

# Grassland Set-aside (GLSA) surveys of Pacific Great Blue Heron and Birds of Prey

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Photo 1: GLSA field in Delta, 2021

## Introduction

Grasslands have been identified as important habitats for birds, including several species at risk, such as 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) aims to improve grassland habitat in the Fraser River delta by entering into stewardship agreements with farmers to manage farmland as Grassland Set-asides (GLSA). These set-asides support a high density of small mammals, such as the Townsend's Vole (*Microtus townsendii*) and provide valuable foraging and roosting habitat for birds. This study aims to assess the effectiveness of GLSAs in restoring habitat for predatory birds, focusing on species at risk. The objectives of the study were as follows:

1. To evaluate the use of grassland set aside fields by Pacific Great Blue Heron.
2. To evaluate the use of GLSA fields by diurnal raptors.
3. To compare the use of active GLSAs to fields that were recently brought out of the GLSA program.

We surveyed the activity of GLSA fields for herons, raptors and owls between November 16, 2021, and March 16, 2022. The survey included twenty-five active fields and seven fields that were removed from the GLSA program in 2021. Fields were selected to represent various seeding types, field ages, sizes, and geographical locations.

# 1.0 PACIFIC GREAT BLUE HERON

## 1.1 Methods

Pacific Great Blue Heron surveys were conducted in 25 GLSA fields in Delta and Richmond. Each field was surveyed eight times, once every two weeks. Surveys took place between 8:30 am, and 5:00 pm and the route was altered weekly to ensure each field was observed at different times of the day.

Upon arrival, the field was scanned with binoculars for 20 minutes, and any visible herons were counted. The heron surveys were completed in conjunction with surveys for diurnal raptors. Surveys were conducted at least once a month at 25 GLSA fields between November 16, 2021, and March 16, 2022. A total of 23 herons were observed throughout the season, and there was no significant difference in their frequency throughout the season.

## 1.2 Results

Hérons were seen in the greatest densities in fields planted with the DF&WT seed mix. However, the difference observed between each of the varieties was not statistically significant (*Figure 1*). The heron survey from 2020-2021 found that herons were frequently observed in newer fields. This year, we found a greater number of herons in GLSA fields three years or older, compared with set-asides that were one or two years old (*Figure 2*).

| Set-aside seed mix type | Total Herons observed | Total acres surveyed | Mean Herons per acre |
|-------------------------|-----------------------|----------------------|----------------------|
| DF&WT Mix               | 10                    | 796                  | 0.22                 |
| Grass & Clover          | 9                     | 834                  | 0.17                 |
| Pollinator Mix          | 2                     | 413                  | 0.09                 |

Figure 1: Heron observations by GLSA seed mix type

| Set-aside age        | Total Herons observed | Total acres surveyed | Mean Herons per acre |
|----------------------|-----------------------|----------------------|----------------------|
| 1 or 2 years         | 10                    | 718                  | 0.53                 |
| greater than 3 years | 11                    | 1325                 | 0.76                 |

Figure 2: Heron observations by GLSA age

## 2.0 Raptor Survey

### 2.1 Methods

Diurnal raptor surveys were conducted in 25 GLSA fields from November 16, 2021, to March 16, 2022. Fields were selected for variety of field locations, year planted and seed mix. Each field was sampled as a 20-minute point count once a month, between 8:30 am and 5:00 pm. The survey time was altered weekly to ensure each field was observed at different times of the day. An adjacent non-GLSA field next to the grassland-set aside was also surveyed for raptors.

### 2.2 Results | General

A total of five raptor species were observed in the survey (*Figure 1*). Northern Harriers were present in 84% of the fields sampled, followed by Bald Eagle (64%), Rough-legged Hawk (32%), Red-tailed Hawk (20%) and Cooper's Hawk (4%) (*Figure 2*).

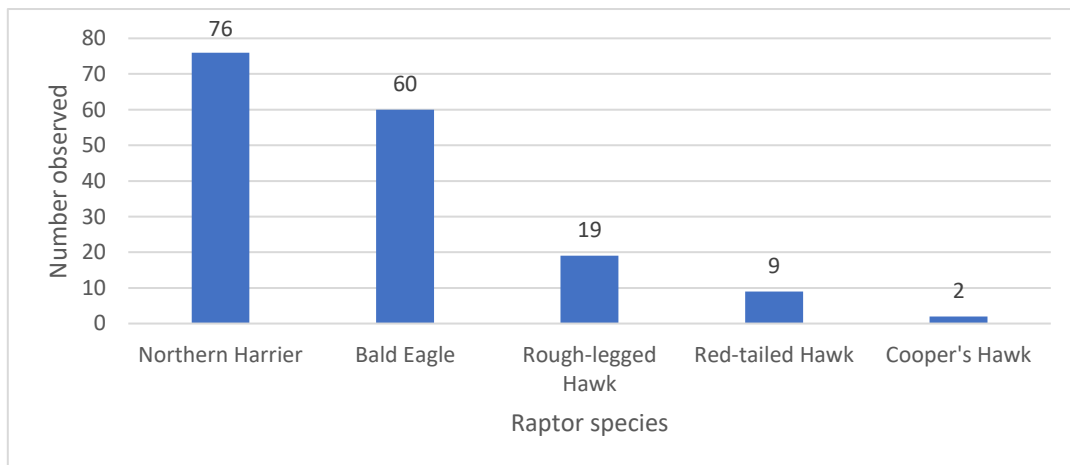


Figure 1: Total sightings of each raptor species recorded in Delta and South Richmond

Each raptor species was observed in GLSAs of all three seed mixes except for Cooper's Hawk, which was only observed once. Raptors were more frequently observed in fields planted with the 'Pollinator Mix' compared with the traditional seed mixes (*Figure 4*).

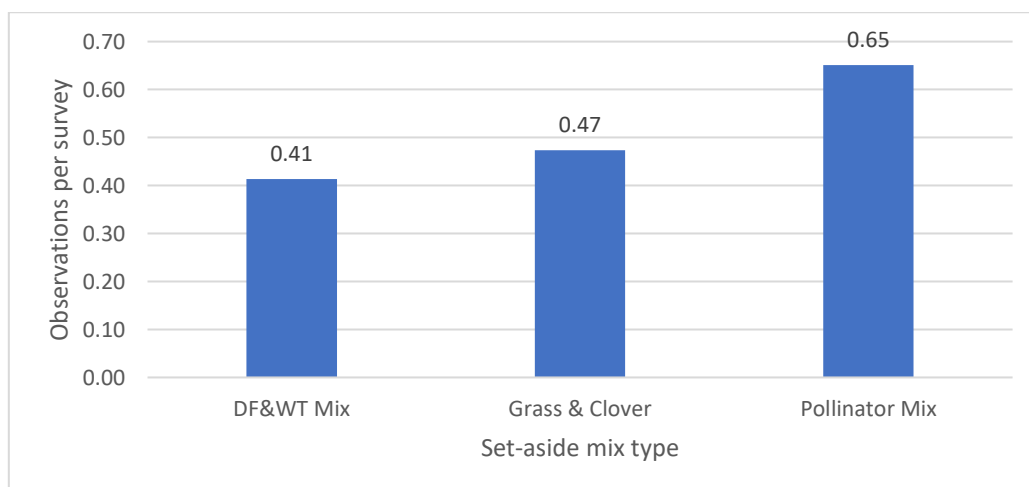
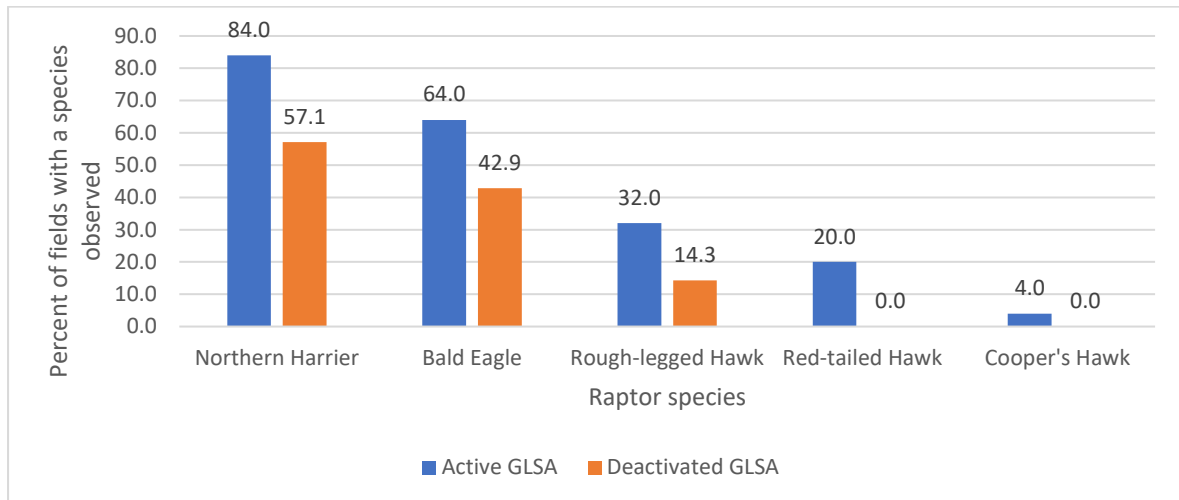


Figure 2: Mean raptor observations by GLSA mix type.

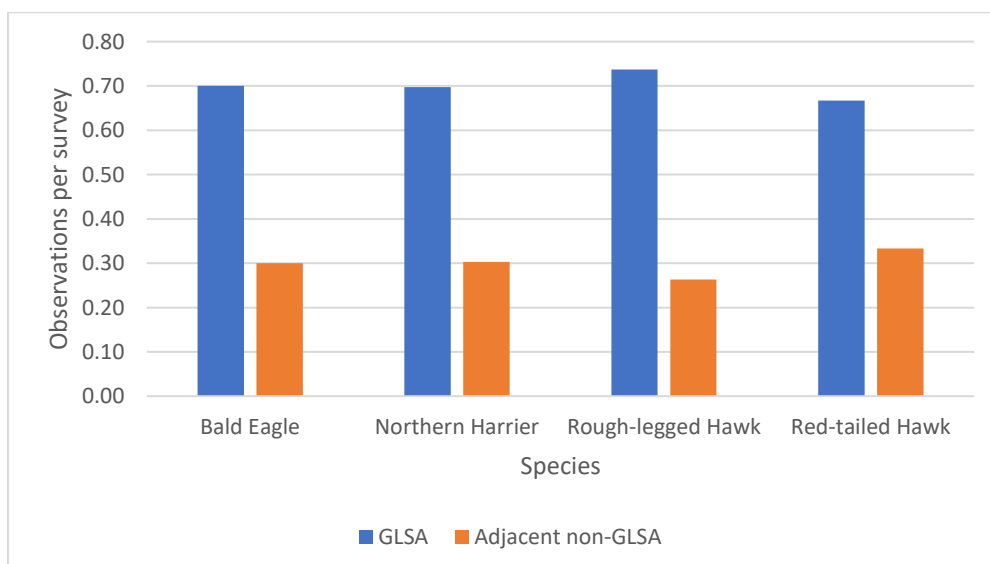
## Results | GLSA vs. previous GLSA / non-GLSA

Our survey found that every raptor species was observed more frequently in active GLSAs than in our comparison to fields that had been GLSAs but were removed from the program in 2021 and returned to annual cropland (*Figure 3*).



*Figure 3: Comparison of raptor abundance in active GLSAs and fields recently removed from the program*

We compared the frequency of raptors observed during surveys of GLSA fields to adjacent fields which were not in the GLSA program and found that of the four main species encountered during surveys, each were observed significantly more frequently on set-aside fields than on adjacent non-set-aside fields (*Figure 4*).



*Figure 4: Comparison of raptors observed in GLSAs and adjacent non-set-aside fields*

## Results | GLSA age and size

Among GLSAs, there was a greater number of raptor observations in older, more well-established set asides compared with fields recently enrolled in the program. Average number of raptor observations in first year set-asides was 0.28, increasing to 0.44 in second year-set asides and 0.55 in set asides 3 or more years older (*Figure 5*). We also found that larger set asides tended to support higher numbers of raptors, with set asides over 20 acres observing 0.52 raptors each survey compared with 0.34 raptors in set-asides under 10 acres.

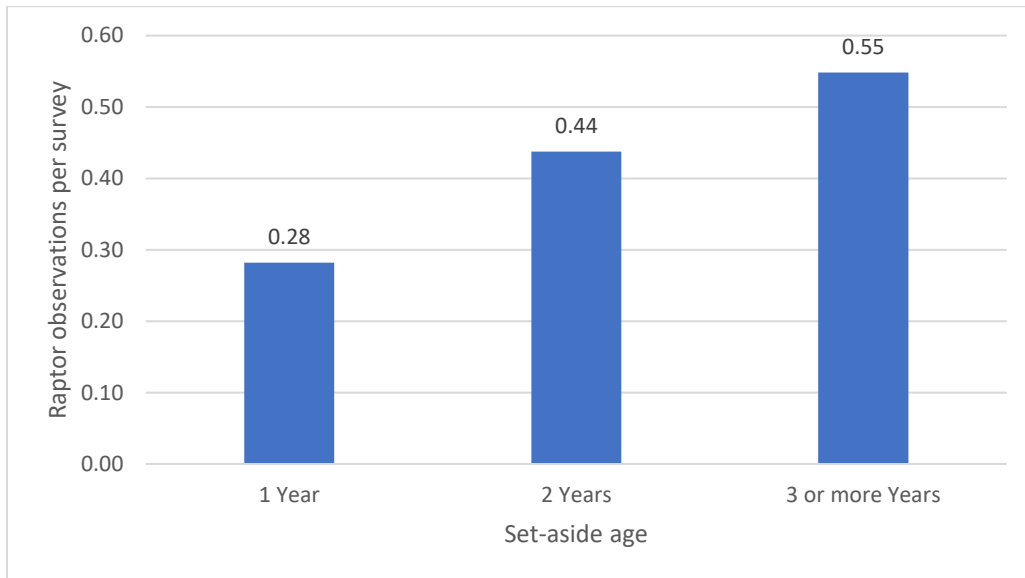


Figure 5: Mean raptor observations by GLSA age

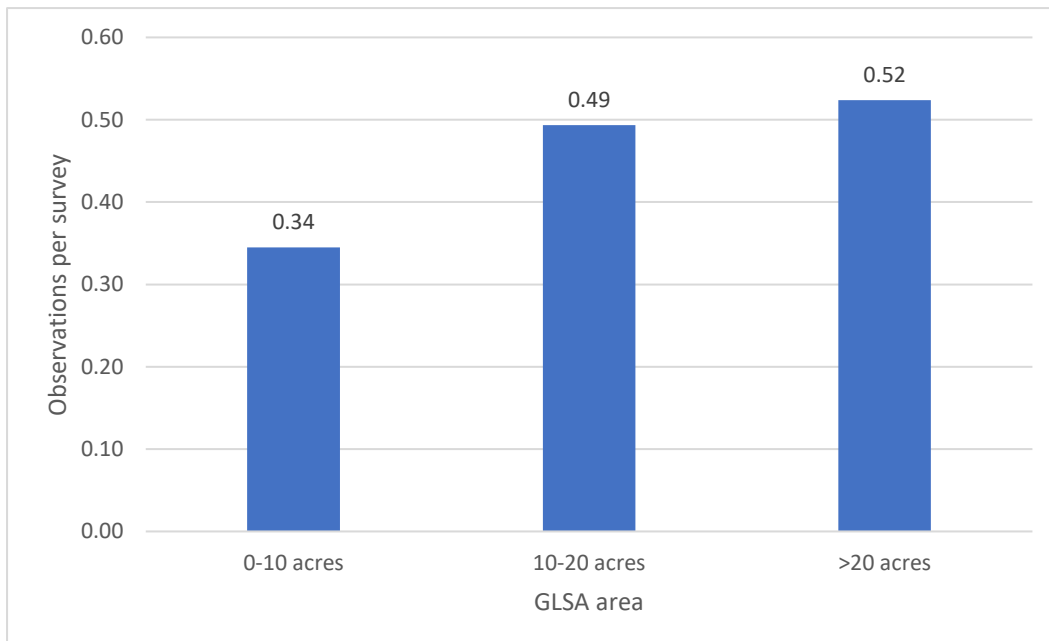


Figure 6: Mean raptor observations by GLSA size

While the size of set-asides was a factor in the number of raptors observed, we found that the effect varied by species. Bald Eagles were more frequently observed in set-asides under 10 acres and Northern Harriers preferred set-asides over 20 acres (*Figure 7*). This may be due to the behaviours observed by each species at the set-aside. Bald Eagles were observed about equally observed to be perched or actively hunting and Northern Harriers were much more frequently observed actively hunting, and would prefer larger open areas (*Figure 8*).

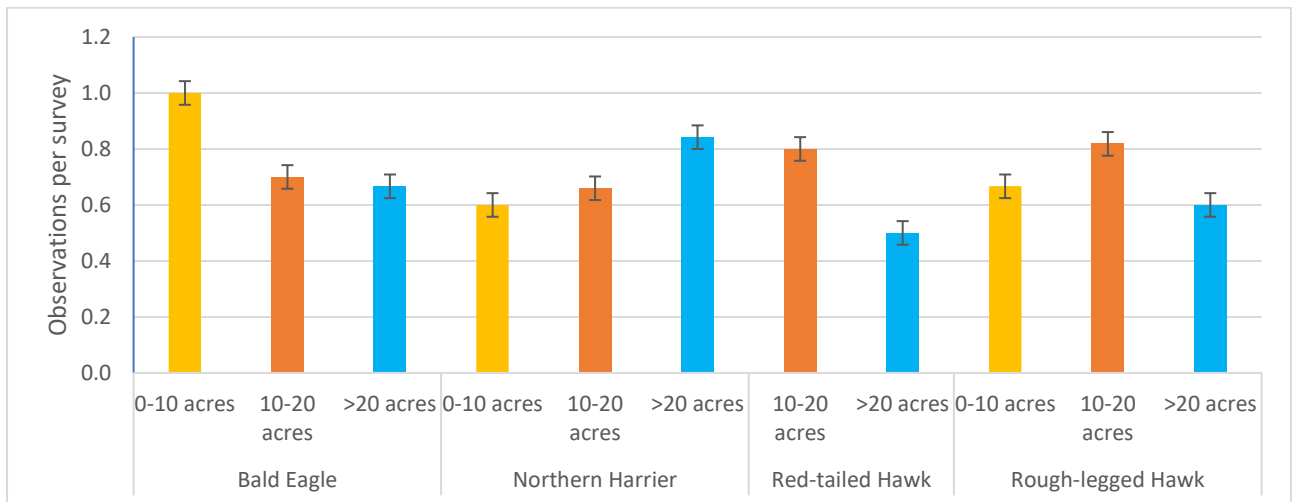


Figure 7: Raptor observations in GLSA fields by area and species

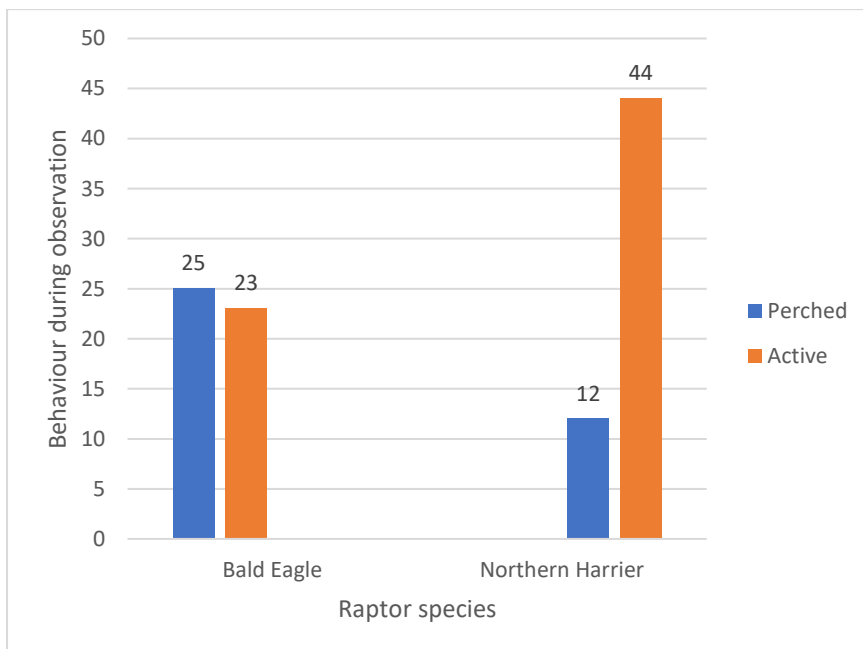


Figure 8: Behaviour observed of Bald Eagles and Northern Harriers in GLSAs

## 3.0 Barn Owl and Short-eared Owl

### 3.1 Methods

Owl surveys were conducted in 16 grassland-set aside fields in Delta and Richmond from November 15, 2021 to March 15, 2022. Each field was surveyed for 90 minutes surrounding sunset and was surveyed twice over the season. Surveys were conducted from a point location at the edge of the field where the entire field would be visible with either binoculars or a spotting scope. All raptor activity was recorded including species observed, time first observed, and description of activity (e.g. foraging, perching). Surveys were not performed when rain exceeded 1mm/h or wind exceeded 16km/h.

### 3.2 Results

Owls were detected in 6 GLSA fields on 7 survey days (*Table 1*). A total of 8 Short-eared owls were observed in 5 GLSA fields and 1 Barn Owl was observed. The behaviour most often observed during owl surveys was active hunting, followed by perching and flying over the field. Active hunting was observed during every owl observation seen on surveys for at least a portion of the survey. Short-eared owls were observed in all three types of the seed mixes used for GLSAs; Pollinator mix, DF&WT mix and Grass/Clover mix. Owls were also observed in set-asides from 1 year to 4 years old, however no owls were observed in fields planted during the spring of 2021.

| Date   | Species         | Minimum number of individuals | Field type     | Owls previously observed in this field? |
|--------|-----------------|-------------------------------|----------------|---|
| 14-Dec | Short-eared Owl | 1                             | Grass/Clover   | Yes                                     |
| 07-Feb | Short-eared Owl | 1                             | Grass/Clover   | Yes                                     |
| 16-Nov | Short-eared Owl | 1                             | Pollinator mix | Yes                                     |
| 17-Feb | Short-eared Owl | 1                             | Pollinator mix | Yes                                     |
| 24-Nov | Short-eared Owl | 1                             | Grass/Clover   | No                                      |
| 20-Jan | Short-eared Owl | 1                             | Grass/Clover   | No                                      |
| 22-Nov | Short-eared Owl | 2                             | Pollinator mix | Yes                                     |
| 14-Mar | Barn Owl        | 1                             | DFWT mix       | No                                      |

Figure 1: Owl observations in GLSAs by field type and previous owl observations