated with habitats in the LSA (Fuller and Langslow 1994; OBBA 2001; EC 2014a). Each monitoring station was surveyed twice during the breeding season in all sampling years. The first round of surveys occurred between May 30 – June 5, 2018; June 7 – 14, 2021; and June 3 – 13, 2024. The second round of surveys was conducted between June 21 – 27, 2018; June 19 – 26, 2021; and June 13 – July 1, 2024. Survey timing aligned with the avian nesting period of this region (ECCC 2024). To reduce temporal biases, stations were surveyed in reverse order during the second round of sampling. All surveys were completed by qualified biologists with expertise in identifying birds by sight and sound.

Surveys started before sunrise and extended to a maximum of five hours after sunrise, depending on weather conditions. Surveys were aborted or postponed if weather conditions

were not optimal (e.g., light rain or high wind above 20 km/h). During each round of sampling, stations were surveyed for a total of ten minutes during which observers recorded: (1) the number of individuals of all detected species, (2) the time of detection (categorized into time intervals of 0 – 3, 3 – 5, or 5 – 10 min), and (3) the distance at which individuals were detected (categorized into distance intervals of 0 – 50, 50 – 100, or >100 m, or flyovers [i.e., individuals that flew above or through a survey area without interacting with the habitat]). Distance and direction of detection were mapped on field sheets for each bird to minimize double counting of individuals. Incidental sightings were also documented, particularly for SAR and species not detected during standardized point count surveys.

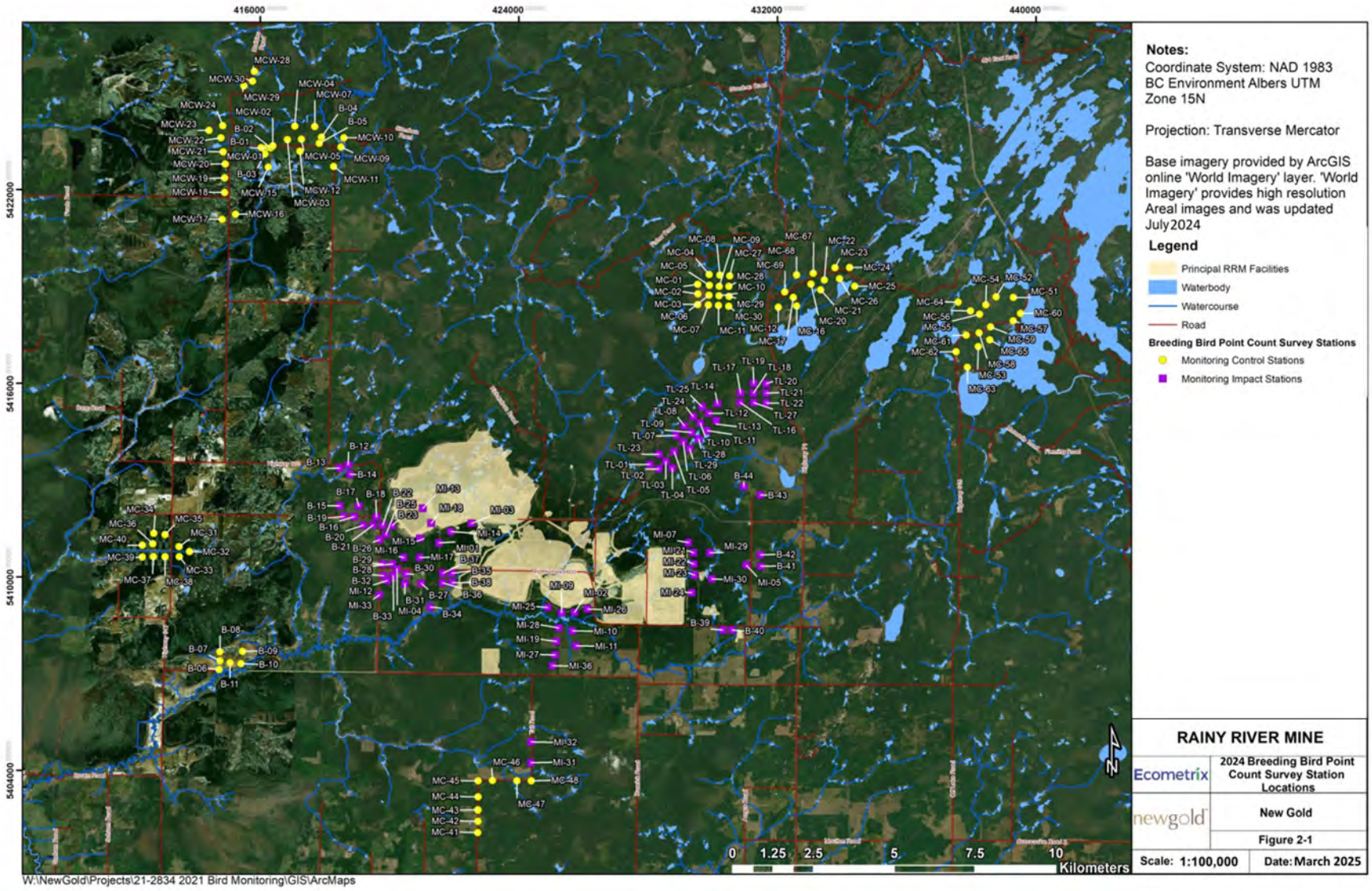

Figure 2-1: 2024 Breeding Bird Point Count Survey Locations

2.2 Data Processing

2.2.1 Data Compilation

We used data from background surveys (2014 and 2015), construction surveys (2016), and post-construction surveys (2018, 2021, and 2024). Data from 2014, 2015, 2016, and 2018 were previously presented in Wood (2019). Data from 2018 and 2021 were previously presented in Ecometrix (2022).

2.2.2 Bird Community Structure Metrics

The RRM FMP for breeding birds and their habitats follows the ECCC guidelines for surveys as outlined in EC (2014a) and used previously by Wood (2019). In line with this guideline, four metrics were applied to explore annual variations in bird community structure and potential project-related effects over time. These metrics include:

- **Occupancy rate (%):** Occupancy rate gives the percentage of stations where a species was detected. For each species and station type, occupancy rate was calculated as the maximum number of occupied survey stations across sampling rounds, divided by the total number of survey stations. Calculated using the formula:

$$Occupancy\ rate_{ij} = \left(\frac{\max(Number\ of\ stations\ occupied_{r1}, Number\ of\ stations\ occupied_{r2})_{ij}}{Number\ of\ stations_j}\right) \times 100$$

  where *i* is an individual species, *j* indicates station type (control or impact), and *r* indicates the sampling round.

- **Mean abundance (birds/station):** Mean abundance indicates the average count per station. For each species and station type, mean abundance was calculated as the sum maximum number of individuals recorded per station across sampling rounds, divided by the total number of survey stations observed. Calculated using the formula:

$$Mean\ abundance_{ij} = \left(\sum_{i=1}^{n} \max\left(Number\ of\ individuals_{r1},\ Number\ of\ individuals_{r2}\right)_{ij} \Big/ Number\ of\ stations_j\right)$$

  where *i* is an individual species, *j* indicates station type (control or impact), and *r* indicates the round of sampling.

- **Mean density (birds/ha):** Mean density indicates the average number of species present per unit area. For each species and station type, mean density was calculated as the sum of the maximum number of individuals within 100 m of a station across sampling rounds, divided by the total number of survey stations, divided by the area of sampling (3.14159 ha, where A = πr^2 = 3.14159 * (100 m)^2 = 31,415.9 m^2 * 1 ha/10,000 m^2 = 3.14159 ha).

$$Density_{ij} = \frac{\left(\sum_{i=1}^{n} \max\left(Number\ of\ individuals_{r1}, Number\ of\ individuals_{r2}\right)_{ij} / Number\ of\ stations_{j}\right)}{3.14159\ ha},$$

where *i* is an individual species, *j* indicates station type (control or impact), and *r* indicates the sampling round.

- **Richness: (species/station):** Species richness gives the number of species at each survey station. For each station, richness was calculated as the maximum number of species recorded at each station across sampling rounds.

$$Richness_{sch} = \max\left(Number\ of\ unique\ species_{r1}, Number\ of\ unique\ species_{r2}\right)_{sch}$$

where *s* is an individual station, *c* indicates species conservation grouping, *h* indicates habitat guild, and *r* indicates the sampling round.

2.2.3 Species classifications

Species detected on point count surveys were classified into both conservation groupings and habitat guilds for analysis.

The federal government lists species under the Species at Risk Act (SARA; ECCC 2025). Species are assessed for listing by the Committee on the Status on Endangered Wildlife in Canada (COSEWIC), which classifies species into different risk categories (Extinct, Extirpated, Endangered, Threatened, and Special Concern) based on factors like population size, population trends, and threats (COSEWIC 2021). As of January 2025, 94 bird species were listed as SAR in Canada. Ontario similarly classifies SAR as Endangered, Threatened, Special Concern, or Extirpated under the Ontario Endangered Species Act (Ontario Regulation 230/08; MECP 2024). Ontario currently lists 44 bird species as SAR (MECP 2024).

Bird Conservation Regions (BCRs) were developed by the North American Bird Conservation Initiative (NABCI) to address the conservation needs to birds across North America. Bird Conservation Regions are ecologically distinct areas that serve as the primary units within which conservation planning and implementation are undertaken (ECCC 2017). Each BCR has a BCR Strategy, which identifies priority species for conservation for that area. The RRM is located within the Boreal Hardwood Transition (BCR 12), and the Bird Conservation Strategy for BCR 12 in Ontario and Manitoba identifies 100 BCR priority bird species (EC 2014c).

Species detected on point count surveys were separated into two conservation groupings for analysis: Species Not of Conservation Concern (non-SCC) and Species of Conservation Concern (SCC). In this report, SCC include Bird Conservation Region (BCR) 12 priority species and provincially- and federally-listed SAR. Results are presented separately for SCC and non-SCC. This was done to emphasize results for species that have been identified as conservation priorities.

We note that although Canada Goose is identified as a BCR12 priority species, it is identified as such due to overabundance, with an objective to decrease populations (EC 2014c). Given this rationale for its priority species classification, and because Canada Goose is neither a provincially- nor a federally-listed SAR (ECCC 2025; MECP 2024), Canada Goose was classified as a non-SCC for this analysis.

For some analyses, species were also grouped into four guilds based on habitat preferences. These groupings were:

- Edge - shrub - successional (species typical of shrubby and/or young habitats, including shrub swamps, bogs and fens),
- Forest (species typical of treed habitats, including treed swamp),
- Wetland - open water (species typical of large rivers, lakes and marshes), and
- Grassland - open country (species typical of open habitats).

House Sparrow was observed at two impact sites in 2024. This species belongs to the "Towns" habitat guild (indicating its preference for human-impacted habitats; Lowther et al. 2020). However, as this was the only species with this guild classification, Towns was omitted from statistical comparisons of habitat guilds.

2.3 Statistical Analyses

We compared species occupancy rates, abundance, and density using generalized linear mixed effects models (GLMMs). A GLMM is a flexible statistical tool that let us test whether there were differences in the bird community structure metrics between station types and project phases. A GLMM is useful because it let us include both "fixed effects" and "random effects" in our statistical analysis. Fixed effects are the main variables that we want to test (i.e., station type and project phase). Random effects are natural sources of variation that we want to account for, like natural differences in abundance among species, for example. Using GLMMs also allowed us to analyze data that were not normally distributed (i.e., data where values did not fit a bell curve). Therefore, GLMMs were useful for this analysis because they allowed us to statistically analyze complex ecological data even when it did not follow a simple pattern.

Neither occupancy rate, abundance, nor density was normally distributed. Values for these variables had a mix of many zeros (30 – 40% of values were zero, meaning that a species was not detected on the survey) and positive, continuous numbers (i.e., values above zero could be any number, including numbers with decimal points). When a dataset contains many zeros (a situation known as zero-inflation), special methods are needed to correctly analyze the data. We therefore ran models using a tweedie distribution, which is well-suited for these types of zero-inflated data with continuous, positive values.

All GLMMs for occupancy rate, abundance, and density included station type (control or impact) and RRM phase (background, construction, or operation) as fixed effects. We also included the interaction of station type and RRM phase as a fixed effect. Including the interaction let us check whether the difference between control and impact stations was the same across all RRM phases

or whether it varied from one phase to another. We included species identity as a random effect to account for the natural variability between species.

We also analyzed species richness using GLMMs. For species richness models, we used a Poisson distribution. The Poisson distribution is designed for count data, so it was appropriate for analyzing species richness, which is a count of the number of species at each station. Station-level species richness data were not available for the background and construction phases; therefore, species richness models only included station type as a fixed effect. We included station identity as a random effect to account for natural between-station variability.

All analyses were first run on two subsets of data: SCC and non-SCC. Then, to examine impacts on each habitat guild, SCC and non-SCC data were subset into habitat guilds, and analyses were run on SCC of each habitat guild and non-SCC of each habitat guild. Given the importance of waterfowl and other gamebirds for hunters, we also analyzed whether the density of gamebird species varied by station type and RRM phase (this analysis included species identified in the Population status of migratory game birds in Canada – 2023 report [Canadian Wildlife Service Waterfowl Committee 2023] and the 2024 Ontario Hunting Regulations Summary [Ontario Ministry of Natural Resources and Forestry 2024]). Likewise, given the ecological and cultural significance of raptors, we evaluated differences in raptor species abundance between station types and among RRM phases (this analysis included all hawks, eagles, vultures, owls, harriers, and falcons).

We interpreted GLMM results using parameter estimates, standard errors, and *p* values. Parameter estimates tell us how strong the relationship is between a fixed effect (like station type or RRM phase) and an outcome (such as occupancy rate). Standard errors tell us the precision of the parameter estimate. Then, *p* values indicate whether there was statistical significance, where $p < 0.05$ was considered statistically significant.

Both the tweedie and Poisson distributions give log-transformed parameter estimates. Therefore, we used an exponential transformation to back-transformed parameter estimates so that they were on the same scale as the bird community structure metrics (i.e., the response scale). In this report, all parameter estimates are presented on the response scale. We note that these back-transformed parameter estimates represent the ratio between the effect and controls. Parameter estimates >1 indicated a positive effect, and parameter estimates <1 indicated a negative effect. For example, an estimate of 0.78 would indicate that the effect was 0.78 times that of the control value (i.e., the effect was 22% lower than control).

Analyses were completed in R version 4.4.1 (R Core Team, 2024). GLMMs were run in the glmmTMB package (Brooks et al., 2017), and plots were generated using ggplot2 (Wickham, 2016) and gridExtra (Auguie, 2017).

3.0 Results

The 2024 breeding bird survey was a component of the RRM FMP and was designed to evaluate any potential effects from mine-related activities on the bird community in the vicinity of the mine. The 2024 survey represented the third operational phase survey.

The RRM currently has a permit under the Endangered Species Act Clause 17(2) (c) (Permit Number FF-C-001-14) for Bobolink and Eastern Whip-Poor Will as part of their operating conditions. Specific monitoring requirements with respect to survey design and schedule for those species is outlined within that Permit. In 2024, there were requirements to monitor Eastern Whip-Poor will in the mine area and the periphery, which was completed. There was no requirement to monitor Bobolink in 2024. Other requirements under the ESA permit such as SAR awareness training have been provided by New Gold under separate cover (Aspen 2025). For the purposes of this report, Bobolink, Eastern Whip-Poor Will, and any additional SAR species detected during point count surveys are included but are treated the same as other SCC.

Bird community structure metrics from operational phase surveys (2018, 2021, and 2024) are presented in Appendix A. Bird community structure metrics from background condition surveys (2014 and 2015) and surveys completed during construction (2016) are presented in Appendix B.

3.1 Avian Community

In 2024, 131 bird species and 5,841 individual birds were detected during point count surveys. Nearly half (47%) of these species preferred forested habitats, 22% preferred edge/shrub/successional habitats, 21% were wetland/open water-associated species, 9% were grassland/open country birds, and 0.8% (1 species: House Sparrow) preferred anthropogenically-influenced habitats. The proportion of species belonging to each habitat guild likely reflects the proportion of land cover types in the survey area.

These numbers were comparable to those recorded in 2018 (133 species, 5,324 individuals) and 2021 (132 species, 5,901 individuals). Additionally, similar proportions of species belonged to each habitat guild (2018: 44% forest, 26% edge/shrub/successional, 19% wetland/open water, 11% grassland/open country; 2021: 45% forest, 25% edge/shrub/successional, 20% wetland/open water, 10% grassland/open country).

Surveys from 2018, 2021, and 2024 detected a higher number of species and individuals compared to the 2016 construction phase survey, which reported 114 species and 3,890 individuals. Surveys from 2018, 2021, and 2024 also detected a higher number of species than background surveys from 2014 (95 species) and 2015 (116 species). However, 2014 and 2015 surveys had fewer point count stations (**Appendix B**), which may have contributed to this difference.

3.2 Species of Conservation Concern

A total of 51 SCC were detected on point count surveys in 2024. Therefore, 40% of all bird species observed in 2024 were SCC. Of these 51 species, 47 SCC were observed at impacted survey stations, and 43 SCC were observed at control stations.

Of the 51 SCC observed in 2024, all are BCR 12 priority species. Nine are also designated as SAR under the SARA (ECCC, 2002): Bank Swallow, Barn Swallow, Bobolink, Canada Warbler, Eastern Wood-Pewee, Golden-winged Warbler, Olive-sided Flycatcher, Red-headed Woodpecker, and Wood Thrush. These 9 species, as well as American White Pelican, are also designated as SAR under the Ontario Endangered Species Act (MECP, 2008).

In 2014 and 2015 (background), 34 and 31%, respectively, of the total number of species were SCC. During construction in 2016, 24% of all detected species were SCC. Finally, during the two other operation phase years (2018 and 2021), 40% of the total number of bird species observed were SCC. Therefore, the proportion of SCC observed was consistent across all three operational years and was also higher than during the background and construction phases.

3.3 Species Occupancy Rates

3.3.1 Species of Conservation Concern

3.3.1.1 Most Widespread SCC

The most widespread SCC at all survey stations (control and impact) in 2024 were Nashville Warbler, White-throated Sparrow, Veery, Common Yellowthroat, and Chestnut-sided Warbler.

The five SCC that occupied the highest proportion of impact stations in 2024 were (occupancy rates show in parentheses):

- Nashville Warbler (63%),
- White-throated Sparrow (56%),
- Common Yellowthroat (52%),
- Veery (41%), and
- Bobolink (38%).

Nashville Warbler, White-throated Sparrow, and Common Yellowthroat were also the three SCC with the highest occupancy rates (>50%) at impact stations in 2018. Likewise, these three species and Veery were among the five SCC with highest occupancy rates at impact stations in 2021.

The five SCC that occupied the highest proportion of control stations in 2024 were:

- Nashville Warbler (83%),
- White-throated Sparrow (52%),
- Veery (41%),
- Rose-breasted Grosbeak (32%), and

- Chestnut-sided Warbler (31%).

Nashville Warbler, White-throated Sparrow, Veery, and Chestnut-sided Warbler were also among the five SCC with highest occupancy rates at control stations in 2018 and 2021.

These results suggest that similar SCC showed high occupancy rates at impact and control stations during the RRM's operation phase. They also suggest that similar SCC had the highest occupancy rates in 2018, 2021, and 2024.

3.3.1.2 Occupancy Rate Trends

Trends in occupancy rates of the five most widespread SCC (Nashville Warbler, White-threated Sparrow, Veery, Common Yellowthroat, and Chestnut-sided Warbler) at control and impact stations in 2024 are shown in **Figure 3-1**.

Overall, trend results suggest that RRM construction and operation had little impact on these species occupancy rates. Nashville Warbler, Veery, and Chestnut-sided Warbler occupancy rates showed little variation between baseline (2014 and 2015), RRM construction (2016), and RRM operations (2018 – 2024). White-throated Sparrow occupancy rates declined after the RRM construction phase in 2016. However, as declines were observed at both control and impact stations, this change likely not due to the RRM. Common Yellowthroat occupancy rates also declined over time. Declines were steeper at control stations, which suggests that temporal changes in Common Yellowthroat occupancy rates were likely unrelated to RRM operations. Occupancy rates were only lower at impact stations compared to control for Nashville Warbler. However, this difference was observed in all years, including baseline; therefore, this difference is likely not due to the RRM.

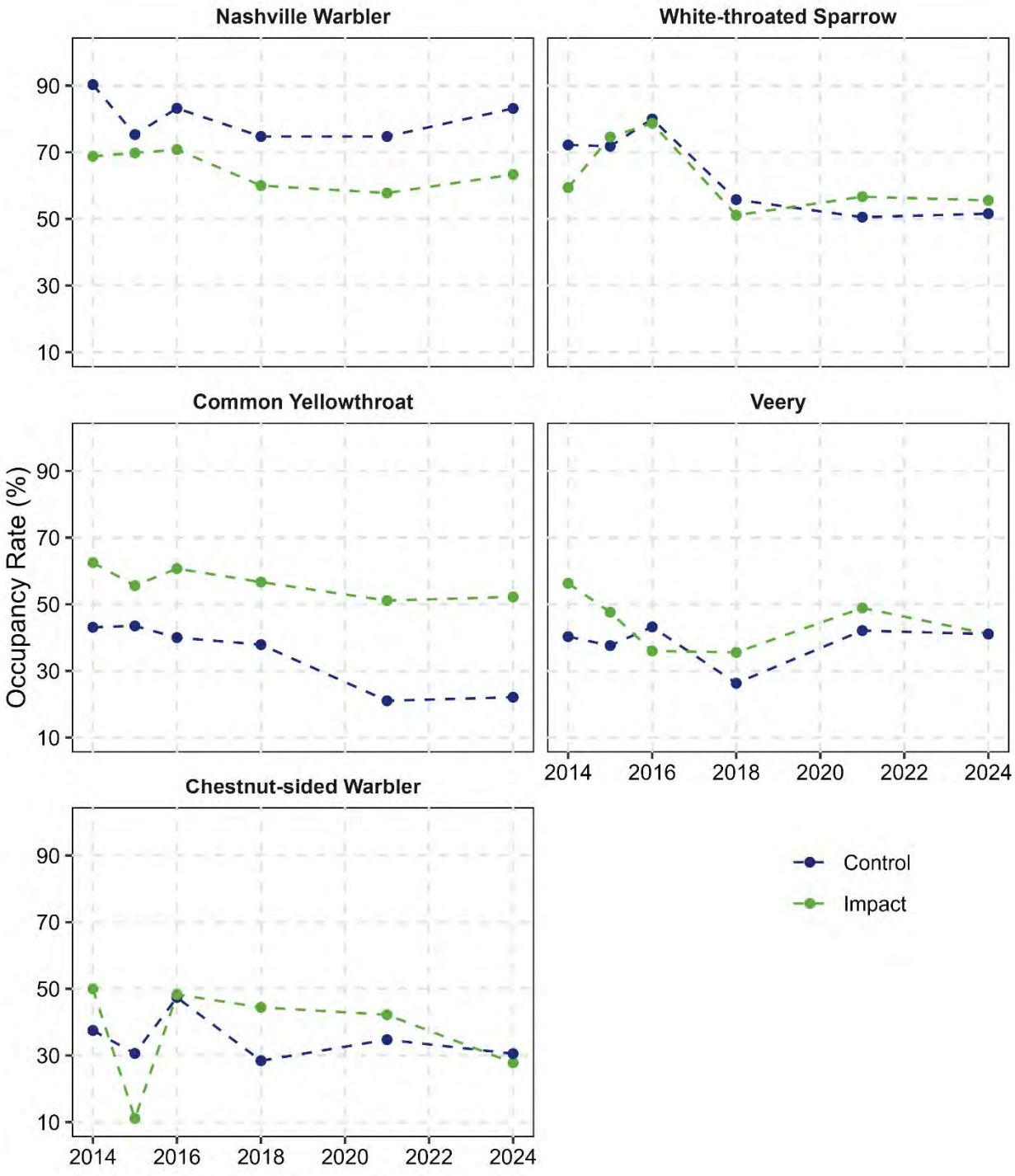

Figure 3-1: Occupancy Rates of Five Most Widespread SCC at Control and Impact Stations between 2014 and 2024

3.3.1.3 Comparison of Control and Impact Stations Across RRM Phases

Occupancy rates of SCC at control and impact stations during the background, construction, and operation phases of the RRM are shown in **Figure 3-2**.

Comparisons between control and impact stations and among RRM phases suggest that RRM construction and operations had little impact on SCC occupancy rates. SCC occupancy rates were higher at impact stations compared to controls (estimate ± standard error: β = 1.2 ± 1.1, p = 0.006). SCC occupancy rates did not differ from background during construction (β = 1.2 ± 1.1, p = 0.05) or operation (β = 0.89 ± 1.1, p = 0.1). Furthermore, the interaction between station type and RRM phase suggested that SCC occupancy rates were similar at control and impact stations during construction (β = 0.78 ± 1.1, p = 0.07) and operation (β = 0.96 ± 1.1, p = 0.7) compared to background.

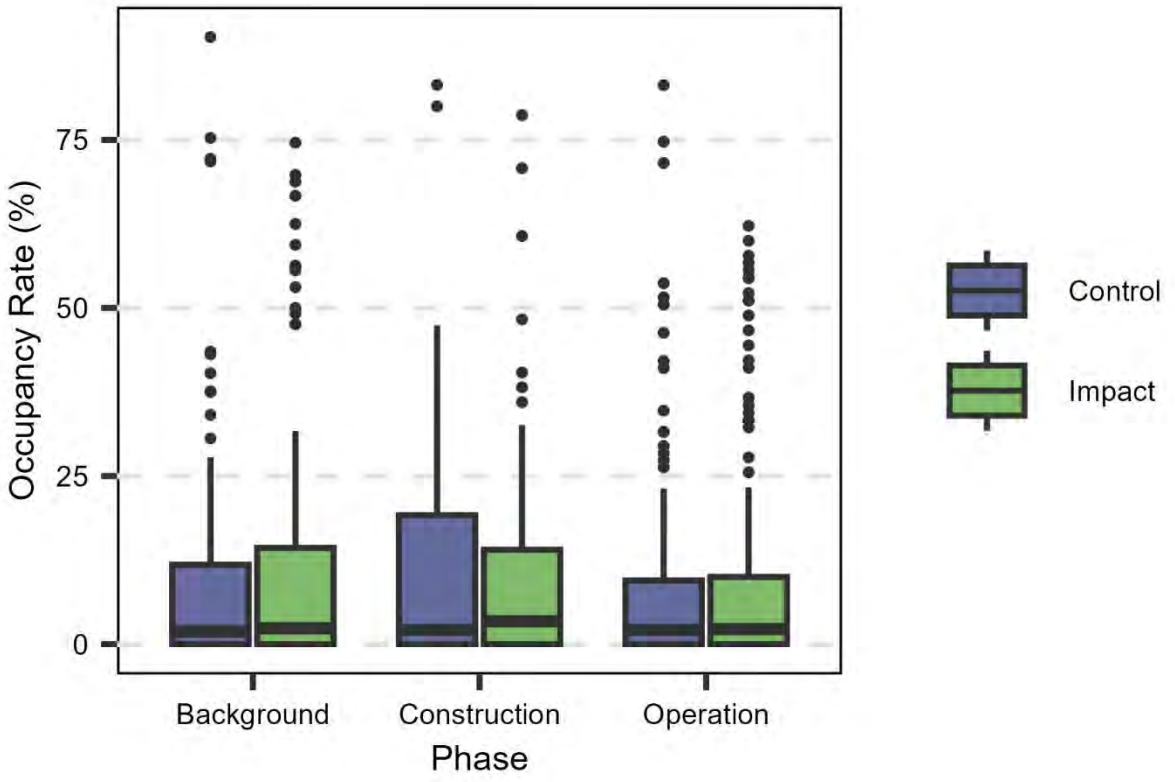

Figure 3-2. Occupancy Rates of SCC at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

Note: In this figure, and all the following boxplots, control stations are represented by purple boxes, and impact stations are represented by green boxes. In each box, bold black lines represent the median value, the top of the box shows the 75th percentile, and the bottom of the box shows the 25th percentile. Vertical lines show 95% confidence intervals, and circles indicate values falling outside of 95% confidence intervals.

3.3.1.4 Comparison of Habitat Guilds

We further investigated possible RRM impacts by comparing SCC occupancy rates at control and impact stations during different RRM phases for each habitat guild. This comparison is shown in **Figure 3-3**.

For SCC that prefer edge/shrub/successional habitats, occupancy rates were higher at impact stations compared to controls (β = 1.6 ± 1.3, p = 0.007). We found no differences between occupancy rates between background and construction (β = 1.0 ± 1.3, p = 0.9) or between background and operation (β = 0.83 ± 1.2, p = 0.3). Likewise, the interaction between station type and RRM phase suggested that occupancy rates of edge/shrub/successional SCC were similar at control and impact stations during construction (β = 0.83 ± 1.4, p = 0.6) and operation (β = 1.0 ± 1.3, p = 1.0) compared to background.

Occupancy rates of SCC that prefer forests did not differ between control and impact stations (β = 0.87 ± 1.1, p = 0.2) or between background, construction (β = 1.2 ± 1.1, p = 0.1), and operation (β = 0.85 ± 1.1, p = 0.06). Additionally, occupancy rates of forest SCC were similar at control and impact stations during construction (β = 0.83 ± 1.2, p = 0.2) and operation (β = 0.99 ± 1.1, p = 1.0) compared to background.

Occupancy rates of SCC that prefer grassland/open country suggest that these species were positively impacted by the RRM. Occupancy rates of SCC that prefer grassland/open country were higher at impact stations relative to controls (β = 5.1 ± 1.2, p < 0.0001). Occupancy rates were higher during construction compared to background (β = 1.7 ± 1.3, p = 0.02), but we found no difference between operation and background (β = 1.7 ± 1.3, p = 0.06). Conversely, the interaction between station type and RRM phase suggested that grassland/open country SCC occupancy rates were lower at impact stations during construction and operation compared to background (construction: β = 0.52 ± 1.4, p = 0.04; operation: β = 0.48 ± 1.3, p = 0.005; note: effect sizes <1 indicate a decrease [see **Section 2.3**]).

For SCC that prefer wetland/open water habitats, occupancy rates were higher at impact stations compared to controls (β = 2.0 ± 1.2, p = 0.0003). Wetland/open water SCC had higher occupancy rates during construction compared to background (β = 1.6 ± 1.3, p = 0.04). Otherwise, we found no differences between occupancy rates during background and operation (β = 1.0 ± 1.2, p = 1.0). Likewise, the interaction between station type and RRM phase suggested that occupancy rates of wetland/open water SCC were similar at control and impact stations during construction (β = 0.65 ± 1.4, p = 0.2) and operation (wetland/open water: β = 0.83 ± 1.3, p = 0.5) compared to background.

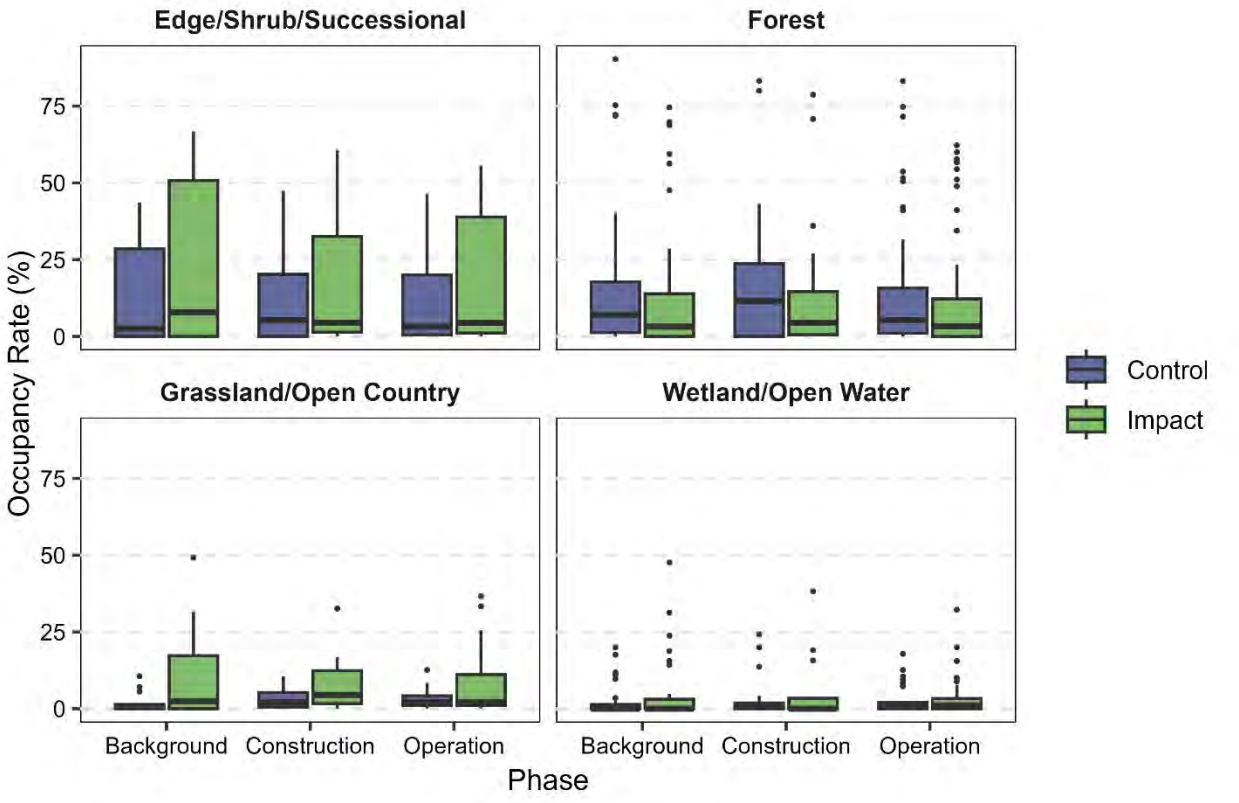

Figure 3-3. Comparison of SCC Occupancy Rates Among Habitat Guilds at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.3.2 Species Not of Conservation Concern

3.3.2.1 Most Widespread non-SCC

The most widespread non-SCC at all survey stations (control and impact) in 2024 were Red-eyed Vireo, Ovenbird, Blue Jay, American Robin, and Black-and-white Warbler.

The five non-SCC that occupied the highest proportion of impact stations in 2024 were:

- Red-eyed Vireo (78%),
- Ovenbird (53%),
- American Crow (40%),
- American Robin (39%), and
- Black-and-white Warbler (39%)

Red-eyed Vireo, Ovenbird, American Robin, and Black-and-white Warbler were also among the five non-SCC with the highest occupancy rates at impact stations in 2018. Likewise, Ovenbird, Red-eyed Vireo, and American Robin were among the five non-SCC with highest occupancy rates at impact stations in 2021.

As American Robin and Black-and-white Warbler had the same occupancy rate, six non-SCC had the highest occupancy rates at control stations in 2024. These were:

- Red-eyed Vireo (75%)
- Ovenbird (65%)
- Blue Jay (40%)
- Hermit Thrush (37%)
- American Robin (29%)
- Black-and-white Warbler (29%)

These species also occupied the highest proportion of control stations in 2018 and 2021.

Therefore, results for non-SCC were comparable to SCC results. Like the SCC, similar non-SCC showed high occupancy rates at impact and control stations during the RRM's operation phase. Moreover, similar non-SCC occupied the highest proportion of stations among years.

3.3.2.2 Occupancy Rate Trends

Trends in occupancy rates of the five most widespread non-SCC (Red-eyed Vireo, Ovenbird, Blue Jay, American Robin, and Black-and-white Warbler) at control and impact stations in 2024 are shown in **Figure 3-4**.

Overall, trend results suggest that RRM construction and operations had little impact on these species occupancy rates. These species showed little variation in occupancy rates between baseline (2014 and 2015), RRM construction (2016), and RRM operations (2018 – 2024). Ovenbird occupancy rates declined after the RRM construction phase in 2016. However, similar declines at both control and impact stations in 2018 and 2021 suggest that these changes were not related to the RRM. Although 2024 data show lower Ovenbird occupancy at impact stations in 2024, future surveys are needed to determine whether this is a trend that will persist into future years or whether this difference reflects natural variation in this species' distribution. American Robin tended to have higher occupancy rates at impact stations relative to control, and occupancy rates were similar at control and impact stations for Red-eyed Vireo, Blue Jay, and Black-and-White Warble in all years.

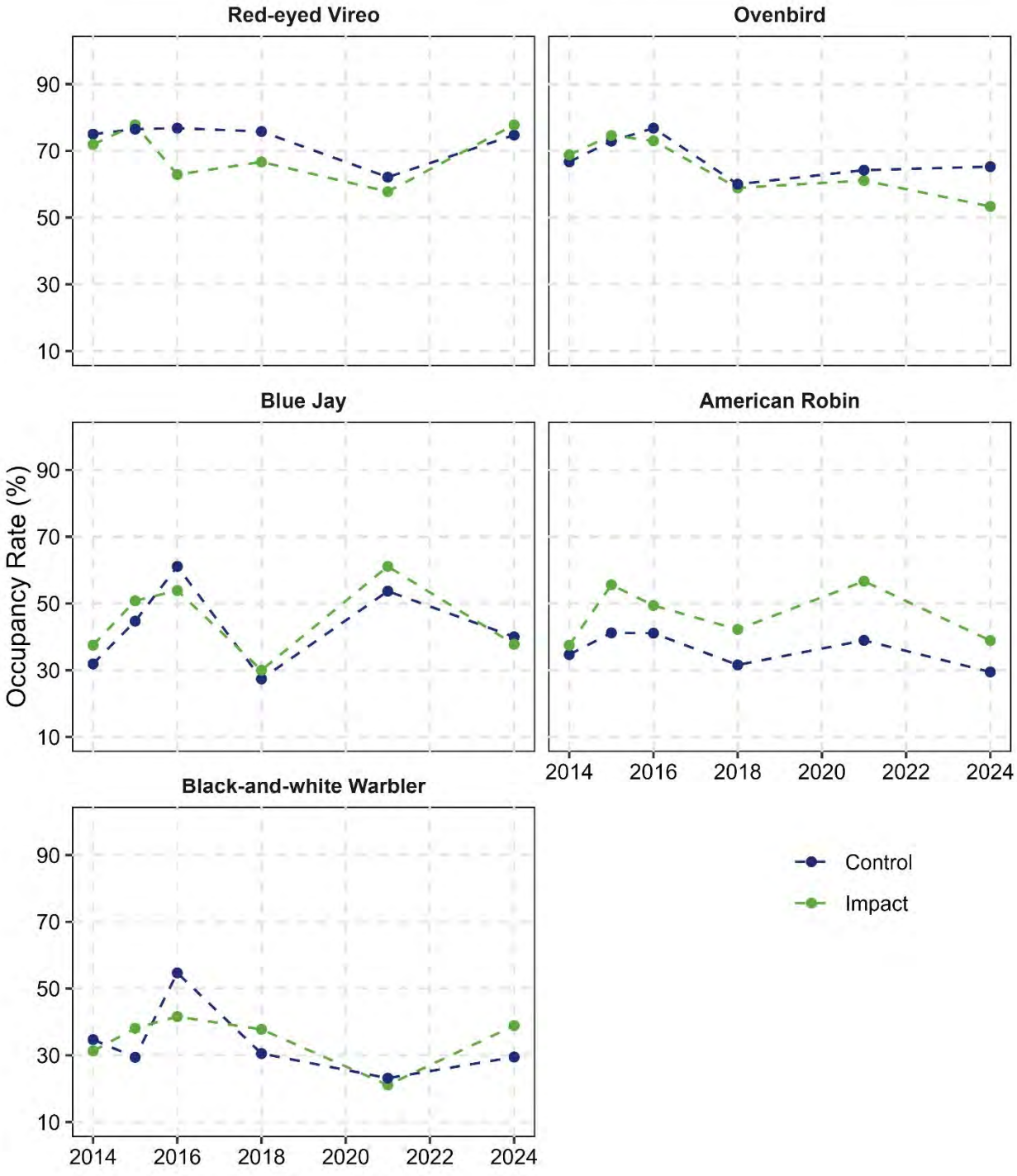

Figure 3-4: Occupancy Rates of Five Most Widespread non-SCC at Control and Impact Stations between 2014 and 2014

3.3.2.3 Comparison of Control and Impact Stations Across RRM Phases

Non-SCC occupancy rates at control and impact stations during the background, construction, and operation phases of the RRM are shown in **Figure 3-5**.

Comparisons between control and impact stations at among RRM phases suggest that RRM construction and operations had little impact on non-SCC occupancy rates. Although non-SCC occupancy rates were higher at impact stations compared to controls (β = 1.2 ± 1.1, p = 0.04). Occupancy rates during construction (β = 1.2 ± 1.1, p = 0.07) and operation (β = 0.93 ± 1.1, p = 0.3) were similar to background. The interaction between station type and RRM phase suggested that non-SCC occupancy rates were similar at impact and control stations during construction (β = 0.80 ± 1.1, p = 0.06) and operation (β = 0.98 ± 1.1, p = 0.8) compared to background.

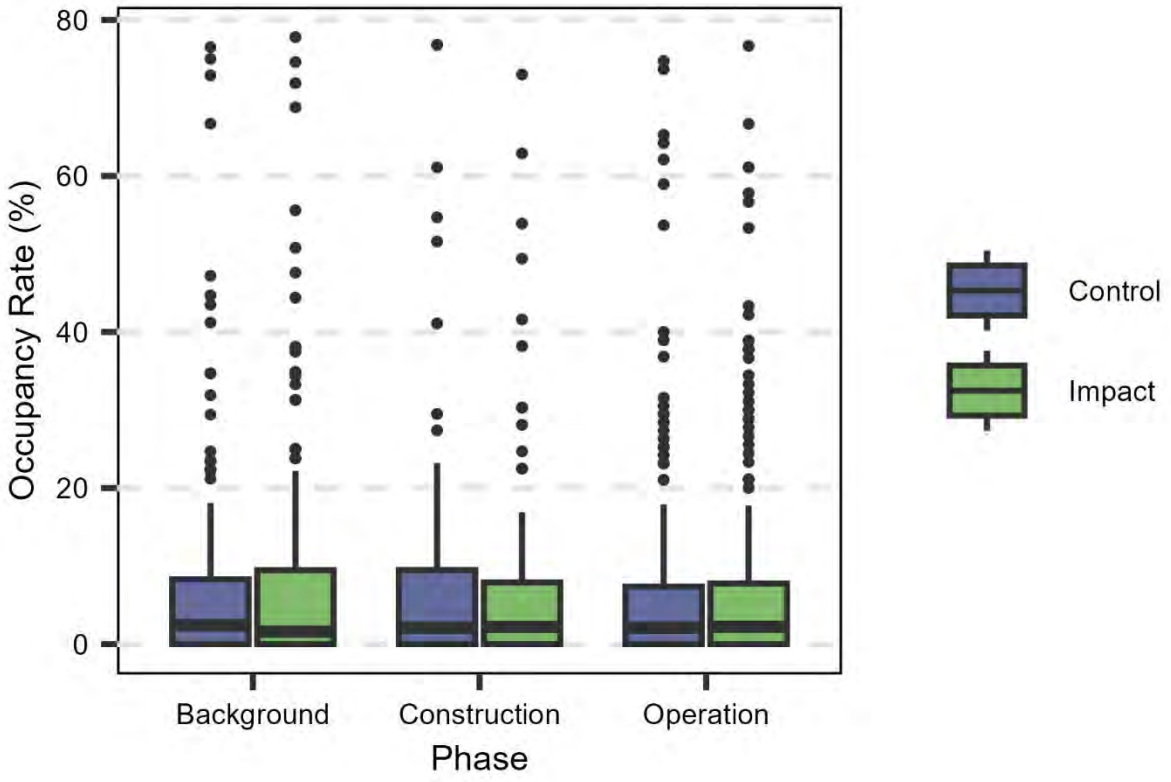

Figure 3-5. Occupancy Rates of non-SCC at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.3.2.4 Comparison of Habitat Guilds

Comparisons among non-SCC occupancy rates at control and impact stations during different RRM phases for each habitat guild are presented in **Figure 3-6**. Overall, non-SCC habitat guilds displayed similar patterns as SCC.

Similar to the SCC, non-SCC that prefer edge/shrub/successional habitats also showed higher occupancy rates at impact stations relative to controls (β = 1.5 ± 1.1, p = 0.0002). However, occupancy rates were lower during operation compared to background (β = 0.73 ± 1.1, p = 0.008). Occupancy rates were similar during background and construction (β = 0.95 ± 1.2, p = 0.8). Additionally, occupancy rates of edge/shrub/successional non-SCC were similar at control and impact stations during construction (β = 0.79 ± 1.2, p = 0.3) and operation (β = 0.99 ± 1.2, p = 0.9) compared to background.

Also similar to the SCC, occupancy rates of non-SCC that prefer forests did not differ between control and impact stations (β = 0.84 ± 1.1, p = 0.05) or between background, construction (β = 1.2 ± 1.1, p = 0.09), and operation (β = 0.97 ± 1.1, p = 0.7). Additionally, occupancy rates of forest non-SCC were similar at control and impact stations during construction (β = 0.84 ± 1.2, p = 0.3) and operation (β = 1.0 ± 1.1, p = 1.0) compared to background.

Like the grassland/open country SCC, non-SCC that prefer grassland/open country habitats also had higher occupancy rates at impact stations relative to controls (β = 6.3 ± 1.4, p < 0.0001). However, we found no difference between background, construction (β = 1.9 ± 1.7, p = 0.2), and operation (β = 1.7 ± 1.5, p = 0.2). Occupancy rates were also similar at control and impact stations during construction (β = 0.67 ± 1.8, p = 0.5) and operation (β = 0.63 ± 1.5, p = 0.3) compared to background.

The non-SCC that prefer wetland/open water habitats had higher occupancy rates at impact stations relative to controls (β = 1.8 ± 1.3, p =0.02). Additionally, occupancy rates were higher during construction (β = 2.4 ± 1.3, p = 0.0002) and operation (β = 1.8 ± 1.3, p = 0.02) compared to background. However, the interaction between station type and RRM phase suggested that wetland/open non-SCC control and impact station occupancy rates were lower during construction (β = 0.49 ± 1.5, p = 0.06) and operation (β = 0.87 ± 1.3, p = 0.6) compared to background.

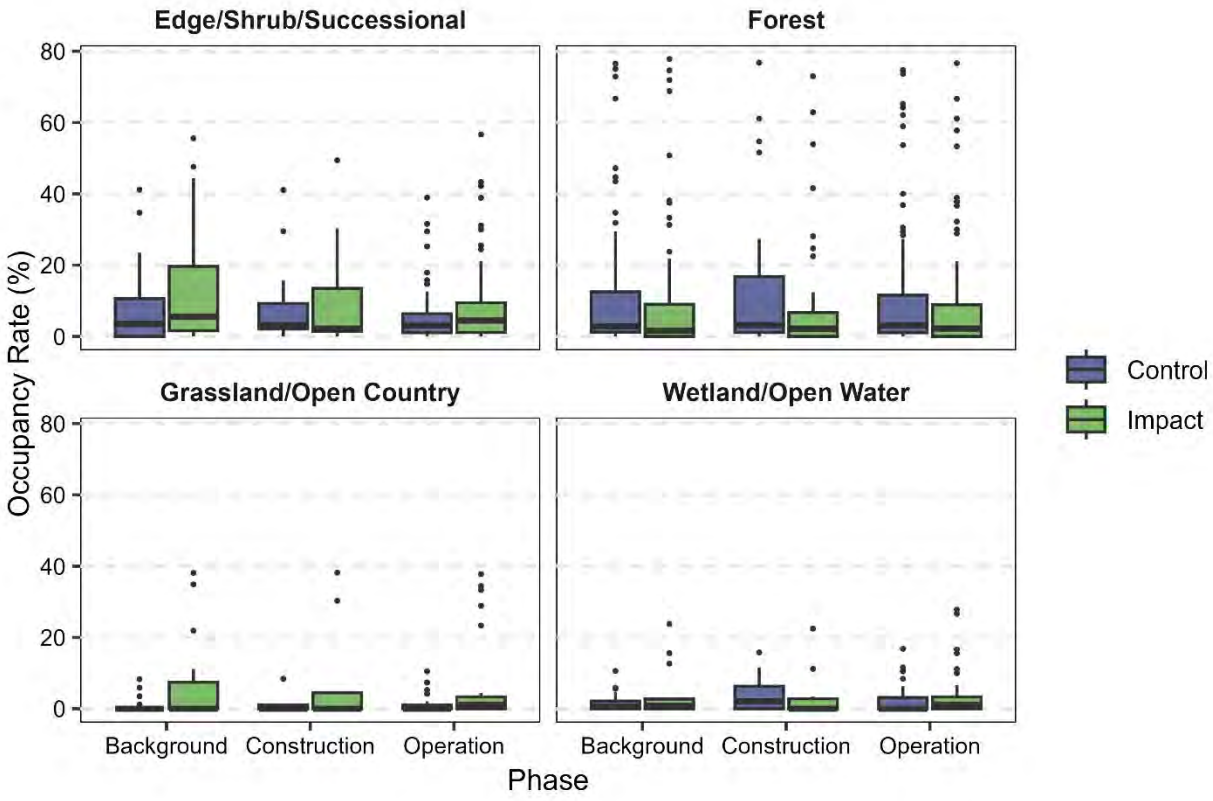

Figure 3-6. Comparison of non-SCC Occupancy Rates Among Habitat Guilds at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.4 Species Abundance

In 2024, a total of 1,467 individual birds were detected at control stations, and 2,104 birds were detected at impact stations. Although more individuals were observed at impact stations, mean abundance at each station type was comparable.

3.4.1 Species of Conservation Concern

3.4.1.1 Most Abundant SCC

The most abundant SCC at all survey stations (control and impact) in 2024 were Nashville Warbler, White-throated Sparrow, Veery, Mallard, and Common Yellowthroat.

As Sandhill Crane and White-throated Sparrow had the same abundance, the six most abundant SCC at impact stations in 2024 were (abundance shown in parentheses):

- Nashville Warbler (1.47 birds/station),
- Mallard (1.27 birds/station),
- Bobolink (1.14 birds/station),
- Common Yellowthroat (0.98 birds/station),

- Sandhill Crane (0.93 birds/station), and
- White-throated Sparrow (0.93 birds/station).

Nashville Warber, Common Yellowthroat, White-throated Sparrow, and Bobolink were also among the five most abundant SCC at impact stations in 2018 and 2021.

The five most abundant SCC at control stations in 2024 were:

- Nashville Warbler (1.89 birds/station),
- White-throated Sparrow (0.91 birds/station),
- Veery (0.75 birds/ station),
- Chestnut-sided Warbler (0.47 birds/ station), and
- Common Yellowthroat (0.40 birds/station).

These five species were also among the most abundant SCC at control stations in 2018. Nashville Warbler, White-throated Sparrow, Veery, and Chestnut-sided Warbler were also among the five most abundant SCC in 2021.

These results suggest that similar SCC showed high abundance at impact and control stations during the RRM's operation phase. They also suggest that similar SCC had the highest abundance in 2018, 2021, and 2024.

3.4.1.2 Abundance Trends

Trends in abundance of the five most abundant SCC (Nashville Warbler, White-throated Sparrow, Common Yellowthroat, Veery, and Chestnut-sided Warbler) at control and impact stations in 2024 are shown in **Figure 3-7**.

Overall, trend results suggest that RRM construction and operation had little impact on the abundance of these species. Nashville Warbler, Common Yellowthroat, and Chestnut-sided Warbler abundance showed little variation between baseline (2014 and 2015), RRM construction (2016), and RRM operations (2018 – 2024). White-throated Sparrow abundance declined after the RRM construction phase in 2016. However, as declines were observed at both control and impact stations, this change likely not due to the RRM. Veery abundance declined at impact stations between 2014 and 2016. As Veery abundance was nearly identical at control and impact stations from 2016 onwards, this decline is likely not related to the RRM. We saw moderate declines in Common Yellowthroat occupancy rates over time at control stations. Abundance was only lower at impact stations compared to control for Nashville Warbler. However, this difference was observed in all years, including baseline; therefore, this difference is likely not due to the RRM.

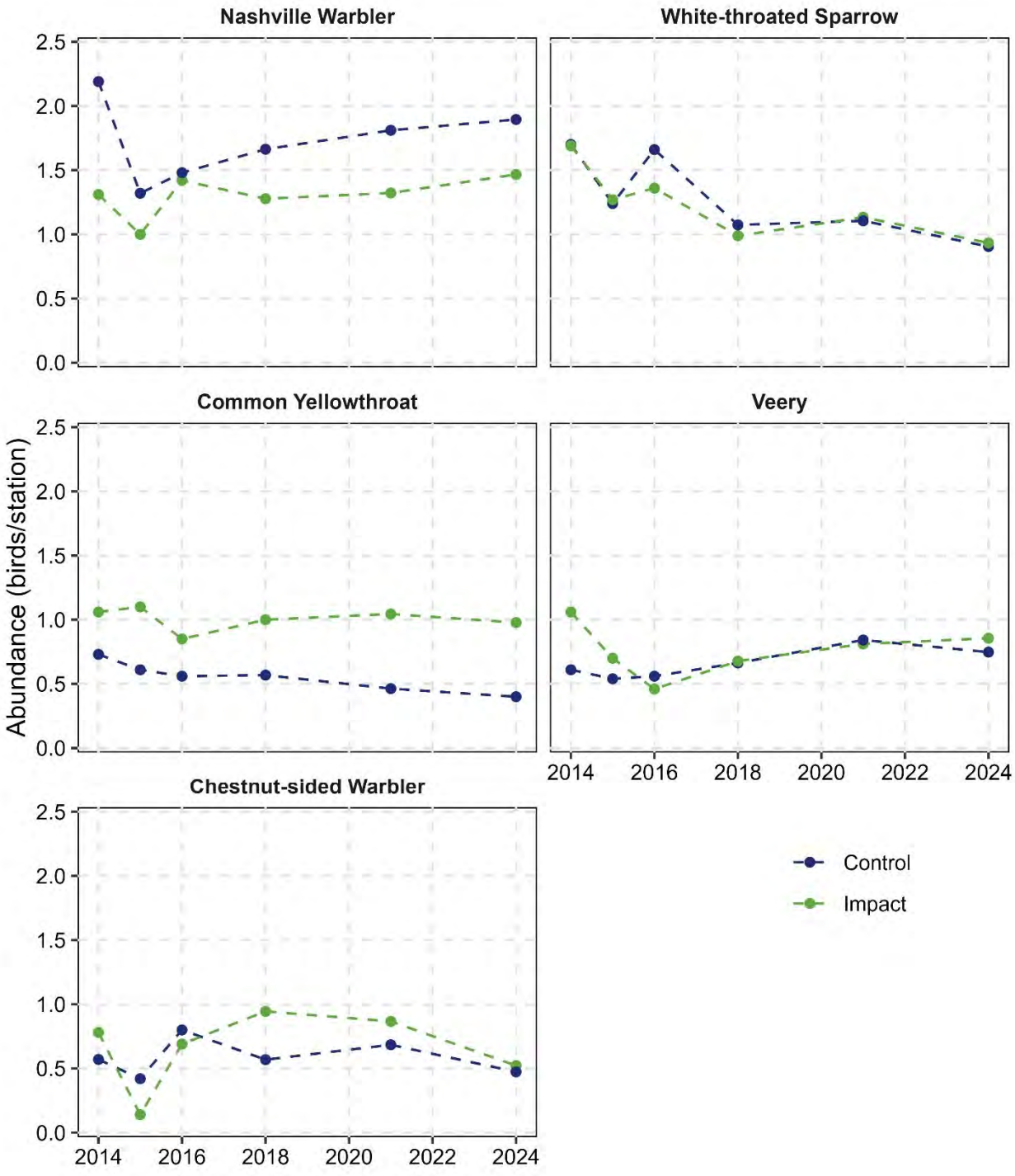

Figure 3-7: Mean Abundance of Five most Abundant SCC at Control and Impact Stations between 2014 and 2024

3.4.1.3 Comparison of Control and Impact Stations Across RRM Phases

The abundance of SCC at control and impact stations during the background, construction, and operation phases is shown in **Figure 3-8**.

Abundance of SCC was higher at impact stations compared to controls (β = 1.3 ± 1.1, p = 0.005). Abundance of SCC did not differ from background during construction (β = 1.1 ± 1.1, p = 0.3) or operation (β = 1.2 ± 1.1, p = 0.3). Moreover, the interaction between station type and RRM phase suggested that SCC abundance was similar at control and impact stations during construction (β = 0.74 ± 1.2, p = 0.1) and operation (β = 1.0 ± 1.1, p = 0.9) compared to background.

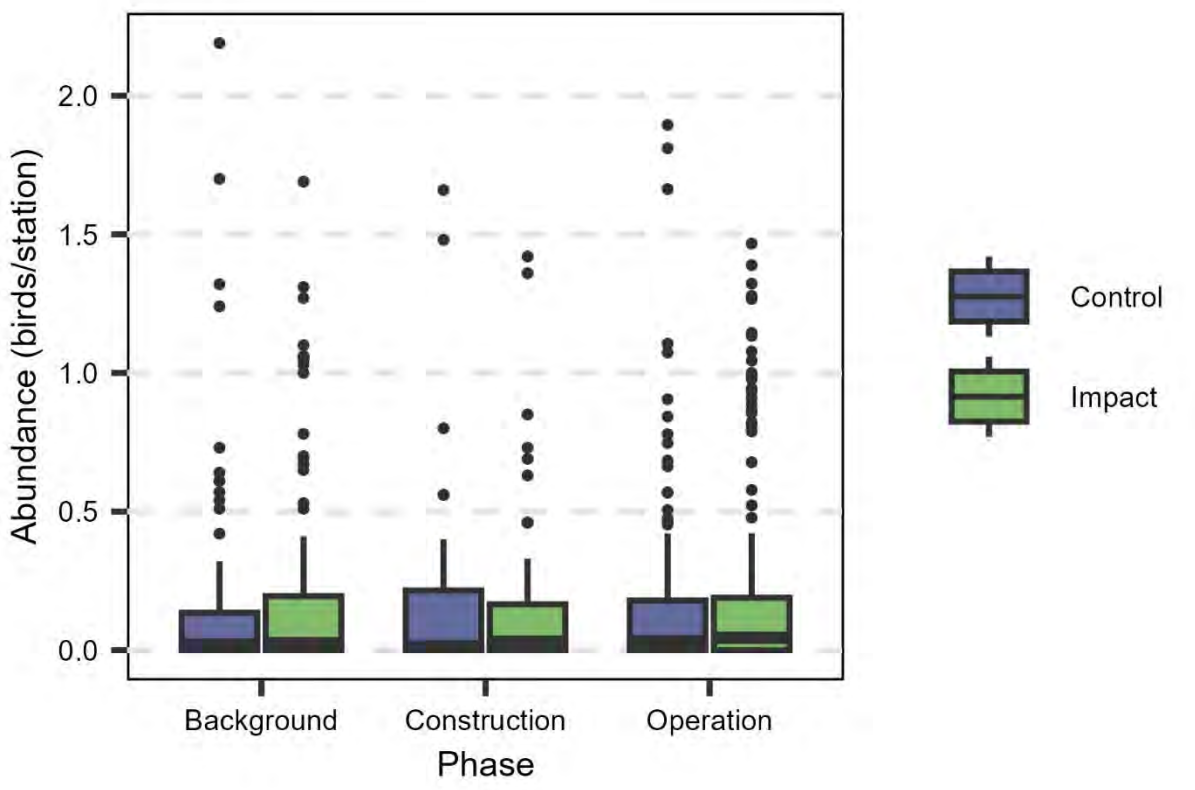

Figure 3-8. Mean SCC Abundance at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.4.1.4 Comparison of Habitat Guilds

Comparisons of SCC abundance at control and impact stations during different RRM phases for each habitat guild are shown in **Figure 3-9**.

The SCC that prefer edge/shrub/successional habitats had higher abundance at impact relative to control stations (β = 1.7 ± 1.2, p = 0.01). We found no difference in abundance between background and construction (β = 1.0 ± 1.3, p = 0.9) or operation (β = 0.98 ± 1.2, p = 0.9), and

abundance was similar at control and impact stations during construction (β = 0.74 ± 1.4, p = 0.4) and operation (β = 1.0 ± 1.3, p = 1.0) compared to background.

Abundance of SCC that prefer forests did not differ between control and impact stations (β = 0.89 ± 1.1, p = 0.3) or between background, construction (β = 1.1 ± 1.1, p = 0.4), and operation (β = 1.1 ± 1.1, p = 0.5). Additionally, abundance of forest SCC was similar at control and impact stations during construction (β = 0.79 ± 1.2, p = 0.2) and operation (β = 0.93 ± 1.1, p = 0.6) compared to background.

The SCC that prefer grassland/open country habitats had higher abundance at impact stations relative to controls (β = 6.7 ± 1.4, p < 0.0001). We also found that abundance was higher during operations compared to background (β = 3.3 ± 1.4, p = 0.0004), but was lower at impact relative to control stations during operation (β = 0.33 ± 1.5, p = 0.005). We found no difference between background and construction (β = 1.9 ± 1.6, p = 0.2), or between control and impact stations during construction (β = 0.47 ± 1.7, p = 0.2).

The SCC that prefer wetland/open water habitats were more abundant at impact stations relative to controls (β = 2.1 ± 1.4, p =0.03). However, we found no differences in abundance between background, construction (β = 1.5 ± 1.6, p = 0.4), and operation (β = 1.8 ± 1.4, p = 0.1) compared to background. The interaction between station type and RRM phase suggested that wetland/open SCC abundance was similar at control and impact stations during construction (β = 0.70 ± 1.8, p = 0.5) and operation (β = 1.4 ± 1.5, p = 0.4) compared to background.

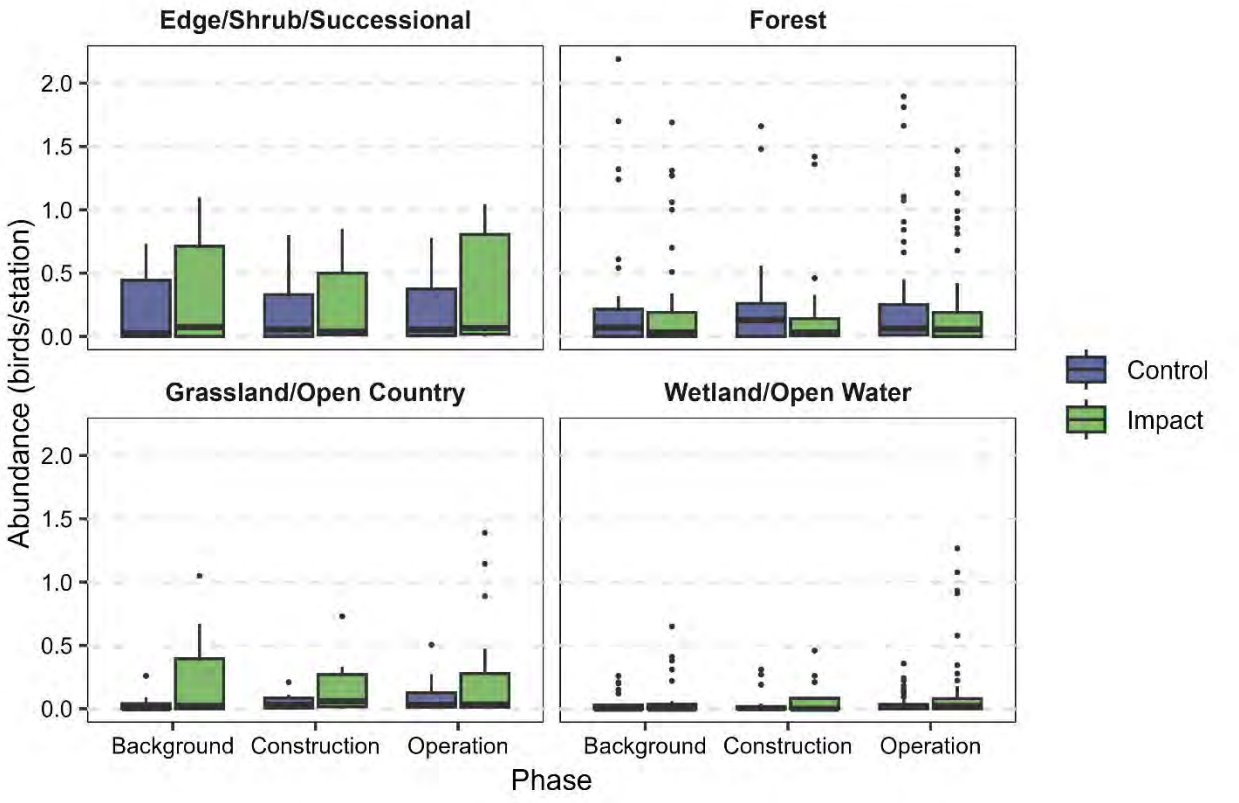

Figure 3-9. Comparison of SCC Abundance Among Habitat Guilds at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.4.2 Species Not of Conservation Concern

3.4.2.1 Most Abundant non-SCC

The most abundant non-SCC at all survey stations (control and impact) in 2024 were Red-eyed Vireo, Ovenbird, Canada Goose, Blue Jay, and Hermit Thrush.

The five most abundant non-SCC at impact stations in 2024 were:

- Red-eyed Vireo (1.82 birds/station),
- Canada Goose (1.64 birds/station),
- Ovenbird (1.24 birds/station),
- Savannah Sparrow (0.86 birds/station), and
- Pine Siskin (0.84 birds/station).

Red-eyed Vireo, Ovenbird, Savannah Sparrow, and Canada Goose were also among the top five most abundant non-SCC at impact stations in 2018. Red-eyed Vireo and Ovenbird were also among the five most abundant non-SCC at impact stations in 2021.

The five most abundant non-SCC at control stations in 2024 were:

- Red-eyed Vireo (1.64 birds/station),
- Ovenbird (1.45 birds/station),
- Blue Jay (0.74 birds/station),
- Hermit Thrush (0.68 birds/station), and
- Cedar Waxwing (0.60 birds/station).

Red-eyed Vireo and Ovenbird were similarly among the top five most abundant non-SCC at control stations in 2018 and 2021. Blue Jay was also among the top five most abundant non-SCC at control stations in 2021.

Therefore, results for non-SCC were comparable to SCC results. Like the SCC, some of the same non-SCC showed high abundance at impact and control stations during the RRM's operation phase. Additionally, similar non-SCC had the highest abundance in 2018, 2021, and 2024, particularly at impact stations.

3.4.2.2 Abundance Trends

Trends in abundance of the five most abundant non-SCC (Canada Goose, Red-eyed Vireo, Ovenbird, Blue Jay, and Hermit Thrush) at control and impact stations in 2024 are shown in **Figure 3-10**.

Ovenbird abundance showed a slight decline at impact stations relative to control in 2016, and impact station abundance remained slightly lower than control station abundance in 2018, 2021, and 2024. More research is needed to determine whether this small difference in abundance between control and impact stations reflects a negative impact from the RRM on this species.

Trend results suggest that RRM construction and operation had little impact on Canada Goose, Red-eyed Vireo, Blue Jay, and Hermit Thrush abundance. Canada Goose abundance showed high between-year variability at impact stations, with notably high abundance at impact stations in 2015 (baseline) and 2024 (operation). Canada Goose often form large, conspicuous flocks, which may have contributed to high counts in these years. Red-eyed Vireo, Blue Jay, and Hermit Thrush showed little variation in abundance between baseline (2014 and 2015), RRM construction (2016), and RRM operation (2018 – 2024). Although Hermit Thrush abundance tended to be higher at control stations compared to impact stations, because this difference was observed during baseline years, it is likely not due to the RRM.

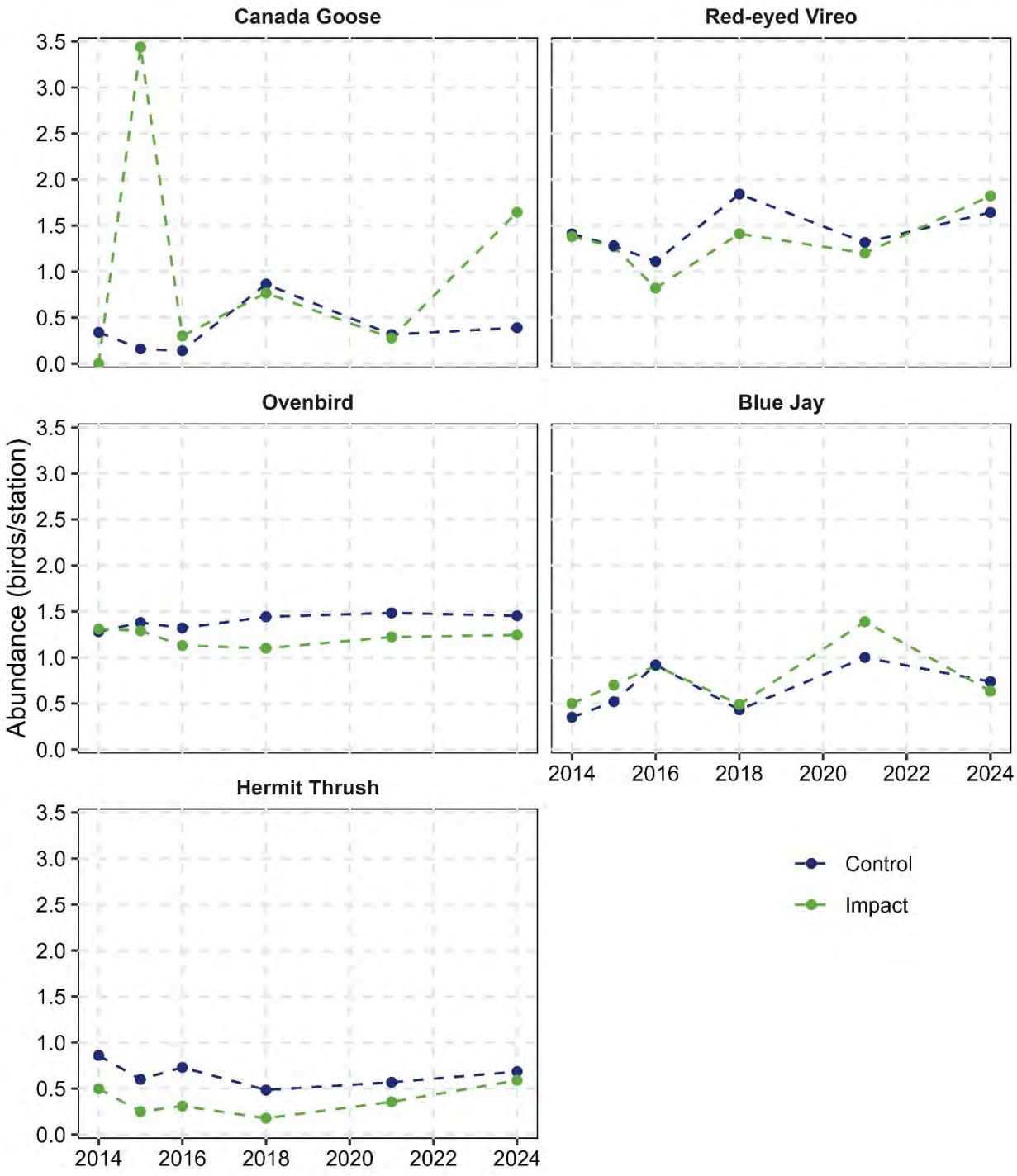

Figure 3-10: Mean Abundance of Five most Abundant non-SCC at Control and Impact Stations between 2014 and 2024

3.4.2.3 Comparison of Control and Impact Stations Across RRM Phases

Abundance of non-SCC at control and impact stations during the background, construction, and operation phases are shown in **Figure 3-11**.

Abundance of non-SCC was higher at impact stations compared to control stations (β = 1.3 ± 1.0, p = 0.01). Abundance of non-SCC was higher during operation compared to background (β = 1.2 ± 1.1, p = 0.02), but we found no difference between construction and background (β = 1.1 ± 1.1, p = 0.3). The interaction between station type and RRM phase suggested that non-SCC abundance was similar at control and impact stations during construction (β = 0.77 ± 1.2, p = 0.1) and operation (β = 0.98 ± 1.1, p = 0.9) compared to background.

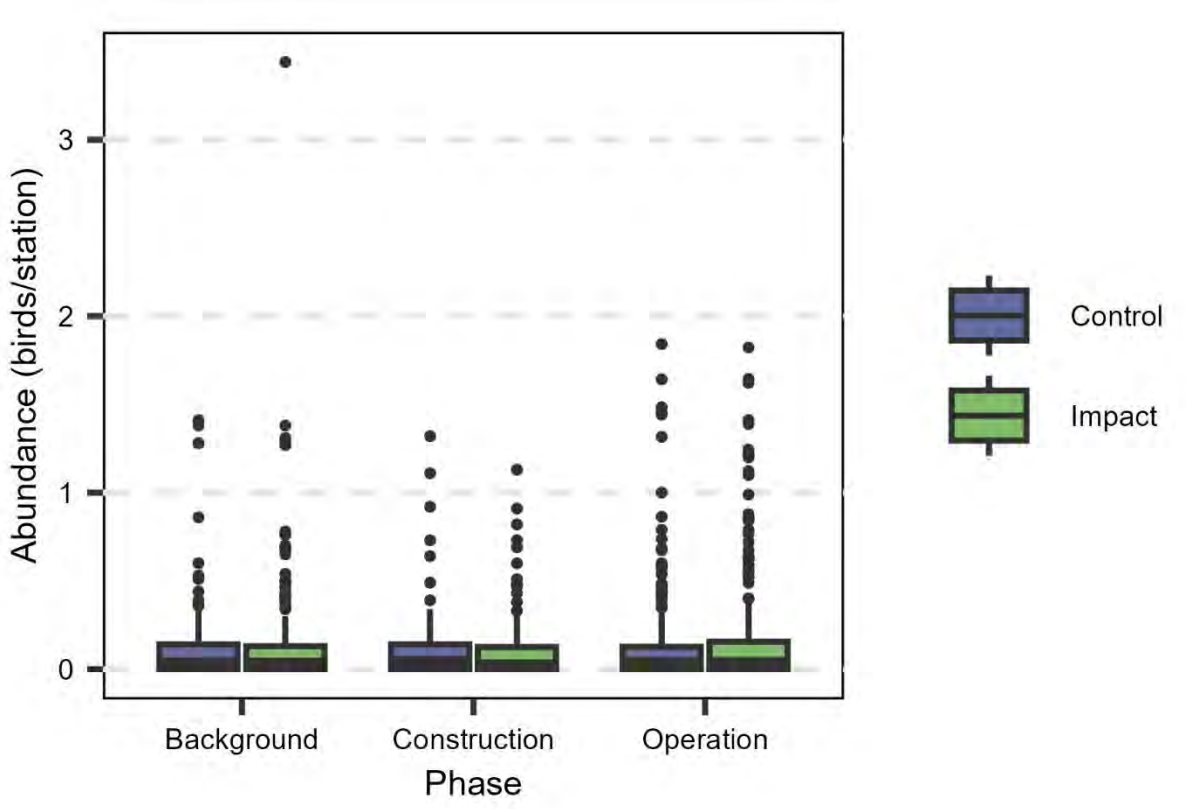

Figure 3-11. Mean non-SCC Abundance at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.4.2.4 Comparison of Habitat Guilds

Abundance of non-SCC at control and impact stations during the background, construction, and operation phases for each habitat guild are shown in **Figure 3-12**.

Similar to SCC, non-SCC that prefer edge/shrub/successional habitats had higher abundance at impact relative to control stations (β = 1.6 ± 1.1, p = 0.001). We found no difference in abundance between background and construction (β = 0.91 ± 1.2, p = 0.6) or operation (β =

0.95 ± 1.1, p = 0.7), and abundance was similar at control and impact stations during construction (β = 0.88 ± 1.3, p = 0.6) and operation (β = 0.96 ± 1.2, p = 0.8) compared to background.

Abundance of non-SCC that prefer forests was lower at impact stations compared to controls (β = 0.78 ± 1.1, p = 0.03). We also found that forest non-SCC were more abundant during operation compared to background (β = 1.3 ± 1.1, p = 0.01); however, abundance of forest non-SCC was similar at control and impact stations during operation (β = 1.1 ± 1.1, p = 0.3), which may suggest that that differences in abundance between background and operation were due to natural, interannual variability. We found no difference in abundance between background and construction (β = 1.2 ± 1.1, p = 0.13). Additionally, forest non-SCC was similar at control and impact stations during construction (β = 0.83 ± 1.2, p = 0.3).

The non-SCC that prefer grassland/open country habitats had higher abundance at impact stations relative to controls (β = 6.5 ± 1.6, p < 0.0001). We found no difference in abundance between background and construction (β = 1.8 ± 1.8, p = 0.3) or operation (β = 1.8 ± 1.6, p = 0.2). Abundance was similar at control and impact stations during construction (β = 0.78 ± 2.0, p = 0.7) and operation (β = 0.81 ± 1.7, p = 0.7) compared to background.

The non-SCC that prefer wetland/open water habitats were more abundant at impact stations relative to controls (β = 3.5 ± 1.4, p =0.0006). Abundance was also higher during operation compared to background (β = 2.1 ± 1.4, p =0.03), but we found no difference between construction and background (β = 1.3 ± 1.6, p = 0.6). The interaction between station type and RRM phase suggested that wetland/open non-SCC abundance was similar at control and impact stations during construction (β = 0.37 ± 1.9, p = 0.1) and operation (β = 0.53 ± 1.6, p = 0.1) compared to background.

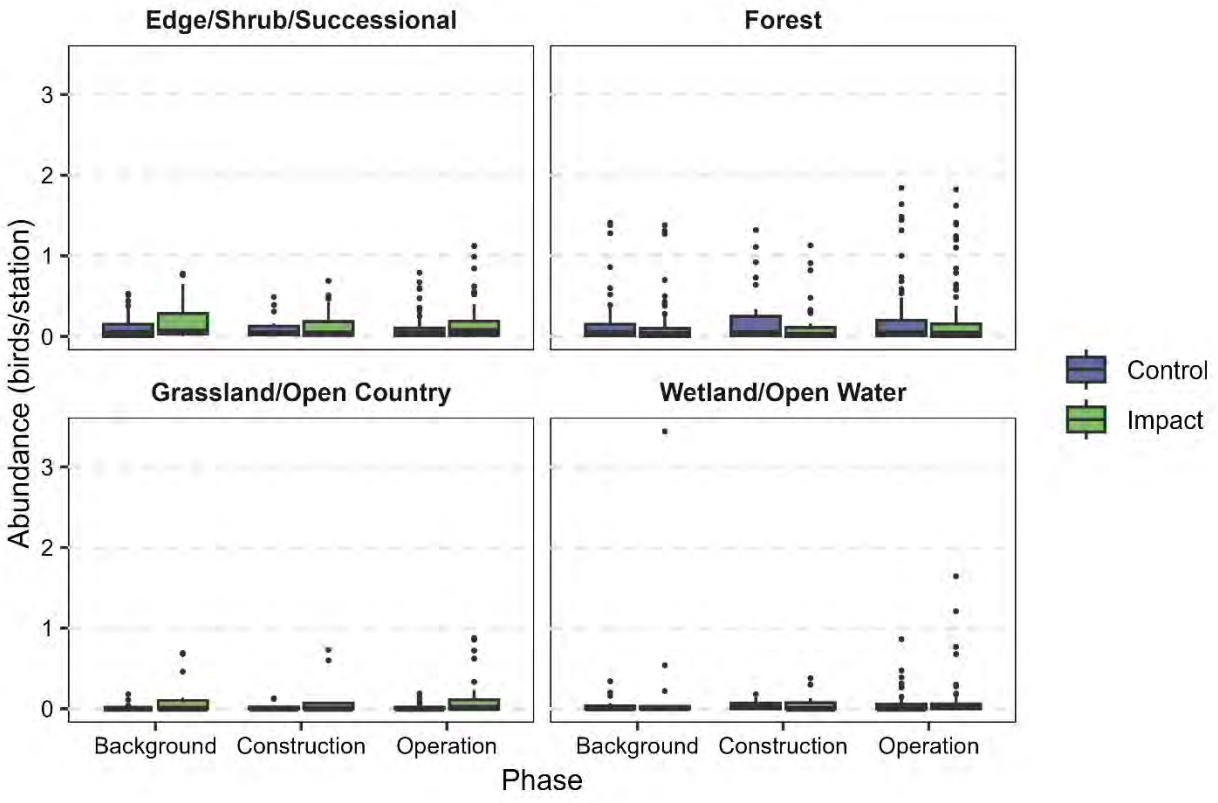

Figure 3-12. Comparison of non-SCC Abundance Among Habitat Guilds at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.4.3 Raptors

Between 2014 and 2024, a total of 12 raptors were detected on point count surveys. This included four hawks (Broad-winged Hawk, Red-shouldered Hawk, Red-tailed Hawk, and Sharp-shinned Hawk), three owls (Barred Owl, Great Gray Owl, and Long-eared Owl), and two falcons (American Kestrel and Merlin), as well as Bald Eagle, Northern Harrier, and Turkey Vulture. Nine of these species (American Kestrel, Bald Eagle, Broad-winged Hawk, Great Gray Owl, Merlin, Northern Harrier, Red-tailed Hawk, Sharp-shinned Hawk, and Turkey Vulture) were observed in 2024.

Overall, raptor abundance was lower than the abundance of the SCC and non-SCC with the highest abundances. Raptors often occur at low densities and occupy large territories (Sergio 2018). It should also be noted that point count surveys are poorly suited for monitoring raptors, which require specialized, context- and species-dependent survey techniques (Sergio 2018). For example, morning point count surveys are not optimized for detecting nocturnal species, like owls.

3.4.3.1 Most Abundant Raptors

The most abundant raptors at all survey stations (control and impact) in 2024 were Turkey Vulture, American Kestrel, Broad-winged Hawk, Merlin, and Red-tailed Hawk.

The five most abundant raptors at impact stations in 2024 were:

- Turkey Vulture (0.0667 birds/station),
- Broad-winged Hawk (0.0556 birds/station),
- American Kestrel (0.0333 birds/station),
- Merlin (0.0333 birds/station), and
- Red-tailed Hawk (0.0222 birds/station).

Red-tailed Hawk, American Kestrel, and Turkey Vulture were also among the top five most abundant raptors at impact stations in 2018. Turkey Vulture, American Kestrel, and Merlin were also among the five most abundant raptors at impact stations in 2021.

The five most abundant raptors at control stations in 2024 were:

- American Kestrel (0.0316 birds/station),
- Turkey Vulture (0.0316 birds/station),
- Bald Eagle (0.0105 birds/station),
- Broad-winged Hawk (0.0105 birds/station), and
- Red-tailed Hawk (0.0105 birds/station).

American Kestrel, Red-tailed Hawk, Bald Eagle, Turkey Vulture, and Broad-winged Hawk were similarly among the top five most abundant raptors at control stations in 2018 and 2021.

3.4.3.2 Abundance Trends

Trends in abundance of the five raptors with the highest abundance at control and impact stations in 2024 (Turkey Vulture, American Kestrel, Broad-winged Hawk, Merlin, and Red-tailed Hawk) are shown in **Figure 3-13**. As discussed above, raptor abundance was lower than the abundance of the SCC and non-SCC with the highest abundances. Therefore, the y-axis range in Figure 3-13 (0 – 0.2 birds/station) is smaller than the range shown for SCC and non-SCC in **Figure 3-7** (0 – 2.5 birds/station) and **Figure 3-10** (0 – 3.5 birds/station). It is important to account for the smaller y-axis range when interpreting changes in raptor, as the smaller y-axis range may make variations appear more pronounced compared to SCC and non-SCC abundances.

Raptor abundance was low in all years (<0.1 birds/station), and trend results suggest that RRM construction and operation had little impact on raptor abundance over time. The abundance of all five species showed little variation between baseline (2014 and 2015), RRM construction (2016), and RRM operation (2018 – 2024). The abundance of all five species was also similar at control and impact stations in all years.

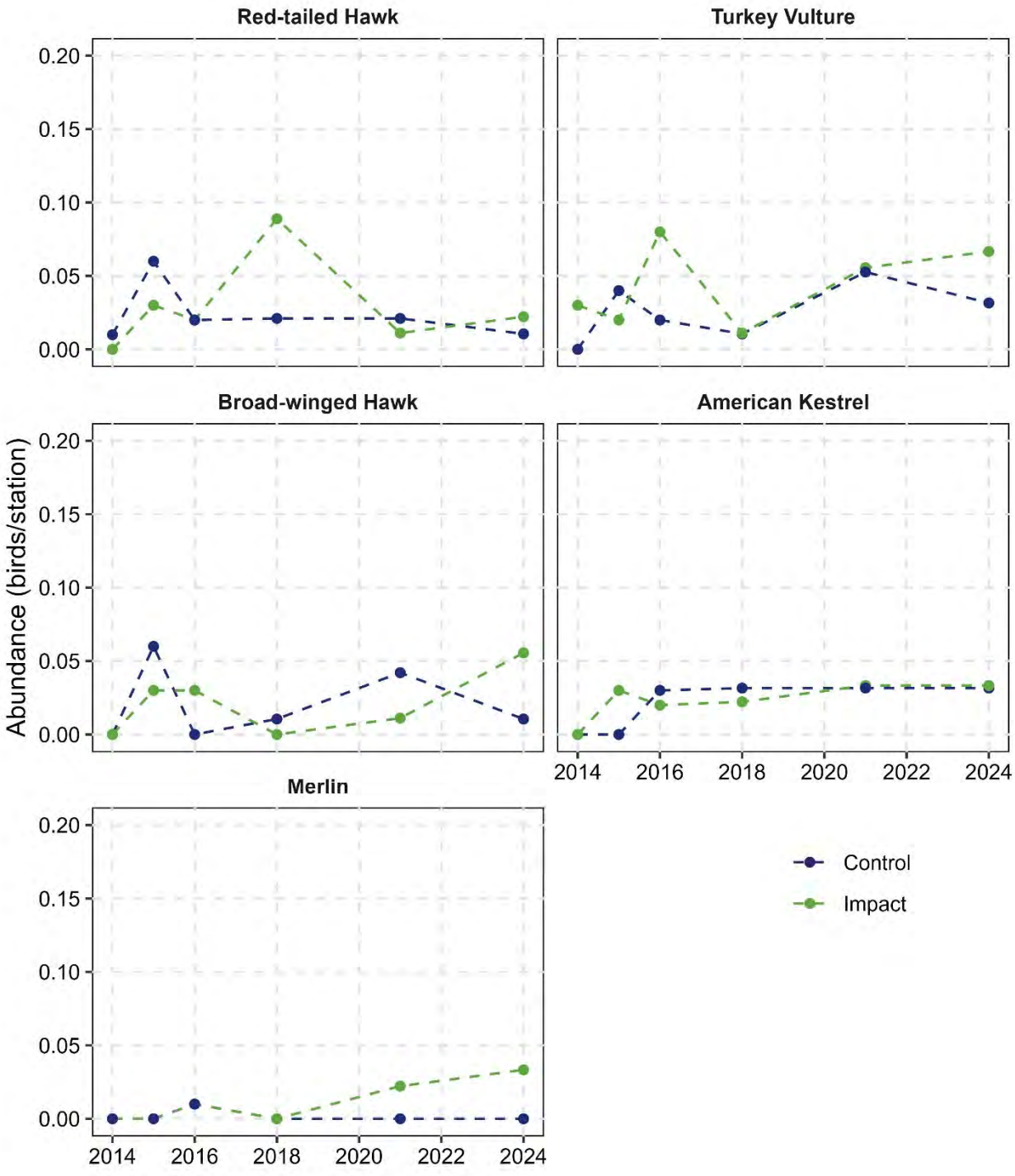

Figure 3-13. Mean Abundance of Five most Abundant Raptors at Control and Impact Stations between 2014 and 2024

3.4.3.3 Comparison of Control and Impact Stations Across RRM Phases

Abundance of raptors at control and impact stations during the background, construction, and operation phases are shown in **Figure 3-14**.

Raptor abundance was similar at impact and control stations (β = 0.77 ± 1.4, p = 0.4). Although raptor abundance appeared to increase from background to operation in **Figure 3-14**, any changes were not statistically significant. We found no difference in raptor abundance from background during construction (β = 1.2 ± 1.4, p = 0.6) or operation (β = 1.3 ± 1.3, p = 0.3). Moreover, the interaction between station type and RRM phase suggested that raptor abundances were similar at control and impact stations during construction (β = 2.2 ± 1.6, p = 0.1) and operation (β = 2.1 ± 1.5, p = 0.06) compared to background.

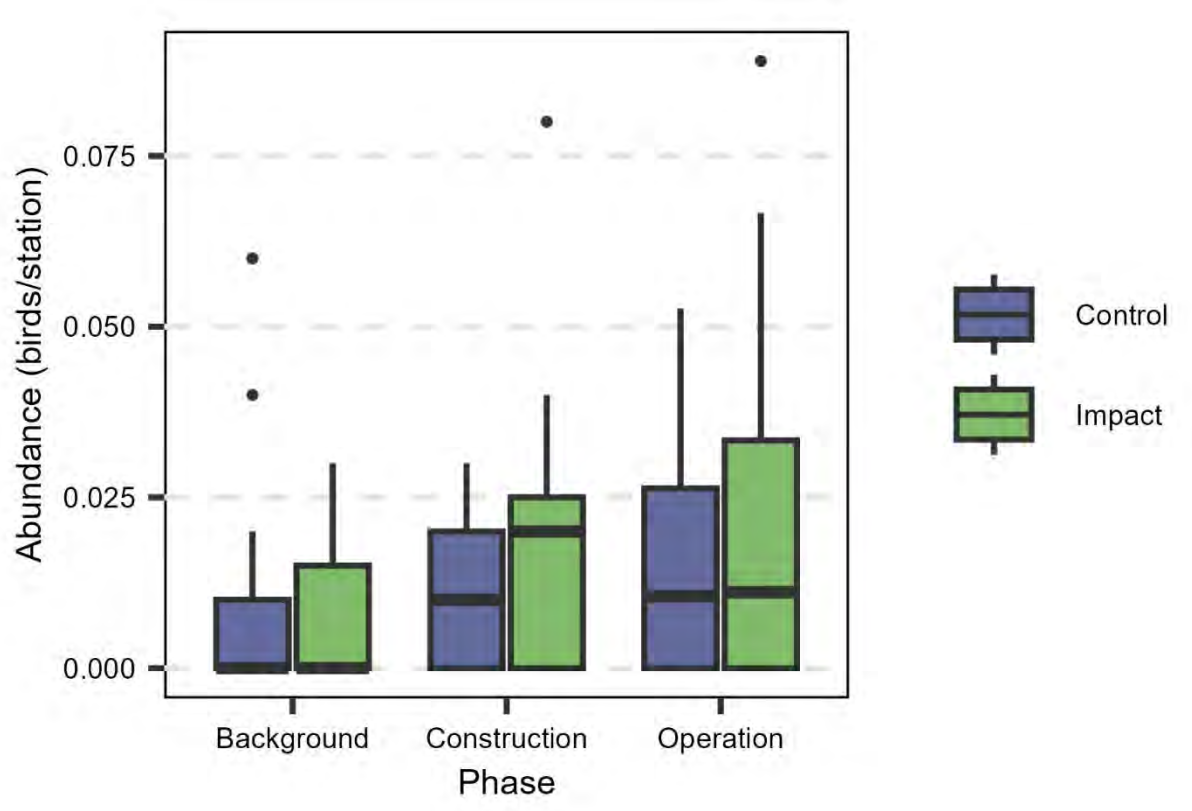

Figure 3-14. Mean Raptor Abundance at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.5 Species Density

Species identified in flocks or large groups were excluded from the lists of dominant species and analyses as they represent outliers in the statistical analyses.

3.5.1 Species of Conservation Concern

3.5.1.1 SCC with the Highest Densities

The SCC with the highest densities at all survey stations (control and impact) in 2024 were Nashville Warbler, White-throated Sparrow, Veery, Common Yellowthroat, and Bobolink.

The five SCC with the highest densities at impact stations in 2024 were (density shown in parentheses):

- Nashville Warbler (0.393 birds/ha),
- Bobolink (0.294 birds/ha),
- Common Yellowthroat (0.269 birds/ha),
- Veery (0.226 birds/ha); and
- White-throated Sparrow (0.216 birds/ha).

Nashville Warbler, Common Yellowthroat, White-throated Sparrow, and Bobolink were also among the five SCC with the highest densities in 2018 and 2021.

As Black-throated Green Warbler and Mourning Warbler had the same densities, the six SCC with the highest densities at control stations in 2024 were:

- Nashville Warbler (0.576 birds/ha),
- White-throated Sparrow (0.248 birds/ha),
- Veery (0.214 birds/ha),
- Chestnut-sided Warbler (0.124 birds/ha),
- Black-throated Green Warbler (0.104 birds/ha), and
- Mourning Warbler (0.104 birds/ha).

Nashville Warbler, White-throated Sparrow, and Chestnut-sided Warbler were also among the five SCC with the highest densities at control stations in 2018 and 2021. Veery was also among the five SCC with the highest densities at control stations in 2021.

These results suggest that similar SCC occurred at relatively high densities at impact and control stations during the RRM's operation phase. They also suggest that similar SCC had the highest densities in 2018, 2021, and 2024.

3.5.1.2 Density Trends

Trends in density of the five SCC with the highest densities (Nashville Warbler, White-throated Sparrow, Common Yellowthroat, Veery, and Chestnut-sided Warbler) at control and impact stations in 2024 are shown in **Figure 3-15**.

Overall, trend results suggest that RRM construction and operation had little impact on the density of these species. The density of all five species tended to increase over time, with little variation between baseline (2014 and 2015), RRM construction (2016), and RRM operation (2018 – 2024). Bobolink and Common Yellowthroat densities were higher at impact stations compared to controls in all years except 2014. Densities were only lower at impact stations compared to control for Nashville Warbler and White-throated Sparrow. However, these differences were observed in all years, including baseline (2014 and 2015 for Nashville Warbler, 2015 for White-throated Sparrow) and are therefore not likely to be due to the RRM. Veery densities were lower at impact stations compared to controls in 2016. However, densities were nearly identical at control and impact stations in later years, suggesting that any negative impacts on Veery due to RRM construction did not persist into the RRM operation phase.

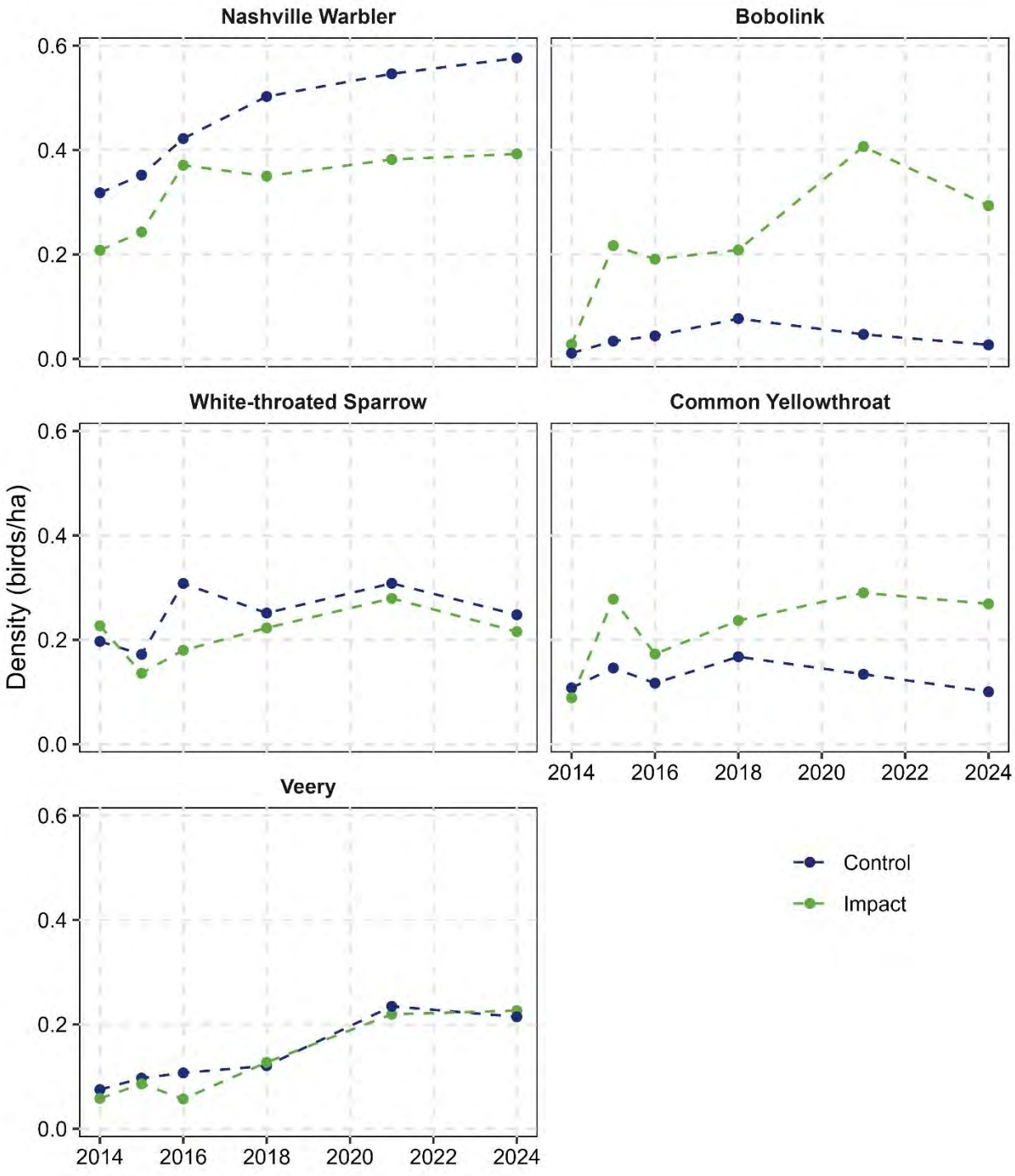

Figure 3-15. Mean Density of the Five SCC with the Highest Density at Control and Impact Stations between 2014 and 2024

3.5.1.3 Comparison of Control and Impact Stations Across RRM Phases

Densities of SCC at control and impact stations during the background, construction, and operation phases are shown in **Figure 3-16**.

Densities of SCC were higher during operation compared to background (β = 1.7 ± 1.1, p < 0.0001). SCC densities did not differ between control and impact stations (β = 1.1 ± 1.1, p = 0.2), and SCC densities did not differ from background during construction (β = 1.3 ± 1.1, p = 0.06). Moreover, the interaction between station type and RRM phase suggested that SCC densities were similar at control and impact stations during construction (β = 0.76 ± 1.2, p = 0.1) and operation (β = 0.96 ± 1.1, p = 0.8) compared to background.

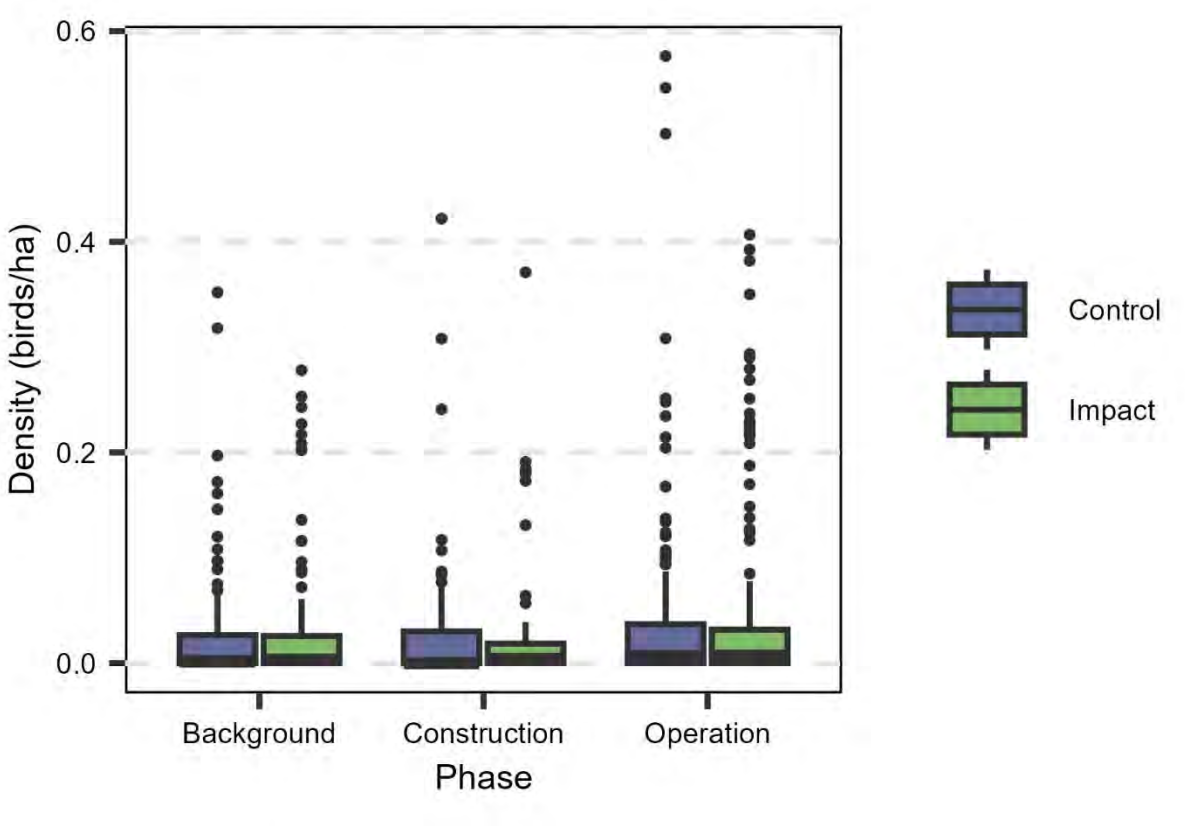

Figure 3-16. Mean SCC Density at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.5.1.4 Comparison of Habitat Guilds

Comparisons of SCC density at control and impact stations during different RRM phases for each habitat guild are shown in **Figure 3-17**.

Density of SCC that prefer edge/shrub/successional habitats did not differ between control and impact stations (β = 1.3 ± 1.3, p = 0.3). We found no difference in density between background and construction (β = 1.3 ± 1.3, p = 0.3) or operation (β = 1.3 ± 1.2, p = 0.3)/ Additionally, density was similar at control and impact stations during construction (β = 0.88 ± 1.5, p = 0.7) and operation (β = 1.4 ± 1.3, p = 0.3) compared to background.

Density of SCC that prefer forests was lower at impact stations compared to controls (β = 0.78 ± 1.1, p = 0.02). Forest SCC density was higher during construction (β = 1.3 ± 1.1, p = 0.03) and operation (β = 1.7 ± 1.1, p < 0.0001) compared to background. However, the density of forest SCC was similar at control and impact stations during construction (β = 0.85 ± 1.2, p = 0.4) and operation (β = 0.96 ± 1.1, p = 0.8) compared to background, which may suggest natural interannual variations in forest species density over time.

The SCC that prefer grassland/open country habitats had higher densities at impact stations relative to controls (β = 7.8 ± 1.7, p < 0.0001). Density was also higher during operation compared to background (β = 5.6 ± 1.7, p = 0.0007), but was lower at impact relative to control stations during operation, albeit with a low effect (β = 0.29 ± 1.8, p = 0.03). We found no difference between background and construction (β = 2.3 ± 2.0, p = 0.2), or between control and impact stations during construction (β = 0.35 ± 2.2, p = 0.2).

Density of SCC that prefer wetland/open water habitats was similar at control and impact stations (β = 2.0 ± 1.5, p =0.07). We also found no difference in density between background, construction (β = 0.96 ± 1.7, p = 0.9), and operation (β = 1.9 ± 1.4, p = 0.08) compared to background. The interaction between station type and RRM phase suggested that wetland/open SCC abundance was similar at control and impact stations during construction (β = 0.43 ± 2.1, p = 0.3) and operation (β = 0.73 ± 1.6, p = 0.5) compared to background.

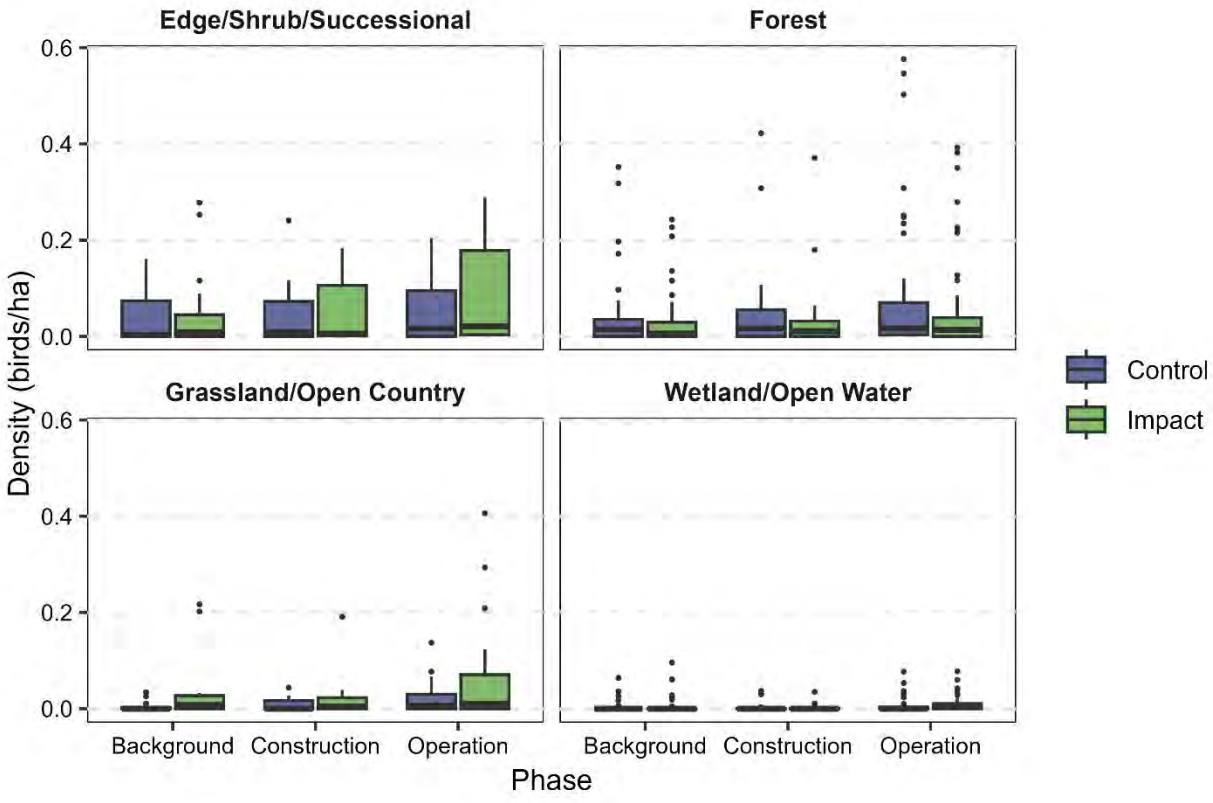

Figure 3-17. Comparison of SCC Density Among Habitat Guilds at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.5.2 Species Not of Conservation Concern

3.5.2.1 Non-SCC with the Highest Densities

The five non-SCC with the highest densities at all survey stations (control and impact) in 2024 were Red-eyed Vireo, Ovenbird, Hermit Thrush, Black-and-white Warbler, and American Robin.

The five non-SCC with the highest densities at impact stations in 2024 were:

- Red-eyed Vireo (0.421 birds/ha),
- Ovenbird (0.286 birds/ha),
- Savannah Sparrow (0.212 birds/ha),
- Hermit Thrush (0.173 birds/ha), and
- Black-and-White Warbler (0.163 birds/ha).

Red-eyed Vireo, Ovenbird, Savannah Sparrow, and Black-and-white Warbler were also among the five non-SCC with the highest densities in 2018. Red-eyed Vireo, Ovenbird, and American Robin were also among the five non-SCC with the highest densities in 2021.

The five non-SCC with the highest densities at control stations in 2024 were:

- Red-eyed Vireo (0.466 birds/ha),
- Ovenbird (0.442 birds/ha),
- Hermit Thrush (0.201 birds/ha),
- American Robin (0.164 birds/ha), and
- Black-and-white Warbler (0.161 birds/ha).

Red-eyed Vireo, Ovenbird, and American Robin were also among the five non-SCC with the highest densities in 2018 and 2021. Black-and-white Warbler was also among the five non-SCC with the highest densities in 2018, and Hermit Thrush was also among the five non-SCC with the highest densities in 2021.

Therefore, results for non-SCC were comparable to SCC results. Like the SCC, similar non-SCC showed high densities at impact and control stations during the RRM's operation phase. Additionally, similar non-SCC had the highest densities in 2018, 2021, and 2024.

3.5.2.2 Density Trends

Trends in density of the five non-SCC with the highest densities (Red-eyed Vireo, Ovenbird, Hermit Thrush, Black-and-white Warbler, and American Robin) at control and impact stations in 2024 are shown in **Figure 3-18**.

Overall, trend results suggest that RRM construction and operation had little impact on the density of these species. The density of all five species tended to increase over time, with little variation between baseline (2014 and 2015), RRM construction (2016), and RRM operation (2018 – 2024). American Robin and Black-and-white Warbler densities were similar at control and impact stations in all years. Red-eyed Vireo, Ovenbird, and Hermit Thrush densities tended to be lower at impact stations relative to controls. However, because this difference was observed during baseline years, it is likely not due to the RRM.

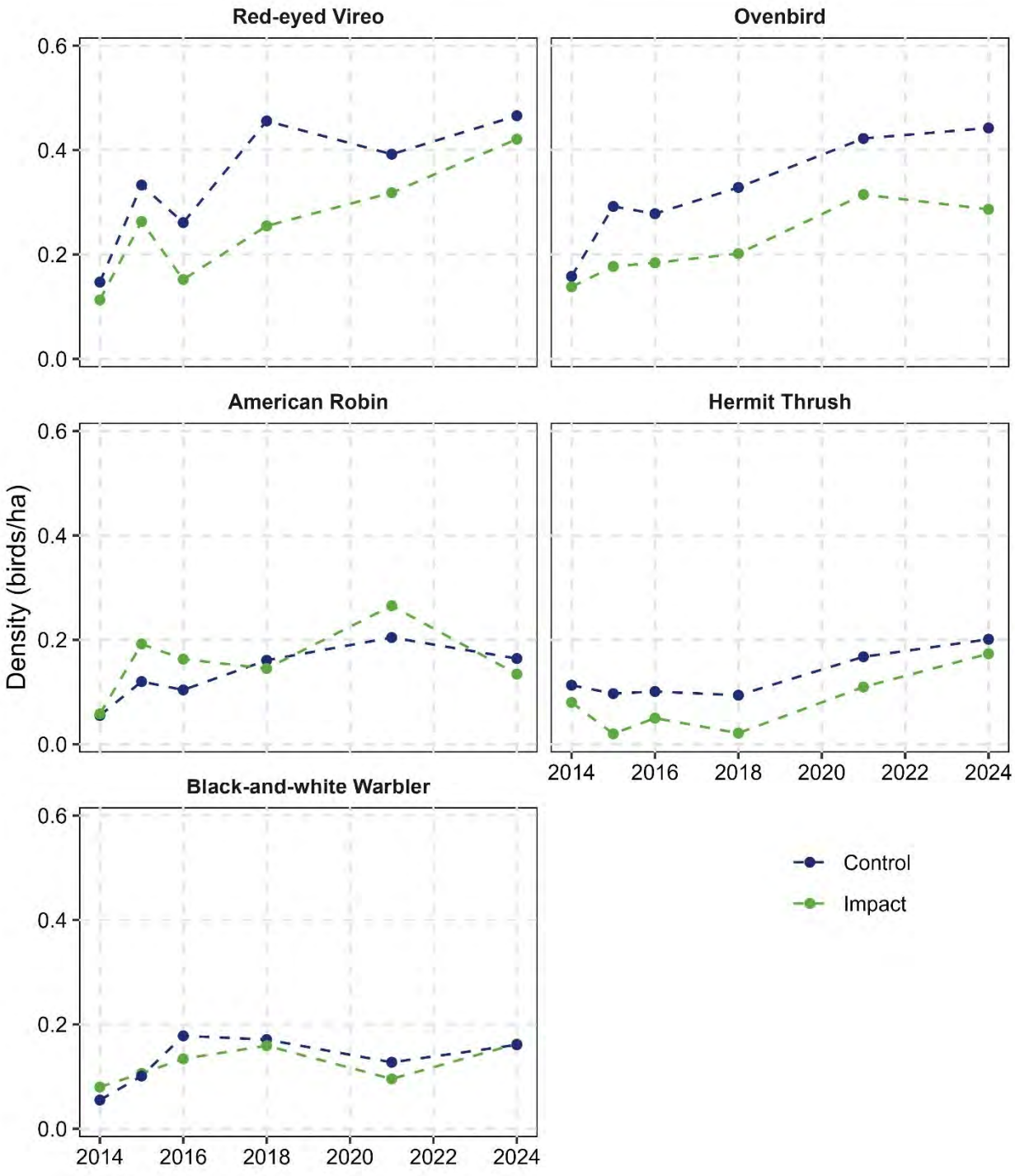

Figure 3-18. Mean Density of the Five non-SCC with the Highest Density at Control and Impact Stations between 2014 and 2024

3.5.2.3 Comparison of Control and Impact Stations Across RRM Phases

Densities of non-SCC at control and impact stations during the background, construction, and operation phases are shown in **Figure 3-19**.

Densities of non-SCC were higher at impact stations compared to controls (β = 1.2 ± 1.1, p = 0.4). Densities of non-SCC did not differ from background during construction (β = 1.2 ± 1.1, p = 0.07) or operation (β = 0.93 ± 1.1, p = 0.3). Moreover, the interaction between station type and RRM phase suggested that non-SCC densities were similar at control and impact stations during construction (β = 0.80 ± 1.1, p = 0.06) and operation (β = 0.98 ± 1.1, p = 0.8) compared to background.

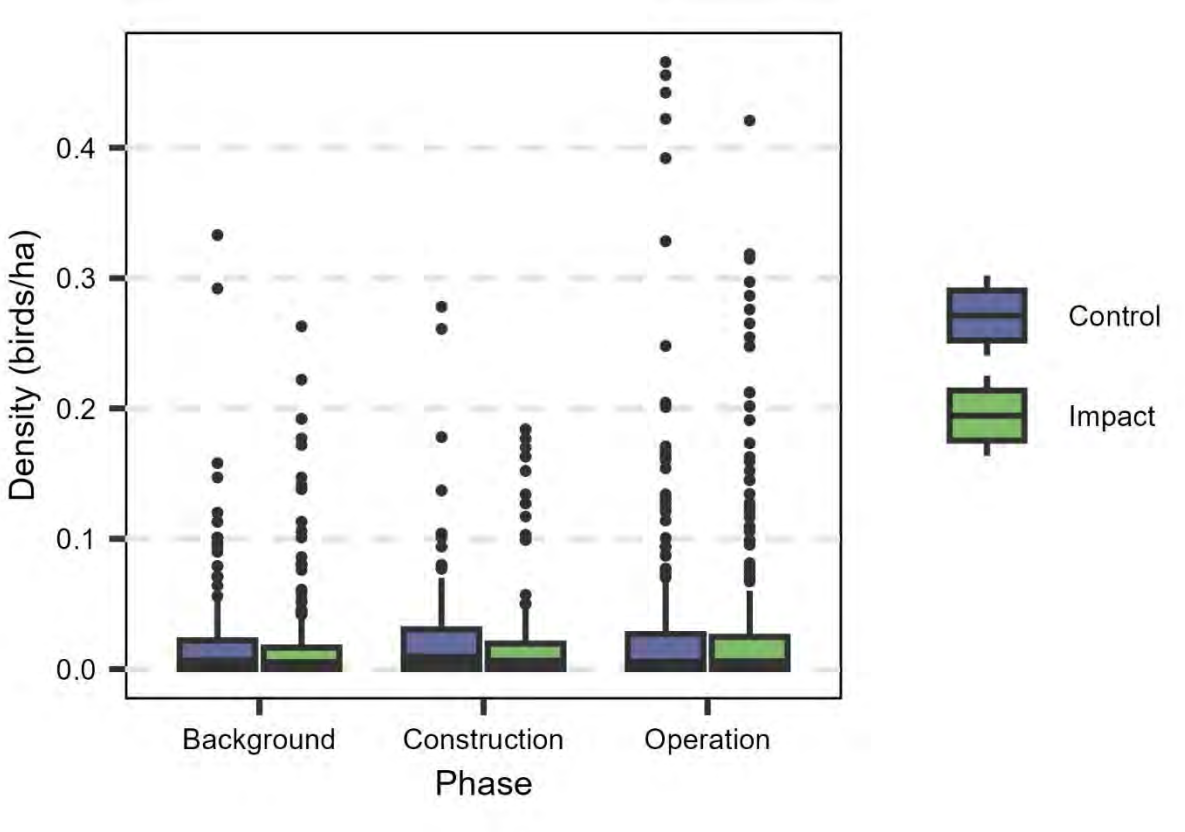

Figure 3-19. Mean non-SCC Density at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.5.2.4 Comparison of Habitat Guilds

Density of non-SCC at control and impact stations during the background, construction, and operation phases for each habitat guild are shown in **Figure 3-20**.

Density of non-SCC that prefer edge/shrub/successional habitats was higher at impact stations compared to controls (β = 1.5 ± 1.1, p = 0.0002), but density was lower during operation compared to background (β = 0.73 ± 1.1, p = 0.008). We found no difference in density between background and construction (β = 0.95 ± 1.1, p = 0.8). Additionally, density was similar at control and impact stations during construction (β = 0.79 ± 1.2, p = 0.3) and operation (β = 0.99 ± 1.2, p = 0.9) compared to background.

Density of non-SCC that prefer forests was similar at impact and control stations (β = 0.84 ± 1.1, p = 0.05). We also found no difference in density during construction (β = 1.2 ± 1.1, p = 0.09) and operation (β = 0.97 ± 1.1, p = 0.7) compared to background. Additionally, density of forest non-SCC was similar at control and impact stations during construction (β = 0.84 ± 1.1, p = 0.3) and operation (β = 1.0 ± 1.1, p = 1.0) compared to background.

The non-SCC that prefer grassland/open country habitats had higher densities at impact stations relative to controls (β = 6.3 ± 1.5, p < 0.0001). Density was similar during background, construction (β = 1.9 ± 1.7, p = 0.2), and operation (β = 1.7 ± 1.5, p = 0.2). We found no difference between background and construction (β = 0.67 ± 1.8, p = 0.5), or between control and impact stations during construction (β = 0.63 ± 1.6, p = 0.3).

Density of non-SCC that prefer wetland/open water habitats was higher at impact stations compared to controls (β = 1.8 ± 1.3, p =0.02). Density was also higher during construction (β = 2.4 ± 1.3, p = 0.002) and operation (β = 1.8 ± 1.3, p = 0.02) compared to background. The interaction between station type and RRM phase suggested that wetland/open non-SCC abundance was similar at control and impact stations during construction (β = 0.49 ± 1.5, p = 0.06) and operation (β = 0.87 ± 1.3, p = 0.6) compared to background.

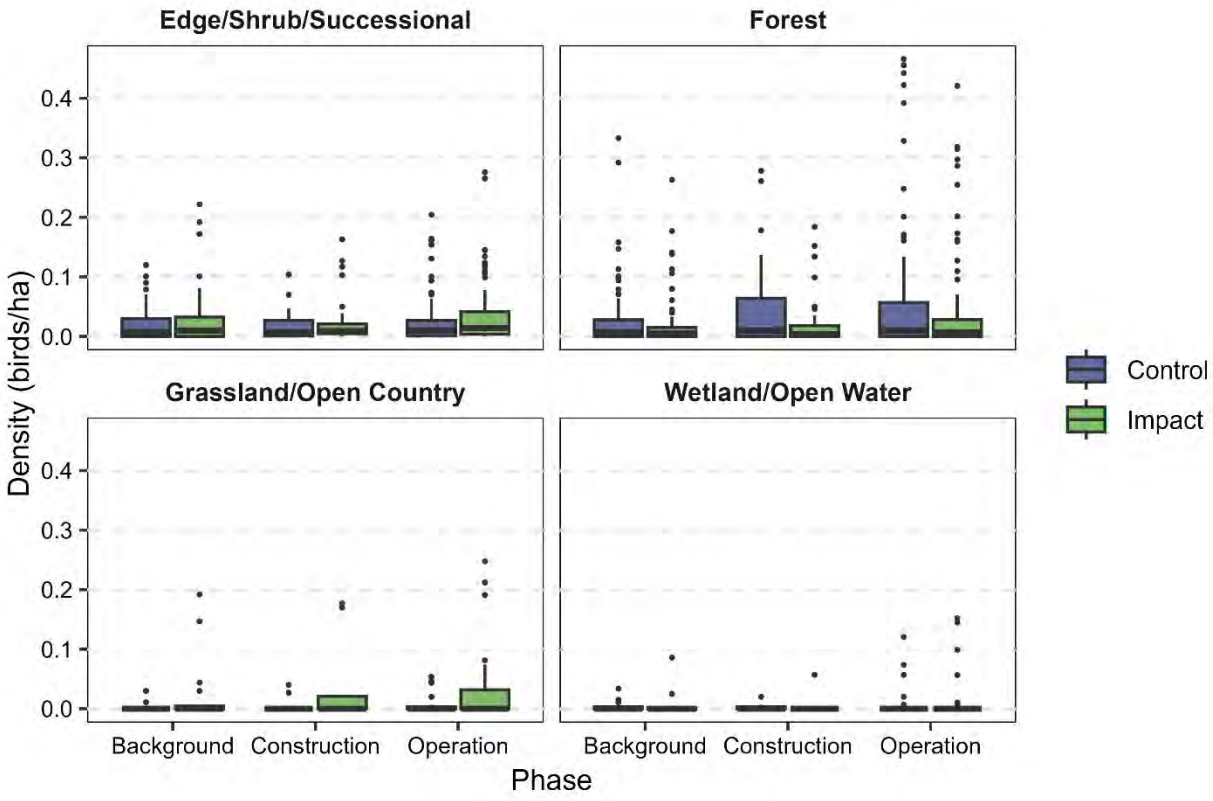

Figure 3-20. Comparison of non-SCC Density Among Habitat Guilds at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.5.3 Gamebirds

Between 2014 and 2024, a total of 23 gamebirds were detected on point count surveys. This included seven dabbling ducks (American Wigeon, Blue-winged Teal, Green-winged Teal, Gadwall, Mallard, Ring-necked Duck, and Wood Duck), four sea ducks (Common Merganser, Hooded Merganser, Red-breasted Merganser, and Common Goldeneye), three upland gamebirds (Ruffed Grouse, Sharp-tailed Grouse, and Spruce Grouse), two geese and swans (Canada Goose and Trumpeter Swan), and seven other harvested bird species (American Woodcock, Mouning Dove, Sandhill Crane, Sora, Virginia Rail, Wilson's Snipe, and Double-crested Cormorant). All of these 23 species were detected in 2024. We note that although Sandhill Crane hunting is not currently permitted in Ontario, the Canadian Wildlife Service is currently considering a proposal to allow Sandhill Crane harvest, with a potential opening as early as September 2026.

Overall, gamebird density was lower than the density of the SCC and non-SCC with the highest densities. This was likely due to the relatively low proportion of wetland/open water-associated species detected on point count surveys relative to other habitat guilds.

3.5.3.1 Gamebirds with the Highest Densities

The five gamebird species with the highest densities at all survey stations (control and impact) in 2024 were Ruffed Grouse, Mallard, Sandhill Crane, Sharp-tailed Grouse, and Wilson's Snipe.

As Virginia Rail and Wilson's Snipe had the same density, the six gamebird species with the highest densities at impact stations in 2024 were:

- Ruffed Grouse (0.0460 birds/ha),
- Sandhill Crane (0.0424 birds/ha),
- Sharp-tailed Grouse (0.0389 birds/ha),
- Blue-winged Teal (0.00707 birds/ha),
- Virginia Rail (0.00354 birds/ha), and
- Wilson's Snipe (0.00354 birds/ha)

Sharp-tailed Grouse, Sandhill Crane, Ruffed Grouse, and Wilson's Snipe were also among the five gamebird species with the highest densities at impact stations in 2018. Sharp-tailed Grouse and Sandhill Crane were also among the five gamebird species with the highest densities at impact stations in 2021.

The five gamebird species with the highest densities at control stations in 2024 were:

- Mallard (0.0771 birds/ha),
- Ruffed Grouse (0.0403 birds/ha),
- Wilson's Snipe (0.0268 birds/ha),
- Sandhill Crane (0.0101 birds/ha), and
- Canada Goose (0.00670 birds/ha).

Ruffed Grouse and Wilson's Snipe were also among the five migratory gamebird species with the highest densities at control stations in 2018. Sandhill Crane, Wilson's Snipe, and Ruffed Grouse also among the five gamebird species with the highest densities at control stations in 2021.

3.5.3.2 Density Trends

Trends in density of the five gamebirds with the highest densities at control and impact stations in 2024 (Ruffed Grouse, Mallard, Sandhill Crane, Sharp-tailed Grouse, and Wilson's Snipe) are shown in **Figure 3-21**. As discussed above, gamebird density was lower than the densities of the SCC and non-SCC with the highest densities. Therefore, the y-axis range in **Figure 3-21** (0 – 0.15 birds/ha) is smaller than the range shown for SCC and non-SCC in **Figure 3-15** and **Figure 3-18** (0 – 0.6 birds/ha). It is important to account for the smaller y-axis range when interpreting changes in gamebird density, as the smaller y-axis range may make variations appear more pronounced compared to SCC and non-SCC densities.

Overall, trend results suggest that RRM construction and operation had little impact on gamebird density. The density of all five species showed little variation between baseline (2014 and 2015), RRM construction (2016), and RRM operation (2018 – 2024). Mallard and Ruffed Grouse densities were similar at control and impact stations in all years. Sharp-tailed Grouse and Sandhill Crane densities tended to be higher at impact stations relative to controls. From 2016 onwards, Wilson's Snipe densities tended to be lower at impact stations relative to controls; however, differences were small (0.0128 – 0.0300 fewer birds/ha at impact stations) and may not be biologically meaningful.

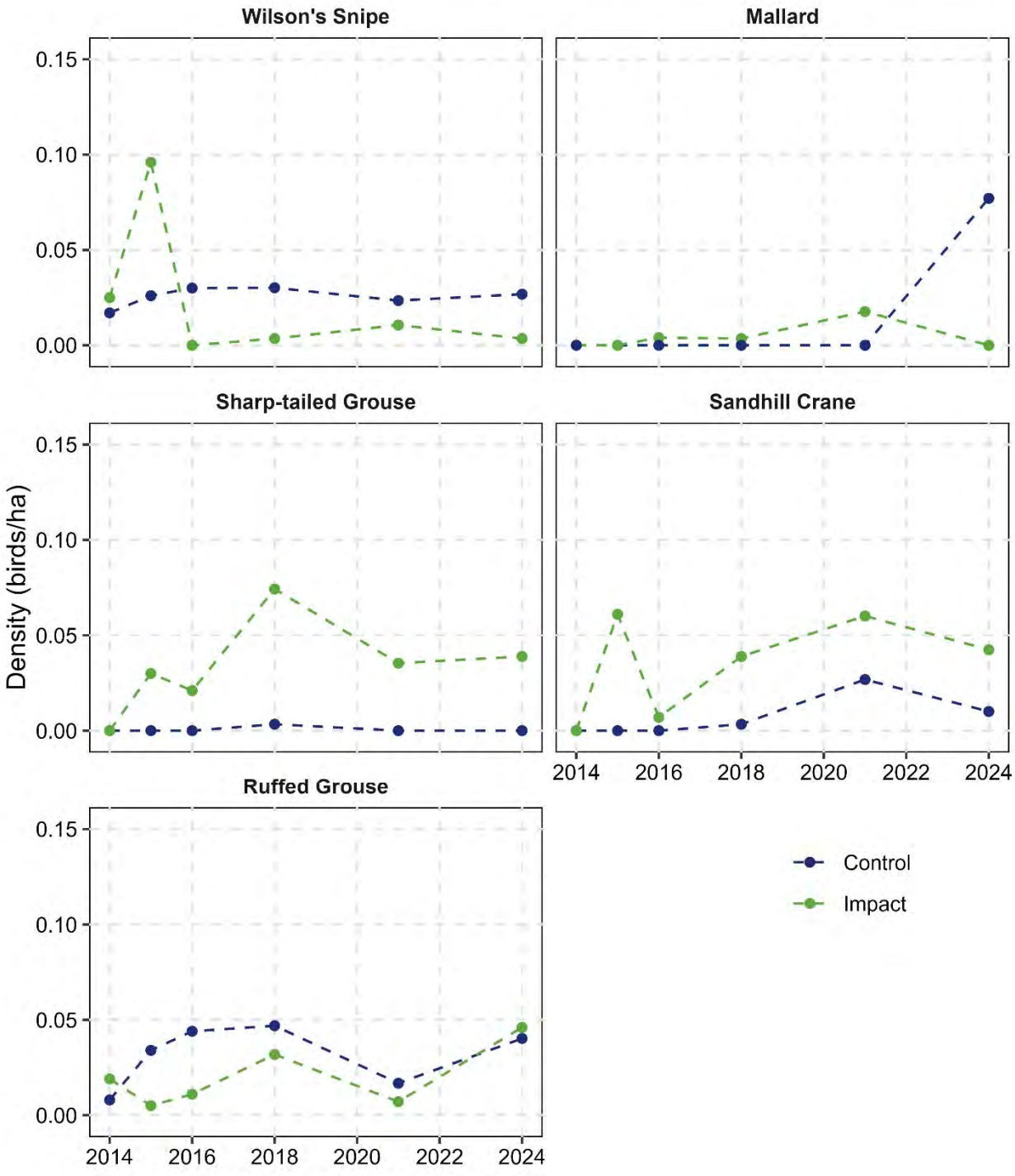

Figure 3-21. Mean Density of the Five Gamebirds with the Highest Density at Control and Impact Stations between 2014 and 2024

3.5.3.3 Comparison of Control and Impact Stations Across RRM Phases

Densities of gamebirds at control and impact stations during the background, construction, and operation phases are shown in **Figure 3-22**.

Gamebird densities were similar at impact and control stations (β = 12.4 ± 1.7, p = 0.09). Gamebird densities did not differ from background during construction (β = 1.5 ± 1.9, p = 0.5) or operation (β = 2.2 ± 1.6, p = 0.1). Moreover, the interaction between station type and RRM phase suggested that gamebird densities were similar at control and impact stations during construction (β = 0.22 ± 2.6, p = 0.1) and operation (β = 0.74 ± 1.8, p = 0.6) compared to background.

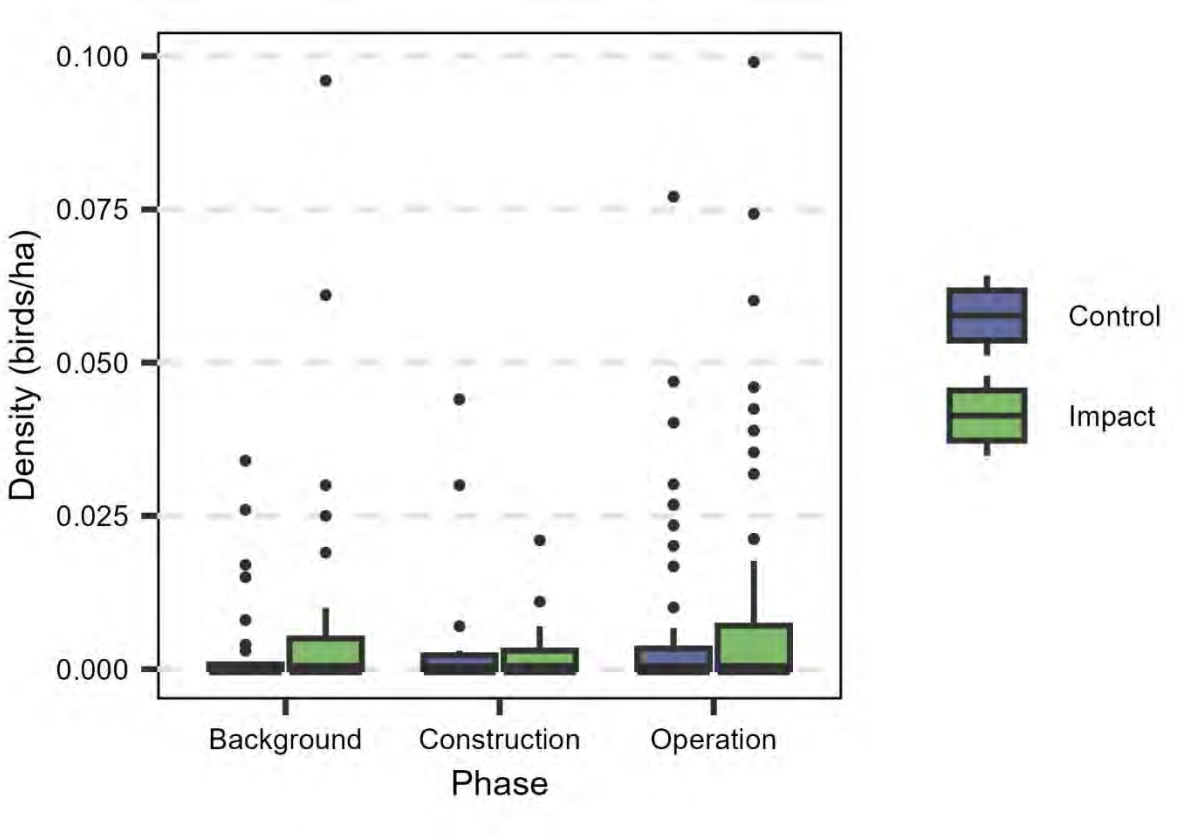

Figure 3-22. Mean Gamebird Density at Control and Impact Stations Under Background Conditions and During the Construction and Operation Phases of the RRM

3.6 Species Richness

3.6.1 Species of Conservation Concern

3.6.1.1 Richness Trends

In 2024, 43 SCC were detected at the 95 control stations, and 47 SCC were detected at the 90 impact stations. **Figure 3-23** shows SCC richness, measured as the total number of species detected divided by the total number of stations, over time. Overall, SCC richness declined between 2014 and 2024. In particular, richness dropped from 1.9 to 0.95 species/station between 2014 and 2015 at impact stations (a decline of approximately 1 species/station). It is possible that pre-construction activities created new habitats (e.g., new edge habitats created by road construction to access the site or by the clearing of forests for prospecting), which initially increased the diversity of species at impact stations prior to 2016. Following this decline, the richness of SCC remained stable during RRM operation, and the number of SCC per station and was higher at impact stations relative to controls in all years except 2018.

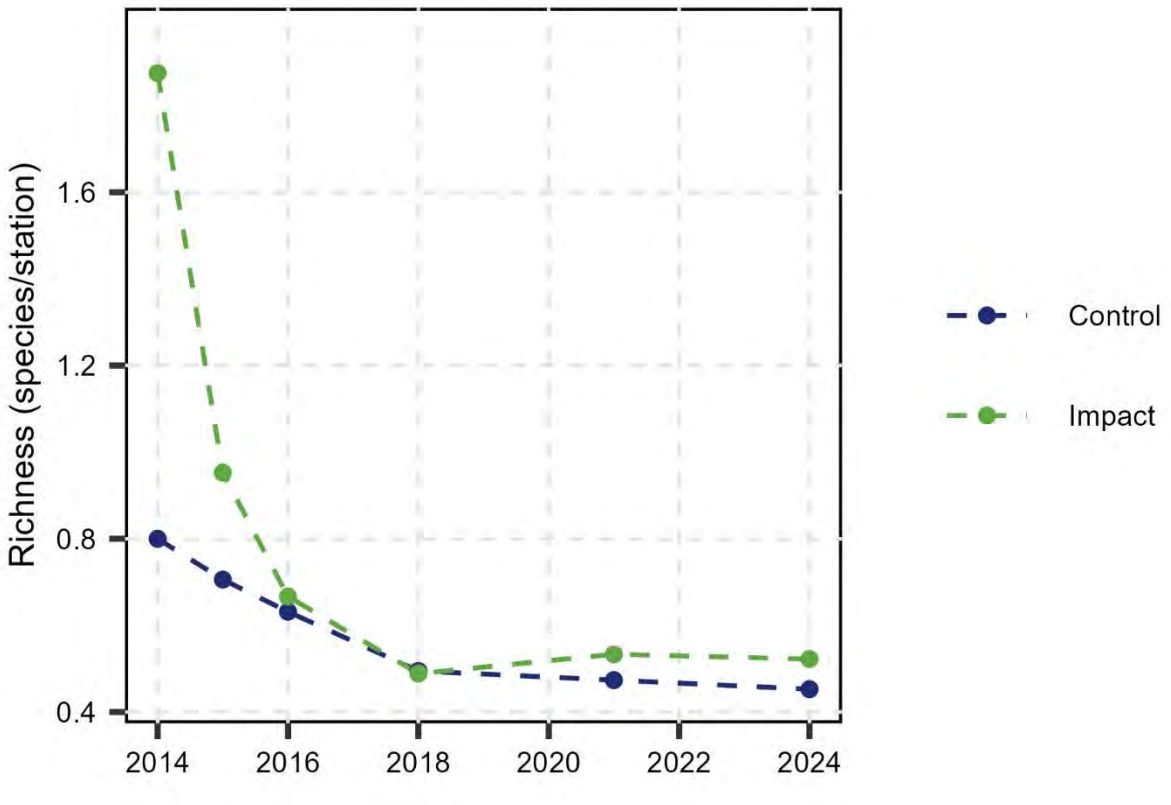

Figure 3-23. Richness of SCC at Control and Impact Stations between 2014 and 2024

3.6.1.2 Comparison of Control and Impact Stations During RRM Operations

As station-specific data were unavailable for 2014, 2015, and 2016 surveys, it was not possible to statistically compare RRM phases. Analyses of the number of SCC detected at each survey station during the RRM operation phase (2018, 2021, and 2024) revealed that more species were detected at impact sites compared to control sites (β = 1.2 ± 1.0, p < 0.0001, **Figure 3-24**).

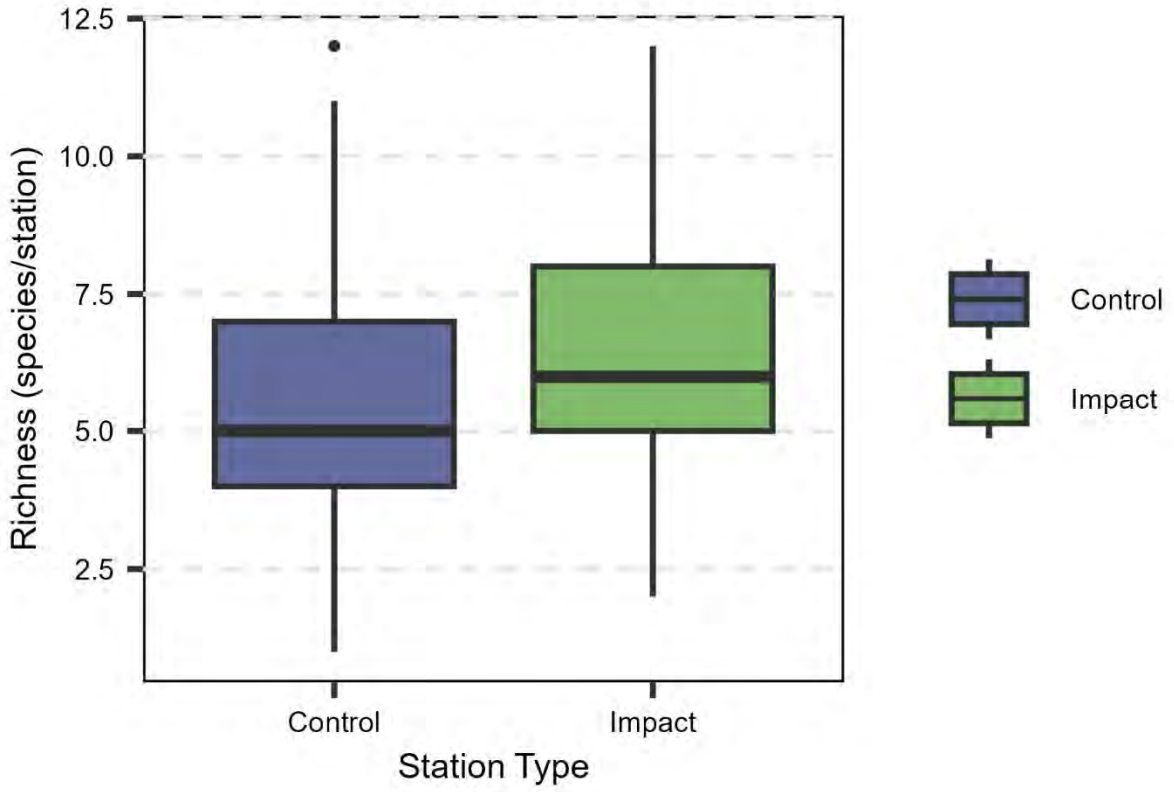

Figure 3-24. Richness of SCC at Control and Impact Stations During the RRM Operation Phase

3.6.1.3 Comparison of Habitat Guilds

Richness of SCC at control and impact stations during RRM operations for each habitat guild is shown in **Figure 3-25**.

For SCC that prefer edge/shrub/successional habitats, richness was higher at impact stations compared to controls during RRM operations (β = 1.2 ± 1.1, p = 0.005). SCC richness was similar at control and impact stations for SCC that prefer forest habitats (β = 0.93 ± 1.0, p = 0.1), grassland/open country habitats (β = 1.0 ± 1.1, p = 1.0), and wetland/open water habitats (β = 1.2 ± 1.1, p = 0.1).

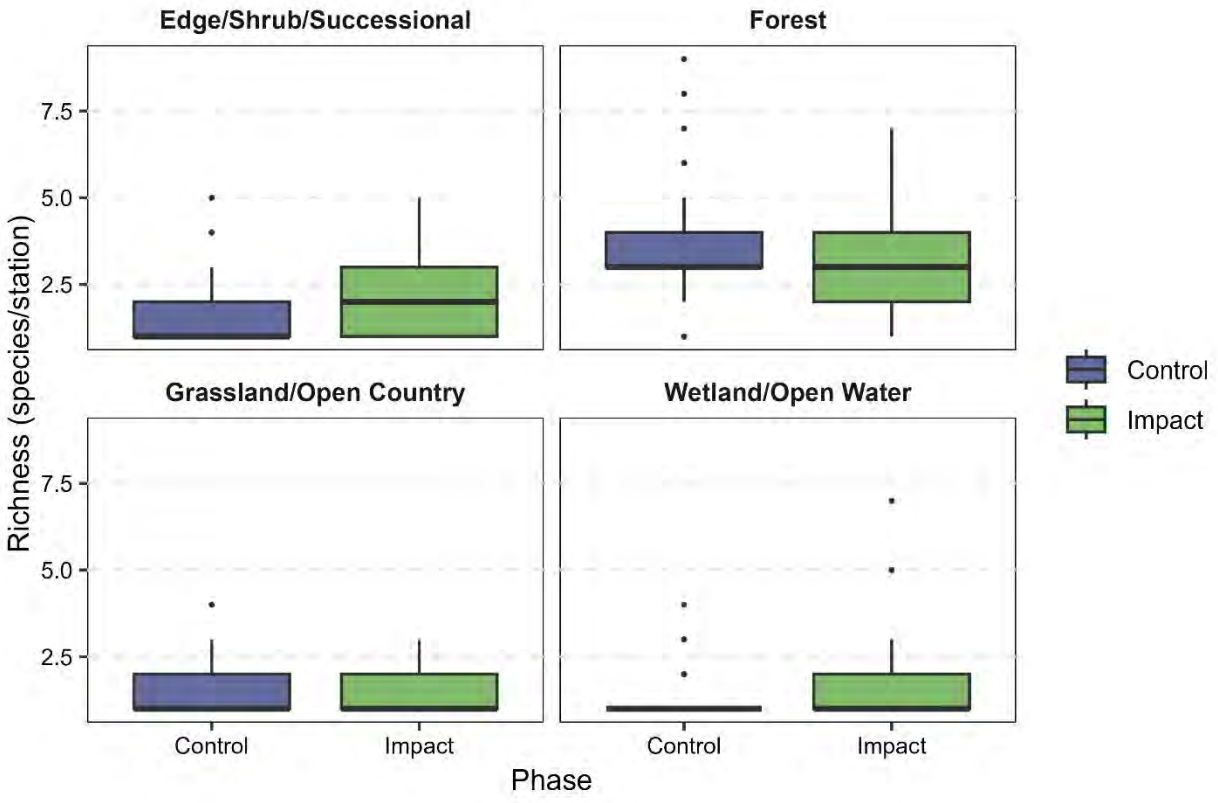

Figure 3-25. Comparison of SCC Richness Among Habitat Guilds at Control and Impact Stations During the RRM Operation Phase

3.6.2 Species Not of Conservation Concern

3.6.2.1 Richness Trends

In 2024, 65 non-SCC were detected at 95 control stations, and 70 non-SCC were detected at the 90 impact stations. **Figure 3-26** shows non-SCC richness, measured as the total number of species detected divided by the total number of stations, over time. Overall, non-SCC richness followed similar pattern to SCC richness. Richness of non-SCC also declined between 2014 and 2024. Richness also declined at impact stations between 2014 and 2015, with a drop from 2.7 to 1.4 species/station (a decline of approximately 1.3 species/station). Similar to the SCC, this may have reflected a decrease from an elevated species richness due to pre-construction activities. Additionally, non-SCC richness remained stable during RRM operation, and the number of non-SCC per station and was also higher at impact stations relative to controls in all years except 2018.

Together, SCC and non-SCC richness results suggest that there were similar interannual variations in the number of species detected on point count surveys. Neither SCC nor non-SCC showed temporal patterns indicative of impacts during RRM operations, and SCC were not disproportionately impacted by RRM operations.

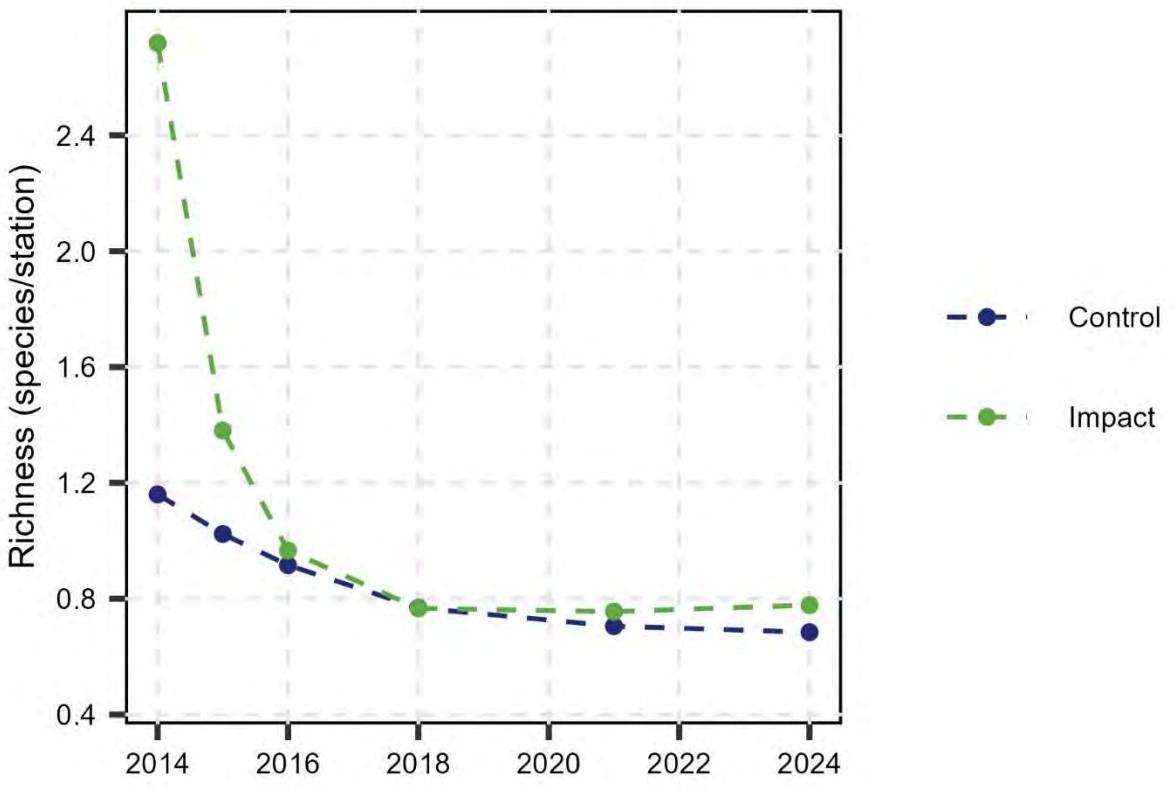

Figure 3-26. Richness of non-SCC at Control and Impact Stations between 2014 and 2024

3.6.2.2 Comparison of Control and Impact Stations During RRM Operations

Analyses of the number of non-SCC detected at each survey station during the RRM operation phase (2018, 2021, and 2024) also revealed that more species were detected at impact sites compared to control sites (β = 1.1 ± 1.0, p = 0.002, **Figure 3-27**Figure 3-24).

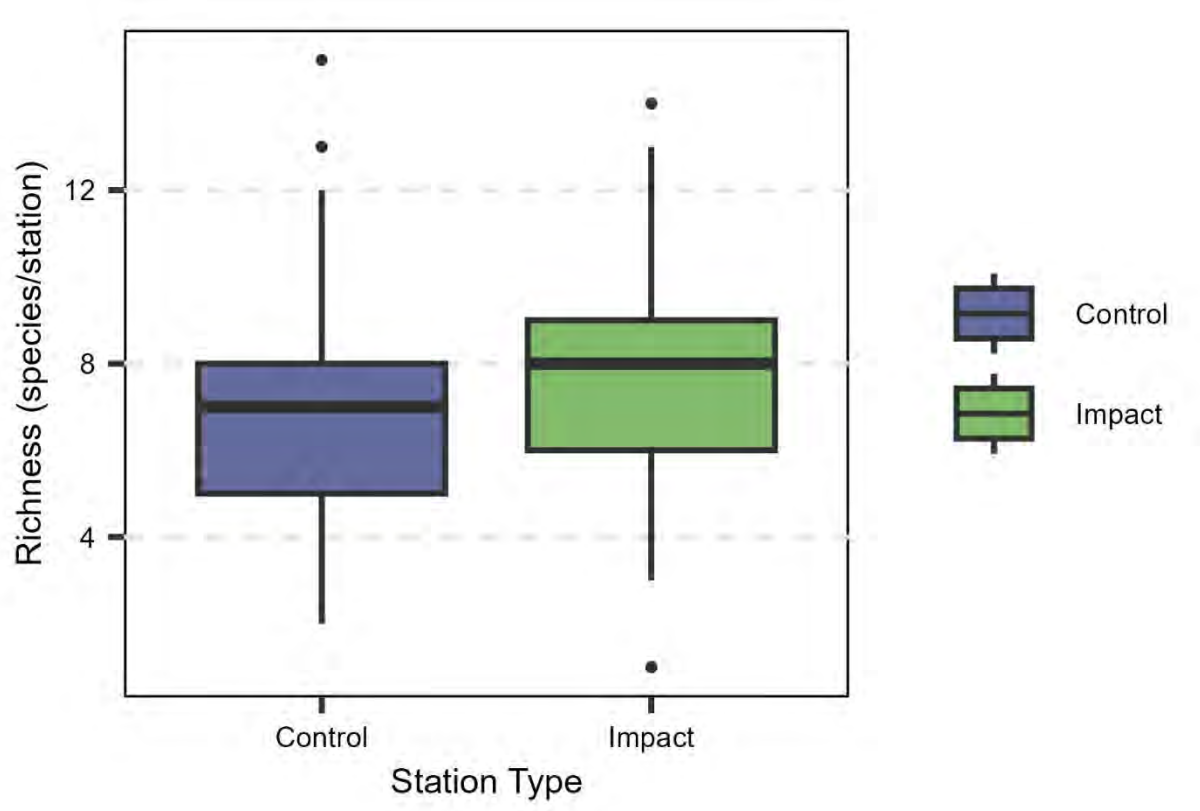

Figure 3-27. Richness of non-SCC Richness at Control and Impact Stations During the RRM Operation Phase

3.6.2.3 Comparison of Habitat Guilds

Richness of non-SCC at control and impact stations during RRM operations for each habitat guild is shown in **Figure 3-28**.

For non-SCC that prefer edge/shrub/successional habitats, richness was higher at impact stations compared to controls during RRM operations (β = 1.2 ± 1.1, p = 0.001). The non-SCC that prefer forests had lower richness at impact stations compared to controls (β = 0.88 ± 1.0, p = 0.002). Richness of non-SCC was similar at control and impact stations for SCC that prefer grassland/open country habitats (β = 1.2 ± 1.2, p = 0.3) and wetland/open water habitats (β = 1.2 ± 1.1, p = 0.2).

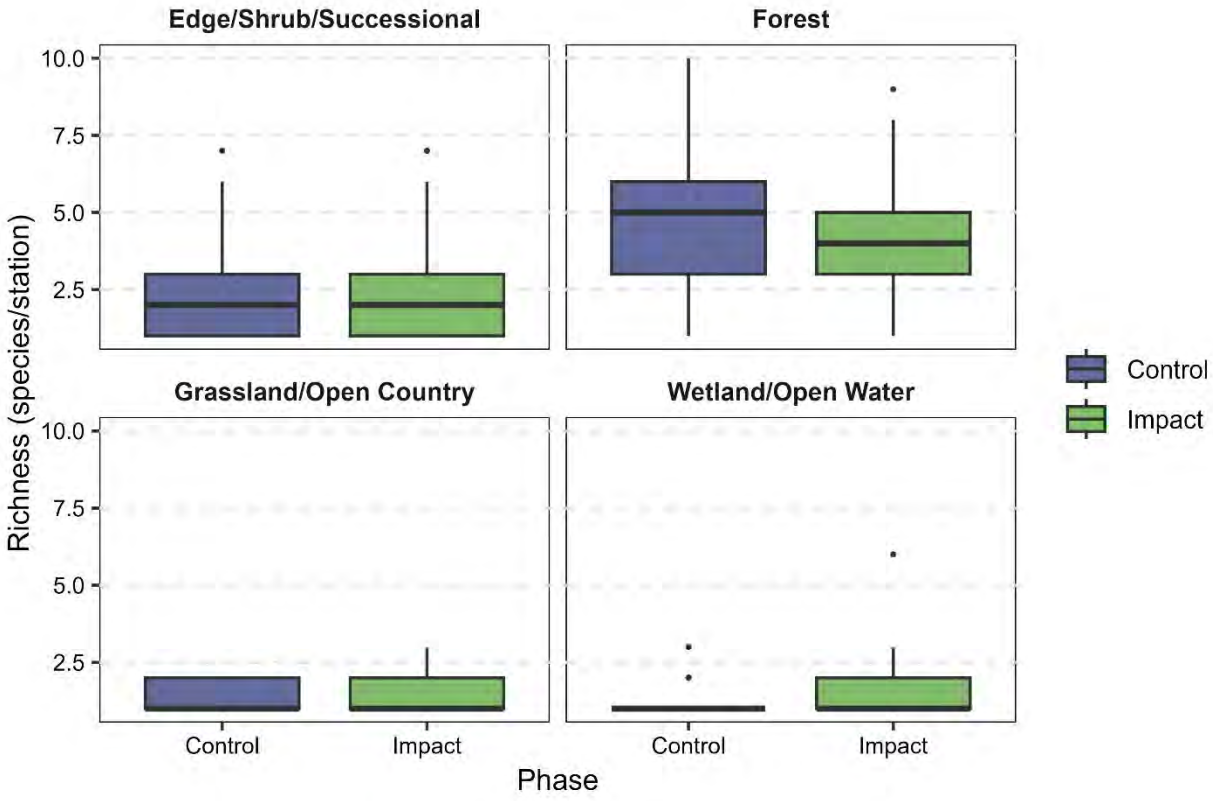

Figure 3-28. Comparison of non-SCC Richness Among Habitat Guilds at Control and Impact Stations During the RRM Operation Phase

4.0 Conclusions

Overall, survey data suggest that the RRM had minimal influence on bird community structure, and analyses of both SCC and non-SCC suggest that the RRM did not disproportionately affect at-risk or priority species.

Throughout the survey years of RRM operation, similar SCC and non-SCC showed high occupancy rates, abundance, and densities. Moreover, similar SCC and non-SCC showed high occupancy rates, abundance, and densities at control and impact stations in 2018, 2021, and 2024. Together, these results suggested that RRM operations had little influence on the most widespread and abundant species.

Qualitative assessments of temporal changes for SCC and non-SCC with the highest occupancy rates, abundance, and density also suggested that the RRM had little impact on bird community structure. However, it is also important to note that results may differ for less abundant and widespread species. Although some species experienced declines during or after the RRM construction phase in 2016, declines were typically observed at both control and impact stations. Likewise, although some species had lower metrics at impact stations compared to control stations, these differences were typically observed in all years, including baseline, which suggested that differences were likely unrelated to the RRM.

A possible exception was Ovenbird, a forest-dwelling, non-SCC. Ovenbird occupancy rates were lower at impact stations relative to controls in 2024. Ovenbird abundance also declined at impact stations relative to controls in 2016, and its abundance at impact stations remained slightly lower than controls throughout the survey years of RRM operations. Furthermore, Ovenbird densities were lower at impact stations compared to controls; however, this difference was also observed under baseline conditions in 2015. Analyses of future survey data should pay attention to this species to investigate whether differences between control in impact stations persist into future years.

A qualitative assessment of temporal changes in species richness indicated a decrease in SCC and non-SCC richness over time. As the steepest declines occurred between 2014 and 2015, in the baseline phase, these changes are likely not related to the RRM and may reflect normal temporal variability. Nevertheless, future analyses should continue to examine species richness to determine whether this pattern continues.

Statistical comparisons between control and impact stations and among RRM phases provided further evidence that RRM activities had little impact on bird community metrics. In analyses that investigated all SCC and non-SCC, all metrics except SCC density were higher at impact stations relative to controls. Additionally, non-SCC abundance and SCC density were higher during RRM operations compared to background.

Further analyses suggested that these results were driven by certain habitat guilds. Indeed, edge/shrub/successional, grassland/open country, and wetland/open water SCC and non-SCC tended to have higher occupancy rates, abundance, and density at impact stations relative to

control stations. Edge/shrub/successional SCC and non-SCC also had higher richness at impact stations. Therefore, these guilds may have preferentially occupied and were more abundant in areas that were cleared by RRM construction activities. Grassland/open country birds had relatively high effect sizes (at impact stations occupancy rates were 5 – 6 times higher than at control stations, abundance was 7 times higher, and density was 6 – 8 times higher), suggesting that this guild was most strongly associated with cleared areas near impacted stations. However, there was some evidence of negative impacts, with edge/shrub/successional and grassland/open country showing reductions for some metrics during construction and operation relative to background.

Forest birds were most likely to be negatively impacted by increased disturbance and habitat loss from RRM construction activities (Wood, 2019). Indeed, forest non-SCC abundance and richness, and SCC density were lower at impact stations compared to controls. Low effect sizes (abundance and density were 22% lower at impact stations, and richness was 11% lower at impact stations) suggest that statistical differences may not indicate a biologically meaningful impact. Nevertheless, continued forest bird monitoring is recommended to ensure that any RRM-related impacts on forest birds are minimal.

As outlined in the FMP, the next breeding bird survey will be completed in 2027. It will provide additional data to further understand differences and trends from 2024 and previous years.

5.0 Recommendations

We recognize that this report focuses on results for the most widespread and abundant species in the survey area (i.e., species with the highest occupancy rates, abundance, and density). However, rare or less common species may be more vulnerable to population declines if they are negatively impacted by RRM activities. We recommend that the analyses and discussions of future Bird Monitoring Reports better incorporate rare, less widespread, and less abundant species to better understand possible effects on these birds.

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Appendix A Bird Community Structure Metrics from the Rainy River Mine Operation Phase(2018 – 2024)

Table A-1. Number of Species Detected and Number of Survey Stations on Point Count Surveys Conducted in 2018, 2021, and 2024

Year	Species not of Conservation Concern			Species of Conservation Concern			Number of Survey Stations		
	Control	Impact	Total	Control	Impact	Total	Control	Impact	Total
2018	73	69	80	47	44	53	95	90	185
2021	67	68	79	45	48	53	95	90	185
2024	65	70	80	43	47	51	95	90	185

Table A-2. Mean Species Richness (species/station) on Surveys Conducted in 2018, 2021, and 2024

Year	Species not of Conservation Concern		Species of Conservation Concern	
	Control	Impact	Control	Impact
2018	6.7	7.4	5.0	6.2
2021	6.7	7.4	5.6	6.5
2024	7.2	8.1	5.3	6.1

Table A-3. Species Occupancy Rate, Mean Abundance, and Mean Density at Control and Impact Stations on Surveys Conducted in 2018, 2021, and 2024

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
Alder Flycatcher	Edge/Shrub/ Successional	No	Control	17.89	0.36	0.10	15.79	0.25	0.07	14.74	0.24	0.07
			Impact	30.00	0.56	0.12	21.11	0.40	0.10	25.56	0.39	0.11
American Bittern	Wetland/ Open Water	No	Control	5.26	0.05	0.00	2.11	0.03	0.00	0.00	0.00	0.00
			Impact	1.11	0.02	0.00	2.22	0.04	0.01	3.33	0.03	0.00
American Crow	Forest	No	Control	12.63	0.25	0.02	25.26	0.59	0.09	13.68	0.24	0.01
			Impact	10.00	0.19	0.01	32.22	1.62	0.20	37.78	0.79	0.01
American Goldfinch	Edge/Shrub/ Successional	No	Control	10.53	0.22	0.05	3.16	0.09	0.01	1.05	0.01	0.00
			Impact	17.78	0.40	0.11	7.78	0.19	0.02	12.22	0.26	0.05
American Goshawk	Forest	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.02	0.00
American Herring Gull	Wetland/ Open Water	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.02	0.00	0.00	0.00	0.00
American Kestrel	Grassland/ Open Country	Yes	Control	2.11	0.03	0.01	2.11	0.03	0.01	1.05	0.03	0.00
			Impact	1.11	0.02	0.01	2.22	0.03	0.01	2.22	0.03	0.00
American Pipit	Grassland/ Open Country	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Redstart	Edge/Shrub/ Successional	No	Control	14.74	0.32	0.09	7.37	0.07	0.02	6.32	0.11	0.03
			Impact	12.22	0.17	0.05	7.78	0.13	0.04	4.44	0.09	0.02
American Robin	Edge/Shrub/ Successional	No	Control	31.58	0.67	0.16	38.95	0.79	0.20	29.47	0.59	0.16
			Impact	42.22	0.84	0.15	56.67	1.12	0.27	38.89	0.62	0.13
American Three-toed Woodpecker	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.03	0.01
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.01	0.00
American White Pelican	Wetland/ Open Water	Yes	Control	2.11	0.16	0.00	2.11	0.09	0.00	1.05	0.04	0.00
			Impact	3.33	0.08	0.01	8.89	1.08	0.02	7.78	0.91	0.00
American Wigeon	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.02	0.00
American Woodcock	Edge/Shrub/ Successional	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	1.11	0.07	0.02	0.00	0.00	0.00
Bald Eagle	Wetland/ Open Water	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	2.22	0.04	0.01	4.44	0.06	0.01	0.00	0.00	0.00
Baltimore Oriole	Edge/Shrub/ Successional	No	Control	2.11	0.02	0.01	3.16	0.03	0.01	2.11	0.02	0.01
			Impact	4.44	0.06	0.01	1.11	0.02	0.00	0.00	0.00	0.00
Bank Swallow		Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.02	0.01

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
	Wetland/ Open Water		Impact	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.07	0.01
Barn Swallow	Grassland/ Open Country	Yes	Control	4.21	0.51	0.14	3.16	0.11	0.02	3.16	0.08	0.01
			Impact	7.78	0.28	0.06	10.00	0.40	0.06	6.67	0.11	0.01
Bay-breasted Warbler	Forest	Yes	Control	3.16	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Belted Kingfisher	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	2.11	0.02	0.00	2.11	0.02	0.01
			Impact	2.22	0.02	0.01	2.22	0.03	0.00	0.00	0.00	0.00
Black-and-white Warbler	Forest	No	Control	30.53	0.58	0.17	23.16	0.44	0.13	29.47	0.54	0.16
			Impact	37.78	0.64	0.16	21.11	0.38	0.10	38.89	0.58	0.16
Black-backed Woodpecker	Forest	No	Control	3.16	0.05	0.01	1.05	0.01	0.00	2.11	0.02	0.01
			Impact	2.22	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Black-billed Cuckoo	Edge/Shrub/ Successional	Yes	Control	3.16	0.04	0.01	46.32	0.78	0.09	1.05	0.01	0.00
			Impact	4.44	0.04	0.01	55.56	0.82	0.17	1.11	0.01	0.00
Black-billed Magpie	Edge/Shrub/ Successional	No	Control	1.05	0.02	0.00	1.05	0.01	0.00	0.00	0.00	0.00
			Impact	12.22	0.20	0.03	7.78	0.18	0.01	3.33	0.04	0.01
Blackburnian Warbler	Forest	Yes	Control	11.58	0.21	0.06	11.58	0.18	0.06	15.79	0.27	0.09
			Impact	3.33	0.04	0.01	0.00	0.00	0.00	1.11	0.02	0.01
Black-capped Chickadee	Forest	No	Control	16.84	0.28	0.09	11.58	0.22	0.07	11.58	0.20	0.06
			Impact	17.78	0.30	0.07	10.00	0.18	0.05	10.00	0.18	0.04
Blackpoll Warbler	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Black-throated Blue Warbler	Forest	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Black-throated Green Warbler	Forest	Yes	Control	17.89	0.33	0.09	15.79	0.26	0.08	17.89	0.34	0.10
			Impact	10.00	0.14	0.03	4.44	0.06	0.02	12.22	0.19	0.06
Blue Jay	Forest	No	Control	27.37	0.43	0.09	53.68	1.00	0.25	40.00	0.74	0.12
			Impact	30.00	0.49	0.06	61.11	1.39	0.30	36.67	0.63	0.10
Blue-headed Vireo	Forest	No	Control	1.05	0.01	0.00	2.11	0.03	0.01	3.16	0.04	0.01
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	6.67	0.07	0.01
Blue-winged Teal	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.02	0.01
Blue-winged Warbler	Edge/Shrub/ Successional	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bobolink		Yes	Control	7.37	0.27	0.08	8.42	0.22	0.05	12.63	0.22	0.03

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
	Grassland/ Open Country		Impact	25.56	0.89	0.21	33.33	1.39	0.41	36.67	1.14	0.29
Boreal Chickadee	Forest	No	Control	0.00	0.00	0.00	1.05	0.02	0.01	2.11	0.03	0.01
			Impact	0.00	0.00	0.00	1.11	0.02	0.01	0.00	0.00	0.00
Brewer's Blackbird	Edge/Shrub/ Successional	No	Control	2.11	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	3.33	0.07	0.01	3.33	0.04	0.01	0.00	0.00	0.00
Broad-winged Hawk	Forest	Yes	Control	1.05	0.01	0.00	2.11	0.04	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	1.11	0.01	0.00	4.44	0.06	0.01
Brown Creeper	Forest	No	Control	2.11	0.03	0.01	1.05	0.03	0.01	1.05	0.01	0.00
			Impact	2.22	0.03	0.01	2.22	0.03	0.01	0.00	0.00	0.00
Brown Thrasher	Edge/Shrub/ Successional	Yes	Control	0.00	0.00	0.00	1.05	0.01	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	2.22	0.03	0.00
Brown-headed Cowbird	Edge/Shrub/ Successional	No	Control	2.11	0.04	0.01	2.11	0.03	0.01	3.16	0.04	0.01
			Impact	4.44	0.13	0.04	14.44	0.22	0.05	6.67	0.10	0.02
Canada Goose	Wetland/ Open Water	No	Control	4.21	0.86	0.00	5.26	0.32	0.00	10.53	0.39	0.01
			Impact	15.56	0.77	0.10	6.67	0.28	0.00	10.00	1.64	0.00
Canada Jay	Forest	No	Control	7.37	0.18	0.05	4.21	0.12	0.03	9.47	0.16	0.05
			Impact	2.22	0.06	0.01	3.33	0.07	0.01	4.44	0.10	0.03
Canada Warbler	Forest	Yes	Control	5.26	0.06	0.02	3.16	0.05	0.02	2.11	0.03	0.01
			Impact	4.44	0.08	0.02	4.44	0.07	0.02	3.33	0.06	0.01
Cape May Warbler	Forest	No	Control	1.05	0.03	0.01	1.05	0.01	0.00	1.05	0.01	0.00
			Impact	1.11	0.01	0.00	1.11	0.01	0.00	0.00	0.00	0.00
Cedar Waxwing	Edge/Shrub/ Successional	No	Control	12.63	0.47	0.13	7.37	0.22	0.06	25.26	0.60	0.15
			Impact	12.22	0.33	0.11	15.56	0.39	0.07	21.11	0.52	0.12
Chestnut-sided Warbler	Edge/Shrub/ Successional	Yes	Control	28.42	0.57	0.17	34.74	0.68	0.20	29.47	0.47	0.12
			Impact	44.44	0.94	0.25	42.22	0.87	0.23	27.78	0.52	0.15
Chipping Sparrow	Edge/Shrub/ Successional	No	Control	8.42	0.11	0.03	6.32	0.15	0.04	3.16	0.06	0.02
			Impact	12.22	0.17	0.05	6.67	0.09	0.02	6.67	0.10	0.02
Clay-colored Sparrow	Edge/Shrub/ Successional	No	Control	7.37	0.11	0.02	9.47	0.18	0.05	3.16	0.04	0.01
			Impact	31.11	0.54	0.12	43.33	0.99	0.28	24.44	0.52	0.15
Cliff Swallow	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	2.11	0.09	0.00	0.00	0.00	0.00
			Impact	1.11	0.02	0.01	3.33	0.22	0.03	2.22	0.02	0.00
Common Goldeneye	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	1.05	0.02	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.02	0.00	1.11	0.11	0.00
Common Grackle	Edge/Shrub/ Successional	No	Control	4.21	0.06	0.01	4.21	0.11	0.03	5.26	0.08	0.01
			Impact	2.22	0.04	0.01	3.33	0.06	0.00	7.78	0.18	0.04
		No	Control	4.21	0.07	0.00	8.42	0.14	0.01	3.16	0.07	0.00

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
Common Loon	Wetland/ Open Water		Impact	2.22	0.03	0.00	10.00	0.19	0.00	11.11	0.14	0.00
Common Merganser	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	1.05	0.01	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Nighthawk	Grassland/ Open Country	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Raven	Forest	No	Control	5.26	0.15	0.00	6.32	0.15	0.00	13.68	0.22	0.00
			Impact	12.22	0.27	0.02	8.89	0.16	0.01	8.89	0.14	0.00
Common Tern	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.01	0.00	1.11	0.01	0.00
Common Yellowthroat	Edge/Shrub/ Successional	Yes	Control	31.58	0.57	0.17	21.05	0.46	0.13	22.11	0.40	0.10
			Impact	54.44	1.00	0.24	51.11	1.04	0.29	52.22	0.98	0.27
Connecticut Warbler	Forest	Yes	Control	1.05	0.01	0.00	9.47	0.16	0.05	3.16	0.07	0.02
			Impact	2.22	0.03	0.01	4.44	0.06	0.01	2.22	0.03	0.01
Cooper's Hawk	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dark-eyed Junco	Forest	No	Control	7.37	0.11	0.03	8.42	0.20	0.06	10.53	0.16	0.04
			Impact	1.11	0.01	0.00	2.22	0.03	0.01	2.22	0.02	0.01
Dickcissel	Grassland/ Open Country	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	3.33	0.08	0.00	0.00	0.00	0.00
Double-crested Cormorant	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	1.11	0.03	0.00	1.11	0.08	0.00
Downy Woodpecker	Forest	No	Control	3.16	0.04	0.01	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	1.11	0.02	0.00	1.11	0.01	0.00	1.11	0.02	0.01
Eastern Bluebird	Grassland/ Open Country	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	2.11	0.03	0.00
			Impact	3.33	0.03	0.01	0.00	0.00	0.00	3.33	0.04	0.00
Eastern Kingbird	Edge/Shrub/ Successional	No	Control	3.16	0.06	0.02	2.11	0.03	0.00	2.11	0.03	0.01
			Impact	5.56	0.08	0.02	3.33	0.08	0.01	5.56	0.07	0.02
Eastern Phoebe	Edge/Shrub/ Successional	No	Control	4.21	0.04	0.01	1.05	0.02	0.01	4.21	0.07	0.01
			Impact	2.22	0.03	0.00	0.00	0.00	0.00	2.22	0.03	0.00
Eastern Whip-poor-will	Forest	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Wood-Pewee	Forest	Yes	Control	5.26	0.08	0.02	6.32	0.07	0.01	5.26	0.06	0.02
			Impact	3.33	0.06	0.01	6.67	0.12	0.02	1.11	0.01	0.00

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
European Starling	Edge/Shrub/ Successional	No	Control	4.21	0.09	0.02	2.11	0.03	0.01	1.05	0.01	0.00
			Impact	5.56	0.28	0.01	5.56	0.19	0.04	2.22	0.21	0.04
Evening Grosbeak	Forest	Yes	Control	1.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gadwall	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.02	0.00
Golden-crowned Kinglet	Forest	No	Control	4.21	0.05	0.02	5.26	0.12	0.04	8.42	0.19	0.06
			Impact	3.33	0.04	0.01	1.11	0.01	0.00	4.44	0.09	0.03
Golden-winged Warbler	Edge/Shrub/ Successional	Yes	Control	8.42	0.14	0.03	6.32	0.08	0.02	7.37	0.13	0.03
			Impact	10.00	0.14	0.05	6.67	0.10	0.03	8.89	0.11	0.02
Gray Catbird	Edge/Shrub/ Successional	Yes	Control	1.05	0.01	0.00	2.11	0.03	0.00	3.16	0.05	0.02
			Impact	2.22	0.02	0.01	3.33	0.03	0.01	2.22	0.03	0.01
Great Blue Heron	Wetland/ Open Water	No	Control	2.11	0.03	0.00	1.05	0.01	0.00	0.00	0.00	0.00
			Impact	3.33	0.03	0.00	3.33	0.10	0.00	1.11	0.02	0.00
Great Crested Flycatcher	Forest	No	Control	1.05	0.01	0.00	3.16	0.03	0.00	1.05	0.02	0.00
			Impact	4.44	0.04	0.01	2.22	0.03	0.01	3.33	0.03	0.01
Great Gray Owl	Forest	Yes	Control	0.00	0.00	0.00	1.05	0.01	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Green-winged Teal	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.06	0.00
Hairy Woodpecker	Forest	No	Control	0.00	0.00	0.00	5.26	0.08	0.02	6.32	0.13	0.03
			Impact	3.33	0.03	0.01	7.78	0.11	0.02	8.89	0.13	0.04
Hermit Thrush	Forest	No	Control	26.32	0.48	0.09	28.42	0.57	0.17	36.84	0.68	0.20
			Impact	11.11	0.18	0.02	15.56	0.36	0.11	28.89	0.59	0.17
Hooded Merganser	Wetland/ Open Water	Yes	Control	1.05	0.01	0.00	1.05	0.01	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.07	0.02	1.11	0.06	0.00
House Sparrow	Towns	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.02	0.00
(Northern) House Wren	Edge/Shrub/ Successional	No	Control	1.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	2.22	0.04	0.00	4.44	0.08	0.02	4.44	0.06	0.02
Indigo Bunting	Edge/Shrub/ Successional	No	Control	0.00	0.00	0.00	3.16	0.04	0.01	4.21	0.06	0.02
			Impact	1.11	0.01	0.00	6.67	0.08	0.02	10.00	0.13	0.02
Killdeer	Grassland/ Open Country	Yes	Control	4.21	0.06	0.01	1.05	0.01	0.00	2.11	0.02	0.00
			Impact	4.44	0.08	0.01	2.22	0.03	0.01	1.11	0.01	0.00
Least Flycatcher	Forest	Yes	Control	12.63	0.20	0.06	10.53	0.25	0.07	15.79	0.29	0.08
			Impact	11.11	0.19	0.04	14.44	0.26	0.07	17.78	0.30	0.07

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
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LeConte's Sparrow	Grassland/ Open Country	No	Control	7.37	0.14	0.04	1.05	0.02	0.01	4.21	0.06	0.02
			Impact	28.89	0.62	0.19	0.00	0.00	0.00	23.33	0.33	0.08
Lincoln's Sparrow	Edge/Shrub/ Successional	No	Control	5.26	0.08	0.03	2.11	0.03	0.01	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.01	0.00	0.00	0.00	0.00
Magnolia Warbler	Forest	No	Control	23.16	0.44	0.13	6.32	0.11	0.03	4.21	0.04	0.01
			Impact	7.78	0.10	0.03	2.22	0.02	0.01	3.33	0.04	0.01
Mallard	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	1.05	0.02	0.00	2.11	0.24	0.08
			Impact	3.33	0.07	0.00	3.33	0.10	0.02	3.33	1.27	0.00
Marbled Godwit	Grassland/ Open Country	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marsh Wren	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Merlin	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	2.22	0.02	0.00	1.11	0.03	0.01
Mourning Dove	Edge/Shrub/ Successional	No	Control	1.05	0.02	0.00	1.05	0.03	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	1.11	0.01	0.00	0.00	0.00	0.00
Mourning Warbler	Forest	Yes	Control	13.68	0.27	0.07	27.37	0.42	0.11	22.11	0.34	0.10
			Impact	22.22	0.42	0.08	23.33	0.40	0.12	20.00	0.29	0.08
Nashville Warbler	Forest	Yes	Control	71.58	1.66	0.50	74.74	1.81	0.55	83.16	1.89	0.58
			Impact	60.00	1.28	0.35	57.78	1.32	0.38	62.22	1.47	0.39
Northern Flicker	Forest	Yes	Control	6.32	0.14	0.03	9.47	0.17	0.03	15.79	0.26	0.07
			Impact	7.78	0.11	0.02	10.00	0.18	0.01	21.11	0.33	0.07
Northern Harrier	Grassland/ Open Country	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.01	0.00	0.00	0.00	0.00
Northern Parula	Forest	No	Control	11.58	0.17	0.04	9.47	0.19	0.05	12.63	0.20	0.06
			Impact	2.22	0.02	0.00	2.22	0.03	0.01	1.11	0.02	0.01
Northern Rough-winged Swallow	Wetland/ Open Water	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Northern Waterthrush	Forest	No	Control	4.21	0.09	0.02	2.11	0.03	0.00	1.05	0.02	0.01
			Impact	5.56	0.10	0.01	2.22	0.03	0.01	4.44	0.04	0.01
Olive-sided Flycatcher	Forest	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	4.21	0.05	0.01
			Impact	2.22	0.03	0.00	1.11	0.01	0.00	1.11	0.01	0.00
	Forest	No	Control	1.05	0.01	0.00	1.05	0.01	0.00	2.11	0.02	0.01

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
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Orange-crowned Warbler			Impact	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.02	0.01
Ovenbird	Forest	No	Control	58.95	1.44	0.33	64.21	1.48	0.42	65.26	1.45	0.44
			Impact	57.78	1.10	0.20	61.11	1.22	0.31	53.33	1.24	0.29
Palm Warbler	Edge/Shrub/ Successional	No	Control	6.32	0.13	0.04	6.32	0.13	0.04	4.21	0.07	0.02
			Impact	2.22	0.02	0.00	1.11	0.03	0.01	2.22	0.04	0.01
Philadelphia Vireo	Forest	No	Control	2.11	0.03	0.01	7.37	0.09	0.03	4.21	0.04	0.01
			Impact	3.33	0.04	0.01	5.56	0.12	0.04	3.33	0.03	0.01
Pied-billed Grebe	Wetland/ Open Water	No	Control	1.05	0.01	0.00	3.16	0.03	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	4.44	0.06	0.00	0.00	0.00	0.00
Pileated Woodpecker	Forest	No	Control	3.16	0.06	0.01	11.58	0.16	0.02	9.47	0.11	0.02
			Impact	6.67	0.12	0.00	8.89	0.16	0.02	7.78	0.16	0.01
Pine Siskin	Forest	No	Control	2.11	0.03	0.01	1.05	0.01	0.00	14.74	0.27	0.06
			Impact	3.33	0.12	0.04	0.00	0.00	0.00	8.89	0.84	0.13
Pine Warbler	Forest	No	Control	1.05	0.01	0.00	1.05	0.01	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Purple Finch	Forest	Yes	Control	0.00	0.00	0.00	1.05	0.01	0.00	2.11	0.03	0.01
			Impact	4.44	0.04	0.01	1.11	0.01	0.00	3.33	0.03	0.01
Red Crossbill	Forest	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	4.21	0.06	0.01
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.03	0.00
Red-bellied Woodpecker	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-breasted Merganser	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.04	0.00
Red-breasted Nuthatch	Forest	No	Control	15.79	0.25	0.06	23.16	0.46	0.13	25.26	0.41	0.11
			Impact	16.67	0.24	0.06	11.11	0.21	0.06	12.22	0.22	0.05
Red-eyed Vireo	Forest	No	Control	73.68	1.84	0.46	62.11	1.32	0.39	74.74	1.64	0.47
			Impact	66.67	1.41	0.25	57.78	1.20	0.32	76.67	1.82	0.42
Red-headed Woodpecker	Edge/Shrub/ Successional	Yes	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	3.33	0.04	0.01	1.11	0.01	0.00
Red-tailed Hawk	Forest	No	Control	2.11	0.02	0.00	2.11	0.02	0.00	1.05	0.01	0.00
			Impact	7.78	0.09	0.00	1.11	0.01	0.00	1.11	0.02	0.00
Red-winged Blackbird	Wetland/ Open Water	No	Control	11.58	0.28	0.07	10.53	0.47	0.12	16.84	0.26	0.06
			Impact	16.67	0.30	0.06	26.67	1.21	0.15	27.78	0.68	0.15
Ring-billed Gull	Wetland/ Open Water	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.01	0.00
Ring-necked Duck	Wetland/ Open Water	Yes	Control	1.05	0.01	0.00	1.05	0.02	0.01	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.02	0.01	0.00	0.00	0.00

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
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Rock Pigeon	Grassland/ Open Country	No	Control	0.00	0.00	0.00	1.05	0.02	0.01	0.00	0.00	0.00
			Impact	1.11	0.07	0.02	0.00	0.00	0.00	1.11	0.01	0.00
Rose-breasted Grosbeak	Forest	Yes	Control	10.53	0.18	0.05	23.16	0.45	0.12	31.58	0.38	0.10
			Impact	18.89	0.32	0.06	23.33	0.31	0.07	16.67	0.33	0.08
Ruby-crowned Kinglet	Forest	Yes	Control	12.63	0.20	0.05	11.58	0.19	0.06	7.37	0.09	0.03
			Impact	8.89	0.11	0.02	2.22	0.04	0.01	2.22	0.04	0.01
Ruby-throated Hummingbird	Edge/Shrub/ Successional	No	Control	2.11	0.03	0.01	4.21	0.09	0.02	1.05	0.01	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.01	0.00
Ruffed Grouse	Forest	Yes	Control	22.11	0.25	0.05	6.32	0.06	0.02	16.84	0.18	0.04
			Impact	20.00	0.20	0.03	1.11	0.02	0.01	16.67	0.20	0.05
Sandhill Crane	Wetland/ Open Water	Yes	Control	8.42	0.14	0.00	17.89	0.36	0.03	7.37	0.18	0.01
			Impact	15.56	0.34	0.04	20.00	0.58	0.06	32.22	0.93	0.04
Savannah Sparrow	Grassland/ Open Country	No	Control	7.37	0.19	0.05	10.53	0.15	0.05	5.26	0.08	0.02
			Impact	37.78	0.88	0.25	33.33	0.72	0.21	34.44	0.86	0.21
Scarlet Tanager	Forest	No	Control	1.05	0.01	0.00	2.11	0.04	0.01	6.32	0.09	0.02
			Impact	0.00	0.00	0.00	5.56	0.07	0.02	3.33	0.03	0.01
Sedge Wren	Grassland/ Open Country	Yes	Control	7.37	0.24	0.07	4.21	0.13	0.03	7.37	0.13	0.03
			Impact	22.22	0.48	0.12	11.11	0.23	0.07	12.22	0.28	0.07
Sharp-shinned Hawk	Forest	No	Control	2.11	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	1.11	0.02	0.01	1.11	0.01	0.00
Sharp-tailed Grouse	Grassland/ Open Country	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	2.22	0.23	0.07	2.22	0.12	0.04	4.44	0.12	0.04
Song Sparrow	Edge/Shrub/ Successional	Yes	Control	17.89	0.25	0.07	10.53	0.19	0.05	18.95	0.35	0.10
			Impact	46.67	0.87	0.21	33.33	0.52	0.14	35.56	0.79	0.19
Sora	Wetland/ Open Water	No	Control	1.05	0.01	0.00	2.11	0.02	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spotted Sandpiper	Wetland/ Open Water	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	2.22	0.02	0.00	1.11	0.01	0.00	1.11	0.03	0.01
Spruce Grouse	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.07	0.02	0.00	0.00	0.00
	Forest	No	Control	8.42	0.11	0.01	3.16	0.06	0.02	0.00	0.00	0.00

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
Swainson's Thrush			Impact	2.22	0.02	0.00	3.33	0.03	0.01	0.00	0.00	0.00
Swamp Sparrow	Wetland/ Open Water	Yes	Control	7.37	0.15	0.04	7.37	0.13	0.03	9.47	0.18	0.05
			Impact	10.00	0.18	0.03	10.00	0.11	0.03	15.56	0.28	0.08
Tennessee Warbler	Forest	Yes	Control	11.58	0.21	0.06	4.21	0.04	0.01	2.11	0.02	0.01
			Impact	8.89	0.12	0.04	0.00	0.00	0.00	0.00	0.00	0.00
Tree Swallow	Wetland/ Open Water	Yes	Control	2.11	0.03	0.01	2.11	0.07	0.00	1.05	0.01	0.00
			Impact	4.44	0.08	0.00	6.67	0.16	0.01	3.33	0.08	0.01
Trumpeter Swan	Wetland/ Open Water	No	Control	6.32	0.15	0.00	3.16	0.08	0.02	3.16	0.12	0.00
			Impact	2.22	0.03	0.00	3.33	0.18	0.01	4.44	0.08	0.00
Turkey Vulture	Edge/Shrub/ Successional	No	Control	1.05	0.01	0.00	4.21	0.05	0.00	2.11	0.03	0.00
			Impact	1.11	0.01	0.00	4.44	0.06	0.00	3.33	0.07	0.00
Veery	Forest	Yes	Control	26.32	0.66	0.12	42.11	0.84	0.23	41.05	0.75	0.21
			Impact	34.44	0.68	0.13	48.89	0.81	0.22	41.11	0.86	0.23
Vesper Sparrow	Grassland/ Open Country	Yes	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.02	0.01	0.00	0.00	0.00
Virginia Rail	Wetland/ Open Water	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	1.11	0.01	0.00
Warbling Vireo	Edge/Shrub/ Successional	No	Control	0.00	0.00	0.00	1.05	0.01	0.00	4.21	0.04	0.01
			Impact	2.22	0.03	0.00	3.33	0.03	0.01	0.00	0.00	0.00
Western Meadowlark	Grassland/ Open Country	No	Control	1.05	0.01	0.00	0.00	0.00	0.00	1.05	0.01	0.00
			Impact	4.44	0.04	0.00	3.33	0.04	0.01	0.00	0.00	0.00
White-breasted Nuthatch	Forest	No	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	1.11	0.01	0.00	0.00	0.00	0.00
White-throated Sparrow	Forest	Yes	Control	53.68	1.07	0.25	50.53	1.11	0.31	51.58	0.91	0.25
			Impact	51.11	0.99	0.22	56.67	1.13	0.28	54.44	0.93	0.22
White-winged Crossbill	Forest	No	Control	0.00	0.00	0.00	1.05	0.01	0.00	21.05	0.35	0.08
			Impact	0.00	0.00	0.00	0.00	0.00	0.00	5.56	0.27	0.02
Wilson's Snipe	Wetland/ Open Water	Yes	Control	12.63	0.22	0.03	7.37	0.14	0.02	10.53	0.16	0.03
			Impact	6.67	0.10	0.00	3.33	0.04	0.01	4.44	0.09	0.00
Wilson's Warbler	Edge/Shrub/ Successional	No	Control	3.16	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00
			Impact	1.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winter Wren	Forest	No	Control	6.32	0.08	0.02	9.47	0.12	0.03	24.21	0.32	0.09
			Impact	5.56	0.08	0.01	1.11	0.01	0.00	4.44	0.07	0.02

Common Name	Habitat Guild	SCC	Station Type	2018			2021			2024		
				Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
Wood Duck	Wetland/ Open Water	Yes	Control	2.11	0.02	0.00	1.05	0.03	0.01	0.00	0.00	0.00
			Impact	0.00	0.00	0.00	2.22	0.04	0.01	0.00	0.00	0.00
Wood Thrush	Forest	Yes	Control	11.58	0.15	0.03	8.42	0.13	0.04	4.21	0.05	0.02
			Impact	10.00	0.17	0.03	8.89	0.10	0.03	11.11	0.17	0.03
Yellow Warbler	Edge/Shrub/ Successional	No	Control	12.63	0.22	0.06	1.05	0.01	0.00	12.63	0.19	0.05
			Impact	7.78	0.18	0.03	4.44	0.04	0.01	20.00	0.29	0.08
Yellow-bellied Flycatcher	Forest	No	Control	15.79	0.28	0.08	12.63	0.29	0.07	17.89	0.27	0.09
			Impact	11.11	0.19	0.05	11.11	0.16	0.04	11.11	0.22	0.07
Yellow-bellied Sapsucker	Forest	Yes	Control	2.11	0.02	0.01	5.26	0.06	0.01	3.16	0.05	0.01
			Impact	7.78	0.09	0.02	3.33	0.06	0.01	2.22	0.06	0.02
Yellow-rumped Warbler	Forest	No	Control	11.58	0.20	0.06	8.42	0.12	0.03	8.42	0.14	0.04
			Impact	12.22	0.18	0.06	5.56	0.07	0.02	7.78	0.12	0.04

Appendix B Bird Community Structure Metrics for the Rainy River Mine Baseline (2014, 2015) and Construction Phase (2016)

Table B-1. Number of Species Detected and Number of Survey Stations on Point Count Surveys Conducted in 2014, 2015, and 2016 (data from Wood, 2019)

Year	All Species			Species of Conservation Concern			Number of Survey Stations		
	Control	Impact	Total	Control	Impact	Total	Control	Impact	Total
2014	85	74	95	33	27	36	75	32	107
2015	102	94	117	38	40	47	85	63	148
2016	101	99	115	38	43	47	95	90	185

Table B-2. Occupancy Rate, Abundance, and Density for Bird Species Detected on 2014 – 2016 Surveys (data from Wood, 2019)

				2014			2015			2016		
Common Name	Habitat Guild	SCC	Station Type	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)	Occupancy Rate (%)	Abundance (birds/station)	Density (birds/ha)
Alder Flycatcher	Edge/Shrub/ Successional	No	Control	16.7	0.27	0.042	22.4	0.38	0.09	29.5	0.39	0.104
			Impact	34.4	0.41	0.053	44.4	0.65	0.172	16.9	0.17	0.039
American Bittern	Wetland/ Open Water	No	Control	1.4	0.01	0.003	2.4	0.02	0	3.2	0.04	0.007
			Impact	3.1	0.03	0	1.6	0.02	0	0	0	0
American Crow	Forest	No	Control	6.9	0.08	0.008	15.3	0.26	0.037	21.1	0.25	0.007
			Impact	18.8	0.19	0.003	33.3	0.43	0.04	28.1	0.33	0.011
American Goldfinch	Edge/Shrub/ Successional	No	Control	18.1	0.19	0.033	23.5	0.36	0.101	12.6	0.16	0.017
			Impact	31.3	0.47	0.03	22.2	0.35	0.101	14.6	0.19	0.05
American Herring Gull	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
American Kestrel	Grassland/ Open Country	Yes	Control	0	0	0	0	0	0	3.2	0.03	0.007
			Impact	0	0	0	3.2	0.03	0.01	2.2	0.02	0.004
American Pipit	Grassland/ Open Country	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
American Redstart	Edge/Shrub/ Successional	No	Control	6.9	0.07	0.011	9.4	0.09	0.03	10.5	0.15	0.04
			Impact	25	0.34	0.042	9.5	0.13	0.04	4.5	0.04	0.011
American Robin	Edge/Shrub/ Successional	No	Control	34.7	0.51	0.055	41.2	0.53	0.12	41.1	0.49	0.104
			Impact	37.5	0.5	0.058	55.6	0.78	0.192	49.4	0.69	0.163
American Tree Sparrow	Edge/Shrub/ Successional	No	Control	1.4	0.01	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
American White Pelican	Wetland/ Open Water	Yes	Control	1.4	0.03	0.006	0	0	0	0	0	0
			Impact	0	0	0.019	4.8	0.06	0	3.4	0.09	0
		Yes	Control	0	0	0	0	0	0	0	0	0

				2014			2015			2016		
Common Name	**Habitat Guild**	**SCC**	**Station Type**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**
American Woodcock	Edge/Shrub/ Successional		Impact	0	0	0	0	0	0	0	0	0
Bald Eagle	Wetland/ Open Water	Yes	Control	0	0	0	1.2	0.01	0.004	1.1	0.01	0
			Impact	0	0	0	3.2	0.03	0.005	0	0	0
Baltimore Oriole	Edge/Shrub/ Successional	No	Control	0	0	0	2.4	0.02	0.004	0	0	0
			Impact	0	0	0	3.2	0.03	0.005	0	0	0
Barn Swallow	Grassland/ Open Country	Yes	Control	1.4	0.01	0.003	1.2	0.05	0	2.1	0.06	0
			Impact	0	0	0	12.7	0.4	0.025	7.9	0.33	0
Barred Owl	Forest	No	Control	0	0	0	0	0	0	2.1	0.02	0
			Impact	0	0	0	0	0	0	0	0	0
Bay-breasted Warbler	Forest	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	1.1	0.01	0.004
Belted Kingfisher	Wetland/ Open Water	Yes	Control	0	0	0	3.5	0.04	0.004	1.1	0.01	0.003
			Impact	3.1	0.03	0.003	0	0	0	0	0	0
Black-and-white Warbler	Forest	No	Control	34.7	0.39	0.055	29.4	0.36	0.101	54.7	0.64	0.178
			Impact	31.3	0.41	0.08	38.1	0.38	0.106	41.6	0.48	0.134
Black-backed Woodpecker	Forest	No	Control	0	0	0	1.2	0.01	0.004	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Black-billed Cuckoo	Edge/Shrub/ Successional	Yes	Control	9.7	0.11	0	7.1	0.12	0.004	8.4	0.09	0.01
			Impact	53.1	0.69	0.022	19	0.21	0.02	4.5	0.04	0
Black-billed Magpie	Edge/Shrub/ Successional	No	Control	1.4	0.01	0.003	2.4	0.02	0.007	0	0	0
			Impact	6.3	0.06	0.003	22.2	0.4	0.081	14.6	0.25	0.018
Blackburnian Warbler	Forest	Yes	Control	6.9	0.09	0.019	11.8	0.12	0.037	18.9	0.23	0.074
			Impact	0	0	0.006	3.2	0.03	0.005	4.5	0.06	0.014
Black-capped Chickadee	Forest	No	Control	12.5	0.15	0.028	12.9	0.16	0.045	17.9	0.26	0.077
			Impact	3.1	0.03	0.008	4.8	0.06	0.02	7.9	0.11	0.032
Blackpoll Warbler	Forest	No	Control	0	0	0	4.7	0.05	0.015	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	Forest	Yes	Control	1.4	0.03	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	Forest	Yes	Control	15.3	0.2	0.025	21.2	0.22	0.06	26.3	0.35	0.077
			Impact	12.5	0.13	0.028	3.2	0.03	0.01	13.5	0.13	0.039
Blue Jay	Forest	No	Control	31.9	0.35	0.053	44.7	0.52	0.094	61.1	0.92	0.137
			Impact	37.5	0.5	0.061	50.8	0.7	0.141	53.9	0.91	0.099
	Forest	No	Control	5.6	0.05	0.011	9.4	0.09	0.026	2.1	0.03	0.01

				2014			2015			2016		
Common Name	**Habitat Guild**	**SCC**	**Station Type**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**
Blue-headed Vireo			Impact	3.1	0.03	0.008	14.3	0.14	0.04	0	0	0
Bobolink	Grassland/ Open Country	Yes	Control	5.6	0.08	0.011	10.6	0.26	0.034	10.5	0.21	0.044
			Impact	21.9	0.53	0.028	49.2	1.05	0.217	32.6	0.73	0.191
Boreal Chickadee	Forest	No	Control	1.4	0.01	0.003	0	0	0	0	0	0
			Impact	0	0	0.003	0	0	0	0	0	0
Brewer's Blackbird	Edge/Shrub/ Successional	No	Control	1.4	0.01	0.003	0	0	0	2.1	0.04	0.01
			Impact	6.3	0.19	0.014	0	0	0	2.2	0.03	0.011
Broad-winged Hawk	Forest	Yes	Control	0	0	0	4.7	0.06	0.007	0	0	0
			Impact	0	0	0.011	3.2	0.03	0.01	3.4	0.03	0.004
Brown Creeper	Forest	No	Control	2.8	0.03	0.006	0	0	0	4.2	0.04	0.013
			Impact	6.3	0.06	0.006	0	0	0	3.4	0.03	0.011
Brown Thrasher	Edge/Shrub/ Successional	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	4.5	0.04	0.004
Brown-headed Cowbird	Edge/Shrub/ Successional	No	Control	6.9	0.07	0.011	1.2	0.01	0.004	3.2	0.03	0.007
			Impact	25	0.38	0.022	9.5	0.14	0.025	2.2	0.02	0.007
Canada Goose	Wetland/ Open Water	No	Control	1.4	0.34	0	5.9	0.16	0.015	11.6	0.14	0
			Impact	0	0	0.003	12.7	3.44	0	11.2	0.3	0
Canada Jay	Forest	No	Control	11.1	0.12	0.022	8.2	0.09	0.03	8.4	0.14	0.034
			Impact	3.1	0.03	0.011	0	0	0	5.6	0.08	0.025
Canada Warbler	Forest	Yes	Control	0	0	0	3.5	0.05	0.015	5.3	0.06	0.017
			Impact	3.1	0.03	0.014	0	0	0	5.6	0.06	0.011
Cape May Warbler	Forest	No	Control	0	0	0	1.2	0.01	0.004	2.1	0.02	0.007
			Impact	0	0	0	0	0	0	0	0	0
Cedar Waxwing	Edge/Shrub/ Successional	No	Control	22.2	0.31	0.039	22.4	0.27	0.056	15.8	0.31	0.07
			Impact	25	0.41	0.042	14.3	0.27	0.051	15.7	0.43	0.103
Chestnut-sided Warbler	Edge/Shrub/ Successional	Yes	Control	37.5	0.57	0.089	30.6	0.42	0.12	47.4	0.8	0.241
			Impact	50	0.78	0.116	11.1	0.14	0.035	48.3	0.69	0.184
Chipping Sparrow	Edge/Shrub/ Successional	No	Control	12.5	0.14	0.022	3.5	0.04	0.004	8.4	0.11	0.017
			Impact	15.6	0.16	0.019	6.3	0.06	0.01	10.1	0.1	0.021
Clay-colored Sparrow	Edge/Shrub/ Successional	No	Control	8.3	0.15	0.011	10.6	0.15	0.03	7.4	0.16	0.047
			Impact	25	0.5	0.025	47.6	0.76	0.222	30.3	0.51	0.117
Cliff Swallow	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.05	0	0	0	0
Common Grackle	Edge/Shrub/ Successional	No	Control	0	0	0	3.5	0.08	0.022	3.2	0.04	0.007
			Impact	0	0	0	3.2	0.03	0.01	2.2	0.02	0.007

				2014			2015			2016		
Common Name	**Habitat Guild**	**SCC**	**Station Type**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**	**Occupancy Rate (%)**	**Abundance (birds/station)**	**Density (birds/ha)**
Common Loon	Wetland/ Open Water	No	Control	2.8	0.03	0	4.7	0.07	0.011	8.4	0.09	0
			Impact	0	0	0	0	0	0	2.2	0.02	0
Common Nighthawk	Grassland/ Open Country	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.02	0.005	1.1	0.01	0
Common Raven	Forest	No	Control	12.5	0.15	0.003	23.5	0.31	0.049	27.4	0.34	0.013
			Impact	21.9	0.28	0	12.7	0.13	0.01	24.7	0.29	0.018
Common Yellowthroat	Edge/Shrub/ Successional	Yes	Control	43.1	0.73	0.108	43.5	0.61	0.146	40	0.56	0.117
			Impact	62.5	1.06	0.089	55.6	1.1	0.278	60.7	0.85	0.173
Connecticut Warbler	Forest	Yes	Control	11.1	0.2	0.033	5.9	0.09	0.026	0	0	0
			Impact	3.1	0.06	0.011	0	0	0	4.5	0.06	0.011
Dark-eyed Junco	Forest	No	Control	8.3	0.14	0.022	8.2	0.09	0.022	1.1	0.01	0.003
			Impact	0	0	0.008	4.8	0.05	0.005	2.2	0.02	0.004
Downy Woodpecker	Forest	No	Control	2.8	0.03	0.006	3.5	0.04	0.011	9.5	0.11	0.034
			Impact	6.3	0.06	0.006	1.6	0.02	0.005	1.1	0.01	0.004
Eastern Bluebird	Grassland/ Open Country	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Eastern Kingbird	Edge/Shrub/ Successional	No	Control	2.8	0.05	0.011	7.1	0.08	0.015	3.2	0.03	0.003
			Impact	3.1	0.06	0.008	14.3	0.17	0.045	2.2	0.02	0.007
Eastern Phoebe	Edge/Shrub/ Successional	No	Control	4.2	0.04	0.008	10.6	0.11	0.019	11.6	0.12	0.027
			Impact	3.1	0.03	0	6.3	0.06	0.01	7.9	0.09	0.018
Eastern Towhee	Edge/Shrub/ Successional	Yes	Control	0	0	0	2.4	0.02	0.004	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Eastern Whip-poor-will	Forest	Yes	Control	2.8	0.03	0.003	1.2	0.01	0	0	0	0
			Impact	0	0	0	1.6	0.02	0	0	0	0
Eastern Wood-Pewee	Forest	Yes	Control	2.8	0.03	0.006	14.1	0.16	0.037	1.1	0.01	0
			Impact	9.4	0.09	0.006	4.8	0.05	0.005	1.1	0.01	0.004
European Starling	Edge/Shrub/ Successional	No	Control	0	0	0	5.9	0.44	0.026	2.1	0.07	0.003
			Impact	0	0	0	1.6	0.24	0	2.2	0.29	0
Evening Grosbeak	Forest	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Golden-crowned Kinglet	Forest	No	Control	9.7	0.14	0.025	8.2	0.12	0.037	11.6	0.24	0.077
			Impact	0	0	0.008	0	0	0	0	0	0
Golden-winged Warbler	Edge/Shrub/ Successional	Yes	Control	2.8	0.03	0.003	10.6	0.12	0.037	8.4	0.12	0.03
			Impact	9.4	0.09	0.006	9.5	0.16	0.04	9	0.11	0.032

				2014			2015			2016		
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Gray Catbird	Edge/Shrub/ Successional	Yes	Control	1.4	0.01	0.003	0	0	0	2.1	0.02	0.007
			Impact	6.3	0.06	0.006	3.2	0.03	0.01	1.1	0.01	0.004
Great Blue Heron	Wetland/ Open Water	No	Control	0	0	0	0	0	0	1.1	0.01	0
			Impact	3.1	0.03	0	0	0	0	0	0	0
Great Crested Flycatcher	Forest	No	Control	2.8	0.03	0.006	2.4	0.02	0.007	1.1	0.02	0.003
			Impact	9.4	0.09	0.008	1.6	0.03	0	5.6	0.06	0.011
Green Heron	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.02	0	0	0	0
Hairy Woodpecker	Forest	No	Control	1.4	0.03	0	1.2	0.02	0.007	4.2	0.04	0.007
			Impact	6.3	0.06	0.011	7.9	0.1	0.015	4.5	0.04	0.007
Hermit Thrush	Forest	No	Control	47.2	0.86	0.113	43.5	0.6	0.097	51.6	0.73	0.101
			Impact	37.5	0.5	0.08	23.8	0.25	0.02	22.5	0.31	0.05
Hooded Merganser	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
(Northern) House Wren	Edge/Shrub/ Successional	No	Control	0	0	0	2.4	0.02	0.004	2.1	0.02	0.003
			Impact	3.1	0.03	0.003	6.3	0.08	0.015	1.1	0.01	0
Indigo Bunting	Edge/Shrub/ Successional	No	Control	0	0	0	0	0	0	1.1	0.01	0.003
			Impact	9.4	0.09	0.006	1.6	0.03	0.01	2.2	0.02	0.007
Killdeer	Grassland/ Open Country	Yes	Control	0	0	0	1.2	0.01	0	1.1	0.01	0
			Impact	0	0	0	7.9	0.08	0.01	4.5	0.06	0.007
Least Flycatcher	Forest	Yes	Control	16.7	0.19	0.036	25.9	0.32	0.097	22.1	0.28	0.067
			Impact	28.1	0.34	0.039	28.6	0.51	0.116	24.7	0.33	0.064
LeConte's Sparrow	Grassland/ Open Country	No	Control	0	0	0	3.5	0.04	0.011	8.4	0.13	0.04
			Impact	9.4	0.13	0.006	34.9	0.46	0.147	30.3	0.6	0.17
Lincoln's Sparrow	Edge/Shrub/ Successional	No	Control	5.6	0.09	0.017	10.6	0.13	0.03	7.4	0.12	0.037
			Impact	0	NA	0	3.2	0.03	0.005	1.1	0.01	0.004
Long-eared Owl	Forest	No	Control	0	0	0	1.2	0.01	0	0	0	0
			Impact	0	0	0	0	0	0	2.2	0.02	0
Magnolia Warbler	Forest	No	Control	13.9	0.15	0.022	23.5	0.27	0.071	23.2	0.32	0.094
			Impact	6.3	0.06	0.017	20.6	0.21	0.045	12.4	0.12	0.035
Mallard	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	1.1	0.01	0
			Impact	0	0	0	0	0	0	3.4	0.04	0.004
Marbled Godwit	Grassland/ Open Country	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Marsh Wren	Wetland/ Open Water	No	Control	0	0	0	1.2	0.04	0.011	0	0	0
			Impact	0	0	0	1.6	0.02	0.005	0	0	0

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Merlin	Forest	No	Control	0	0	0	0	0	0	1.1	0.01	0
			Impact	0	0	0	0	0	0	1.1	0.01	0.004
Mourning Dove	Edge/Shrub/ Successional	No	Control	0	0	0	0	0	0	2.1	0.02	0
			Impact	0	0	0	3.2	0.03	0.01	0	0	0
Mourning Warbler	Forest	Yes	Control	15.3	0.23	0.033	12.9	0.13	0.022	11.6	0.17	0.03
			Impact	25	0.31	0.072	3.2	0.03	0.01	12.4	0.15	0.039
Nashville Warbler	Forest	Yes	Control	90.3	2.19	0.318	75.3	1.32	0.352	83.2	1.48	0.422
			Impact	68.8	1.31	0.208	69.8	1	0.243	70.8	1.42	0.371
Northern Flicker	Forest	Yes	Control	18.1	0.26	0.028	24.7	0.29	0.034	20	0.23	0.027
			Impact	12.5	0.22	0.033	22.2	0.29	0.045	23.6	0.27	0.032
Northern Harrier	Grassland/ Open Country	No	Control	0	0	0	1.2	0.01	0	1.1	0.02	0
			Impact	0	0	0	0	0	0	4.5	0.04	0.004
Northern Parula	Forest	No	Control	9.7	0.12	0.019	15.3	0.2	0.041	15.8	0.23	0.064
			Impact	6.3	0.09	0.008	1.6	0.02	0.005	2.2	0.02	0.004
Northern Rough-winged Swallow	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Northern Waterthrush	Forest	No	Control	2.8	0.04	0.003	2.4	0.02	0.004	4.2	0.05	0.01
			Impact	0	0	0	3.2	0.03	0.01	5.6	0.07	0.007
Olive-sided Flycatcher	Forest	Yes	Control	0	0	0	0	0	0	2.1	0.02	0.003
			Impact	0	0	0	1.6	0.02	0	0	0	0
Orange-crowned Warbler	Forest	No	Control	1.4	0.01	0.003	1.2	0.01	0.004	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Ovenbird	Forest	No	Control	66.7	1.28	0.158	72.9	1.38	0.292	76.8	1.32	0.278
			Impact	68.8	1.31	0.138	74.6	1.29	0.177	73	1.13	0.184
Palm Warbler	Edge/Shrub/ Successional	No	Control	8.3	0.22	0.036	17.6	0.27	0.071	6.3	0.08	0.027
			Impact	0	0	0.008	0	0	0	1.1	0.01	0.004
Philadelphia Vireo	Forest	No	Control	0	0	0	2.4	0.04	0.011	0	0	0
			Impact	6.3	0.06	0.008	0	0	0	0	0	0
Pied-billed Grebe	Wetland/ Open Water	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	Forest	No	Control	2.8	0.03	0.006	8.2	0.08	0.015	5.3	0.05	0.007
			Impact	3.1	0.06	0	9.5	0.1	0.005	2.2	0.02	0.004
Pine Siskin	Forest	No	Control	0	0	0	0	0	0	3.2	0.08	0.017
			Impact	0	0	0.003	0	0	0	1.1	0.02	0
Pine Warbler	Forest	No	Control	0	0	0	2.4	0.02	0.004	0	0	0

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			Impact	0	0	0	0	0	0	0	0	0
Purple Finch	Forest	Yes	Control	2.8	0.03	0.006	2.4	0.02	0.007	0	0	0
			Impact	0	0	0	1.6	0.02	0.005	0	0	0
Red Crossbill	Forest	Yes	Control	12.5	0	0	23.5	0	0	25.3	0	0
			Impact	3.1	0	0	12.7	0	0	15.7	0.01	0
Red-breasted Nuthatch	Forest	No	Control	0	0.14	0.025	0	0.27	0.071	0	0.29	0.07
			Impact	0	0.03	0.019	0	0.13	0.015	1.1	0.16	0.035
Red-eyed Vireo	Forest	No	Control	75	1.41	0.147	76.5	1.28	0.333	76.8	1.11	0.261
			Impact	71.9	1.38	0.113	77.8	1.27	0.263	62.9	0.82	0.152
Red-headed Woodpecker	Edge/Shrub/ Successional	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	2.2	0.02	0.007
Red-shouldered Hawk	Forest	Yes	Control	0	0	0	2.4	0.02	0.007	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Forest	No	Control	1.4	0.01	0	3.5	0.06	0	2.1	0.02	0.003
			Impact	0	0	0	3.2	0.03	0.005	2.2	0.02	0.004
Red-winged Blackbird	Wetland/ Open Water	No	Control	5.6	0.05	0.003	10.6	0.2	0.034	15.8	0.18	0.02
			Impact	15.6	0.22	0.025	23.8	0.54	0.086	22.5	0.38	0.057
Ring-billed Gull	Wetland/ Open Water	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	2.2	0.02	0
Ring-necked Duck	Wetland/ Open Water	Yes	Control	0	0	0	1.2	0.01	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Rock Pigeon	Grassland/ Open Country	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Rose-breasted Grosbeak	Forest	Yes	Control	20.8	0.23	0.042	25.9	0.31	0.06	32.6	0.4	0.084
			Impact	25	0.31	0.036	14.3	0.19	0.051	27	0.27	0.032
Ruby-crowned Kinglet	Forest	Yes	Control	2.8	0.03	0.006	9.4	0.11	0.03	12.6	0.14	0.027
			Impact	0	0	0	15.9	0.19	0.015	5.6	0.06	0.014
Ruby-throated Hummingbird	Edge/Shrub/ Successional	No	Control	1.4	0.01	0.003	1.2	0.01	0.004	2.1	0.02	0.007
			Impact	3.1	0.03	0.003	4.8	0.05	0.01	2.2	0.02	0.007
Ruffed Grouse	Forest	Yes	Control	4.2	0.04	0.008	14.1	0.19	0.034	32.6	0.36	0.044
			Impact	18.8	0.19	0.019	6.3	0.08	0.005	5.6	0.07	0.011
Rusty Blackbird	Forest	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.06	0	0	0	0
		Yes	Control	2.8	0.03	0	11.8	0.15	0	20	0.31	0

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Sandhill Crane	Wetland/ Open Water		Impact	18.8	0.38	0	23.8	0.41	0.061	19.1	0.26	0.007
Savannah Sparrow	Grassland/ Open Country	No	Control	8.3	0.18	0.03	5.9	0.11	0.03	8.4	0.12	0.027
			Impact	21.9	0.69	0.044	38.1	0.68	0.192	38.2	0.73	0.177
Scarlet Tanager	Forest	No	Control	2.8	0.03	0.003	2.4	0.02	0.004	3.2	0.04	0.013
			Impact	6.3	0.09	0.003	0	0	0	3.4	0.06	0.007
Sedge Wren	Grassland/ Open Country	Yes	Control	1.4	0.01	0.003	7.1	0.09	0.026	7.4	0.11	0.027
			Impact	18.8	0.38	0.033	31.7	0.67	0.202	16.9	0.21	0.039
Sharp-shinned Hawk	Forest	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0
Sharp-tailed Grouse	Grassland/ Open Country	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	11.1	0.14	0.03	2.2	0.07	0.021
Song Sparrow	Edge/Shrub/ Successional	Yes	Control	27.8	0.51	0.069	34.1	0.64	0.161	24.2	0.4	0.087
			Impact	56.3	1.03	0.061	66.7	1.05	0.253	40.4	0.63	0.131
Sora	Wetland/ Open Water	No	Control	1.4	0.01	0.003	1.2	0.01	0.004	2.1	0.02	0
			Impact	3.1	0.03	0.003	1.6	0.02	0	0	0	0
Spotted Sandpiper	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	3.4	0.08	0.011
Swainson's Thrush	Forest	No	Control	1.4	0.03	0.006	7.1	0.07	0.015	1.1	0.01	0
			Impact	3.1	0.03	0.006	0	0	0	0	0	0
Swamp Sparrow	Wetland/ Open Water	Yes	Control	9.7	0.2	0.036	20	0.26	0.064	13.7	0.19	0.037
			Impact	15.6	0.31	0.028	14.3	0.22	0.061	15.7	0.21	0.035
Tennessee Warbler	Forest	Yes	Control	0	0	0	7.1	0.09	0.026	6.3	0.14	0.023
			Impact	6.3	0.06	0.003	11.1	0.11	0.03	2.2	0.03	0.011
Tree Swallow	Wetland/ Open Water	Yes	Control	1.4	0.03	0	0	0	0	4.2	0.04	0
			Impact	0	0	0	0	0	0	3.4	0.03	0
Trumpeter Swan	Wetland/ Open Water	No	Control	0	0	0	0	0	0	4.2	0.05	0.007
			Impact	0	0	0	1.6	0.02	0	3.4	0.13	0
Turkey Vulture	Edge/Shrub/ Successional	No	Control	0	0	0	3.5	0.04	0.004	2.1	0.02	0
			Impact	3.1	0.03	0	1.6	0.02	0	4.5	0.08	0.007
Veery	Forest	Yes	Control	40.3	0.61	0.075	37.6	0.54	0.097	43.2	0.56	0.107
			Impact	56.3	1.06	0.058	47.6	0.7	0.086	36	0.46	0.057
Vesper Sparrow	Grassland/ Open Country	Yes	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	0	0	0	0	0	0

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Virginia Rail	Wetland/ Open Water	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.02	0.005	0	0	0
Warbling Vireo	Edge/Shrub/ Successional	No	Control	0	0	0	1.2	0.01	0	0	0	0
			Impact	6.3	0.06	0.006	0	0	0	6.7	0.08	0.021
Western Meadowlark	Grassland/ Open Country	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.02	0	0	0	0
White-breasted Nuthatch	Forest	No	Control	0	0	0	1.2	0.01	0.004	1.1	0.01	0.003
			Impact	0	0	0	0	0	0	0	0	0
White-throated Sparrow	Forest	Yes	Control	72.2	1.7	0.197	71.8	1.24	0.172	80	1.66	0.308
			Impact	59.4	1.69	0.227	74.6	1.27	0.136	78.7	1.36	0.18
White-winged Crossbill	Forest	No	Control	1.4	0.01	0.003	0	0	0	1.1	0.01	0
			Impact	0	0	0	0	0	0	0	0	0
Wilson's Snipe	Wetland/ Open Water	Yes	Control	11.1	0.12	0.017	17.6	0.21	0.026	24.2	0.27	0.03
			Impact	31.3	0.31	0.025	47.6	0.65	0.096	38.2	0.46	0
Wilson's Warbler	Edge/Shrub/ Successional	No	Control	0	0	0	0	0	0	0	0	0
			Impact	0	0	0	1.6	0.03	0	0	0	0.011
Winter Wren	Forest	No	Control	16.7	0.23	0.028	16.5	0.16	0.022	16.8	0.17	0.034
			Impact	9.4	0.13	0.03	1.6	0.02	0.005	10.1	0.11	0.014
Wood Duck	Wetland/ Open Water	Yes	Control	0	0	0	0	0	0	1.1	0.01	0.003
			Impact	0	0	0	0	0	0	0	0	0
Wood Thrush	Forest	Yes	Control	2.8	0.03	0.006	7.1	0.08	0.019	21.1	0.24	0.02
			Impact	6.3	0.06	0.006	0	0	0	1.1	0.01	0.004
Yellow Warbler	Edge/Shrub/ Successional	No	Control	6.9	0.08	0.017	21.2	0.28	0.079	9.5	0.13	0.027
			Impact	18.8	0.19	0.028	23.8	0.3	0.076	30.3	0.47	0.127
Yellow-bellied Flycatcher	Forest	No	Control	8.3	0.08	0.017	16.5	0.2	0.064	6.3	0.12	0.034
			Impact	0	0	0.006	6.3	0.06	0.015	4.5	0.07	0.018
Yellow-bellied Sapsucker	Forest	Yes	Control	8.3	0.12	0.014	20	0.22	0.041	11.6	0.13	0.017
			Impact	9.4	0.09	0.019	11.1	0.13	0.02	1.1	0.01	0.004
Yellow-rumped Warbler	Forest	No	Control	11.1	0.11	0.022	24.7	0.27	0.079	21.1	0.27	0.08
			Impact	9.4	0.13	0.033	20.6	0.24	0.045	6.7	0.15	0.046