

Multi-year (2019 – 2021) analysis of Species-at-Risk Surveys of Grassland Set-asides

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Photo 1: A Short-eared Owl flying low over a two-year old grassland set-aside field on January 11, 2021.

Introduction:

Over the past decades, wildlife habitat in the Fraser River Delta has been significantly modified to residential and agricultural areas. This loss of natural wildlife habitat has negatively impacted the population of birds dependent on this ecosystem and thus raised the need to conserve these species and their habitat. Grasslands have been identified as critical habitat for several species at risk, including the Barn Owl (*Tyto alba*), Short-eared Owl (*Asio flammeus*) and Pacific Great Blue Heron (*Ardea Herodias fannini*).

The Delta Farmland and Wildlife Trust (DF&WT) is working to restore grassland habitats in the Fraser

River delta by entering into stewardship agreements with farmers to plant and maintain grassland set-asides. These set-aside fields support high densities of prey animals such as the Townsend's vole (*Microtus townsendii*) and provide valuable roosting habitat. In 2019, surveys were initiated to monitor the use of these set-asides fields by Pacific Great Blue Heron, Barn Owls, and Short-eared Owls. Surveys showed a significant use of these fields by all three species and were repeated again in 2020 to continue long-term monitoring of these fields to assess the effectiveness of grassland set-asides for improving species-at-risk habitat. This study aimed to investigate the trends in occupancy and habitat use by species-at-risk over the last two years. The survey data from both years were analyzed to estimate mean heron density/ha/survey day and mean time spent by Barn Owl and Short-eared Owl across set-aside fields of varying vegetation, age, and size.

1. Pacific Great Blue Heron

1.1 Method:

Pacific Great Blue Heron (hereafter referred to as "heron") surveys included 21 and 24 grassland set-aside fields in 2019-20 and 2020-21, respectively. Fields were selected to represent a variety of seeding types, field ages, and geographical locations. Each year, every field was surveyed once every two weeks. Surveys took place between 7:00 am and 5:00 pm and the route was altered weekly to ensure each field was observed at different times of day. Upon arrival, the field was scanned with binoculars and any visible herons were counted. The perimeter of the field was then walked to flush herons that may have been obscured in ditches. Any flushed herons were tracked visually while walking to avoid double-counting.

1.2 Results and discussion:

To compare the mean heron per ha per survey day across the different ages of set-aside fields, fields from 2019 and 2020 surveyed were grouped into four age classes. Set-aside fields planted in the same year of the survey were classified as first-year set-asides, and others were marked subsequently as second and third-year set-aside fields. Set-aside fields in their fourth year and older were analyzed in a single category.

Mean heron density per survey day was highest in two- and four-year old grassland set-aside fields (Figure 1). It was difficult to determine what caused the decline in heron density in the three-year old

set-aside fields due to only two years of data. It is recommended that the surveys are continued for the next few years and trends in prey species population are assessed to find any link between heron field selection and set-aside field age.

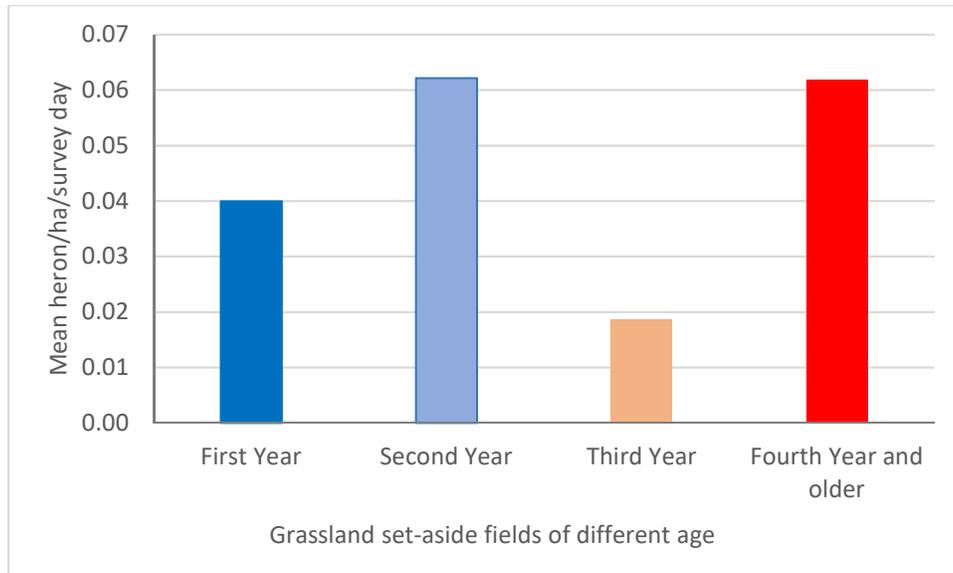


Figure 1: Mean heron density per survey day in grassland set-asides fields by field age.

Mean heron density per survey day was found highest in Pollinator Mix fields compared to Traditional Mix fields and DFWT Mix (Figure 2). Also, mean heron density per survey day was greatest in fields larger than 20 acres in size (Figure 3), and the lowest mean heron density was recorded in fields that were less than 10 acres.

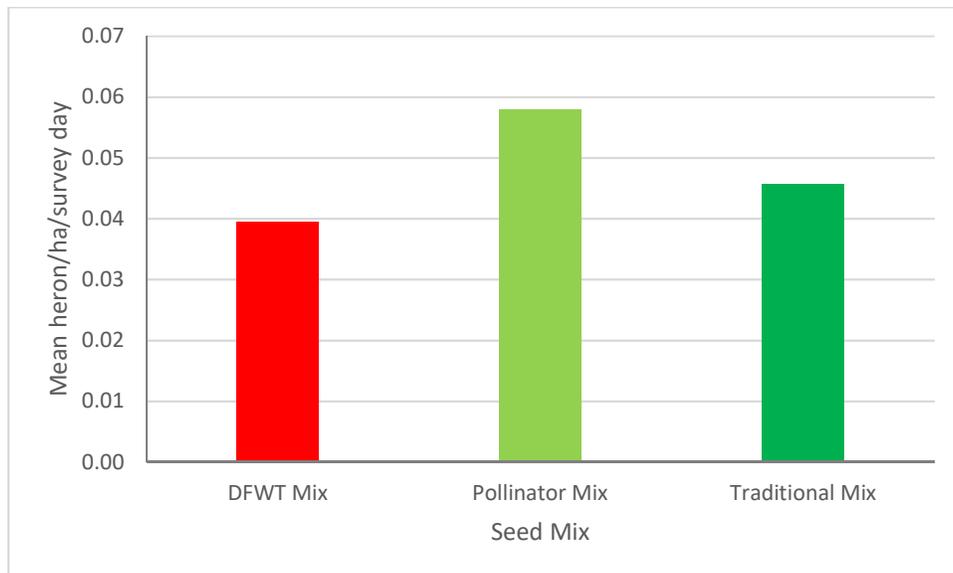


Figure 2: Mean heron density per survey day in grassland set-asides fields by seed mix.

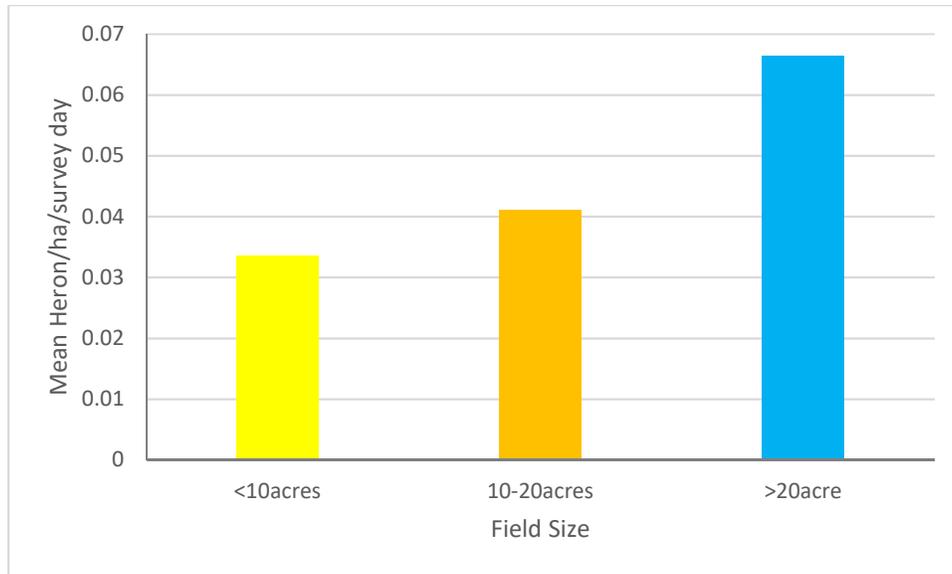


Figure 3: Mean heron density per survey day in grassland set-asides fields by field size.

2. Barn Owl and Short-eared Owl Survey

2.1 Method

Over the last two years (2019-20 and 2020-21), a total of 23 grassland set-aside fields were sampled for owl surveys. During 2019-20 surveys, each field was surveyed twice at dawn and twice at dusk for one hour surrounding sunrise or sunset respectively, resulting in four survey hours per field. Some fields were surveyed for less time due to time constraints. In 2020-21 surveys, each field was surveyed twice for one and half hours at dusk, resulting in three survey hours per field. A total of 16 fields were sampled in 2019-20 and 15 fields were sampled in 2020-21. Eight of the fields sampled were the same across both years. Surveys were conducted by finding a position where the entire field to be surveyed was visible with minimal movement. The area was then visually scanned continuously for a set time, alternating between binoculars and normal sight.

All owl activity was recorded, including the species, time of entering and exiting the field, and a description of activity (foraging, perching, etc.). "Flying low" was defined as under 10 m above the field and "flying over" was defined as over 10 m. Birds were determined to be "foraging" if they were flying low and engaging in behavior such as circling, diving, or moving their head to scan the field. Surveys were not performed in inclement conditions such as rain over 1 mm per hour or high winds. In order to conduct the multi-year analysis, the total time spent (minutes) by species in each field was calculated

per survey hour to account for the difference in the total number of hours (survey effort) a field was surveyed in 2019-20 and 2020-21.

2.2 Result and discussion:

Grassland set-aside age was classified the same as explained in section 1.2. The mean time spent by Barn Owl was found highest in three-year old set-aside (Figure 4). Whereas Short-eared Owl spent the most time in four-year old grassland set-aside fields and the least time in one-year old set-aside fields, which was the same as observed for Barn owls (Figure 5). The results support the increasing value of set-aside fields as they get older for target species-at-risk (Figure 6).

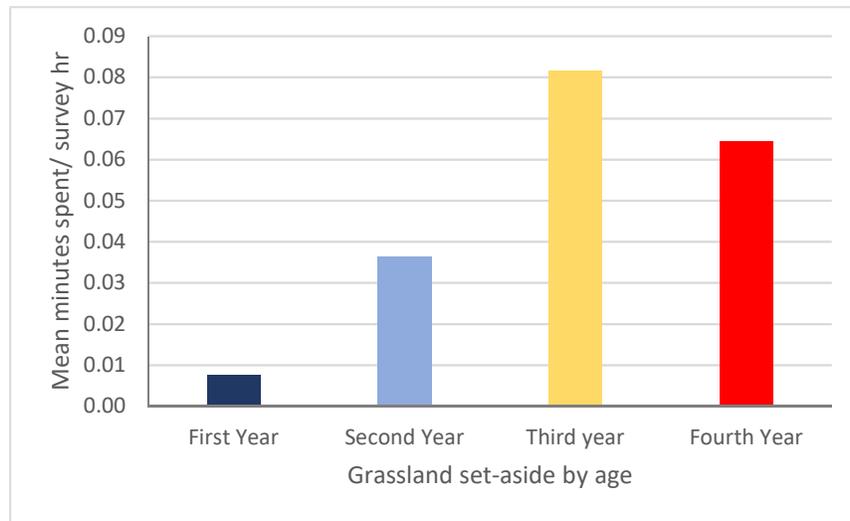


Figure 4: Mean time spent (minutes per hour) by Barn Owls in grassland set-asides by field age.

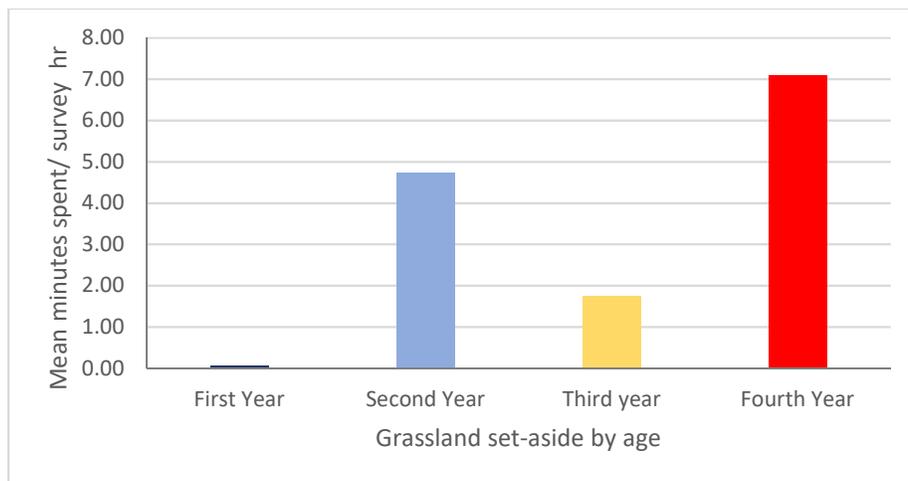


Figure 5: Mean time spent (minutes per hour) by Short-eared Owls in grassland set-asides by field age.

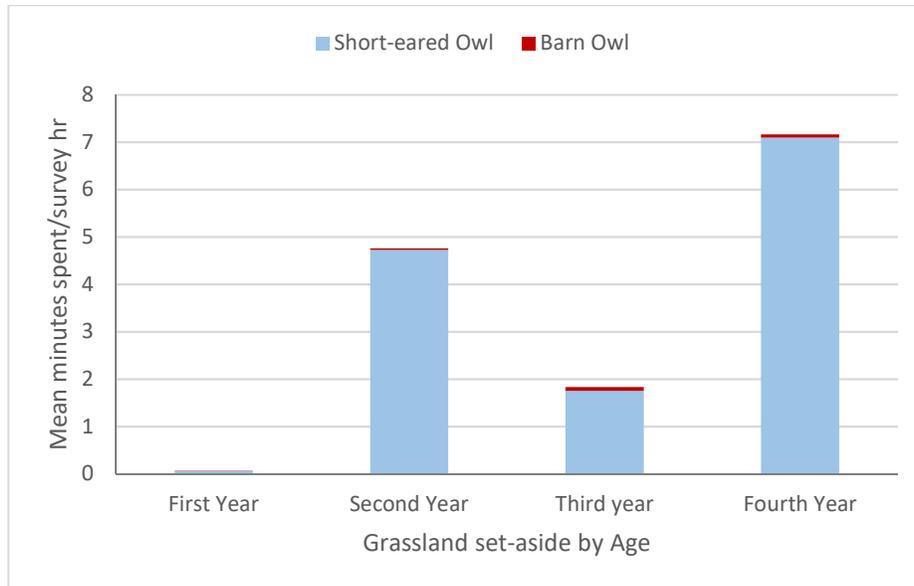


Figure 6: Comparison for Mean time spent (minutes per hour) by Barn Owl and Short-eared Owls in grassland set-asides by field age.

Barn Owl was present in 7 grassland set-aside fields, and Short-eared Owl was present in 14 out of the 23 fields surveyed in 2019-20 and 2020-21. Survey results found a trend of Barn Owls spending the most amount of time in DFWT Mix fields compared to the other field types (Figure 7), whereas Short-eared Owl were found to spend significantly more time time in Pollinator Mix fields compared to the other field types (Figure 8). This difference could be due to the difference in detection probability of Short-eared Owl and Barn owl, or it could be due to niche competition, as both the species have dietary overlap (Figure 9).

Ontario Ministry of the environment, conservation, and Parks (2014) has reported on their website that successful nest box programs to attract Barn Owls have coincided with the decline of the Short-eared Owl in the same area. If this is the case, it should be researched further to investigate how these set-aside fields play a role in habitat selection between Short-eared Owl and Barn Owl.

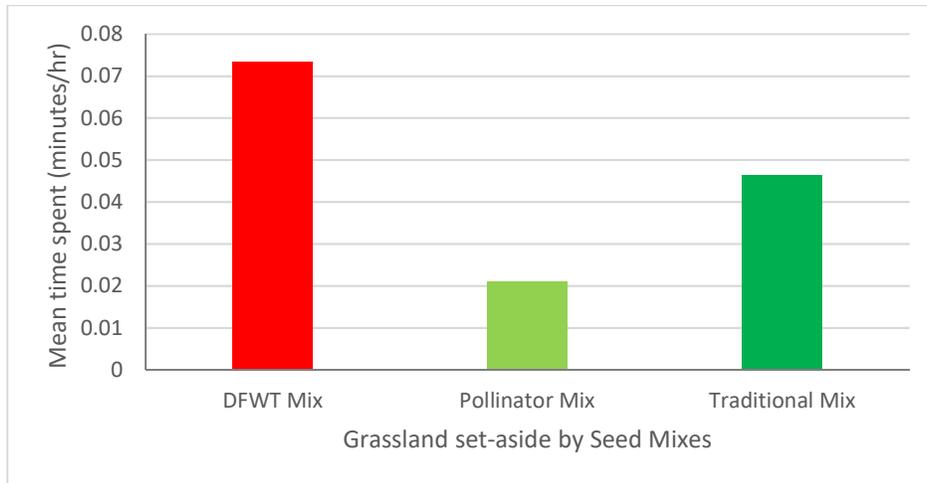


Figure 7: Mean time spent (minutes per hour) by Barn Owls in DFWT Mix, Pollinator Mix, and Traditional Mix grassland set-aside fields.

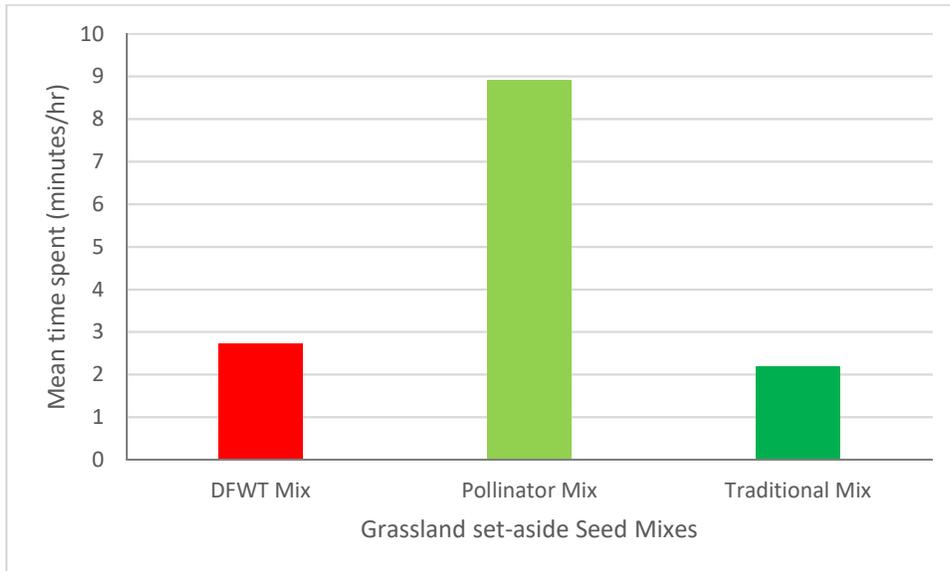


Figure 8: Mean time spent (minutes per hour) by Short-eared Owls in DFWT Mix, Pollinator Mix, and Traditional Mix grassland set-aside fields.

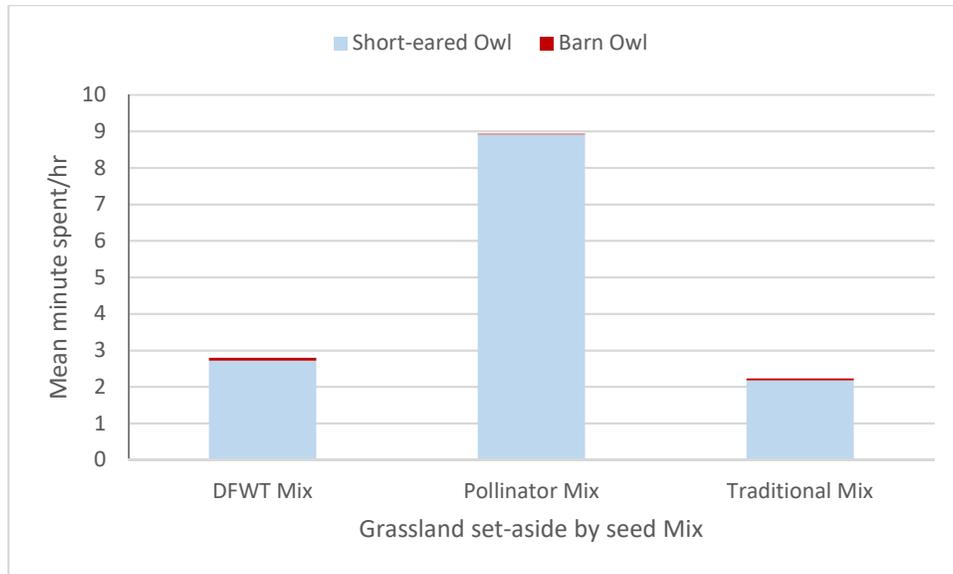


Figure 9: Comparison for Mean time spent (minutes per hour) by Barn Owl and Short-eared Owls in DFWT Mix, Pollinator Mix, and Traditional Mix grassland set-aside fields.

Reference:

Ontario Ministry of the environment, conservation, and Parks (2014) Short-eared Owl (<https://www.ontario.ca/page/short-eared-owl>, assessed on April 4, 2021)