Nicola Naturalist Society

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SURVEYS OF GREAT BASIN SPADEFOOTS IN THE DOUGLAS LAKE PLATEAU GRASSLANDS: 2022 PROGRESS REPORT

Report covering year 1 of funding from the BC Nature anonymous donation.
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ABSTRACT

In 2022, volunteers from the Nicola Naturalist Society initiated the first year of a planned five-year project to map and monitor Great Basin Spadefoots (*Spea intermontana*) in the grasslands of the Douglas Lake Plateau near Merritt, BC. This amphibian species is listed as Threatened in Canada. The Douglas Lake Plateau supports one of the few breeding concentrations in British Columbia. The project is an extension of the five-year amphibian monitoring project our club completed under the guidance of professional herpetologists in 2011-2015. The survey method involves listening for the nocturnal calls of breeding Spadefoots and other amphibians for five minutes at roadside stations located 800 m apart. Despite a late start to the season, we completed five nights of surveys covering 60 listening stations. Spadefoots were recorded at 16 stations, which included 13 stations where Spadefoots were previously recorded in 2011-2015, and three new locations. The 2022 season was an opportunity to refine the survey methods and train volunteer observers. Information gathered on amphibians and other animals in these surveys contributes to supporting Key Biodiversity Area (KBA) status for the Douglas Lake Plateau (already an Important Bird & Biodiversity Area; IBA).

A calling Great Basin Spadefoot. Photo courtesy Lennart Sopuck

INTRODUCTION

This report covers the first year (2022) of a five-year study focused on expanding our knowledge of the distribution and abundance of Great Basin Spadefoots (*Spea intermontana*; Amphibia) on the high grasslands of the Douglas Lake Plateau. The project aims to repeat and expand standardized surveys for Spadefoots that were undertaken in 2011-2015. The Spadefoot is an enigmatic amphibian with a highly restricted range in British Columbia. The species is listed as Threatened in Canada (COSEWIC 2019) and is on the provincial Blue List of Special Concern (BC Conservation Data Centre 2002). The Douglas Lake Plateau grasslands are one of the few places in the province that support a reasonable breeding population of this little amphibian. These grasslands are within easy access (40-100 km) from Merritt where our club is based.

In 2011 the Nicola Naturalist Society, collaborating with professional herpetologists from Biolinx consultants (Dr. Kristiina Ovaska, Lennart Sopuck and Christian Engelstoft), initiated a five-year amphibian mapping and monitoring project centred on the Nicola Valley in the BC southern interior (Ovaska et al. 2016). Part of this project involved developing unique call survey methods for Spadefoots and applying these along public roads in the high grasslands. Details and reports of our 2011-2015 project are available online at: http://www.nicolanaturalists.ca/projects/amphibian-monitoring/

Great Basin Spadefoots spend much of their lives buried deep (up to 2 m down) in sandy soils. In late spring they emerge, begin feeding on insects and worms and move to shallow ponds where they breed. Adult males attract females to the breeding sites by emitting loud croaking calls, audible to humans for almost 1 km. It is these mating calls that our surveys monitor and tally in this project as indicators of the animals numbers and distribution (details under Methods below). Many of the breeding ponds are on private ranchlands and the roadside call surveys allow us to reliably map and monitor the Spadefoots without having to intrude on private lands.

RATIONALES FOR THIS PROJECT

Building a long-term database – Previous surveys by our club, done annually in 2011-2015, established a valuable baseline to track numbers and distribution of Spadefoots (Ovaska et al. 2016). Because conditions affecting amphibians, especially Spadefoots, change over time, surveys repeated at roughly 10-year intervals provide a much stronger timeline for understanding long-term trends and threats.

Changing environment and climate – The BC interior is experiencing substantial changes as a result of the global climate change. In particular, there are more frequent droughts, heat waves and wildfires. Studies at Thompson Rivers University have shown continued declines in available ponds in the interior grasslands, linked with climate change (Coelho 2015). All of these changes affect Spadefoots and having long-term trend data will greatly help in developing stewardship strategies for this vulnerable species.

Expanding surveys into new habitat – In addition to re-sampling known breeding locations, the project also explores new areas on the Douglas Lake Plateau where Spadefoots might be breeding. We will thus develop a better understanding of the overall importance of these grasslands to the provincial population of Spadefoots.

Contributing to Key Biodiversity Area (KBA) status – The Douglas Lake Plateau is already an Important Bird & Biodiversity Area (IBA) and is being considered as a KBA. The KBA program is an international initiative to identify the most important areas for biodiversity, resulting in greater recognition and protection for such areas: https://kbacanada.org/
KBAs recognize all wildlife organisms and our surveys contribute quantified data on amphibians and birds.

Student mentoring – Our project includes students from the Environmental Resources Technology Program at the Nicola Valley Institute of Technology (NVIT). Most of these students are Indigenous. Gaining experience in wildlife surveys, data gathering and analysis will be of great value for their future careers. Part of our budget provides honoraria for participating NVIT students. We also encourage the participation of local high school students as part of their career mentoring program.

METHODS

Call surveys – Following our 2011-2015 survey protocols, night-time call surveys follow pre-determined routes, each with listening stations 800 m apart. Surveys are undertaken during the early breeding season (May and June) when the males are calling. In 2022, due to delays in project confirmation, surveys were done between 2nd and 23rd June. At each station, the number, direction and approximate distance of Spadefoot calls were recorded for a 5-minute interval. Calling by Pacific Tree Frogs (*Pseudacris regilla*), Common Nighthawks (*Chordeiles minor*), Common Poorwill (*Phalaenoptilus nuttallii*) and any owls was also recorded. Information on birds and amphibians contributes to the status of the Douglas Lake Plateau Important Bird & Biodiversity Area (IBA) which is transiting to a Key Biodiversity Area (KBA).

All surveys were undertaken by Nicola Naturalist Society members as volunteers. The project funding covered travel costs. Several observers had participated in the 2011-2015 Spadefoot surveys. All observers were trained in the methods used, which included listening to recorded Spadefoot calls.

Appendix 1 shows the standard form used to record data during the call surveys. The form explains the information recorded, including: names of observers; date and time; weather at the start and end of the survey; and comments on survey conditions. At each survey station the following information was collected during the 5-minute listening period (see Appendix 1 for details): station code (e.g., DL07 for station 7 along the Douglas Lake Road route); the UTM location determined from a GPS; numbers of passing cars; noise index; and records of other animals detected. When amphibian calls were detected we recorded the following (see Appendix 1 for details): species code (e.g., SPIN for Spadefoot); call index (coded as 1 to 3); proximity of the calling frogs (Near <400 m or Far >400 m) and the direction of the calls.

Data analysis and archiving – All data were collated in Excel spreadsheets and will be analysed with basic statistical software. All our data will be submitted to the BC Conservation Data Centre for archiving. Data are also uploaded to the iNaturalist and eBird online databases for open access.

Data entry was undertaken by Penelope Bridge, a second-year student in the Environmental Resources Technology Program at NVIT, with a small contract covered by the donor funding.

Reporting – All reports will be publicly available on the Nicola Naturalist Society web-page, along with our initial 2011-2015 reports: http://www.nicolanaturalists.ca/projects/amphibian-monitoring/

Our project has already been featured in the *BCnature* magazine (Fall 2022 issue: pages 24-25). Additional articles will be provided to this magazine as the project progresses.

RESULTS

Tables 1 and 2 summarise the surveys undertaken in 2022. Appendix 2 provides the details of each survey station.

In total we undertook five nights of survey, covering six routes and 60 survey stations. Ten volunteers participated and were trained to do future surveys. Calling Spadefoots were recorded at 16 of the 60 stations and at 9 of these stations there was a full chorus (call index 3) indicating a well-used breeding site.

Table 1. Summary of Spadefoot survey effort in 2022. The number of survey stations at which various responses (Call Indices) were recorded is shown.

				Spadefoot Call Index (no. stations)						
Route	Route code	Date	No. of stations sampled	0	1	2	3	# stations with response	% response	NOTES
Douglas Lake main	DL 01-10	02-Jun-22	10	3	0	1	6	7	70.0	Same route & stations as 2011-15
Pennask Lake Road main	PEN 01-13	07-Jun-22	13	8	3	0	2	5	38.5	Same route & stations as 2011-15
Mix PEN & MIN	PEN 21-24/MIN 1-4	14-Jun-22	8	7	1	0	0	1	12.5	Survey cut - too cold 7C & windy
Douglas Lake English-Salmon	DL 12-27	21-Jun-22	16	13	1	1	1	3	18.8	Also PSRE at one station
Lauder Road	LAU 01-12; DL-03X	23-Jun-22	13	13	0	0	0	0	0.0	PSRE at one station
Total for 2022		5	60	44	5	2	9	16	26.7	

Table 2. Great Basin Spadefoot surveys 2022 - details on each survey

Route code	Route name	Date	No. of stations	Observer initials	Start time	End time	Start Temp [C]	End Temp [C]	Start rain	End rain	Start cloud	End cloud	Start wind	End wind	Comments
DL	Douglas Lake Road	02-Jun-22	10	AB, CS, DS	21:20	22:52	14	14	D	N	>95	>95	1	0	Good conditions
PEN	Pennask Lake Road	07-Jun-22	13	AB, LH, ML	21:40	23:45	14	13	N	N	>95	>95	2	2	Wind constant - sometimes noisy
MIN	Minnie Lake Road	14-Jun-22	4	AB, LH, VN, SN	21:30	00:00	7	7	N	N	<5	<5	3	3	Cold and windy throughout - interferes with observations.
PEN	Pennask Lake Road	14-Jun-22	4	AB, LH, VN, SN	21:30	00:00	7	7	N	N	<5	<5	3	3	Cold and windy throughout. Stopped survey - SPIN at pond at PEN13 not calling - was v active last week. Too cold?
DL	Douglas Lake Road	21-Jun-22	16	AB, VN, SN, LJ	21:35	00:20	14	12	N	N	>95	51-95	0	1	Beyond English Bridge to Salmon Lake: Stations AM - DL12 to DL23 (No DL11). Excellent conditions throughout, light breeze towards end.
LAU	Lauder Road	23-Jun-22	13	AB, CL, TC	21:45	00:16	9	11	N	N	>95	>95	2	1	AM LAU - LAU 12, Good generally

* Observers: AB - Alan Burger; TC - Ted Cederland; LH - Loretta Holmes; LJ - Liis Jeffries; CL - Chris Lepsoe; ML - Madison Lee; SN - Susan Newton; VN - Vic Newton; CS - Cathy Starr; DS - Don Starr.

In addition to repeating survey stations previously surveyed in 2011-2015 (i.e., DL 01-10; PEN 01-13; MIN 01-04) we also expanded the areas surveyed to new areas (DL 12-27; LAU 01-12) and found calling Spadefoots at 3 new locations, thus expanding the known range of breeding on the Douglas Lake Plateau.

Pacific Tree Frogs were also recorded at two stations, Common Nighthawks at four stations and Short-eared Owls at two stations (Appendix 2). More common birds were also recorded at numerous stations.

DISCUSSION AND CONCLUSIONS

Due to delays in confirming the funding, the project had a late start in 2022 and we did not complete as many surveys as planned. Nevertheless, we did sample a reasonable number of stations (60),

confirmed Spadefoots breeding at 13 previously-known sites and documented three additional sites. Furthermore we trained a core of volunteers in our club and refined the methods. We spent only half of the funding available for 2022 and this will allow us to extend the project from the original plan of four years to a more ambitious five years.

The call survey method developed in 2011-2015 has proven to be an effective way of mapping and monitoring Great Basin Spadefoots. On the Douglas Lake Plateau nearly all the Spadefoot habitat is on private ranchland and First Nations Reserves. Because the call surveys use only public roads but provide information from the surrounding habitat this is the most effective way to locate breeding Spadefoots in this area. The calls of the Spadefoots are detectable by humans up to 1 km under optimal conditions.

Refinements of the call survey methods are needed. During the 2022 study we found no Spadefoots calling on one night (14 June) when there was a strong cold wind blowing (+7 C air temperature), even at site PEN03 where there had been a vigorous chorus a week earlier. We therefore need to investigate in more detail the weather conditions in which calling is most likely and plan our night surveys accordingly.

With improved methodology and trained volunteers the club is in good shape to undertake Spadefoot surveys for the following four years and provide valuable information on site persistence, new locations and population trends for this Threatened species. In future years our sampling will be extended to daytime visits to potential breeding ponds to document evidence and relative abundance of breeding Spadefoots, including egg masses and tadpoles.

ACKNOWLEDGMENTS

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Appendix 1 – Spadefoot field data form

Nicola Naturalist Society - Spadefoot Surveys

Amphibian Call Survey Datasheet

Route name:

Date: **Start time:** **Start temp:**

Observers: **End time:** **End temp:**

Rain (start): **None drizzle light moderate** **Rain (end):** **None drizzle light moderate**
Cloud % (start): **<5 5-50 51-95 >95** **Cloud % (end):** **<5 5-50 51-95 >95**
Wind (start): 0 1 2 3 4 **Wind (end): 0 1 2 3 4**

Comments on conditions:

Call station #	WPT # or UTM	Species code[1]	Call index[2]	Near /Far[3]	Dir.[4]	# cars pass	Noise index[5]	Comments

[1]Columbia Spotted Frog: RALU; Western Toad: AMBO; Pacific Tree Frog: PSRE; Spadefoot: SPIN
[2] Call index: 1: individual calls distinct/not overlapping; 2: some overlapping calls; 3: full chorus
[3]Far (F) – if very faint; Near (N) – if clearly near (e.g., within 400 m); otherwise leave blank.
[4]Dir: approximate compass bearing (e.g., N, NE, ENE, etc. or give actual bearing in degrees – true not magnetic)
Use separate lines for calls coming from different directions at the same station.
[5]Noise index: 0: no effect (e.g. owl calling); 1: low (e.g. dog barking, distant traffic, 1 car passing, wind rustling leaves); 2: moderate (e.g. 2-5 cars passing); 3:high (continuous traffic nearby, 6-10 cars passing); 4: very high (e.g. continuous traffic passing, construction noise)
Record any changes in weather during the survey

Appendix 2. Great Basin Spadefoot surveys 2022 - details on each station (some stations used 2 or more lines)

				UTM coordinates									
Route code	Date	Station code	Survey sequence	Zone	Easting	Northing	Species code*	Call index	Near (N) or Far (F)	Direction	# cars	Noise index	Comments, including other animals reorded
DL	02-Jun-22	DL10	1	10U	703987	5561335	-	-	-	-	0	0	SaSp 1, WiSn 1, Kildeer 1, VeSp 1
DL	02-Jun-22	DL09	2	10U	703857	5560606	-	-	-	-	0	0	VeSp 1, Osprey 1
DL	02-Jun-22	DL08	3	10U	702735	5560739	SPIN	3	N	-	0	0	CaGo calling, Kildeer 1, WiSn 1, VeSp 1
DL	02-Jun-22	DL07	4	10U	701933	5560911	SPIN	2	F	-	0	0	CaGo calling, Kildeer 1
DL	02-Jun-22	DL06	5	10U	701178	5560968	-	-	-	-	0	0	CaGo calling
DL	02-Jun-22	DL05	6	10U	700606	5560827	SPIN	3	F	-	0	0	CaGo calling
DL	02-Jun-22	DL04	7	10U	699643	5560893	SPIN	3	N	-	0	0	
DL	02-Jun-22	DL03	8	10U	698831	5561177	SPIN	3	F	-	0	0	GhOw 1
DL	02-Jun-22	DL02	9	10U	698379	5560557	SPIN	3	F	-	0	0	CaGo calling
DL	02-Jun-22	DL01	10	10U	697837	5559973	SPIN	3	F	-	0	0	GhOw 1
PEN	07-Jun-22	PEN13	1	10U	682857	5550252	SPIN	3	N	70	0	0	Big pond in view - many SPIN
PEN	07-Jun-22	PEN12	2	10U	682500	5550918	SPIN	3	F	E	0	0	Calls coming from previous pond
PEN	07-Jun-22	PEN12	2	10U	682500	5550918	PSRE	1	N	SW 210	0	0	Moderately far but possibly <400m
PEN	07-Jun-22	PEN12	2	10U	682500	5550918	SPIN	1	N	SW 210	0	0	Moderately far but possibly <400m
PEN	07-Jun-22	PEN11	3	10U	682209	5551533	SPIN	1	F	N 20	0	1	Wind = noisy
PEN	07-Jun-22	PEN10	4	10U	681808	5552239	-	-	-	-	0	1	Wind = noisy, WiSn 1
PEN	07-Jun-22	PEN9	5	10U	681316	5552804	-	-	-	-	0	1	Wind = noisy, WiSn 1
PEN	07-Jun-22	PEN8	6	10U	681186	5553612	-	-	-	-	0	1	Wind = noisy, WiSn 1
PEN	07-Jun-22	PEN7	7	10U	681084	5554398	-	-	-	-	0	1	Wind = noisy, WiSn 1
PEN	07-Jun-22	PEN6	8	10U	680701	5555019	-	-	-	-	0	1	Wind = noisy
PEN	07-Jun-22	PEN5	9	10U	680350	5555720	-	-	-	-	0	1	Wind = noisy
PEN	07-Jun-22	PEN4	10	10U	680315	5556494	-	-	-	-	0	1	Wind = noisy
PEN	07-Jun-22	PEN3	11	10U	680636	5557229	-	-	-	-	0	1	Wind = noisy
PEN	07-Jun-22	PEN2	12	10U	680301	5557962	-	-	-	-	0	1	Less Wind
PEN	07-Jun-22	PEN1	13	10U	680200	5558771	-	-	-	-	0	1	Less Wind
MN	14-Jun-22	MN04	1	10U	687725	5545604	-	-	-	-	0	1 Wind	VeSp 5, SaSp 2, WiSn 1, WeMe 2
MN	14-Jun-22	MN03	2	10U	687061	5545198	SPIN	1	F	100 E	0	2 Wind	VeSp 4, SaSp 2
MN	14-Jun-22	MN02	3	10U	686424	5544769	-	-	-	-	0	2 Wind	WiSn 1
MN	14-Jun-22	MN01	4	10U	685665	5544550	-	-	-	-	0	1 Wind	CaGo 1
PEN	14-Jun-22	PEN24X	5	10U	684530	5545808	-	-	-	-	0	1 Wind	SEOw 1
PEN	14-Jun-22	PEN23X	6	10U	684224	5546853	-	-	-	-	0	0 Wind	
PEN	14-Jun-22	PEN22X	7	10U	684007	5547676	-	-	-	-	0	0	
PEN	14-Jun-22	PEN21X	8	10U	683561	5549235	-	-	-	-	0	0	Stopped survey. Likely too cold for SPIN to call.
DL	21-Jun-22	DL27	1	11U	286825	5574047	-	-	-	-	0	0	VeSp 3, WwPe 1, AmRo 1, waypoint 084
DL	21-Jun-22	DL26	2	10U	713328	5573364	-	-	-	-	0	0	SavSp 2, AmRo 2, SwTh 1, waypoint 085
DL	21-Jun-22	DL25	3	10U	712723	5572826	-	-	-	-	0	0	CoNi 2, SwTh 1, 086
DL	21-Jun-22	DL24	4	10U	712065	5572369	-	-	-	-	0	0	WiSn 2, MaWr 1, "Prreee call", 087
DL	21-Jun-22	DL23	5	10U	711747	5571662	-	-	-	-	0	1	Leaves rustle, WiSn 1, WiFe 1, 088
DL	21-Jun-22	DL22	6	10U	711186	5571087	-	-	-	-	0	0	CaGo calling, Kill 1, 089
DL	21-Jun-22	DL21	7	10U	710643	5570548	PSRE	3	N	270 W	0	0	CoNi 1. edge Rush Lake, 090
DL	21-Jun-22	DL20	8	10U	710186	5569819	SPIN	2	N	WSW	0	0	CoNi 1. Treed area, 091
DL	21-Jun-22	DL19	9	10U	710064	5569031	SPIN	3	N	WSW	0	0	waypoint #092
DL	21-Jun-22	DL19	9	10U	710064	5569031	SPIN	3	N	NW	0	0	waypoint #092
DL	21-Jun-22	DL18	10	10U	709859	5568223	SPIN	1	F	NNW	0	0	waypoint #093
DL	21-Jun-22	DL17	11	10U	709900	5567436	-	-	-	-	0	0	waypoint #094
DL	21-Jun-22	DL16	12	10U	709485	5566795	-	-	-	-	0	2	Sprinkler noise, #095
DL	21-Jun-22	DL15	13	10U	708709	556624	-	-	-	-	0	1	Sprinklers, #096
DL	21-Jun-22	DL14	14	10U	707980	5566279	-	-	-	-	0	0	waypoint #097
DL	21-Jun-22	DL13	15	10U	707393	5565707	-	-	-	-	0	0	waypoint #098
DL	21-Jun-22	DL12	16	10U	706719	5565281	-	-	-	-	0	0	waypoint #099
LAU	23-Jun-22	LAU01	1	10U	693061	5568405	-	-	-	-	0	1	ChSp 1, SaSp 3, SwTh 1, AmRo 2
LAU	23-Jun-22	LAU02	2	10U	692466	5567641	-	-	-	-	0	0	waypoint #100, CoNi 1
LAU	23-Jun-22	LAU03	3	10U	691975	5566962	-	-	-	-	0	1	#101, Wind
LAU	23-Jun-22	LAU04	4	10U	691522	5566290	PSRE		N	280 W	0	0	#102, Wind
LAU	23-Jun-22	LAU04	4	10U	691522	5566290	PSRE		N	300	0	0	waypoint #102
LAU	23-Jun-22	LAU05	5	10U	690894	5565848	-	-	-	-	0	1	#103, Wind leaves, CoNi
LAU	23-Jun-22	LAU06	6	10U	690178	5565599	-	-	-	-	0	1	#104, Wind, Owl hoots
LAU	23-Jun-22	LAU07	7	10U	689868	5565035	-	-	-	-	0	1	#105, Cows below nearby
LAU	23-Jun-22	LAU08	8	10U	689177	5564811	-	-	-	-	0	1	#106, Wind
LAU	23-Jun-22	LAU09	9	10U	688775	5564028	-	-	-	-	0	1	#107, Wind, Leaves
LAU	23-Jun-22	LAU10	10	10U	668353	5563458	-	-	-	-	0	0	#108
LAU	23-Jun-22	LAU11	11	10U	688268	5562641	-	-	-	-	0	0	#109
LAU	23-Jun-22	LAU12	12	10U	687812	5562228	-	-	-	-	0	1	#110, Trees rustle, River, SEOW owl call
LAU	23-Jun-22	DL03X	13	10U	687796	5559776	-	-	-	-	1	0	#111, Call-playback tried - no response

* Species codes: SPIN - Great Basin Spadefoot (*Spea intermontana*); PSRE - Pacific Tree Frog (*Pseudacris regilla*).