

Migration ecology of a re-established trumpeter swan population

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Supplemental Methods Description

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: **30 kilometers**
- Latest date to be considered a fall migration onset / earliest date to be considered a spring return onset: **30 December**

Supplemental Figures

Migration Phenology Summary Statistics:

Autumn Departure

We estimated migration duration for all swans that traveled >100km from the breeding/capture territory by 1 December.

Table 1: Table S1. Compiled migration durations from 2019-2022.

Total Swans Tracked	Number of Long-Distance Migrants	Number of Fall Departure Events
122	71	117

Table 2: Table S2. Yearly summaries of migration phenology and autumn departures from 2019-2022.

Year	Total Swans Tracked	Number of Long-Distance Migrants	Average Fall Departure	Standard Deviation
2019	17	7	October 31	10 days
2020	82	49	November 02	10 days
2021	86	38	November 09	10 days
2022	44	23	November 17	10 days

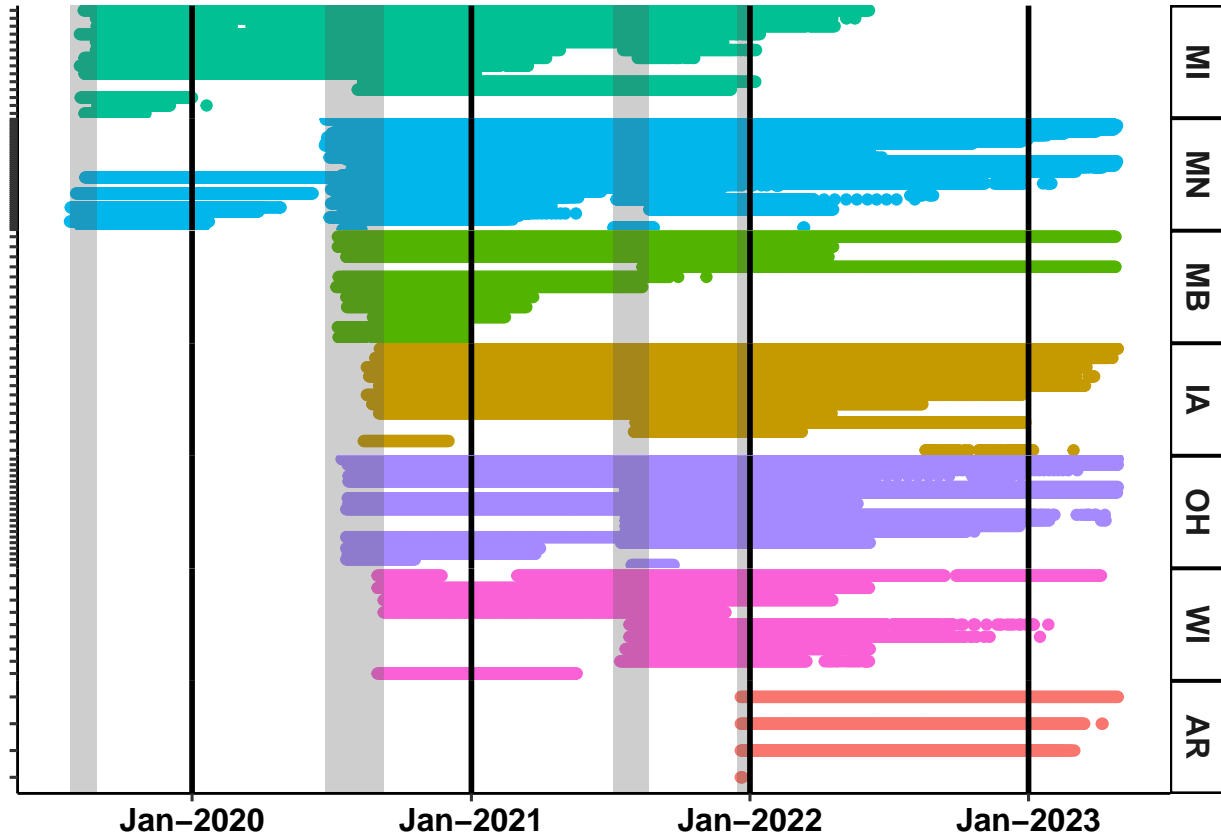


Figure 1: Figure S1. An overview of GPS telemetry data received from all collared IP trumpeter swans. Each line represents the period of data collection from a single collared swan. The grey regions indicate periods of collar deployment. The black lines are 1 January of each year. Number of deployments (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).

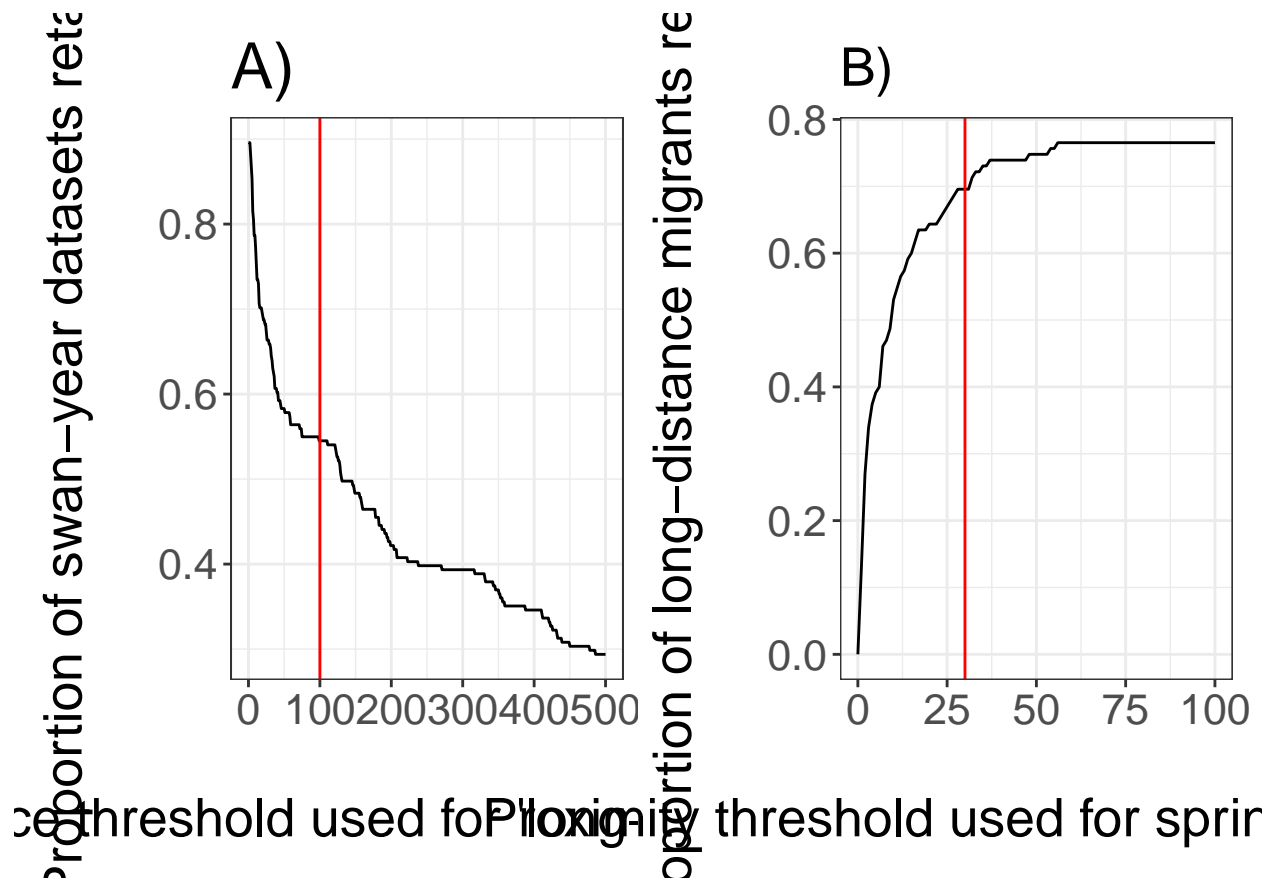


Figure 2: Figure S2. ADD IN CAPTION FOR THE 2 FILTERING PLOTS HERE

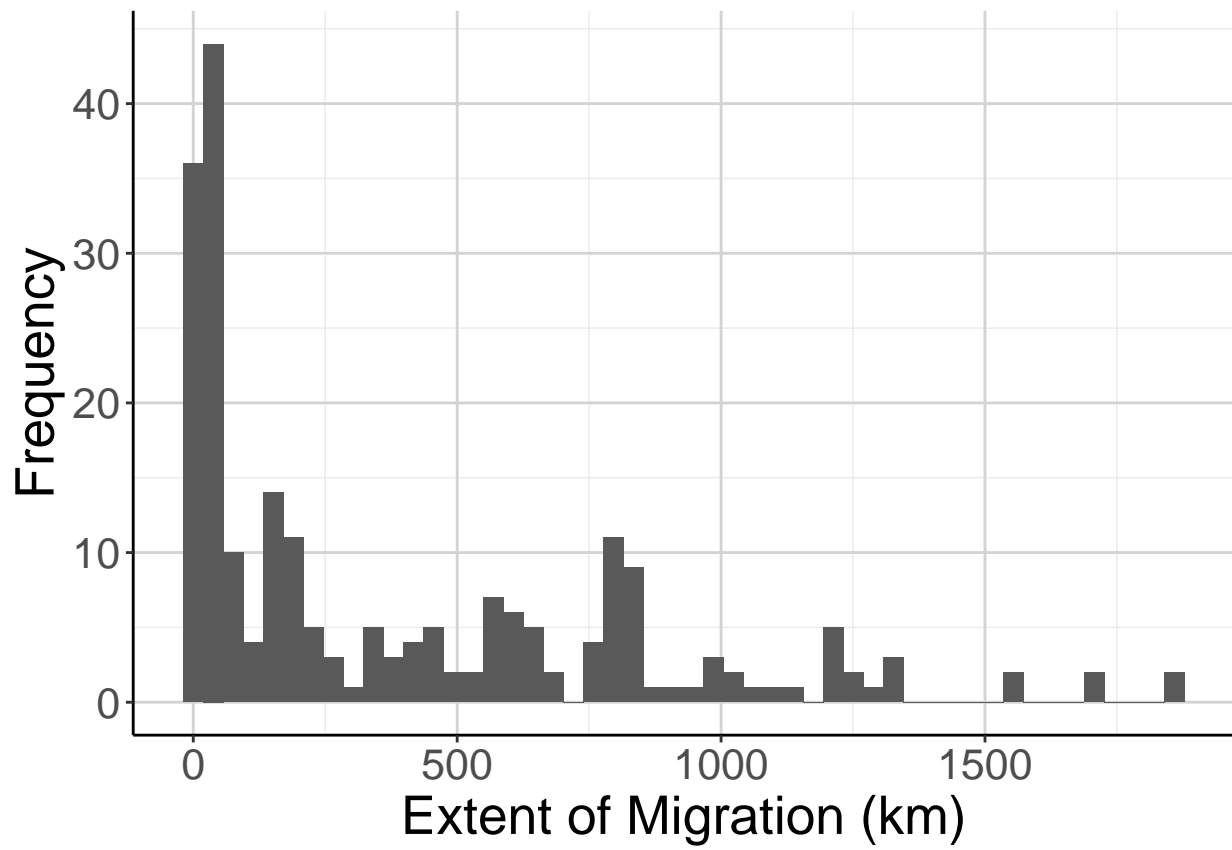


Figure 3: Figure S3. Histogram of the maximum distance moved from the breeding/capture territory for each swan-year dataset.

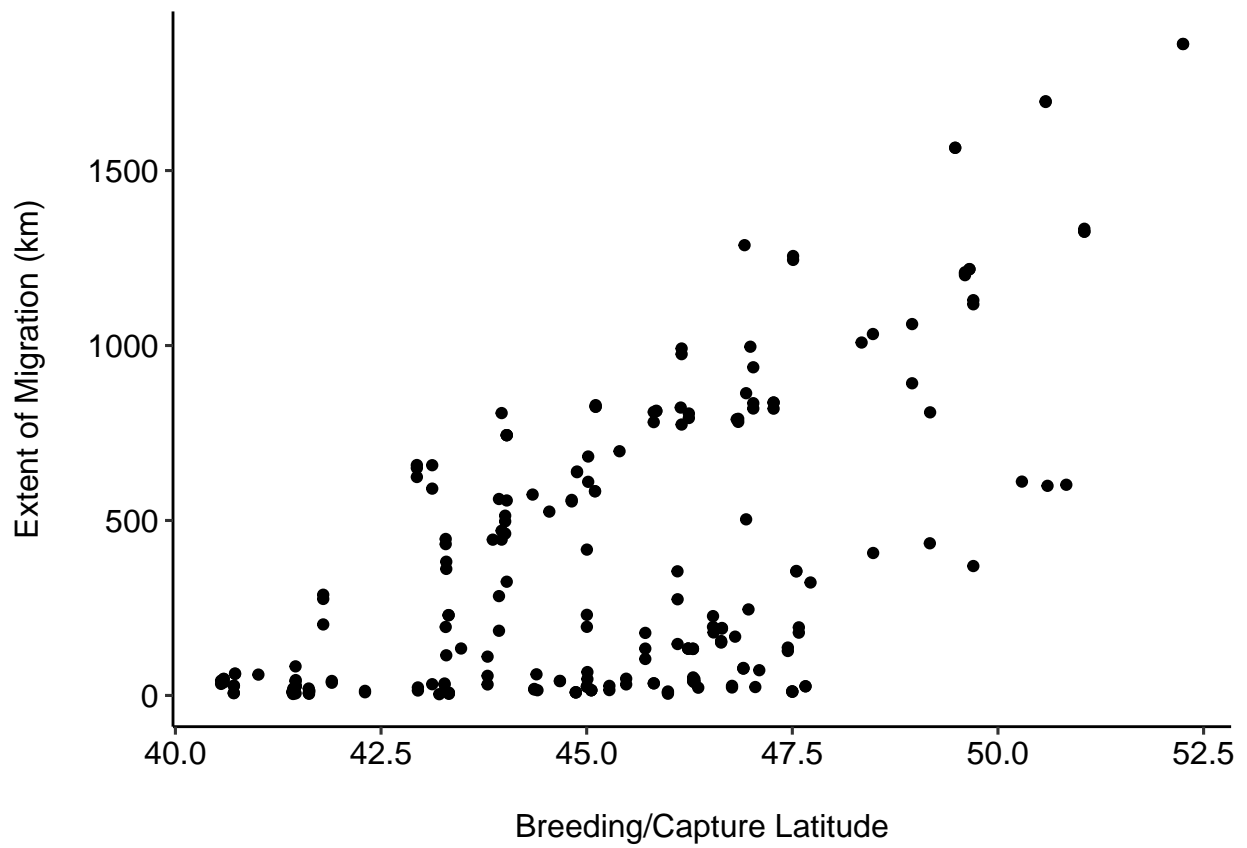


Figure 4: Figure S4. Breeding/capture latitude versus extent of migration (furthest distance from breeding territory during the nonbreeding season) for 221 'swan-year' datasets representing annual migration cycles.

Table 3: Table S3. Fall breeding status

Breeding Status	Total Swans Tracked	Number of Long-Distance Migrants	Number of Fall De
Breeder	70	36	68
Non-Breeder	22	12	19
Paired	21	14	19

Spring Arrival

We estimated spring arrival for all swans that traveled >100km from the breeding/capture territory during the non-breeding season and then returned to within 10 km of their previous summer territory.

Table 4: Table S4. Compiled migration arrivals from 2020-2023.

Total Swans Tracked	Number of Long-Distance Migrants	Number of Spring Arrival Events	A
122	51	84	

Table 5: Table S5. Yearly summaries of migration phenology and spring arrivals from 2020-2023.

Year	Total Swans Tracked	Number of Long-Distance Migrants	Average Spring Arrival	Standard
2020	17	4	March 02	
2021	82	35	March 03	
2022	86	33	March 06	
2023	44	12	March 02	

Table 6: Table S6. Spring arrival by breeding status

Breeding Status	Total Swans Tracked	Number of Long-Distance Migrants	Number of Spring
Breeder	70	29	54
Non-Breeder	22	8	10
Paired	21	8	11

Migration Duration

We estimated migration duration for all swans that traveled >100km from the breeding/capture territory during the non-breeding season and then returned to within 10 km of their previous summer territory. Migration duration represents the span of time absent from the breeding/capture territory during the non-breeding season, and is calculated by the difference in days between spring arrival and the previous year's

autumn departure.

Table 7: Table S7. Compiled duration of nonbreeding season for tracked swans from 2019-2023.

Total Swans Tracked	Number of Long-Distance Migrants	Number of Annual Cycles	Average Duration of nonbreeding season (days)
122	49	78	117

Table 8: Table S8. Yearly summaries of duration of nonbreeding season from 2019-2020 until 2022-2023.

Year	Total Swans Tracked	Number of Long-Distance Migrants	Average Duration of nonbreeding season (days)
2020	17	4	119
2021	82	34	118
2022	86	28	117
2023	44	12	99

Table 9: Table S9. Summaries by breeding status of duration of nonbreeding season from 2019-2020 until 2022-2023.

Breeding Status	Total Swans Tracked	Number of Long-Distance Migrants	Average Duration of nonbreeding season (days)
Breeder	70	29	118
Non-Breeder	22	8	117
Paired	21	8	117