# Annual Movements Supplemental

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## Supplemental Methods Description

Text Sections:

Rule-based thresholds chosen:
- Minimum distance between 2 potential segments: 2 kilometers
- Minimum time difference between 2 potential change points: 2 days
- Minimum distance moved between breeding/capture location and the furthest segment in order to consider onset of fall migration: 100 kilometers
- Minimum distance moved between the furthest segment and the segment representing return to spring territory: 100 kilometers
- Maximum distance between the spring return segment and the breeding/capture territory in order to consider a spring migration arrival: 10 kilometers
- Latest date to be considered a fall migration onset / earliest date to be considered a spring return onset: December 1st

## Figures

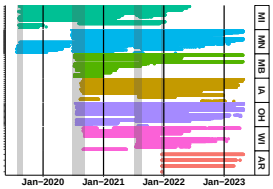


Figure 1: An overview of GPS telemetry data received from all collared IP trumpeter swans. Each line represents the period of data collection from a single collared swan. The grey regions indicate periods of collar deployment. The black lines are 1 January of each year. Number of deployments (including redeployments) by state/province are: Michigan (n=14), Minnesota (n=56), Manitoba (n=11), Iowa (n=12), Ohio (n=20), Wisconsin (n=9), and Arkansas (n=4).

## Tables:

### Autumn Departure

Table 1: Compiled migration pheno
2019-2022. Fall departure timing w
traveled >100km from breeding/cap

| Total Swans Tracked | Number of Long-Distance Migrants | Number of Fall Departure Events | A |
|---|---|---|---|
| 123 | 64 | 91 | |

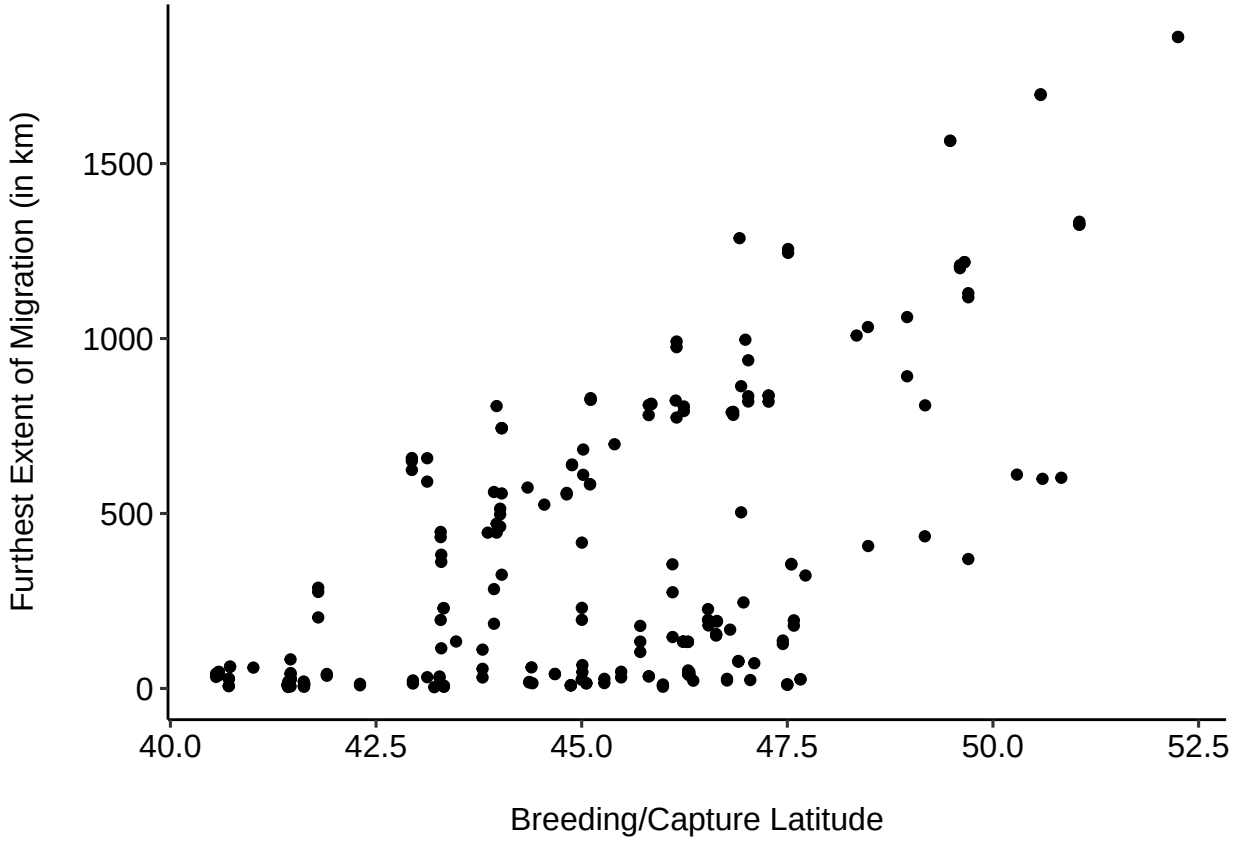


Figure 2: Breeding/capture latitude versus extent of migration (furthest distance from breeding territory during the nonbreeding season) for 221 'swan-year' datasets representing annual migration cycles.

Table 2: Yearly summaries of migration phenology of tures from 2019-2022. Fall departure timing was quan swans that traveled >100km from breeding/capture te December 1.

| Year | Total Swans Tracked | Number of Long-Distance Migrants | Average Fall Departure | Standa |
|---|---|---|---|---|
| 2019 | 17 | 7 | October 31 | |
| 2020 | 82 | 38 | October 25 | |
| 2021 | 87 | 30 | November 06 | |
| 2022 | 44 | 16 | November 07 | |

Table 3: Fall departure status

| Breeding Status | Total Swans Tracked | Number of Long-Distance Migrants | Number of Fall De |
|---|---|---|---|
| breeder | 71 | 33 | 50 |
| non_breeder | 23 | 12 | 19 |
| paired | 22 | 13 | 16 |

**Spring Arrival**

Table 4: Compiled migration phenology 2020-2023. Spring arrival timing was qu traveled >100km from the breeding/cap non-breeding season and that returned w ous summer territory.

| Total Swans Tracked | Number of Long-Distance Migrants | Number of Spring Arrival Events | A |
|---|---|---|---|
| 123 | 42 | 63 | |

Table 5: Yearly summaries of migration phenology of spring a
from 2020-2023. Spring arrival timing was quantified from
that traveled >100km from the breeding/capture territory
the non-breeding season and that returned within 10 km o
previous summer territory.

| Year | Total Swans Tracked | Number of Long-Distance Migrants | Average Spring Arrival | Standa |
|---|---|---|---|---|
| 2020 | 17 | 4 | March 02 | |
| 2021 | 82 | 27 | March 05 | |
| 2022 | 87 | 24 | March 07 | |
| 2023 | 44 | 8 | March 05 | |

Table 6: Fall departures of
status

| Breeding Status | Total Swans Tracked | Number of Long-Distance Migrants | Number of Spring |
|---|---|---|---|
| breeder | 71 | 29 | 45 |
| non_breeder | 23 | 6 | 8 |
| paired | 22 | 7 | 10 |