Minnesota Ornithologists' Union – Savaloja Grants Program

Final Report- Purple Martin reproductive effort and site fidelity in Bemidji, Minnesota

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In 2017 we received a grant for $800 to aid us in an ongoing research project working with Purple Martins (*Progne subis*) in Northwest Minnesota with a specific focus on the Bemidji area. This project began in 2014 with the initial banding and color marking of 81 fledgling martins in July and August. Since 2014 the objectives of the project are to determine reproductive effort and success, as well as survival, and site fidelity to the Bemidji area.

Study Area

Bemidji and Bagley (Beltrami and Clearwater Counties, respectively) lay within the transition zone between the coniferous forest biome, featuring pine, spruce, fir, and tamarack, and the deciduous forest biome, featuring maple, oak, cottonwood, and aspen. Crookston (Polk County) is situated within the transition zone between the tallgrass aspen parkland biome, which features prairie and sedge fens interspersed with groves of aspen or oak, and the prairie grassland biome, which features contiguous areas of flat or rolling grasslands (Minnesota Department of Natural Resources, 2015). The average temperature in northwestern Minnesota during spring months (March - May) is 4.4° C; during summer months (June - August) it is 19° C; during fall months (September - November) it is 5.6° C; and during winter months (December - February) it is -13° C. The average annual precipitation in northwestern Minnesota is 58 cm (National Oceanic and Atmospheric Administration, 2015).

Site Description - Northern Minnesota

All nest-monitoring activities will take place at the purple martin colonies described under "Study Area". There are four nesting colonies in Bemidji and one in Bagley for a total of 106 available cavities. One site, located at Cameron Park in Bemidji, contains two wooden T-14 houses (28 available cavities); another site, located on the Bemidji State University campus, contains two wooden T-14 houses (28 available cavities); a third site is located on private property in northwestern Bemidji and features a wooden T-14 house (14 available cavities); and about 1 km north of the Cameron Park colony is this study's only gourd colony. This colony consists of one group of six gourds and another group of twelve gourds (18 available cavities). The colony in Bagley, located on the southeastern end of Lake Lomond, contains one wooden T-14 house with 4 gourds below (18 available cavities).

Nest Monitoring

Each colony was monitored for returning banded birds beginning in late May and continuing until all nests had fledged in late August. Each colony was visited at least three times a week depending on the weather and each was monitored from approximately 6 am to 10 am. Initial monitoring was focused on re-sighting Purple Martins banded in the Bemidji area in past years. Nest checks occurred every 3-4 days to collect data on reproductive parameters such as

dates of laying onset, hatch dates, clutch and brood sizes, and hatch and fledge dates. The duration of a successful nesting cycle is about 44-54 days, not including nest-building: typical clutch size is 3-6 eggs with one egg laid per day; incubation lasts 15-18 days; and the nestling period usually lasts 26-30 days (Tarof and Brown, 2013; Tarof et al., 2011). In addition, the young of large broods often do not fledge on the same day; it may take 2-3 days for all young to fledge (Tarof and Brown, 2013). At each check, nestlings were counted and aged, and fledging status determined via daily visits to colonies to identify cavities still occupied by nestlings. If parents entered cavities with food, exited cavities with fecal sacs, or if nestlings were peering from cavities or perched upon porches, the cavity was considered occupied for that day.
At approximately 12-17 days old each nestling was fitted with an aluminum USGS band and a red, aluminum color leg band reading "MN Z" or “MN D” and three digits between 000 - 999 which correspond to the last three digits of the federal band number. All bands were size 1D. Banding was done as a sub-permittee under Mike North of Minnesota DNR in Brainerd.

Results from 2017-

The grant money we received from the MOU Savaloja Grant Program was exclusively used to pay the salary of undergraduate research assistant McKenzie Ingram. Her job was to monitor each of the four colonies around Lake Bemidji and the two newly discovered colonies west of town on Adams St. We also monitored the Bagley colony on Lake Lamond. The results of McKenzie’s efforts are found in the tables and figures below.

Banding Year	Bemidji State University	Gangelhoff	Humeniuk	Cameron Park	Bagley	Crookston	**Return Rate by Banding Year**
2014	-	**1**/54 1.85%	**1**/6 16.67%	**4**/21 19.05%	-	-	**6**/81 **7.41%**
2015	**1**/20 5.00%	**7**/64 10.94%	**9**/66 13.64%	**7**/57 12.28%	**7**/69 10.14%	**3**/261 1.15%	**34**/537 **6.22%**
2016	**20**/83 24.10%	**7**/37 18.92%	**10**/54 18.52%	**20**/105 19.05%	**1**/27 3.70%	**5**/298 1.68%	**63**/604 **10.43%**
Return Rate by Colony	**20.39%**	**9.68%**	**15.87%**	**16.94%**	-	-	-

Table 1. Previously banded *Progne subis* re-sighted in 2017 at Gangelhoff’s, Humeniuk’s, Cameron Park, and BSU.

Colony	**2014**	**2015**	**2016**	**2017**
Crookston	-	261	298	-
Bagley	-	69	27	58
Bemidji State University	-	20	83	141
Cameron Park	21	57	105	115
Humeniuk	6	66	54	70
Gangelhoff	54	64	37	49
TOTAL = 1655	**81**	**537**	**604**	**433**

Table 2. *Progne subis* banded 2014-2017.

Colony	**Eggs Laid**	**Eggs Hatched**	**Fledged**	**Success Rate** (%)
Cameron Park	142	117	115	80.99
Bemidji State University	159	145	141	88.68
Humeniuk	75	71	66	88.00
Gangelhoff	80	50	50	62.50
TOTAL	**456**	**383**	**372**	**81.58**

Table 3. 2017 Success rates (% of eggs laid that hatched) at Cameron Park, BSU, Humeniuk's, and Gangelhoff's.

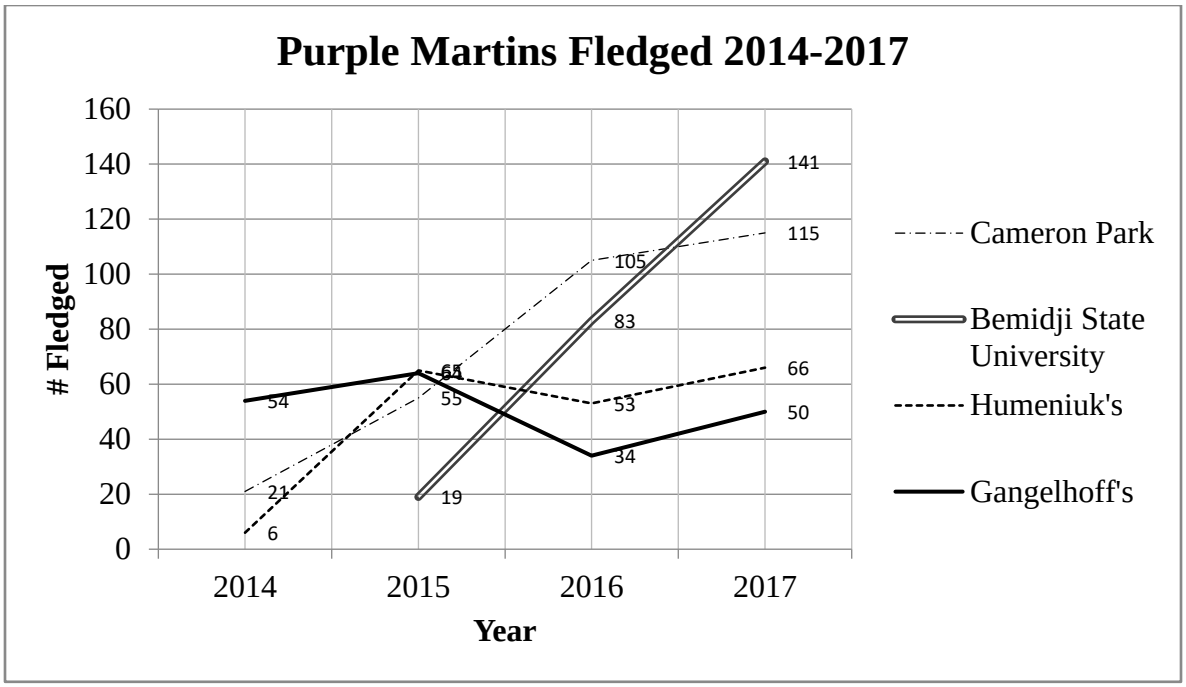

Figure 1. *Progne subis* fledged from Cameron Park, BSU, Humeniuk, and Gangelhoff colonies, (2014-2017).

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