National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

Amphibian Surveys at Klondike Gold Rush NHP

2018 Summary

A Klondike Gold Rush National Historical Park - Natural Resources Management Report

ON THE COVER
An amphibian survey site along the lower portion of the Chilkoot Trail, July 6, 2018 (NPS/ ANDRES SANTINI LAABES)

Dyea 14 (DY14)

Dyea 14 (DY14) looking north from the south inlet on Aug 22, 2018.

This site was visited two times in 2018. The first survey was conducted on May 9th. The site was very active and many toads were present and actively mating. Approximately 94 adults were detected which included five pairs of toads in amplexus but only three adults were captured, measured and released. Additionally, many egg masses were detected at the north end (~51000 eggs). During the second survey on May 22nd, a pair of adult toads in amplexus was detected at the south inlet. They were in the process of laying an egg mass. The egg mass consisted of approximately 2667 eggs and was still growing. At the north end of the main pond approximately 5300 tadpoles (Gosner Stage 25-30) were detected.

West Creek 04 (WC04)

West Creek 04 (WC04) on May 22, 2018.

WC04 was surveyed twice in 2018. The first survey was conducted on May 10th and the second survey on May 22nd. During both visits there were no amphibians detected.

Extensive Sites

Chilkoot Trail 07 (CT07) – Panel 3: Basin A

Chilkoot Trail 07 (CT07) North extension of CT07 on July 6th, 2018 (Right). Tadpole detected at Main pond of CT07 on July 6th, 2018.

CT07 received visited twice in 2017, in which four VES were conducted. This season we surveyed the beaver ponds (CT07) and its northern extensions. Substantial bushwhacking was required to survey the northern extensions of the beaver ponds. Two surveys were conducted during each visit each survey was led by a Natural Resources staff. The first sets of surveys were conducted on June 7th, which resulted positive amphibian detection. One adult toad was detected at the southern end of the beaver ponds, however only twenty-five percent of the shore line was searched. The second pair of surveys were conducted on July 6th, which resulted in the detection of two adult toads and tadpole. The two adults were not detected near each other. One adult was located at the northern extension while the other was located in the main pond in the brush adjacent to the boardwalk. Additionally a tadpole (Gosner Stage 28-30) was found in the center of the main pond (estimated coordinates are in NAD83, 59.545885, -135.334286). This is the first sign of breeding detected at the beaver ponds. An adult toad was photographed at the beaver ponds on July 20th by Annie Matsov, Chief of Resources, when hiking through. The number of VES's conducted at the beaver ponds were greater than in previous years which could be responsible for the increased number of toad detections in the area.

Table 4. Total numbers of Boreal Toads (at varying life stages) detected at monitoring sites in 2018.

Site Number	Lone Adults	Adults in Amplexus	Total Adults (L+A)	Eggmasses	Tadpoles	Metamorphs	Juveniles
Intensive core sites							
TR01	1	0	1	1	0	0	0
DY03	4	0	4	0	0	0	0
DY13	0	0	0	0	1000	0	0
DY14	82	12	94	53667.64	5300	0	0
WC04	0	0	0	0	0	0	0
Extensive sites							
CT07	3	0	3	0	1	0	0
Totals							
	90	12	99	53668.64	6300	0	0

Discussion

Visual Encounter Surveys

Oral history accounts and anecdotal evidence suggest that Boreal Toads were once abundant in both the Skagway and Taiya River valleys. Elders from both communities have commented that the bottom of ponds were not visible in the spring due to all of the black egg masses and tadpoles (Kalen 2010, Albecker 2010, Fairbanks 2010). The small, isolated toad population in Dyea today may be a small fraction of a once abundant species. Similar population crashes of Boreal Toads were documented in Juneau, Ketchikan and Haines between 1970 and 1990 (Carstensen et al. 2003).

Anecdotal evidence suggests that amphibians in southeast Alaska may have already experienced a mass mortality event (Green 2010) and now continue to be subject to variation in breeding site occupancy and productivity due to natural metapopulation dynamics (Shmetterling 2009). A wide-spread amphibian die-off in the Dyea and Skagway valleys could have been triggered by many possible factors. The reasons for abrupt population crashes in Southeast Alaska are most likely a combination of habitat loss, climate change, increased UV-B radiation, introduction of predators (such as stocked fish in the Skagway Valley) and the pathogenic chytrid fungus. The Dyea valley also experienced a major flooding event in 2003 when the West Creek glacial moraine gave out.

Toads and metamorphs should continue to be examined for malformations or other indicators of disease and water quality testing could be conducted to assess environmental contaminants that might be responsible. Human activities may have a major impact on current Boreal Toad survival in KLGO as toads are killed by vehicles while crossing roads and visitors potentially spread pathogens on their footwear or trample newly metamorphosed toads. To mitigate such impacts, community and visitor education should remain an integral part of the amphibian monitoring program.

Opportunistic Amphibian Observations on Canadian Portion of the Chilkoot Trail

During the 2018 Resource Hike (July 24-July 28, 2018), KLGO Natural Resource staff detected an amphibian on July 28th, along one of the boardwalks between Bare Loon Lake and Lake Bennet (Easting 499147, Northing 6631759, NAD83, UTM Z8). The amphibian was captured, measured and released. The amphibian was determined to be a Columbia-Spotted Frog. The collected information was sent to Kim Schlosser of Parks Canada.

Columbia-Spotted Frog captured along boardwalk between Bear Loon Lake and Lake Bennett on the Canadian portion of the Chilkoot Trail (Left). KLGO staff measuring the Columbia-Spotted Frog (Right).

Anecdotal Amphibian Observations

Three anecdotal Observations of adult Boreal Toads were reported. All three reported sights of Boreal Toads were during the month of July. KLGO Interpretation Rangers, Katie Muszkiewicz and Cassie Anderson, reported witnessing Boreal Toads on separate occasions. On July 5th, Katie witnessed an adult Boreal Toad crossing the trail 100ft south of Finnegan's Point. On July 6th, Cassie reported observing a lone adult Boreal Toad halfway between Deep Lake and Lindeman on the Canadian side of the Chilkoot Trail. Additionally, KLGO Chief of Resources, Annie Matsov, reported witnessing one adult Boreal Toad at the north end of the northernmost boardwalk of the Beaver Ponds on July 20th.

Table 5. Anecdotal amphibian sightings in 2018, with estimated coordinates (NAD83, UTM Z8).

Date	Location	Easting (m)	Northing (m)	Observer Name
05 July 2018	Finnegan's Point	481186.6605	6604004	Katie Muszkiewicz
06 July 2018	Between Deep Lake and Lindeman	494616	6625893	Cassie Anderson
20 July 2018	Beaver Ponds	481095	6600925	Annie Matsov

Adult Boreal Toad seen at the Beaver Ponds on 20 July 2018, photo by Annie Matsov.

Conclusions & Recommendations

During the 2018 season, there was no chytrid fungus swabbing or radio-tagging of amphibians, and there were fewer VES compared to other years due to the insufficient resource staff and budget. However, as recommended in the 2017 annual report, there was an emphasis placed on surveying and mapping the Beaver Ponds (CT07) for previously undetected breeding sites. A new KLGO map (Appendix A2) of the surveyed beaver ponds area along with locations of detected toads is saved to this file path (Y:\GISData\Flora_Fauna_Ecology\Fauna\Amphibians\Toads\2018\AmphibianSurvey_BeaverPonds 2018.pdf). Datasheets for the 2018 season were scanned into the network after being reviewed for quality assurance and quality control (QA/QC). They are located at this file path T:\NRM\Amphibians\2018 Amphibians\2018 Amphibian data\digitized datasheets. It is recommended that the amphibian monitoring continue when a technician is available to focus on the project in August-October and a robust sampling design has been developed in order to maximize the effectiveness of the program.

Surveys should continue in order to monitor long-term changes in amphibian distribution, abundance, reproduction, and survival. Monitoring should begin at the start of the breeding season in April when toads can be found in amplexus and eggs are present. Egg masses can often be more easily detected than mobile tadpoles and an early start to monitoring could provide more accurate detections of breeding activity. The use of a dip net while surveying would also help to enhance tadpole or metamorph detection, especially at sites with poor visibility. However, care should be taken to avoid dip netting egg masses which may damage them or remove them from the ideal location.

Radio-tracking of toads provides valuable information on upland habitat use and requirements that could be valuable in better understanding the movement patterns of Boreal Toads as well as the potential impacts of development. No toads were radio-tracked in 2017 or 2018.

Community observations are fundamental to understanding current and historic amphibian distributions throughout the area. In 2017, longtime Dyea resident Wayne Greenstreet reported once discovering a large number (~20) adult Boreal Toads hibernating in the well on his property in Dyea year ago. Future technicians should talk with local residents to target areas for radio-belting toads and identifying locations of hibernacula. Education efforts are also essential in reducing the spread of chytrid or other diseases and mitigating human impacts at sensitive breeding sites. Increased outreach efforts at KLGO should focus on local guide companies, school groups, and visitors. Facebook groups such as “Skagway Naturally!” (maintained by longtime Dyea resident John McDermott) should also be searched for community observations of amphibians, and it might be a good platform for sharing information and results from the Amphibian Monitoring Program at KLGO.

Two projects that should specifically be undertaken during the 2019 field season are:
1) During the 2018 season, the Taiya River experienced a flooding event August 9th. For the 2019 season, Intensive Core sites within the floodplain of the Taiya should be inspected for physical and/or water quality changes that may influence the Boreal Toad population in future years.

2) A recent study found that Wyoming Toads *(Anaxyrus baxteri)* can be individually identified by their dorsal spot pattern with the human eye with incredibly high success (their study reported 100% of the time) (Morrison et al. 2016). Following the photo methods published by that study (Morrison et al. 2016), photo-documentation of dorsal spot patterns of juvenile and adult toads should become a systematic step in data collection when individual Boreal Toads are captured during Visual Encounter Surveys at KLGO. Photos should be geotagged, and renamed systematically ("AmphibianSurvey_Site_IndivID_Date_ObserverName", Ex. "Amphibian Survey_TR01_A3_04June2017_SSurdyk"). Prior to commencing photo data collection, an SOP should be developed for storing and managing digital photos and associated data. Outreach materials should also be developed for promoting citizen science submissions of Boreal Toads.

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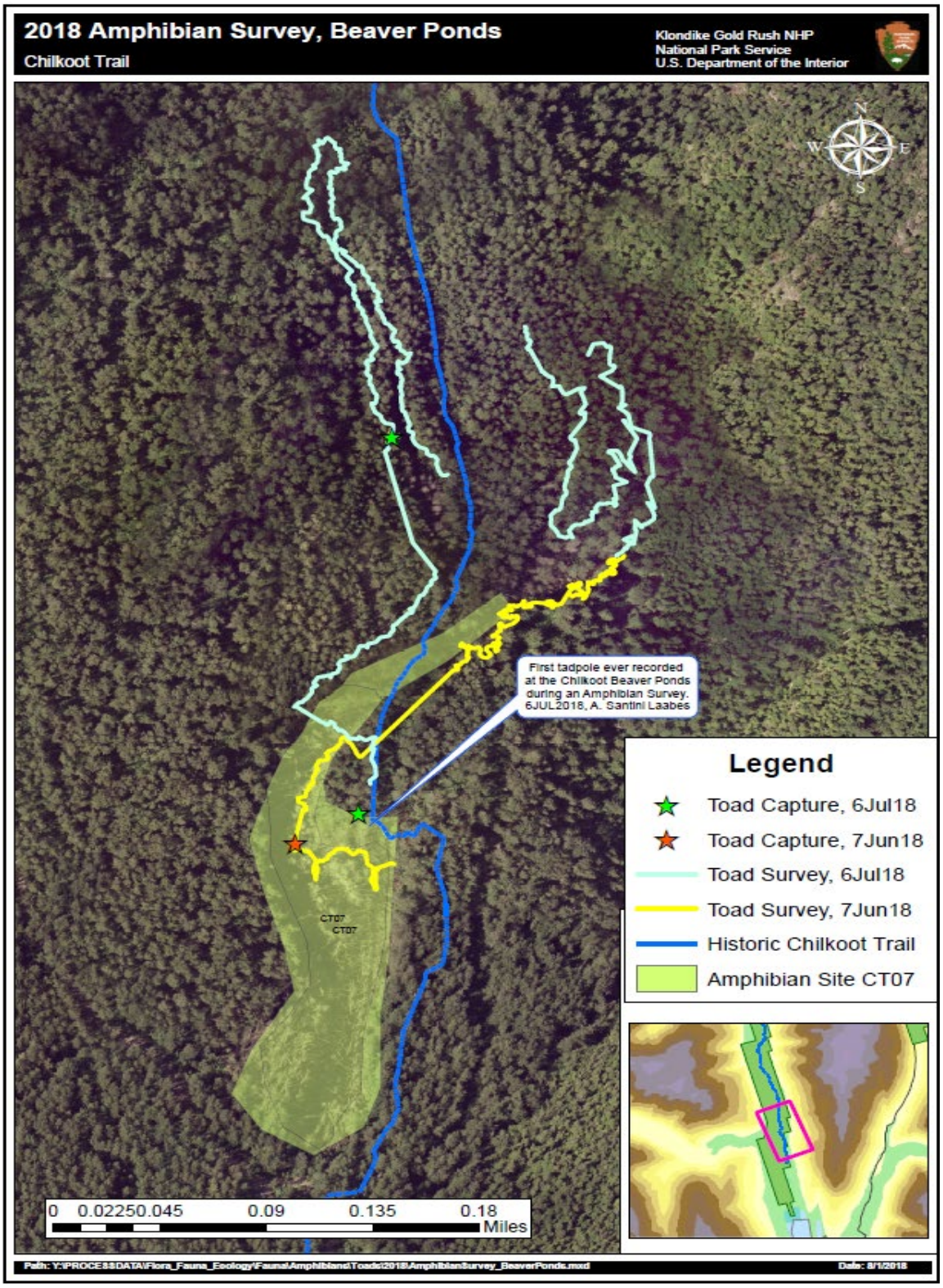
Appendix A. Maps

A1. Intensive Amphibian Monitoring Sites in Dyea



A2. 2018 Amphibian Surveys in Beaver Ponds

A3. Non-Intensive Amphibian Monitoring Panels

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