Amphibians of the Stikine River Region

An Overview of Study Findings
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Project Summary: This project was designed to better understand human-amphibian relationships in the Stikine River Region of Alaska, as well as how these relationships can inform the conservation and management of these species. A series of local and traditional knowledge (LTK) studies and citizen science programs were conducted between 2009 and 2015 in both Wrangell and Petersburg. In addition, annual amphibian inventories were conducted within the Stikine-LeConte Wilderness Area and nearby localities during these years. This document provides a summary of the overall data obtained from this study.

THANK-YOU! First and foremost I want to express my sincere gratitude to the residents of Wrangell and Petersburg for your endless support of this project and for your generous hospitality. I always feel at home during my visits, I have made amazing friends, and I am honored to now bear the Kiks.adi name "Xíxch'i Toowóo" meaning "Frog Feelings" or "He Who Cares for the Frogs." Elders, adults, and youth alike have helped me to become the scientist and humanist that I am today. I have truly grown as a person as a result of my time with you. I also feel a deep spiritual and emotional connection to the majestic landscapes surrounding your home, and I hope that my research has had a positive impact on local education and conservation.

AMPHIBIAN IMPORTANCE

Why are amphibians important in the Stikine River region of Alaska? While they are not commonly consumed by humans and do not apparently have economic value locally, they are important components of local ecological systems. These species provide a substantial food source for birds, small mammals, and fish. They are also considered excellent indicators of biological health given their porous skin and relative inability to migrate long-distances. They are among the first animals to be impacted by development, climate change, and environmental degradation. Monitoring amphibians can be an inexpensive and efficient means of understanding shifts in the local environment. Understanding changes to amphibian populations can therefore provide clues and early warning signs that may help to prevent detrimental impacts on species on which humans directly depend, like salmon and deer.

Amphibians are also important to local cultural groups. The Kiks.adi and Kaach.adi Clans of the Stikine Tlingit both bear the frog (or toad) as a crest and have maintained cultural relationships to these species since time immemorial. The call of the frog has guided boats in dangerous seas to shore, has served in annual calendars as a cue for preparing to move to summer fish camps, and has been used to forecast weather conditions. These animals have also been used in songs and stories that teach the interconnectedness of humans and animals, and the respect that must be given to even the smallest animals if people are to persist in the North. Furthermore, amphibians have been regarded highly for their powers of prediction and healing.

First known Long-toed Salamander at Guerin Slough. Contributed by Ethan Pempek in 2011.

Local people apply intrinsic, recreational, and educational values to amphibians. Most participants in this study recognized that amphibians are important to many different groups of people in the region. Children are often excited to see (and catch) frogs and salamanders found locally. Teachers frequently use amphibians as teaching aids in their classrooms to demonstrate metamorphosis from egg, to tadpole, to frog or salamander. Regardless of personal feelings toward these animals, this study found that many residents frequently encounter amphibians on local landscapes and that they are generally happy to see them from year to year.

HUMAN-AMPHIBIAN INTERACTIONS AND PERCEPTIONS

This topic was largely explored using a mailed survey instrument to the community of Wrangell in 2012. A total of 26% of households represented by 280 surveys were returned. These are the key findings from that survey:

- Most local residents feel at least somewhat familiar with local amphibians but relatively unfamiliar with laws pertaining to these species.
- Most residents (91%) feel that amphibians are important components of local ecological communities and to at least some groups of people (95%). Eighty-one percent of respondents indicated that amphibians are important to EVERYONE!
- Many respondents indicated that they feel enjoyment when encountering local amphibians, followed by excitement, respect, indifference, and fear.
- Respondents observe Boreal Toads on local landscapes most frequently, followed by Rough-skinned Newts, Columbia Spotted Frogs, Long-toed Salamanders, Wood Frogs, and Northwestern Salamanders.
- A large proportion of respondents (41%) have intentionally looked for amphibians in the past.
- When encountering amphibians, 60% of respondents indicated that they have handled them and 28% indicate that they handle them at least occasionally.
- Most respondents (79%) indicated that they have never moved an amphibian from one place to another, and 21% indicated that they had.
- While most respondents (78%) indicated that they have not brought a local amphibian home as a pet or to view in captivity, 22% indicated that they had. Twenty-six respondents released these animals where they were captured, and 24 respondents released them elsewhere.
- The most frequently mentioned observations of recent environmental changes included warmer winter temperatures (89 respondents), cooler summer temperatures (73 respondents), and earlier ice break-ups (36 respondents).

In addition to the above listed items, respondents also offered 862 species and place-specific observations of amphibians! Many of these are previously unknown locations for the occurrence of these animals!

EDUCATIONAL CONTRIBUTIONS

The citizen science and service-learning components of this study gave me the opportunity to give back to the communities through public lectures, curriculum development, short courses, and field training. Similarly, participants in these programs provided high quality data on local amphibians. These are a few photos of our many adventures!



Camp'Phibian 2014
Active sampling with Wrangell Girl Scout Troop # 4156 @ Twin Lakes

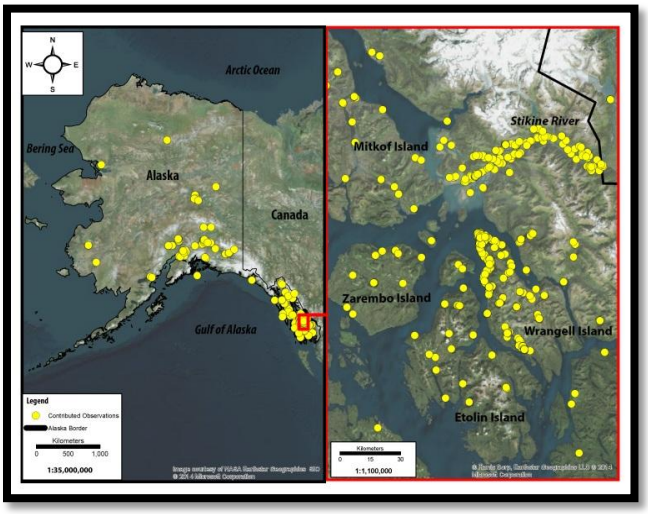
Service-Learning Program 2014
Active sampling with Petersburg Advanced Placement Biology Class @ Cheliped Bay & Mallard Slough



CONTRIBUTED OBSERVATIONS

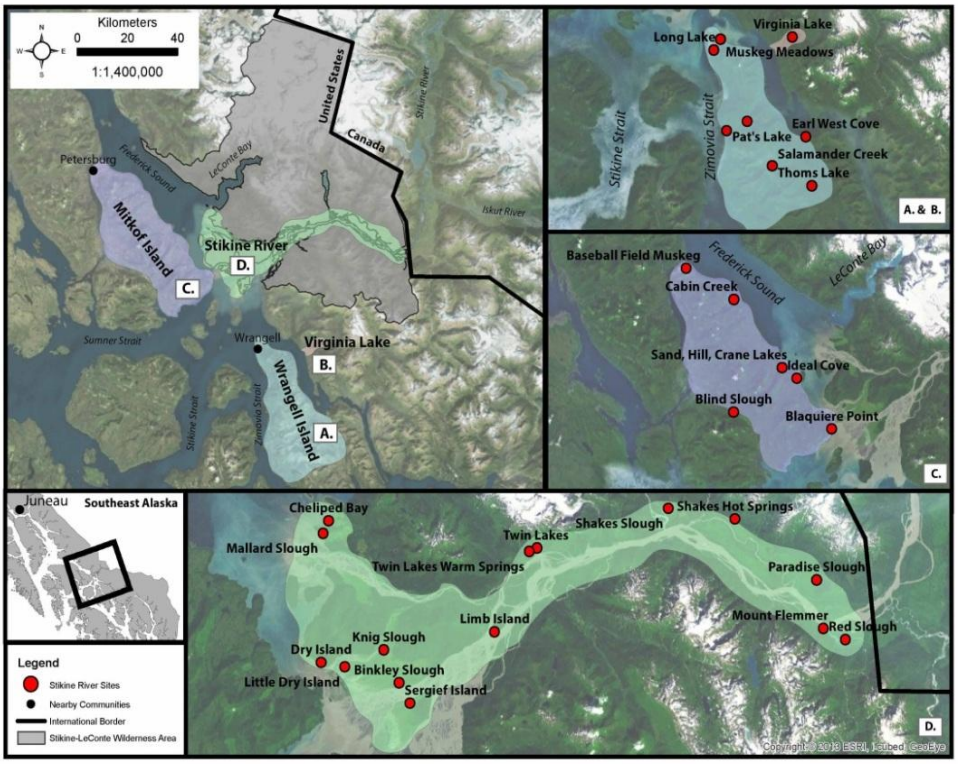
Between the contributed local knowledge observations and citizen science programs used in this study, a total of 2,320 amphibian observations were made. These contributions are listed in the table below by contribution method and by species. Amphibians highlighted in green are known to be native to Alaska. Those cells highlighted in gray are contributions from citizen science programs.

		Species												
Contribution Method	**No. unique contributing households**	Boreal Toad	Columbia-spotted Frog	Wood Frog	Pacific Chorus Frog	Red-legged Frog	Rough-skinned Newt	Long-toed Salamander	Northwestern Salamander	Blue-spotted Salamander	Unknown Amphibian	Unknown Frog	Unknown Salamander	**TOTAL**
Classroom Survey	12	1	0	0	0	0	0	0	0	0	0	13	0	**14**
Mailed Survey	190	271	85	50	0	0	197	42	10	0	69	120	18	**862**
Follow-up Survey	14	13	0	5	0	0	6	2	1	0	0	2	1	**30**
AHS Website	10	9	2	0	0	0	4	0	0	1	0	1	0	**17**
In Person	21	19	1	13	0	0	8	0	0	0	0	19	2	**62**
Email	26	26	0	10	1	0	9	2	0	0	0	5	0	**53**
U.S. Mail	1	0	0	0	0	0	0	1	0	0	0	0	0	**1**
Sub Surveys	28	15	0	65	0	6	6	1	0	0	0	19	0	**112**
Camp'Phibian 2014 / 2015	-	442	12	0	0	0	8	0	0	0	0	0	0	**462**
Amphib'Blitz	-	0	10	0	0	0	0	0	0	0	0	0	0	**10**
Service-Learning Program	-	186	477	20	0	0	0	5	0	0	0	9	0	**697**
TOTAL	-	**982**	**587**	**163**	**1**	**6**	**238**	**53**	**11**	**1**	**69**	**188**	**21**	**2320**



Contributed amphibian observations were primarily from the Stikine River region of Alaska, though some contributors provided observations from other areas. The map above represents each of the localities that amphibians were reported during this study. Most of these points represent species specific observations. For many of them, the species were originally unknown from those locations.

AMPHIBIAN INVENTORIES



In addition to local knowledge and citizen science contributions from the public, I also conducted systematic amphibian surveys during several years of this study. To the left is a map of the locations sampled.

The condensed table on the next page provides a brief overview of my findings. While this table only contains the three sampling years used for my graduate research, sampling has continued annually since. To implement this, the Alaska Herpetological Society (AHS) has created the Stikine Long-term Amphibian Monitoring Program (SLAMP).

A total of 1,325 observations, which represent thousands of individual amphibians, were observed using standard surveying methodologies between 2010 and 2014. In the data below, many eggs or tadpoles were recorded as a single observation.

2010	Boreal Toad	Wood Frog	Columbia-Spotted Frog	Pacific Chorus Frog	Rough-skinned Newt	Long-toed Salamander	Northwestern Salamander	Unknown Salamander	Unknown Frog
Mitkof Island	1	0	0	0	15	0	0	0	0
Stikine River	-	-	-	-	-	-	-	-	-
Wrangell Island	6	0	0	0	15	0	0	0	0
Virginia Lake*	1	0	0	0	12	0	0	0	0
OTHER	2	0	0	2	4	4	0	0	0
Revillagigedo Island	0	0	0	2	0	4	0	0	0
Haines	2	0	0	0	0	0	0	0	0
Prince of Wales Island	0	0	0	0	4	0	0	0	0
TOTAL	10	0	0	2	46	4	0	0	0

2012	Boreal Toad	Wood Frog	Columbia-Spotted Frog	Pacific Chorus Frog	Rough-skinned Newt	Long-toed Salamander	Northwestern Salamander	Unknown Salamander	Unknown Frog
Mitkof Island	0	0	0	0	0	0	0	2	0
Stikine River	25	7	6	0	10	28	0	4	2
Wrangell Island	4	0	0	0	46	0	0	0	0
Virginia Lake*	-	-	-	-	-	-	-	-	-
OTHER	-	-	-	-	-	-	-	-	-
Revillagigedo Island	-	-	-	-	-	-	-	-	-
Haines	-	-	-	-	-	-	-	-	-
Prince of Wales Island	-	-	-	-	-	-	-	-	-
TOTAL	29	7	6	0	56	28	0	6	2

2013	Boreal Toad	Wood Frog	Columbia-Spotted Frog	Pacific Chorus Frog	Rough-skinned Newt	Long-toed Salamander	Northwestern Salamander	Unknown Salamander	Unknown Frog
Mitkof Island	0	0	0	0	0	0	0	0	0
Stikine River	110	7	29	0	121	3	0	0	0
Wrangell Island	-	-	-	-	-	-	-	-	-
Virginia Lake*	-	-	-	-	-	-	-	-	-
OTHER	-	-	-	-	-	-	-	-	-
Revillagigedo Island	-	-	-	-	-	-	-	-	-
Haines	-	-	-	-	-	-	-	-	-
Prince of Wales Island	-	-	-	-	-	-	-	-	-
TOTAL	110	7	29	0	121	3	0	0	0

2014	Boreal Toad	Wood Frog	Columbia-Spotted Frog	Pacific Chorus Frog	Rough-skinned Newt	Long-toed Salamander	Northwestern Salamander	Unknown Salamander	Unknown Frog	TOTAL
Mitkof Island	-	-	-	-	-	-	-	-	-	18
Stikine River	821	0	19	0	19	0	0	0	0	1211
Wrangell Island	-	-	-	-	-	-	-	-	-	71
Virginia Lake*	-	-	-	-	-	-	-	-	-	13
OTHER	-	-	-	-	-	-	-	-	-	12
Revillagigedo Island	-	-	-	-	-	-	-	-	-	6
Haines	-	-	-	-	-	-	-	-	-	2
Prince of Wales Island	-	-	-	-	-	-	-	-	-	4
TOTAL	821	0	19	0	19	0	0	0	0	1325

CONCLUSIONS

- Local knowledge and citizen science provide excellent opportunities for collaboration and data collection.
- Residents of the Stikine region value amphibians as important components of social and ecological systems.
- At least five native species of amphibians are present in the Stikine River region of Alaska.
- Many amphibian populations in this region appear to be stable, with the exception of key sites on Mitkof Island.
- This study has expanded knowledge of amphibian diversity, distribution, and abundance throughout the state.

Wood Frog at Farm Island, 2012

Rough-skinned Newt at Paradise Slough, 2013

Boreal Toad at Twin Lakes, 2014

MORE INFORMATION

The information presented here is a broad overview of the work conducted for this project. Detailed data analysis is currently pending publication in peer-reviewed journals and in my doctoral dissertation at the University of Alaska Fairbanks. These publications and much of the data will soon be available online at www.akherpsociety.org. Please feel free to contact me directly with any questions, comments, or concerns that you may have.

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