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Abundance, Distribution and Migration Patterns of North American Eared Grebes (*Podiceps nigricollis*)

Electronic supplement to: W. Sean Boyd, Nik Clyde, Andre´ Breault, Robbie Di Paolo and Malcolm McAdie. 2021. Abundance, Distribution and Migration Patterns of North American Eared Grebes (*Podiceps nigricollis*). Waterbirds 44: 76-85.

APPENDIX

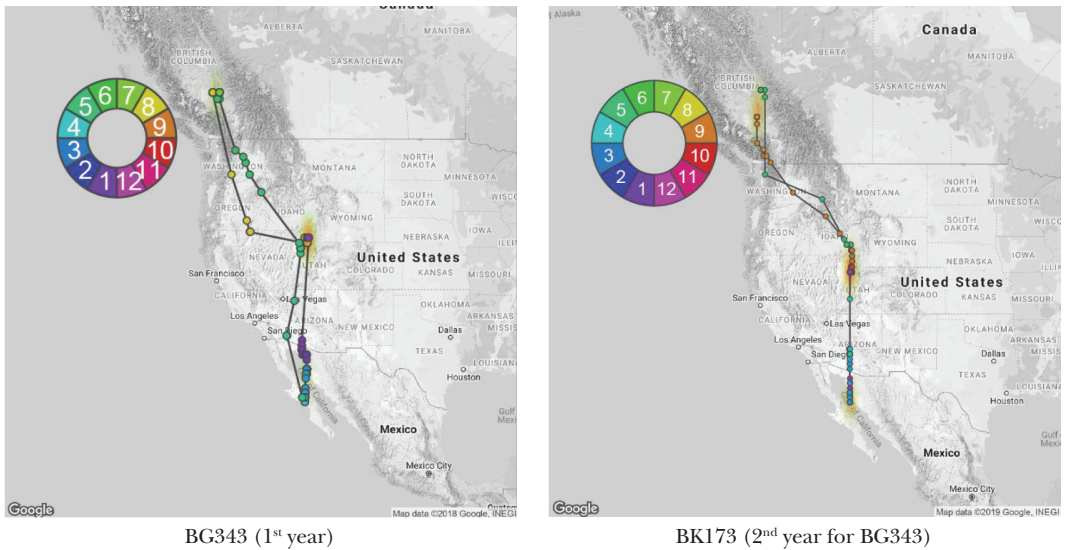


Figure 1A. Migration routes for Eared Grebes (*Podiceps nigricollis*) marked with light-level geolocator (GLS) tags at Riske Creek, British Columbia, Canada in 2017 and 2018. The color of each location corresponds to the month of the year indicated on the color wheel. GLS tags BG343 and BK173 were attached to the same individual but in subsequent years (so, 2 annual cycles). The map for GLS tag BG314 also describes 2 annual cycles but the tag stopped recording before the grebe returned to Riske Creek. GLS tag BK170 stopped recording while the individual was overwintering in Mexico.

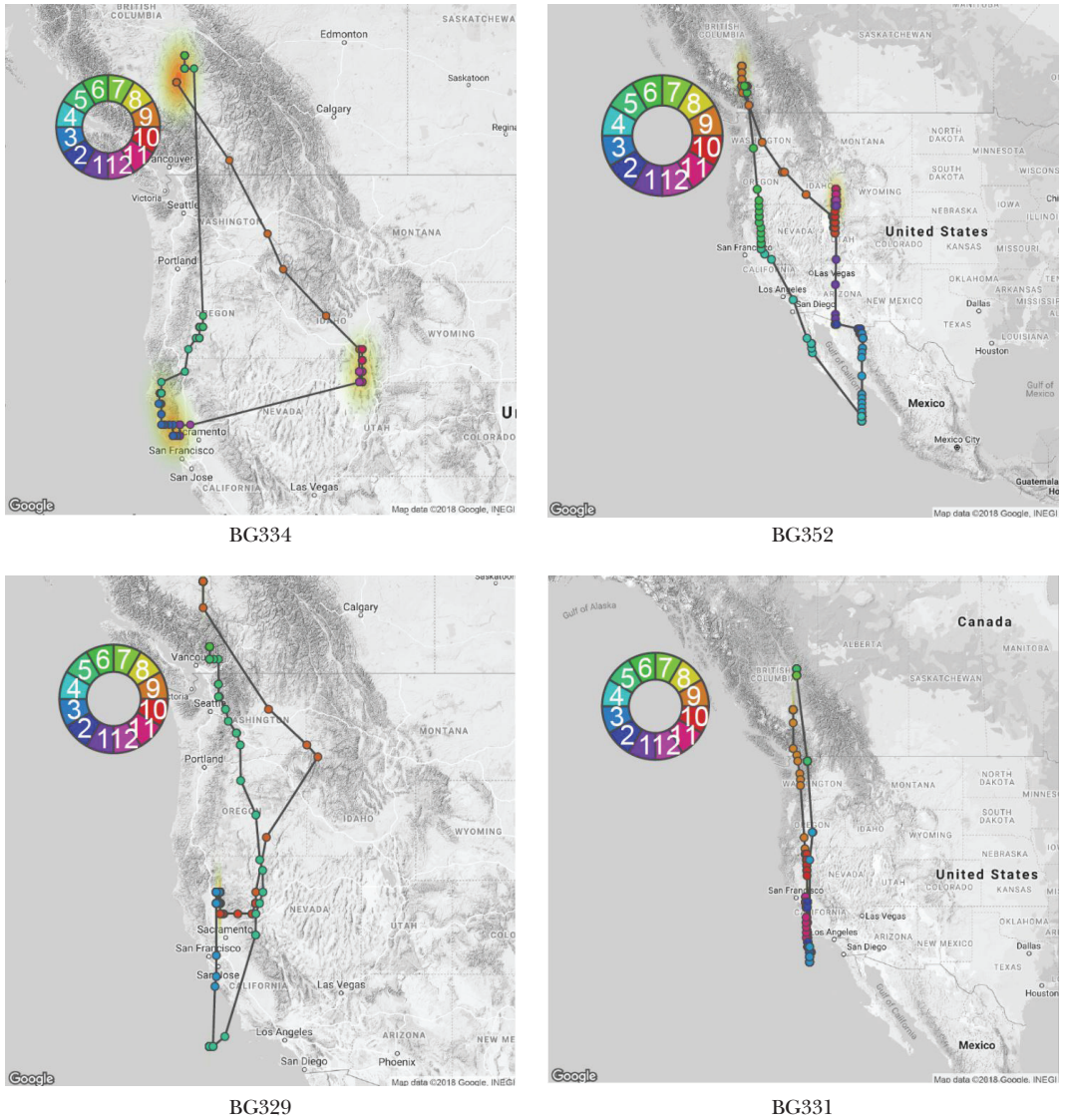
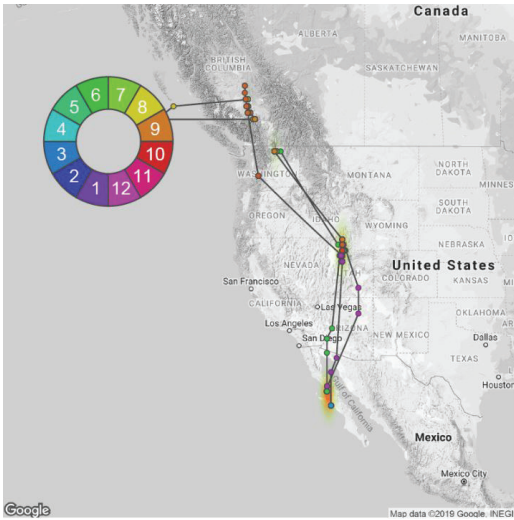
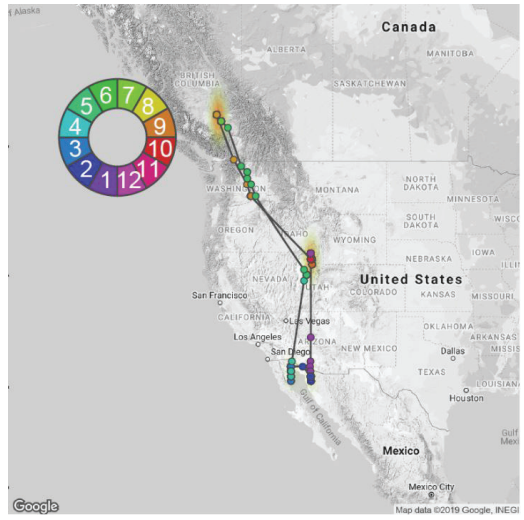


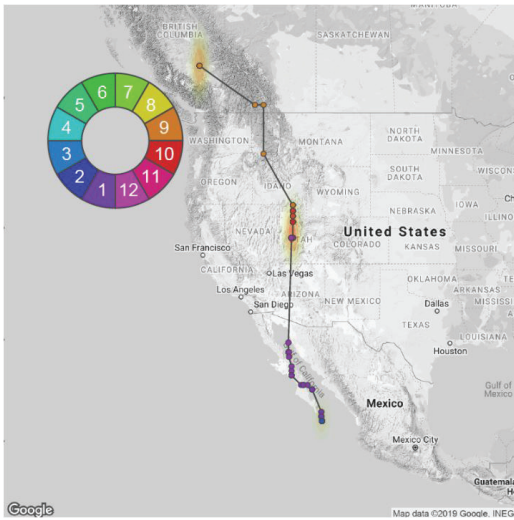
Figure 1A. (Continued) Migration routes for Eared Grebes (*Podiceps nigricollis*) marked with light-level geolocator (GLS) tags at Riske Creek, British Columbia, Canada in 2017 and 2018. The color of each location corresponds to the month of the year indicated on the color wheel. GLS tags BG343 and BK173 were attached to the same individual but in subsequent years (so, 2 annual cycles). The map for GLS tag BG314 also describes 2 annual cycles but the tag stopped recording before the grebe returned to Riske Creek. GLS tag BK170 stopped recording while the individual was overwintering in Mexico.



BG314



BK160



BK170

Figure 1A. (Continued) Migration routes for Eared Grebes (*Podiceps nigricollis*) marked with light-level geolocator (GLS) tags at Riske Creek, British Columbia, Canada in 2017 and 2018. The color of each location corresponds to the month of the year indicated on the color wheel. GLS tags BG343 and BK173 were attached to the same individual but in subsequent years (so, 2 annual cycles). The map for GLS tag BG314 also describes 2 annual cycles but the tag stopped recording before the grebe returned to Riske Creek. GLS tag BK170 stopped recording while the individual was overwintering in Mexico.

Table 1A. Migration summary for Eared Grebes (*Podiceps nigricollis*) marked with light-level geolocator (GLS) tags at Riske Creek, British Columbia, Canada in 2017 and 2018. Values for the timing of migration and the median estimated location of stopover sites and wintering areas were generated using the *stationary_migration_summary* function in package *FLightR*. Lat/long values for capture/recapture events were obtained by locating the centroid of the small pond where individuals were captured. Approximate locations were assigned to known areas (e.g., Great Salt Lake) when those areas were within ~100 km of the coordinates generated by *FLightR*.

GLS - VHF / Dates	Latitude	Longitude	Standard Deviation (Latitude)	Standard Deviation (Longitude)	Approximate Location
GLS BC343 - VHF 165.569					
Capture/tagging – 25 June 2017	51.9986	-122.4380	n/a	n/a	Pond 11, Riske Creek, BC
25 June 2017 – 1 August 2017	52.1913	-122.6977	0.2420	0.1538	Riske Creek, BC
4 August 2017 – 24 December 2017	41.2513	-112.2632	0.3835	0.2024	Great Salt Lake, UT
5 January 2018 – 24 April 2018	28.6001	-112.5348	1.5157	0.2056	Sea of Cortez, MX
25 April 2018 – 3 May 2018	40.4776	-112.9095	0.9805	0.5183	Great Salt Lake, UT
6 May 2018 – 27 June 2018	51.9961	-122.0723	0.2537	0.2257	Riske Creek, BC
Recapture – 27 June 2018	51.9986	-122.4336	n/a	n/a	Pond 12, Riske Creek, BC
NEW GLS DEPLOYED – BK173					
27 June 2018 – 26 August 2018	52.1522	-122.6621	0.4659	0.2147	Riske Creek, BC
31 August 2018 – 16 December 2018	40.6324	-112.4200	0.8417	0.2406	Great Salt Lake, UT
17 December 2018 – 17 April 2019	30.0812	-112.4785	2.3223	0.1686	Sea of Cortez, MX
17 April 2019 – 5 May 2019	42.9511	-112.7034	0.6953	0.4350	Great Salt Lake, UT
6 May 2019 – 5 June 2019	53.7398	-122.2010	0.3798	0.4680	Prince George, BC
Recapture – 5 June 2019	51.9902	-122.4317	n/a	n/a	Pond 8, Riske Creek, BC
VHF detection: GSL @ 18 Oct 2017					
GLS BC334 - VHF 165.483					
Capture/tagging – 25 June 2017	51.9986	-122.4380	n/a	n/a	Pond 11, Riske Creek, BC
25 June 2017 – 5 September 2017	52.1467	-122.6726	0.2946	0.1738	Riske Creek, BC
7 September 2017 – 9 December 2017	41.3489	-112.5432	0.8601	0.2045	Great Salt Lake, UT
9 December 2017 – 24 April 2018	39.5055	-123.0893	1.0854	0.5023	Northern California
5 May 2018 – 9 June 2018	52.8608	-122.1709	0.4137	0.5223	Quesnel, BC
Recapture – 9 June 2018	51.9986	-122.4380	n/a	n/a	Pond 11, Riske Creek, BC
VHF detection: GSL @ 18 & 19 Oct 2017					

(*) While there was no stationary location generated for this period, all locations fell within the Sea of Cortez, Mexico.

Table 1A. (Continued) Migration summary for Eared Grebes (*Podiceps nigricollis*) marked with light-level geolocator (GLS) tags at Riske Creek, British Columbia, Canada in 2017 and 2018. Values for the timing of migration and the median estimated location of stopover sites and wintering areas were generated using the *stationary_migration_summary* function in package *FLightR*. Lat/long values for capture/recapture events were obtained by locating the centroid of the small pond where individuals were captured. Approximate locations were assigned to known areas (e.g., Great Salt Lake) when those areas were within ~100 km of the coordinates generated by *FLightR*.

GLS - VHF / Dates	Latitude	Longitude	Standard Deviation (Latitude)	Standard Deviation (Longitude)	Approximate Location
GLS BC352 - VHF 165.720					
Capture/tagging – 25 June 2017	51.9986	-122.4336	n/a	n/a	Pond 12, Riske Creek, BC
25 June 2017 – 4 September 2017	51.8984	-122.6394	0.7468	0.3028	Riske Creek, BC
7 September 2017 – 2 January 2018	41.9292	-112.4349	1.5634	0.2425	Great Salt Lake, UT
3 January 2018 – 6 February 2018	31.3557	-112.3745	0.8260	0.3063	Sea of Cortez, MX
6 February 2018 – 8 April 2018	27.4328	-109.5959	4.4276	0.3516	Sea of Cortez, MX
12 April 2018 – 16 May 2018	38.7609	-120.6399	1.2161	0.4105	Central California, USA
17 May 2018 – 5 June 2018	50.7266	-122.2453	0.7931	0.7484	Lillooet, BC
Recapture – 5 June 2018	51.9986	-122.4336	n/a	n/a	Pond 12, Riske Creek, BC
VHF detection: GSL @ 18 & 19 Oct 2017					
GLS BC329 - VHF 165.357					
Capture/tagging – 25 June 2017	51.9986	122.4336	n/a	n/a	Pond 12, Riske Creek, BC
25 June 2017 – 8 September 2017	51.9890	122.6670	0.5799	0.1849	Riske Creek, BC
20 September 2017 – 11 March 2018	40.2463	-121.8274	1.1394	0.1747	Northern California, USA
14 March 2018 – 21 April 2018	33.8009	-122.2808	0.9810	0.1684	Southern California, USA
26 April 2018 – 7 June 2018	49.4446	-122.2273	0.9797	0.6478	Stave Lake, BC
Recapture – 7 June 2018	51.9986	-122.4380	n/a	n/a	Pond 11, Riske Creek, BC
VHF detection: None					
GLS BC331 - VHF 165.032					
Capture/tagging – 26 June 2017	52.0303	-122.5163	n/a	n/a	Pond 42, Riske Creek, BC
26 June 2017 – 27 August 2017	52.1769	-122.6912	0.2801	0.0768	Riske Creek, BC
1 November 2017 – 5 February 2018	37.3727	-121.1796	0.4749	0.1243	San Francisco, CA
16 March 2018 – 6 May 2018	48.4534	-121.0459	0.8797	0.2200	Northern Washington, USA
6 May 2018 – 26 June 2018	54.6680	-122.4456	0.2423	0.3348	Prince George, BC
Recapture – 26 June 2018	52.0225	-122.5005	n/a	n/a	Pond 39, Riske Creek, BC
VHF detection: None					

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GLS - VHF/Dates	Latitude	Longitude	Standard Deviation (Latitude)	Standard Deviation (Longitude)	Approximate Location
GLS BC314 - VHF 165.895					
Capture/tagging - 26 June 2017	51.9986	-122.4380	n/a	n/a	Pond 11, Riske Creek, BC
26 June 2017 - 06 August 2017	52.1767	-122.7058	0.1070	0.0704	Riske Creek, BC
07 August 2017 - 30 August 2017	50.8449	-122.0193	0.5239	0.5478	Lillooet, BC
14 September 2017 - 04 December 2017	41.6376	-112.3601	0.7152	0.1648	Great Salt Lake, UT
07 December 2017 - 17 May 2018	28.3126	-114.0364	0.2944	0.0380	Guerrero Negro, MX
30 May 2018 - 31 August 2018	48.6407	-119.6364	0.1692	0.2586	Okanogan Valley, WA
31 August 2018 - 12 December 2018	40.5727	-112.4304	0.6490	0.1877	Great Salt Lake, UT
12 December 2018 - 03 March 2019	27.0979	-113.6814	0.5477	0.1900	Guerrero Negro, MX
Battery died - No data after 3 March 2019	n/a	n/a	n/a	n/a	n/a
Recapture - 4 June 2019	51.9986	-122.4380	n/a	n/a	Pond 11, Riske Creek, BC
VHF Detection: None					
GLS BK160 - No VHF					
Capture/tagging - 8 June 2018	52.0218	-122.4747	n/a	n/a	Pond 35, Riske Creek, BC
8 June 2018 - 21 August 2018	52.1973	-122.6924	0.0645	0.0672	Riske Creek, BC
28 August 2018 - 13 December 2018	41.5440	-112.3065	0.6600	0.1222	Great Salt Lake, UT
13 December 2018 - 9 February 2019	30.8877	-112.2826	0.7911	0.3186	Sea of Cortez, MX
9 February 2019 - 16 April 2019	31.2959	-114.5319	1.0048	0.1707	Sea of Cortez, MX
16 April 2019 - 6 May 2019	40.1191	-112.7628	0.8656	0.3666	Great Salt Lake, UT
10 May 2019 - 26 June 2019	51.6665	-122.1157	0.2458	0.3330	Riske Creek, BC
Recapture - June 26, 2019	52.0218	-122.4747	n/a	n/a	Pond 35, Riske Creek, BC
GLS BK170 - No VHF					
Capture/tagging - 7 June 2018	52.0218	-122.4747	n/a	n/a	Pond 35, Riske Creek, BC
7 June 2018 - 27 August 2018	52.1912	-122.7203	0.2343	0.2428	Riske Creek, BC
28 August 2018 - 13 December 2018	39.5808	-112.4575	1.0556	0.1972	Great Salt Lake, UT
13 December 2018 - 17 February 2019	n/a	n/a	n/a	n/a	Sea of Cortez, MX*
Tag failed - No data after 17 February 2019	n/a	n/a	n/a	n/a	n/a
Recapture - 4 June 2019	52.0218	-122.4747	n/a	n/a	Pond 35, Riske Creek, BC

(*) While there was no stationary location generated for this period, all locations fell within the Sea of Cortez, Mexico.