

## WYOMING GAME AND FISH DEPARTMENT

## FISH DIVISION

## ADMINISTRATIVE REPORT

TITLE: Amphibian Surveys in the Upper Green River Watershed of Wyoming, May to September 2002

PROJECT: NESWHE1

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## ABSTRACT

Amphibian surveys were performed on National Forest land in the upper Green River watershed of Wyoming in the summer of 2002. These surveys were conducted to gather baseline data on amphibian distribution, relative abundance and habitat requirements. Initial efforts were concentrated in river drainages, which were being considered for treatment with piscicides as part of a management plan for native Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*). Boreal Toad (*Bufo boreas boreas*) specimens were collected for genetic and chytrid fungus (*Batrachochytrium dendrobatidis*) analyses. Three river drainages were surveyed: LaBarge Creek, Gypsum Creek, and Cottonwood Creek (North and South Cottonwood Creek). Four species of amphibian were found and 62 specimens were collected. Numerous breeding sites were located: 19 Boreal Toad, 72 Boreal Chorus Frog (*Pseudacris maculata*), 40 Tiger Salamander (*Ambystoma tigrinum*), and one Columbia Spotted Frog (*Rana luteiventris*). Boreal Toad breeding sites were most often associated with beaver ponds, shallows, emergent grasses on the northern shoreline, and silt/mud bottom substrates. Boreal Chorus Frog breeding sites were often isolated with shallows and emergent grasses on the northern shore as well as a silt/mud bottom substrate. Tiger Salamander breeding sites were frequently isolated in semi-permanent or permanent bodies of water, which lacked fish. The sole Columbia Spotted Frog breeding site found was isolated from other bodies of water, had permanent water, water lilies, and no fish. Threats to amphibians include chytrid fungus, oil development, gas development, road creation, suburban development, water manipulation, cattle grazing, as well as stream treatment with piscicides, herbicides, pesticides, and fire retardants (Phillips 1994, Alford and Richards 1990). Future work in Wyoming should include further investigations of amphibians to gather data pertaining to their distribution, abundance, and habitat requirements. This information will facilitate efforts to conserve Wyoming's native amphibians.

## INTRODUCTION

Amphibian declines have been documented worldwide in the past 20 to 25 years. They appear to be related to a variety of factors, which include environmental alteration, habitat fragmentation, acid rain, pesticides, pollution, exotic species introduction, increased UV radiation, and disease (Phillips 1994, Alford and Richards 1990). In Colorado, New Mexico, and southeastern Wyoming, the southern Rocky Mountain Population (SRMP) of the Boreal Toad (has declined dramatically. The SRMP has been petitioned for listing under the Endangered Species Act, but is currently considered "warranted but

precluded” for federal listing. This decision was made due to the high priority of other species in the area . It is considered Native Species Status 1 (population declining and habitat unstable) in Wyoming, but it has the status of endangered in the states of Colorado and New Mexico (Ireland, 1995). Declines have also been observed, but not well documented, in western Wyoming populations of the Northern Leopard Frog (*Rana pipiens*) (Corn and Livo, 1989).

Amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) has been associated with amphibian declines worldwide and locally. Although little is known about how this fungus kills amphibians, a polymerase chain reaction (PCR) test has been developed that detects chytrid DNA in skin samples. This assay (Pisces Molecular, Boulder, CO) is very sensitive, so some care must be taken to avoid contamination of samples. Skin samples (toe clips, pelvic patches, and back patches) have been tested from many species of amphibian in the southern Rocky Mountains, including the Boreal Toad (John Wood personal communication). While many of the breeding sites in the SRMP have tested positive for chytrid, few samples have been collected from western Wyoming. Collecting and analyzing such samples for chytrid will be important to understand the limits of the geographic distribution of chytrid fungus.

In some areas of Wyoming, little data exists on amphibian distribution and abundance. Albany County has been relatively well surveyed, due to the presence of the federally endangered Wyoming Toad (*Bufo baxteri*) and the SRMP of the Boreal Toad. Boreal Toad surveys are frequently performed in the Medicine Bow National Forest near Laramie, Wyoming by a variety of agencies. Gregory Langer and Monica Davis (United States Fish and Wildlife Service, USFWS) performed amphibian surveys in the Laramie plains from June to September 2002, collecting 25 amphibians for chytrid analysis. Garber performed amphibian surveys in the mountains of southern and eastern Wyoming (Garber 1994, 1995a, 1995b). Dr. George Baxter performed surveys statewide and mapped specimen locations from Wyoming in his Master’s thesis at the University of Wyoming These data were later presented in his book, *Amphibians and Reptiles of Wyoming* (Baxter and Stone 1980). Dr. Charles Peterson and Debra Patla, from the University of Idaho, have performed amphibian surveys in the Greater Yellowstone Ecosystem (Patla, personal communication). Hilda Sexauer (WGFD, Pinedale) has performed Boreal Toad surveys in limited areas of the upper Green River drainage of Wyoming (Buck, Chall, Sawmill, Tosi and Tepee creeks). A crew working under Matt McGee and Doug Keinath of the Wyoming Natural Diversity Database (WYNDD) performed surveys this summer on Bureau of Land Management (BLM) land in the upper Green River drainage. Garber (1994, 1995a, 1995b) also surveyed limited areas in the Wind River and Wyoming ranges of western Wyoming.

Two populations of the Boreal Toad are currently recognized: the SRMP and the Northern Rocky Mountain Population (NRMP). The SRMP is believed to inhabit portions of Colorado and southeastern Wyoming south and east of the Great Basin of Wyoming. The NRMP inhabits areas north and west of this basin. The initial categorization of Boreal Toads in western Wyoming as part of the NRMP was based primarily on the geographic isolation from the SRMP rather than thorough genetic analyses. (Ireland, 1995) Anna Goebel has conducted genetic analysis of specimens from Buck and Chall Creeks (Beaver Creek drainage) and Sawmill Creek (Piney Creek drainage) in the upper Green River watershed. When she used mitochondrial DNA, the Sawmill Creek toads (further south than the other two drainages) appeared to be more closely related to the SRMP of toads (Colorado, and three counties in Utah). The Buck and Chall Creek toads appeared more closely related to Idaho, Montana, and Yellowstone toads, as well as to toads inhabiting the region from central California north to Alaska (currently identified as the NRMP). However, when these upper Green River drainage toads were analyzed using nuclear DNA, the toads from all three drainages (Sawmill, Chall and Buck Creeks) were most closely related to the SRMP samples from Colorado (Goebel personal communication). Therefore, there is some confusion surrounding the taxonomy of these toads. Some appear to be more similar (using mitochondrial DNA) to the NRMP, but when nuclear DNA analysis was employed, they are all more similar to the SRMP. It is hoped that further collection and genetic analyses will clarify this taxonomic question.

Native cutthroat trout recovery efforts often use piscicides such as rotenone and antimycin. The effects of rotenone on amphibian species have been cursorily studied, but there are limited data on the effects of antimycin on amphibians. Patla suggested that antimycin treatments were lethal to most species of toad tadpoles. Rotenone has been shown to kill larval amphibians, but is probably as toxic to the less aquatic juveniles and adults (Patla 1998). Because of the relatively unstudied effects of antimycin on amphibians and the known lethal effects of rotenone on larval amphibians, we felt that protecting amphibians and their breeding sites was a priority. This was accomplished by removing amphibians from areas scheduled for treatment. To limit amphibian mortality, piscicide treatments were conducted late in the season after most metamorphosis was thought to have occurred. We also surveyed the streams to find amphibians and remove them until the piscicides were neutralized.

The objectives of this project were to gather baseline data on amphibian geographic distribution and relative abundance. Another goal was to describe amphibian habitat usage in the streams which act as tributaries to the Green River in western Wyoming. Our initial efforts were concentrated in drainages targeted for piscicide treatment to remove non-native salmonids. Boreal Toad specimens were also collected for genetic and chytrid fungus analyses. The results of surveys conducted in 2002 are presented in this report. We also provide recommendations about further field studies, management programs, and conservation strategies as well as identifying possible threats with regard to amphibians.

## METHODS

The protocols developed this season for amphibian surveys and sampling can be considered draft protocols that can be used for sampling amphibians statewide. Methods for sampling aquatic reptiles will be somewhat different from those for amphibians. Traps and additional sampling methods may be required, but the data sheets are versatile enough to be used for any amphibian and reptile species with minor modifications.

### Survey Methods

At the beginning of the season, we surveyed each stream within the drainage. Due to bad weather and deep snow early in the season, it was not possible examine areas located at higher elevations until the conditions improved. We used Global Positioning System (GPS) units (Garmin Model 12xl) to record tracklogs (NAD27 map projection datum) of our searches, which we downloaded onto a computer software map package (Wyoming All Topo Map by iGage software). In addition to the primary surveys performed earlier in the season, we returned to all Boreal Toad breeding sites and most Boreal Chorus Frog breeding sites at the end of September. Surveying a stream generally entailed one or two observers moving along the margin of each side of the stream searching for amphibians. Pieces of cover were moved if they looked like they could conceal an amphibian. They were then replaced exactly as they found to avoid any detrimental microhabitat alterations. We searched the perimeters of slow-moving backwaters, oxbows, and isolated pools. The surveys were focused on finding amphibian egg-masses, tadpoles, juveniles, or adults. Dip nets were used to sweep through vegetation to capture tadpoles or larvae, which may have remained unseen otherwise. We standardized survey effort between people by walking at about the same speed, in the same habitat, etc. When a very large body of water with many amphibians was encountered, we generally counted intensely within a certain area (i.e. one square meter), and then extrapolated this to the rest of the area, assuming a homogenous distribution of animals site-wide. In pools with tadpoles scattered throughout, we often walked one or two transects through each pool to estimate density and extrapolated to estimate total numbers. Wet areas surrounding breeding sites were searched using zigzag or straight-line transects.

We never found amphibians in very high gradient streams habitats and we seldom found amphibians under cover. In an effort to make surveying more efficient, we eventually choose not to survey high gradient stream reaches and searched less frequently under pieces of cover. Amphibian encounter rates are reported as “per survey-hour” throughout this report. A “survey hour” is defined as one individual surveying for one hour. All individuals were assumed to have an equal chance of observing amphibians.

### **Disinfection Protocols**

We used a 10% bleach solution to disinfect boots, waders, and nets at the end of each day. Disinfection protocols entailed rinsing all mud and vegetation from the equipment with tap water. Nets, waders, and boots were then sprayed with the bleach solution and allowed to dry. We also disinfected thermometers and death kit supplies (scissors/toe clippers) with alcohol swabs or by dipping them in alcohol. Sterilization was conducted between surveys or after contacting individual animals. Rubber gloves were used to handle nearly all Boreal Toads and most amphibians. Gloves were always changed between surveys. New gloves were used for each specimen, whether it appeared to be deceased, ill or healthy. Later in the season, we began to carry small spray bottles containing 10% bleach, especially when we were traveling between isolated pools. Debra Patla suggested that isolated pools have a greater possibility of being chytrid-positive (Patla personal communication). Despite these measures, there was still some potential for contamination. After the field season, we learned that when collecting tissue samples for PCR testing, scissors/toe clippers should not only be disinfected with alcohol, but also with a flame (John Wood, personal communication).

### **Data Collection Methods**

For each site we surveyed, we filled out a herpetofauna survey data sheet and a site description sheet (Appendix A). The drainage/site map sheet was not always completed. On the herpetofauna survey data sheets, descriptors on the top row (start point, end point, etc.) were used to represent the site. The second row (species, stage, etc.) was used to record information about observations.

After conducting surveys for a few weeks, it became apparent that the definition of a “site” was somewhat ambiguous. We began by calling each area we surveyed a site, and designating a new site if the habitat changed drastically, a Boreal Toad was found or a breeding site was discovered. We changed our data collection methods on June 19, 2002 to define a site differently. The revised technique is described below.

We designated a new site when the habitat changed dramatically (i.e. from a high to low gradient stream, in which case the corresponding site number would change from A53 to A54). We used the abbreviations “H” or “L” along the left side of the site number to designate a high or low gradient stream, but this designation was abandoned later in the season. A site description was filled out for each site. In addition to the site number, an extra number was used when a breeding “microsite” was found. For example, if we were surveying site number A53 and there was a small backwater with egg-masses in it, this backwater was designated A53-1. The next breeding site we found was A53-2, etc. When the site changed from low to high gradient and became A54, the microsite numbers were restarted at 1, so the first breeding site was A54-1, the second A54-2, etc. A microsite was only designated if breeding had occurred (see following paragraph for the definition of breeding). We also completed a site description for each microsite and treated them as if they were new sites (we recorded starting-ending points and times, water temperatures, etc.). New site numbers were assigned every day. When we revisited a site in

the fall, the original site number was used. If there were areas within a site that seemed like good possibilities for breeding, but there was no breeding was observed, it was noted in the site description notes. Amphibians were recorded as usual on the data sheet under either the appropriate microsite or site. Unique GPS coordinates were recorded for every amphibian encountered more than ten meters from a previously recorded amphibian. Amphibians located within 10 m of one another were considered to be at the same GPS location. We recorded GPS coordinates in the “Elevation” column on the data sheet. If an amphibian was found at a potential breeding site, this was recorded in the notes column, to help pinpoint potential breeding sites.

Throughout the survey season, breeding sites were defined as specific locations in bodies of water where breeding was occurring (Loeffler 2001). Breeding was defined as follows for species of amphibians. For Boreal Toads and Columbia Spotted Frogs the presence of egg-masses, tadpoles, or recently metamorphosed individuals in an area designated it as a breeding site. For Boreal Chorus Frogs all of the same criteria applied but calling before early June was also considered indicative of breeding (Baxter and Stone 1980). Tiger Salamander breeding sites had either egg-masses or larvae. A frog metamorph was defined as an individual that still had a tail nub or one found late in the season with numerous other small individuals of approximately the same size. In order for a site with metamorphs (and no eggs or tadpoles/larvae) to be considered a breeding site, it had to have multiple frogs of about the same size, which were apparently originating from that site. At the beginning of the season, the relative sizes of metamorphs vs. juveniles and juveniles vs. adults were unknown. Therefore, the definition of the stage of each amphibian was based primarily on personal experience and often differed among observers, especially for Boreal Chorus Frogs. Because of this uncertainty, the stage of each animal (which can be very difficult to accurately determine even if carefully defined) was not considered in data analysis. No distinction is made between juvenile (sexually immature, sub-adults) and recently metamorphed anurans (frogs and toads) in the tables and appendices presented in this report. The directions in Appendix A were followed when recording data. The fish present/absent field refers to any species of fish, not only salmonids. It was assumed that any species of fish could prey on amphibian eggs or larval amphibians. If one of the fields was estimated (i.e., snout-vent length was often estimated based on experience), a ~ was used before the number on the data sheet. If a characteristic at the top of the data sheet (i.e. air temp, ownership) changed considerably over the course of the day, an \* was used in that field to indicate that different values were found at different sites.

### **Amphibian Collection Methods**

We periodically collected amphibians for chytrid and/or genetic analyses. We collected five tadpoles from most breeding sites (up to 30 tadpoles per drainage). A number of dead or apparently sick amphibians were kept as specimens (see results of Boreal Toads in the LaBarge Creek drainage for exceptions). Our “death kits” consisted of a 60 ml capacity glass jar containing 37% formalin, which was placed within a 16 oz. plastic specimen jar. Two-milliliter vials for toe clippings, jars containing 70% ethyl alcohol, a pair of surgical scissors or nail clippers, disposable rubber gloves, seven ounce Whirl-paks, and an instruction sheet were all transported in a large plastic bag. Two toes were removed from each adult or juvenile specimen using scissors or clippers and stored in two separate two-milliliter vials containing 70% ethyl alcohol (for chytrid and genetic analyses). Adult specimens were stored in 10% formalin in the 16 oz. plastic jar (for histological analysis for chytrid). Tadpoles were stored in 70% ethyl alcohol. All specimens collected for chytrid analysis will be analyzed using PCR in 2003.

## **Drainages Surveyed**

We surveyed three drainages, which are part of the upper Green River watershed (Figure 1). All of our survey work (other than incidental observations) occurred on United States Forest Service (USFS) land. From 10 May to 30 June, we surveyed LaBarge Creek. We re-visited breeding sites on LaBarge Creek in late August and September. From 9 July to 30 July, we surveyed Gypsum Creek and re-visited breeding sites in late September. From 6 August to 7 September, we surveyed North and South Cottonwood Creeks. Hilda Sexauer's crew (WGFD, Pinedale) surveyed all public land on Buck and Chall Creeks (tributaries to Beaver Creek in the upper Green River watershed, just north of the Cottonwood Creeks) for Boreal Toads. They also surveyed parts of the Cottonwood Creeks.

## **Incidental Observations**

Incidental observations of animals throughout the season were recorded onto data sheets and entered into the database along with the results from intensive surveys. These observations included reptiles and amphibians in Yellowstone and Grand Teton National Parks, in the Ham's Fork River drainage west of Kemmerer and on Route 287 south of Muddy Gap Junction. This data set also includes specimens collected by crews from the WYNDD and the Laramie Region of the Wyoming Game and Fish Department (Don Miller and Mike Snigg). There was also an amphibian survey crew working at Seedskaadee National Wildlife Refuge under the supervision of Abigale Dinsmore and Erin Muths of the Amphibian Research and Monitoring Initiative (ARMI), although no data were received from this crew.

## **Data Analysis**

All data discussed in depth in this report are from our crew; other data are summarized briefly under "All Drainages". This includes all data from all surveyors, including Hilda Sexauer's crew and other WGF personnel.

In order to examine the size distribution of Boreal Toads found during surveys, snout-vent lengths were plotted on a histogram by month (May to September). This data set did not include any estimated snout-vent lengths because estimates were often made by groups of five millimeters, which would lead to large numbers of 20 mm, 25 mm, 30 mm, etc. toads. Such numbers could distort the patterns of size distribution. When interpreting data sheets, if the number of observed individuals associated with any single size record was greater than two, I assumed that this snout-vent length was an estimate. These estimates were excluded from the data set as well (i.e. we knew that no one found a group of 200 toads with the exact same snout-vent lengths and hand-measured every one).

# **RESULTS**

## **LaBarge Creek**

LaBarge Creek is an expansive drainage, with many tributaries on USFS land (Figure 1). It is west of the Green River and originates in the Wyoming Mountain Range. LaBarge is the southern most of the three drainages we surveyed. Beaver dams were common in sections of the creek and grazing levels ranged from none (Nameless Creek) to heavy (South Fork Indian Creek). Native cutthroat trout restoration is underway on LaBarge Creek, which involves electroshocking, treatment with antimycin or rotenone, and building fish barriers. We surveyed all flowing water and most isolated pools in this

drainage over the course of approximately 575 survey-hours. Our surveys took place at elevations from 2,329 m to 2,914 m (7,640 ft to 9,560 ft). The tributaries we surveyed included Little Corral, Crystal, Trail, Little Clear, Clear, Spring, Cabin, Road, Witherspoon, Nameless, Coyote Park, South LaBarge, Mack, Dock, Packsaddle, Shafer, Bald Hornet, Indian, South Indian, and Turkey Creek.

### *Boreal Toads*

Boreal Toads were found from South LaBarge Creek to almost the headwaters of LaBarge Creek (Appendix B) at elevations from 2,426 m to 2,694 m (7,960 ft to 8,840 ft). Most of the toads were close to the stream and many of them were found directly alongside LaBarge Creek. We found a total of 1845 Boreal Toad adults, juveniles, and metamorphs in the LaBarge Creek drainage (Appendix C), which is the equivalent of 0.42 toads per survey-hour (Table 11, 12). These numbers include estimates, which are indicated by underlining in the tables. We collected two adults that were found dead. We also found a dead metamorph on Road Creek, which was not collected.

The majority of the toads at LaBarge Creek seemed healthy. One adult male toad sitting in the water appeared very lethargic, but when approached, it swam away as if healthy. This animal had no visible signs of chytrid. On another adult toad, the “left side of mouth was enlarged and had a small lesion with blood. [It] also [had] small red rash-like spots on belly” (Site LaBarge Creek-B62). A juvenile toad was found with “reddish rashy spots on [the] ventral surface” (Site LaBarge Creek-B63). Unfortunately, neither of these two toads was collected. During the antimycin and rotenone treatment of South LaBarge Creek, we held four Boreal Toad metamorphs and one adult for two nights (from the evening before treatment to the day after treatment) until the piscicides were no longer in the stream.

We located 13 Boreal Toad breeding sites on LaBarge Creek (Appendices B, C and Tables 11,12) at elevations between 2,432 m and 2,682 m (7,980 ft and 8,800 ft). Five of these sites were on tributaries of LaBarge Creek (Little Clear, Spring, South LaBarge, Road, and Nameless Creeks), and the other eight were on the main channel of LaBarge Creek. These sites were at an average elevation of 2,529 m (8,297 ft) and an average water temperature of 16°C (60.8 F) (Tables 1-3). Eight-five percent (n=11) of these sites were associated with beaver ponds. We collected 30 tadpoles from these sites (five from each of the six breeding sites), as well as a group of unviable eggs, which appeared to be covered in green algae. With few exceptions, egg-masses and tadpoles appeared healthy. At one of the breeding sites, (LaBarge Creek-A61-2) a tadpole appeared to have an air bubble underneath its skin between the ventral and lateral surfaces. This caused it to swim at the surface of the water in circles. It was taken as a live specimen and placed in a refrigerator. By the evening of the same day, the tadpole had lost its bubble and was swimming normally. Allan Pessier, the veterinarian at the San Diego Zoo, suggested that this might have been due to warm water temperatures (personal communication). At LaBarge Creek site A61-3, we observed caddisfly larvae, which appeared to be feeding on egg-masses. The most productive of the breeding sites with surviving metamorphs was site B16 on LaBarge Creek. This site had approximately 10,000 tadpoles and 28 metamorphs. Tadpoles found on 26 June at a drying pool in this site were transferred to a backwater about two meters away, which already contained Boreal Toad tadpoles. We found live metamorphs at two additional sites during return visits to the area.

### *Boreal Chorus Frogs*

There were 579 Boreal Chorus Frogs (adults, juveniles, and metamorphs) observed, the equivalent of 1.01 per survey-hour, from Indian Creek north to LaBarge Meadows. These animals were observed from between 2,371 m and 2,896 m (7,780 ft and 9,500 ft) elevation (Appendices B and D). Boreal Chorus Frogs were also heard at 2,231 m (7,320 ft) elevation near LaBarge Creek Road. Because they were on private land, no attempt was made to locate them. Chorus Frogs were often found in open grassy areas adjacent to streams or in small temporary pools during the breeding season. We collected

one dead Chorus Frog on 29 May near the mouth of Nameless Creek (site A27). It was described as having “a puncture on [its] back with maggots/fungus growing.” It is entirely possible that this adult frog died of natural causes during the breeding season. Other than this specimen, all adult and juvenile Chorus Frogs observed in the LaBarge Creek drainage appeared healthy.

We found 38 Boreal Chorus Frog breeding sites in the LaBarge Creek drainage from 2,371 m to 2,896 m (7,780 ft to 9,500 ft) elevation (Appendices B, D and Tables 11, 12). The mean elevation was 2,653 m (8,704 ft). We did not find metamorphs at any of these sites. The average water temperature at these sites was 17.0°C (62.6 F) (Tables 4-6), which was lower than the water temperatures at Gypsum and Cottonwood creeks. Most of the sites (90%) were isolated from other bodies of water. Nearly all of them had shallows and emergent vegetation present on the north shore (Tables 4-6). Additionally, 82% of each site was less than or equal to 50 cm depth. All of the sites had grasses as the primary emergent vegetation type. In one small pool (LaBarge Creek-B16), approximately 50% of the Chorus Frog tadpoles observed had air bubbles in their sides (similar to the Boreal Toad tadpole described above). This pool was drying up and the temperature of the water was 23°C (73.4 F). Twenty-six of these tadpoles were transferred to a backwater about two meters away. Other than these tadpoles, no other irregularities were noted in eggs or tadpoles.

### *Tiger Salamanders*

Tiger Salamanders (28 adults, the equivalent of 0.05 per survey-hour) were found from 2,426 m to 2,890 m (7,960 ft to 9,480 ft) elevation (Appendices B, E and Tables 11, 12). All individuals were found in water, mostly in lakes and ponds. One adult was missing a digit on the right forelimb. No specimens were collected in LaBarge Creek.

We located eight Tiger Salamander breeding sites between 2,512m and 2,883 m (8,240 ft and 9,460 ft) elevation (Appendices B and E). Most of these breeding sites were in lakes and ponds. At least one larva appeared to missing all of its toes. None of the breeding sites had fish present or were associated with beaver ponds. All were isolated from other bodies of water, reducing the possibility of fish predation (Tables 7-9).

### *Columbia Spotted Frogs*

No Columbia Spotted Frogs were found in the LaBarge Creek drainage.

### *Reptiles*

Sixty-two Intermountain Wandering Garter Snakes (0.11 per survey hour) were found in the LaBarge Creek drainage. Some were found on BLM or private land. Six of these were found dead or dying on the road. Snakes found on roads may have been moving between hibernation sites and feeding grounds in late May and late September. The snakes were found from 2,286 m to 2,499 m (7,500 ft to 8,200 ft) elevation. Generally, if these animals were not found crossing the road, they were close to a stream and occasionally entered streams to escape. One large adult snake had scars, but other than this one individual, all snakes appeared to be healthy. Snout-vent lengths ranged from 90 mm to 490 mm (3.5 inches to 19.3 inches).

One Rubber Boa was found dead on the LaBarge Creek Road on July 19<sup>th</sup>. It had a 350 mm (13.8 inches) snout-vent length. It was approximately 390 mm (15.4 inches) in total length. The specimen was frozen, then fixed with ten percent formalin and stored in ethanol. It has been submitted to the Idaho Museum of Natural History for storage and corroboration. This find was an apparent range extension for

the species. There were some scattered rocks on the north side of the road, with trees and open sagebrush habitat on the south side of the road. Closer to the creek, willows were present.

### **Gypsum Creek**

Gypsum Creek is located at a higher elevation than LaBarge and Cottonwood creeks. It enters the Green River from the east rather than the west (Figure 1). Gypsum Creek originates in the Wind River Mountain Range, unlike the other two creeks, which originate in the Wyoming Mountain Range. It is the northern most of the three drainages. The Gypsum Creek habitat was differentiated from all of the other survey areas in that it had more glacial influence (boulders strewn around in terrestrial habitat, kettle ponds, etc.). All flowing waters and most standing waters were surveyed during approximately 279 survey-hours. Tributaries surveyed included Dago Creek, South Fork Gypsum Creek, and many unnamed others. Searches for amphibians were conducted from 2,365 m to 3,206 m (7,760 ft and 10,520 ft) elevation.

#### *Boreal Toads*

We found 265 metamorphs, juveniles, and adult Boreal Toads in the Gypsum Creek drainage (Appendices B, F and Tables 11, 12), corresponding to 0.95 toads per survey-hour. These toads were found between 2,426 m and 2,810 m (7,960 ft and 9,220 ft) elevation. Most of the toads were found close to the water. On one unnamed tributary in this drainage, we found juvenile Boreal Toads that had “transparent” capillary beds. A region of the lower abdomen was red beneath the skin, with an abnormal skin color. We collected a specimen that had a red spot under its chin in addition to the transparent capillary bed. The only other abnormality we found was an adult female missing its right eye.

We found four Boreal Toad breeding sites. All of these were on the main channel of Gypsum Creek between 2,579 m and 2,768 m (8,460 ft and 9,080 ft) elevation (Appendices B and F). On average, these sites were found at 2,646 m (8,680 ft) elevation with water temperatures of 20.7°C (69.3 F) (Tables 1-3). We collected 15 tadpoles from the Gypsum Creek drainage (five from each of three breeding sites). A single metamorph was found at one of the breeding sites during return visits.

#### *Boreal Chorus Frogs*

We found or heard 2,376 Boreal Chorus Frog metamorphs, juveniles, and adults in the Gypsum Creek drainage between 2,560 m and 2,883 m (8,400 ft and 9,460 ft) elevation (Appendices B and G). This was the equivalent of 8.51 Boreal Chorus frog observations per survey-hour (Tables 11,12). Most of them were metamorphs emerging from breeding sites. All of them appeared to be healthy. The metamorphs were observed during visits may to the area in the fall, as follow ups to earlier surveys.

We located 18 Boreal Chorus Frog breeding sites in the Gypsum Creek drainage between 2,560 m and 2,883 m (8,400 ft and 9,460 ft) elevation (Appendices B and G). There may have been additional breeding sites in the drainage (i.e. Dago Creek, B77), but it was not always clear if the juveniles or metamorphs were coming from a new breeding site or had dispersed from a nearby site. Water temperatures at Gypsum Creek breeding sites averaged 25.3°C (77.5 F) (Tables 4-6). Eighty-two percent of the sites had maximum depths of less than one meter. Boreal Chorus Frog breeding sites were associated with fishless habitats and areas lacking beaver ponds. Six of the eight sites, which lacked metamorphs, were surveyed so late in the season that any metamorphs may have previously dispersed.

#### *Tiger Salamanders*

Thirty-five adult Tiger Salamanders (0.13 per survey-hour) were found in the Gypsum Creek drainage between 2,560 and 2,883 m (8,400 and 9,460 ft) elevation (Appendices B, H and Tables 11,12). All of these adults were found in water, mostly in lakes and ponds. We did not note any abnormalities.

Twenty-two Tiger Salamander breeding sites were discovered in the Gypsum Creek drainage, between 2,560 m and 2,865 m (8,400 ft and 9,400 ft) elevation (Appendices B and H). On average, these sites were at an elevation of 2,686 m (8,812 ft). Tiger Salamander breeding sites were most often associated with fishless habitats and areas lacking beaver ponds. Most breeding sites were less than one meter in maximum depth, isolated from other bodies of water, and had emergent vegetation on the north shoreline. We found two dead Tiger Salamander larvae at these breeding sites, both of which were collected. In late July, we found two breeding sites that were dry or nearly so. Both contained dead and dying Tiger Salamander larvae. One also contained dead and dying Boreal Chorus Frog tadpoles.

### *Columbia Spotted Frogs*

We found a total of 20 adult and juvenile Columbia Spotted Frogs (0.072 per survey-hour) in the Gypsum Creek drainage between 2,560 m and 2,768 m (8,400 ft and 9,080 ft) elevation (Appendices B and I). Most of them were found along the edges of streams, but some were found in lakes or ponds. They often jumped immediately into water when disturbed. We did not note any abnormalities in these frogs and did not collect any specimens.

We found one Spotted Frog breeding site in the Gypsum Creek drainage, at 2,585 m (8,480 ft) elevation (Appendices B and I). This large pond had water lilies as the primary vegetation type and appeared to be glacial in origin. It was isolated from other bodies of water. The water appeared to be permanent and there were no fish present. One hundred percent of the bottom substrate was silt/mud and water lilies provided cover for the tadpoles. Approximately 24 tadpoles were located at this breeding site, although no metamorphs were found on a return visit. One adult Spotted Frog was found at a nearby pond. Another pond (Gypsum Creek, B82) appeared to have a habitat conducive to Spotted Frog breeding, although no sign of breeding was observed. One adult Spotted Frog was located at the pond and approximately ten unidentified tadpoles were seen creating water movement. It is possible, however, that these were Tiger Salamander larvae or fish, as we could not catch any of them and did not see them again despite multiple visits throughout the season.

### *Reptiles*

No reptiles were found in the Gypsum Creek drainage.

### **Cottonwood Creeks**

The Cottonwood Creeks are located north of LaBarge Creek, but south of Gypsum Creek, on the west side of the Green River (Figure 1) The main channels of the Cottonwood Creeks had many springs and seeps. There were more bogs in this area than any of the other two drainages. Nearly all flowing water and most isolated pools in the Cottonwood Creek drainage were searched during approximately 280 survey-hours. The tributaries examined on North Cottonwood Creek included Sjhoberg, McDougal, Ole, Nylander, Chase, Hardin, Irene, Halverson, and Little Maki creeks, covering elevations between 2,399 m and 2,865 m (7,870 ft and 9,400 ft). In the South Cottonwood Creek Drainage, tributaries surveyed included South Fork South Cottonwood, Trailer, and Lander creeks and the West Fork, South Fork and main channel of Bare Creek. Elevations of survey sites ranged from 2,463 m to 3,024 m (8,080 ft and 9,920 ft). Some of the other tributaries (Snowdrift, Hidden Basin, Eagle, and Dry Basin Creeks) were completely dry and were not surveyed.

### *Boreal Toads*

We found 39 Boreal Toads (metamorphs, juveniles, and adults) in the Cottonwood Creek drainages (0.139 per survey-hour), between 2,399 m and 2,542 m (7,870 ft and 8,340 ft) elevation (Appendices B, J and Tables 11, 12). Most of the toads were found close to water. Eleven of the adult toads were found in the South Cottonwood drainage and the remaining 12 were in the North Cottonwood drainage. Toads were found at eight locations in the South Cottonwood drainage and four locations in the North Cottonwood drainage (Appendix B).

We found two Boreal Toad breeding sites in the Cottonwood drainages: at 2,402 m (7,880 ft) elevation on Little Maki Creek in N. Cottonwood) and 2,542 m (8,340 ft) on Trailer Creek in S. Cottonwood (Appendices B and J). Breeding sites had an average elevation of 2,470 m (8,105 ft) and average water temperature was 12.8°C (55.0 F) (Tables 2-5). We collected five tadpoles from the Trailer Creek breeding site. All Boreal Toads found seemed healthy, although the tadpoles at the Trailer Creek breeding site may not have metamorphosed before winter, due to the late timing of their hatching. On August 21, most of the tadpoles had small hind legs, but we found no metamorphs. We also found 12 metamorphs at the Little Maki Creek breeding site.

### *Boreal Chorus Frogs*

A total of 1,884 Boreal Chorus Frogs metamorphs, juveniles, and adults were found or heard on the Cottonwood Creeks between 2,484 m and 2,682 m (8,150 ft and 8,800 ft) elevation (6.72 per survey-hour, Appendices B, K and Tables 11, 12). Of these, one juvenile was missing the right eye and had shortened toes on the right forelimb. Other than this one individual, all Chorus Frogs appeared healthy.

We found 16 Chorus Frog breeding sites in the Cottonwood Creek drainages (Appendices B, K and Tables 11,12) between elevations of 2,484 m and 2,591 m (8,150 ft and 8,500 ft). Breeding sites had an average elevation of 2,555 m (8,382 ft) and average water temperature of 21.4°C (70.5 F) (Tables 4-6). None of the sites was associated with beaver ponds, although many were present. Shallows were present at 84% of the sites, while 89% of the sites had emergent vegetation present on the north shoreline. In addition, clear water was present at all breeding sites in the Cottonwood drainages. All tadpoles and metamorphs appeared healthy, although one tadpole appeared to be feeding on a dead Tiger Salamander larva, which may have been killed by an Ambystoma Tigrinum Virus (ATV). We assumed the salamander was killed by a virus because nearly all the salamander larvae in the pond were dead and other species, including Boreal Chorus Frogs, appeared to have been unaffected.

### *Tiger Salamanders*

Two adult Tiger Salamanders, the equivalent of 0.071 per survey-hour, (Appendices B and L) were found in the Cottonwood Creek drainages, at 2,530 m and 2,591 m (8,300 ft and 8,500 ft) elevation. Both were dead. One was so desiccated that its life stage could not be determined with certainty.

Ten Tiger Salamander breeding sites were located, most of them near Sjhoberg Creek (Appendices B and L). None of these sites was associated with beaver ponds, hard fish or clear water. Dead salamanders were observed at five of these sites, but other species present were unaffected. Cindy Carey and Lauren Livo suggested that ATV virus had caused the mass die-offs (personal communications). Many dead Tiger Salamander larvae were found at these sites (as many as 208 in one pool) and numerous others were lethargic with swollen bloodshot legs. Several of them had an abnormal bright green coloration highlighted by yellow gills.

### *Columbia Spotted Frogs*

We found 13 adult Columbia Spotted Frogs in the Cottonwood Creek drainages, which was an average of 0.05 per survey-hour (Appendices B and M). All of them were located during surveys of Nylander Creek, a tributary of North Cottonwood. They were localized to two sections of the stream, which contained active beaver ponds. One of the frogs had a “strange gel ball exiting [its] anus.” Other than this, no abnormalities were noted. No specimens were collected.

No Spotted Frog breeding sites were found in the Cottonwood Creek drainage, but some of the areas on Nylander Creek with active beaver ponds appeared to be potential breeding sites.

### *Reptiles*

Fourteen Intermountain Wandering Gartersnakes were found in the Cottonwood Creek drainages between 2,475 m and 2,579 m (8,120 ft and 8,460 ft) elevation. All but two of the snakes were found in the South Cottonwood Creek drainage. Two snakes (one of which was dead) were found on the road in late August. Snout-vent lengths ranged from 300 mm to 485 mm (11.8 inches to 19.1 inches). Most of these snakes were found near water. They frequently swam to escape.

## **Amphibians in All Drainages Combined**

### *Boreal Toads*

The snout-vent lengths of Boreal Toads were plotted on a histogram by month (Figure 2). Metamorphs appeared in September and were generally between 11 mm and 20 mm (0.4 in. to 0.8 in.). It is difficult to draw any additional conclusions from the histogram, due to the small numbers of toads measured.

The following patterns were evident when summarizing the habitat data collected at Boreal Toad breeding sites (Tables 1-3). Eighty four percent of Boreal Toad breeding sites were associated with beaver ponds. One hundred percent of the sites had grasses as the primary emergent vegetation type. A majority (86%) had clear-colored water. All of the sites had shallows and emergent vegetation present on the northern shoreline. Sixty percent of sites had a maximum depth less than one meter, while 27% had a maximum depth between one meter and two meters. Only 13% had a maximum depth greater than two meters. Sites with a maximum depth less than one meter, had an average depth of 32 cm. Eighty-nine percent of the water at each breeding site was less than or equal to 50 cm depth and 85% of sites were in permanent water. Silt/mud made up the bottom substrate of almost every (98%) site.

Hilda Sexauer’s crew surveyed Buck Creek, Chall Creek, and portions of the Cottonwood Creeks for Boreal Toads and found 19 Boreal Toad breeding sites (Table 10). Thirteen breeding sites were identified on Chall Creek, but this may be an overestimate because nine of these sites only had metamorphs as evidence of reproduction. It is possible that the metamorphs were dispersing from nearby breeding sites, confusing breeding site enumeration. In the Cottonwood Creek drainage, they found a breeding site with egg-masses at Soda Lake. We surveyed the area again later in the season. Although we did not find any tadpoles or metamorphs, we did find juveniles and sub-adults. Breeding was observed at this site in 1999 as well (WYNDD 2002).

The crew from the WYNDD that was working on BLM land found 39 Boreal Toads (adults and juveniles). Of these, they collected four specimens. One of the specimens was stored in formalin before

toe collection; due to the preservative, it could not be used for chytrid or genetic analyses. They found no Boreal Toad breeding sites.

#### *Boreal Chorus Frogs*

A summary of habitat characteristics at Boreal Chorus Frog breeding sites follows. Breeding sites were typically fishless (only nine percent of the sites had fish present). Very few (one percent) were associated with beaver ponds. The primary emergent vegetation at most sites (87%) was grass and 99% of the bottom substrate at each was silt/mud. Most breeding sites were found in isolated pools (86%). Few sites were connected to other water; only five percent of sites were permanently connected to other water and 10% were temporarily connected. The vast majority of breeding sites had shallows (84%) and emergent vegetation (89%) present on the north shoreline. Seventy-four percent of the sites had clear water. Metamorph emergence occurred primarily in late July 2002, although it continued into late August.

The WYNDD crew found or heard approximately 181 adult Chorus Frogs on BLM lands in the Green River drainage. They also located four breeding sites. No specimens were collected.

#### *Tiger Salamanders*

Tiger Salamander breeding sites had no fish present and weren't associated with beaver ponds. The majority (82%) of them had a maximum depth of less than one meter and was isolated from other bodies of water (97%). Seventy-seven percent of the sites had shallows, while 81% had emergent vegetation present on the north shoreline. Seventy-six percent of sites had grass as the primary emergent vegetation type. Forty-seven percent of sites had permanent water while 53% had semi-permanent water. None of them was associated with temporary water.

The WYNDD crew found one Tiger Salamander breeding site on BLM lands in the Green River drainage. They observed no adults. No specimens of the larvae observed were collected.

#### *Columbia Spotted Frogs*

We found Columbia Spotted Frogs in both the Gypsum and North Cottonwood Creek drainages, although breeding sites were only found on Gypsum Creek. The WYNDD crew located 12 egg-masses and 12 tadpoles from three different sites located on BLM land in the Green River drainage. These sites were located on Onion Creek, a tributary to Horse Creek (two sites), and on Marsh Creek, a tributary to the New Fork River (one site). The WYNDD crew also found seven unidentified frog metamorphs, one of which was collected.

## DISCUSSION

The three tributaries of the Green River examined in this study (LaBarge Creek, Gypsum Creek and Cottonwood Creek) required 1134 survey hours of effort. Table 1 lists all of the observations from every drainage. Table 2 presents all of these observations divided by survey hour to aid in determination of survey effort. The most frequently observed amphibians were Boreal Toad tadpoles. Although in many instances the numbers of these animals were estimated, there were 28,229 Boreal Toad tadpoles found. This number includes all of the estimates, but is comparable to all other species of amphibians found during these surveys. Boreal Chorus Frog tadpoles were almost as common (11,806) and were far more abundant than Tiger Salamander larvae (1,772). Boreal Chorus Frog juveniles (1,160) were the most

abundant animals found of their life stage. This number includes recently metamorphosed individuals as well as toads considered small and therefore young by observers.

The most commonly observed reptile was the Intermountain Wandering Garter Snake. These animals are generally observed in and around water. A single Rubber Boa was encountered during surveys. This observation was probably a range extension for the species.

Searches were concentrated along the creek banks, but also involved examining other areas of prime habitat such as isolated vernal pools and beaver ponds. Each area was searched consecutively, giving some sample bias to finding various life stages. For example, areas searched earlier in the year are much more likely to yield eggs than areas searched later in the year. LaBarge Creek was searched first (10 May to 30 June) followed by Gypsum Creek (9 July to 30 July) and finally the Cottonwood Creek Drainage (6 Aug. to 7 Sept.). It is not surprising to find, looking at table 1, that the greatest numbers of Boreal Toad tadpoles (approximately 23,104) were encountered in the LaBarge Creek area. LaBarge Creek also yielded the most observations of egg masses (nine). It is impossible to compare these numbers unreservedly to the other survey areas, as the timing of the LaBarge Creek surveys predisposed them to frequent observations of early life stages. It should also be noted that adult Boreal Toads are more likely to be active during the time when they are mating. Since this coincides with the examination of LaBarge Creek, the largest number of adult Boreal Toad encounters could also be predicted for this site. In LaBarge Creek, surveyors found 85 adult Boreal Toads, which makes up slightly more than 56% of the total adults encountered (Table 11). The matter of the timing of these surveys may have skewed the data although the extent of the deviation incalculable.

Another aspect of the data is the number of animals found with respect to effort. Once again, LaBarge is biased towards more observations. Five hundred and fifty seven hours were spent searching for amphibians in the LaBarge drainage. The other two drainages had only 279 hours (Gypsum) and 280 hours (Cottonwood) of effort spent in them. Because of this bias, it is useful to compare the three drainages and the species found in them by using effort to normalize the data. Table 2 presents this data. The numbers in the table 2, as previously stated, were calculated by dividing the number of observations by the survey hours required for the search. A survey hour was defined as one hour of search time by a single individual.

### *Boreal Toads*

Boreal Toads adults (approximately 0.15 per survey hour) were found with equal frequency in the Gypsum and LaBarge areas. The number of encounters per survey hour was about half (0.082 per survey area) in the Cottonwood Creek Drainages. Juveniles (3.061 per survey hour) were most commonly encountered in LaBarge Creek. LaBarge was examined during the time where emergence of young toads was expected. This timing increased the likelihood of finding young toads in this drainage. During this period in their development, the rain-sized amphibians are in large groups, which further predispose them to detection. Predictably, the data reflect this observational bias. Tadpoles are more likely to be found early in the year. LaBarge Creek was surveyed first (10 May – 30 June), and for most of the early part of the season (575 survey hours). This drainage (40.181 tadpoles per survey hour) had a much greater encounter rate than Gypsum (17.652 per survey area) and Cottonwood (0.741 per survey area). Once again, the order of sampling probably was a major factor in determining encounter rates.

Although 2002 was a drought year, successful Boreal Toad breeding was documented in the upper Green River watershed. We found live metamorphs at five of nineteen breeding sites. We have no data from normal years from which to determine if toad populations or breeding successes were affected by the drought. The number of flourishing breeding sites could have been underestimated if metamorphs dispersed quickly enough to be missed during surveys. Based on the observations of small, juvenile toads

and metamorphs late in the year, it appears that Boreal Toads are having some successful breeding and over wintering in the upper Green River drainage.

Beaver ponds, shallows and emergent grasses on the northern shoreline, and a silt/mud substrate appear to be important habitat criteria for Boreal Toad breeding. All Boreal Toads were found close to water and many were directly alongside creeks. However, because nearly all of our survey time was spent close to streams, this data is biased towards finding animals near water.

### *Boreal Chorus Frogs*

Boreal Chorus Frogs (juveniles, and metamorphs) were most abundant in the Cottonwood Creek drainage. We found 1079 sub-adults in the Cottonwood Creek drainage. Most individuals other than metamorphs were found in the LaBarge Creek drainage (17.389 per survey-hour). This result may be due to the times of year that we surveyed the various drainages. We may have found fewer metamorphs in the LaBarge Creek drainage because we surveyed it so early in the year.

Boreal Chorus Frogs shared many of the same trends as Boreal Toads. They were more frequently encountered as tadpoles in LaBarge Creek (16.45 per survey hour). Sub-adults were most commonly found in Gypsum Creek (7.83 per survey hour). The only novel trend was that adults were observed with greatest regularity in LaBarge Creek (0.939 per survey hour). To understand this variation, one must take into account that Boreal Chorus Frogs are highly vocal, and that some of the extra observations were adults, which were only heard calling. Later in the season, calling adults are less common, and therefore contribute less to the data. Most breeding sites were in the LaBarge Creek drainage, although this may also have been due to the time of sampling. We were able to locate breeding sites in the LaBarge Creek drainage by listening for calling individuals, as well as finding tadpoles or metamorphs. The Gypsum and Cottonwood Creek drainages were surveyed later in the year when calling had slowed.

Although 2002 was a drought year, Boreal Chorus Frogs appeared to have recruited successfully at some breeding sites. Survival from egg to adulthood can be as low as one percent for Chorus Frogs (Hammerson 1999). As a survival strategy, Chorus Frogs often breed in isolated temporary or semi-permanent pools that have fewer predators. We documented this pattern in the Green River drainage. In this area, Boreal Chorus Frogs chose breeding habitats, which were less likely to contain fish, helping to decrease the likelihood of predation by fish on tadpoles. Like the Boreal Toad breeding sites, Chorus Frog breeding sites generally have a silt/mud bottom substrate, shallow water and emergent grasses on the north shore. In the fall, when we revisited the site, nearly all of the breeding sites were completely dry, forcing dispersion of recently metamorphosed individuals prior to the visit. The drying of the breeding sites may have also quickened metamorphosis, which would reduce the likelihood of finding metamorphs during return visits to the site.

### *Other Amphibians and Effort*

The distribution of Spotted Frog and Tiger Salamander encounters seem to be more influenced by habitat trends rather than seasonal ones. Both species were more concentrated in Gypsum Creek. This drainage was quite different from the others, with respect to its habitat parameters.

From this data set, it appears that LaBarge Creek has the most abundant amphibian population. While there was a bias towards certain life stages due to the timing of the surveys, this effect is lessened when one considers the adults. While Tiger Salamanders and Spotted Frogs were most common in the Gypsum area, Boreal Chorus Frogs and Boreal Toads were more abundant in the LaBarge Creek drainage. The most likely explanation for this is habitat usage. The habitat surrounding LaBarge Creek is probably more

suited to Boreal Chorus Frogs and Boreal Toads, while Spotted Frogs and Tiger Salamanders are more likely to choose the habitat types found associated with Gypsum Creek.

It is worth noting that while Boreal Toad tadpoles were the most frequently encountered amphibians the least commonly encountered amphibian was the Spotted Frog. This trend is owed, at least in part, to the habitats chosen for these surveys. Most of the areas examined in this study, were near the southern terminus of the Spotted Frog's range.

### *Tiger Salamanders*

Most Tiger Salamanders (adults and juveniles) and Tiger Salamander breeding sites were found in the Gypsum Creek drainage. None of the sites had fish present, which appears to be a very important characteristic of Tiger Salamander breeding sites (Hammerson 1999). Most sites (97%) were isolated from other bodies of water, which reduces the probability of predation by fish due to the unlikelihood of colonization by fishes. If the pools were temporary, this would also prevent fishes from persisting. Unlike Boreal Chorus Frog breeding sites, most Tiger Salamander breeding sites had permanent or semi-permanent water.

### *Columbia Spotted Frogs*

Columbia Spotted Frogs were found in both the Gypsum and North Cottonwood Creek drainages. They were most abundant in the Gypsum Creek drainage. The breeding site we found in the Gypsum Creek drainage looked quite different from the typical breeding sites for the other species. Although it was isolated from other bodies of water and had no fish present, it was glacial in origin and had emergent water lilies instead of grasses. The site also had permanent water. It appears that we were at the southern edge of the Columbia Spotted Frog range in the upper Green River drainage. Neither our crew nor the WYNDD crew found any Spotted Frogs further south than the North Cottonwood Creek drainage. In the Greater Yellowstone Ecosystem, this species is quite abundant and appears to be thriving, despite an apparent decline in the southern and western portions of its range (Koch and Peterson 1995). Due to limited data in the Wyoming and Wind River Ranges, it is difficult to say if the populations that we found are stable or declining, as we only have data for season.

### *Reptiles*

We did not find any reptiles in the Gypsum Creek drainage. This could be due to the higher elevation resulting in a shorter growing season or the inactivity of reptiles associated with the summer heat during the time when we surveyed Gypsum Creek. The range extension of the Rubber Boa was one of the most interesting finds of the summer. Along with a previous sighting of a Rubber Boa in this area, this record suggests that there is a reproducing population of this secretive snake in the LaBarge Creek drainage.

The most productive time of the year for amphibian surveys on USFS land in the upper Green River drainage was from the last week in May until the third week in August. Egg masses were generally found in late May and early June, while tadpoles were found primarily from mid-June to mid-July. However, some tadpoles still had not metamorphosed in late September. The most productive time of day for surveys was after 10 AM, because early mornings were cold, which translated into still therefore visually cryptic amphibians. We did not usually find amphibians (other than tadpoles or egg-masses) until the air warmed in late morning. No nighttime surveys were attempted, but they might have been productive, particularly during the breeding season.

## Recommendations

### *Data Sheets*

A few changes need to be made to the data sheets based on the methods we utilized this summer. A field should be added so that GPS coordinates and estimated position errors can be recorded for each amphibian. Second, water pH and/or conductivity should be measured and recorded. Third, surveyors should estimate the percent canopy cover or some related characteristic to estimate how much of each breeding site received direct sun light. Fourth, a field should be added for the survey method (i.e. visual survey, incidental observation, trap). Finally, a new datasheet should be created for that may be used for general observations by persons not involved in stringent amphibian surveys.

### *Survey Methods*

The “stage” field should be optional and should be completed only if it is obvious. The terms juvenile, metamorph, and adult should be clearly defined in order to standardize between recorders. Second, very high gradient, steep-walled areas need not be surveyed because it is highly unlikely that amphibians will be found in such reaches. Third, the definition of a Boreal Chorus Frog breeding site should be revised. As it is currently defined, it is not consistent between species because the Boreal Chorus Frog definition includes calling early in the season. We occasionally heard calls at a site, then subsequently returned and found no eggs, tadpoles, or metamorphs. These were probably lone males calling, which did not engage in breeding. The definition of a breeding site should be consistent among species. Observers should still note if they hear calling at a location, but should not call it a breeding site unless eggs, tadpoles or metamorphs are found. Finally, some of the characteristics (i.e. low vs. high grazing, turbidity) need to be more fully defined and clarified to all technicians before the field season in order to avoid confusion and standardize observations. Photographs of each type of characteristic would be helpful for technicians in the field.

Chytrid and genetic testing can now be performed on toe clips. Using toe clips is preferable, as it does not require sacrificing an animal. Since toe clips are small and most amphibians have toes, this method allows similar samples from different species to be taken and stored easily. Photos work well for documenting the presence of individual species. When collecting toe clips for chytrid testing, it is important to be as sterile as possible and to flame utensils between animals to prevent contamination. Additionally, if indications of ATV are found, animals should be frozen (not preserved in alcohol or formalin) for analysis.

### *Database*

The fields added on the data sheet (water pH and/or conductivity, percent cover, and “method”) should also be added to the database. A series of check mark fields would allow one to define which species are breeding at a site. These fields are not currently included in the WYNDD database. A check mark field should also be added to take the place of the ~, thereby clarifying if a number is an estimate or not. This would facilitate record filtering and exporting to other programs.

### *Priority Areas for Future Surveys*

- 1) Piney Creek drainages, followed by Horse Creek.
- 2) Beaver Creek, particularly the areas that have not yet been surveyed such as the lower elevations on Buck and Chall Creeks, reaching private land if possible, and the main stem of Beaver Creek.

- 3) Wagon Creek and lakes near the headwaters.
- 4) Roaring Fork and Crow Creek (including Mud Lake).
- 5) The smaller tributaries of the Green River and the upper Green River including Twin, Mud, Wagonfeur, Lime, and Eagle creeks and any parts of Tosi and Tepee Creeks that have not yet been surveyed. The wetland area on the Green River between Tepee Creek and north of Dollar Lake appears to contain good toad habitat. Toads have recently been found near Dollar Lake and on both Tosi and Tepee Creeks (WYNDD 2002). The region between approximately Wagonfeur Creek and the outlet of the Green River Lakes also appears to contain good amphibian habitat and Boreal Toads were previously found in the Kendall Warm Springs area (WYNDD 2002).
- 6) New Fork River and Marsh Creek (M. McGee of the WYNDD found Boreal Toads on Marsh Creek in the summer of 2002).
- 7) Cottonwood Creeks, in particular Maki Creek and the rest of Little Maki Creek southeast of the breeding site we found to private land on North Cottonwood Creek. Surveys should also be conducted further east on the Cottonwood Creeks. In 1977, a Boreal Toad was found quite far down the Cottonwoods (WYNDD 2002).
- 8) Fontenelle Creek. This creek has potential for Boreal Toads in the upper sections and other species in the lower.
- 9) Ham's Fork and Black's Fork drainages. Boreal Toads were found at Lake Viva Naughton in 1976, on Fish Creek, a tributary to the Ham's Fork, in 1977 and near the headwaters of the East and West Forks of the Smith's Fork (unknown year, WYNDD 2002).
- 10) Green River Lakes area. Although much of the area to the south and east of the lakes will be too high in elevation and will lack good amphibian habitat it should be searched as there have been previous amphibian sightings. Toads have been found in the wetlands north of the outlet of the lakes, and about one mile north of the lakes (WYNDD 2002).
- 11) Additional tributaries of the Green River (Big Sandy Creek, Muddy Creek just north of Fontenelle Creek, and smaller unnamed tributaries) could also be surveyed, although they have less potential for good amphibian habitat.

#### *Disease and Genetic Testing*

The samples we (and WYNDD) collected, which were not fixed in formalin include 50 Boreal Toad tadpoles, five pairs of Boreal Toad toes, five pairs of Tiger Salamander toes, one pair of Boreal Chorus Frog toes, and one pair of unknown frog toes. Therefore, we have 62 samples that can be tested for chytrid fungus. At \$20 per sample, this testing would cost \$1,240, which has been received from the Declining Amphibian Populations Task Force seed grant program. The samples will be sent to Pisces Molecular for analysis. Pisces Molecular can store these samples for up to four years in case we re-use them for genetic analyses (John Wood, personal communication).

The results of genetic analysis could affect the listing of the SRMP of Boreal Toads as federally endangered. However, we agree with Terry Ireland of the USFWS that even if the toads from western Wyoming are more genetically similar to the toads from Colorado and southeastern Wyoming than they are to those in the NRMP, this should not affect the listing decision. Even if toads from western

Wyoming appear to be from similar genetic stock to populations in Colorado, southeastern Wyoming, and New Mexico, that does not change the fact that populations in those areas may be declining and in need of protection. In addition, the USFWS was petitioned to list the SRMP, which was defined as the CO, NM, and southeastern WY population. Genetic results from western Wyoming should not affect that determination, although Terry Ireland has said that all of the facts will be considered when deciding whether to list the Boreal Toad.

### *Threats to Amphibians*

Chytrid fungus is a possible threat to some amphibian species. More studies are required into the causes, effects, and distribution of chytrid in order to determine the possible severity of its effects on wild populations. The distribution of chytrid fungus infections in Wyoming is currently unknown, except to data included in this paper.

Cattle grazing can affect amphibian populations. The movement of cattle between isolated pools and streams could serve as a vector for spread of diseases, viruses, or pathogens such as chytrid or Ambystoma Tigrinum Virus. Heavy grazing of pools/backwaters can damage breeding sites by crushing emergent vegetation necessary for egg attachment and increasing sedimentation in the water. An increase in sediment can have the effect of lowering water temperatures, which may slow larval development decreasing survival. Trampling can also kill amphibians. Cattle may also have some positive effects on amphibians by reducing vegetative cover and keeping large trees from growing around breeding ponds, giving these areas more solar exposure. Due to the increased temperatures larval development time, which is temperature dependent, could be shortened.

Oil and gas extraction may have negative effects on amphibians. The development of roads and alteration of surface habitat required for such endeavors can pose serious threats to amphibians. Roads not only fragment habitat by making it difficult for amphibians to move between breeding and overwintering grounds, but can also cause direct mortalities from vehicle traffic. By altering surface habitat, oil and gas development can affect species, such as amphibians and reptiles, which are dependent on specific types of subterranean retreats for survival.

The development of roads can also affect water quality by increasing sedimentation. Road curbs and borrow ditches can form significant barriers to movement. The habitat fragmentation associated with suburban development may make it difficult, if not impossible, for amphibians to make the seasonal movements required for survival. It is essential to conserve not only breeding habitat, but also overwintering areas and amphibian feeding grounds. Even if breeding areas are managed and preserved, but road construction fragments required habitats, populations can be threatened due to a lack of access to required habitats.

Water manipulation can also affect amphibians. Clearly, dewatering during the middle of the summer can severely affect breeding sites directly attached to the channel. Similarly, dams and reservoirs that reduce spring flows also reduce the amount of potential seasonal floodplain breeding habitat available. The creation and management of dams and reservoirs often diminishes suitable breeding habitat for amphibians. The introduction of predators such as game fish may impact the aquatic larvae of amphibians and force them into unfavorable habitats. However, water management could also have positive effects through the release of irrigation water in the summer and creation of small ponds for cattle watering. This can create amphibian habitats in areas where there would previously have been none. The introduction of non-native species such as the American Bullfrog (*Rana catesbeiana*), trout, and exotic plants could pose threats in some areas.

Chemical alteration of the environment can pose a threat to native amphibian populations. The treatment of streams with rotenone and other piscicides has the potential to kill amphibian larvae and aquatic reptiles if steps aren't taken to limit the effects on non-target species. However, restoration of native trout species could benefit amphibians by removal of predaceous exotic trout. The application of pesticides and herbicides (i.e. atrazine) to crops and rangelands is a potential threat to the persistence of native amphibians. The application of chemical flame-retardants to forests, could also have a negative impact on amphibians, directly through the biochemical effects of the chemicals and indirectly through the prevention of the natural burn cycle.

### *Management Recommendations*

- In order to reduce disease threats to amphibians care should be taken to disinfect all equipment between drainages and between isolated pools and streams. Enhanced knowledge of the distribution, causes, and effects of chytrid as well as other diseases will help to limit the spread of pathogens.
- Road building should be limited as much as possible. Destruction or alteration of amphibian habitats should be avoided when establishing roads.
- Efforts should also be made to limit dewatering during the spring, which is the peak time of amphibian breeding. The impacts of dewatering would be less detrimental during late summer after metamorphs have dispersed. The Wyoming Game and Fish Department's instream flow crew should consider impacts on amphibians when filing for instream flows.
- Cattle grazing must be carefully managed. Efforts should be made to regulate the areas where cattle access water, particularly if the area is where breeding is known to occur. Fencing can be used to limit cattle access to important breeding areas. Cattle should also be excluded from areas where pathogens are present to limit the cattle mediated spread of pathogens.
- Prior to treating streams with piscicides, amphibian surveys should be performed at multiple times of the year to identify breeding sites and note amphibian usage of the stream. The stream should be surveyed prior to treatment and potentially impacted species removed for the duration of the treatment. Treatments should occur late in year after most amphibian metamorphosis is complete. If this is not possible, and treatment occurs in an area with a breeding site connected to the stream, barriers could be used to prevent the spread of rotenone/antimycin into the breeding habitat.

### *Management Priorities*

We recommend three priorities for management of amphibians in the Green River drainage and throughout Wyoming: (1) surveying areas to collect data on native amphibians, (2) monitoring known breeding sites, particularly those of threatened or potentially threatened species (i.e. Boreal Toad, Wyoming Toad, Northern Leopard Frog in western Wyoming), and (3) educating the public about amphibians (i.e. field trips, slide shows, and education in schools) to encourage conservation efforts.

In addition to collecting presence/absence data, it might be helpful to develop a long-term monitoring program at a few breeding sites that utilizes drift-fences and pitfall traps or egg-mass counts to collect information, which can be used to augment existing data. In lieu of such a program, breeding sites should be monitored at least three times a year to determine the timing of egg-laying and to estimate

numbers of egg-masses. Initial breeding site surveys should be conducted early in the spring. Two subsequent surveys should be conducted at least 4-6 weeks apart prior to mid-September. This number and timing of visits would provide a good chance of finding eggs, tadpoles, or metamorphs.

Additional baseline data and monitoring will result in a better understanding of the distribution, abundance, habitat requirements of and threats to Wyoming's amphibians. This information, along with increased public awareness, will facilitate the development and successful implementation of conservation techniques for these populations. Hopefully the end result of all of these endeavors will be a healthy amphibian community, which will persist, thrive and contribute to the unique natural landscape of Wyoming.

## LITERATURE CITED

- Alford, R. A. and R. J. Richards. 1990. Global Amphibian Declines: a Problem in Applied Ecology. *Annu. Rev. Ecol. Syst.* 30: 133-165.
- Baxter, G.T. and M.D. Stone. 1980. Amphibians and Reptiles of Wyoming. Bulletin No. 16. Cheyenne: Wyoming Game and Fish Department. 137 pp.
- Corn, P.S. and L.J. Livo. 1989. Leopard Frog and Wood Frog Reproduction in Colorado and Wyoming. *Northwestern Naturalist* 70:1-9.
- Garber, C. 1994. A Status Survey for Spotted Frogs (*Rana pretiosa*), Wood Frogs (*Rana sylvatica*), and Boreal Toads (*Bufo boreas*) in the Mountains of Southern and Eastern Wyoming.
- Garber, C. 1995a. An Addendum (#1) to: A Status Survey for Spotted Frogs (*Rana pretiosa*), Wood Frogs (*Rana sylvatica*), and Boreal Toads (*Bufo boreas*) in the Mountains of Southern and Eastern Wyoming.
- Garber, C. 1995b. A Status Survey for Boreal Toads in the Medicine Bow Mountains, Sierra Madre and Laramie Range in Wyoming. An Addendum (#2) to: A Status Survey for Spotted Frogs (*Rana pretiosa*), Wood Frogs (*Rana sylvatica*), and Boreal Toads (*Bufo boreas*) in the Mountains of Southern and Eastern Wyoming.
- Hammerson, G.A. 1999. Amphibians and Reptiles in Colorado, 2<sup>nd</sup> ed. Niwot: University Press of Colorado.
- Ireland, T. 1995. Endangered and Threatened Wildlife and Plants; 12 – Month Finding for a Petition to List the Southern Rocky Mountain Population of the Boreal Toad as Endangered. Federal Register Vol. 60 No. 56: 15281-15283.
- Koch, E.D. and C.R. Peterson. 1995. Amphibians and Reptiles of Yellowstone and Grand Teton National Parks. Salt Lake City: University of Utah Press.
- Loeffler, C. (ed.). 2001. Conservation Plan and Agreement for the Management and Recovery of the Southern Rocky Mountain population of the Boreal Toad (*Bufo boreas boreas*), Boreal Toad Recovery Team. 76 pp. + appendices.
- Lowry, R. 2002. Website: Concepts and Applications of Inferential Statistics. <http://faculty.vassar.edu/lowry/webtext.html>.
- Phillips, K. 1994. Tracking the Vanishing Frogs: an Ecological Mystery. St. Martin's Press, New York.
- Patla, D. 1998. Potential Effects of Native Fish Restoration Projects on Amphibians in Yellowstone National Park. Herpetology Laboratory, Dept. of Biological Sciences, Idaho State University.
- Wyoming Natural Diversity Database. 2002. Data Received: Summary of all Boreal Toads Observed in the Upper Green River Watershed.

# DRAFT

Table 1. Habitat characteristics of Boreal Toad breeding sites in each drainage. Sample sizes are indicated in parentheses.

	Avg. elevation (ft)	Avg. water temp (°C)	Avg. distance to forest edge (m)	Fraction of sites with fish present	Fraction of sites associated with beaver ponds	Fraction of sites having grasses as the primary emergent vegetation type	Fraction of sites covered by each percentage of emergent vegetation			Site Depth				
							1-25	26-50	>50	Percent of each site ≤ 50 cm depth	Avg. max depth of site if site is < 1 m (depth in cm)	Sites with max depth <1 m	Sites with max depth 1-2 m	Sites with max depth >2 m
<b>LaBarge</b>	8,297 (13)	16.0 (9)	119 (7)	6/9	11/13	6/6	5/7	2/7	0/7	85% (6)	43.0 (5)	5/9	2/9	2/9
<b>Gypsum</b>	8,680 (4)	20.7 (3)	68 (4)	1/3	2/4	3/3	3/4	1/4	0/4	95% (4)	18.7 (3)	3/4	1/4	0/4
<b>Cottonwoods</b>	8,105 (2)	12.8 (2)	35 (2)	1/2	2/2	1/1	1/2	1/2	0/2	90% (2)	15.0 (1)	1/2	1/2	0/2
<b>All Drainages</b>	8,357 (19)	16.5 (14)	90 (13)	8/14	15/19	10/10	9/13	4/13	0/13	89% (12)	31.8 (9)	9/15	4/15	2/15

Table 2. Continued habitat characteristics of Boreal Toad breeding sites in each drainage.

	Fraction of sites with each water color		Fraction of sites with each water turbidity		Fraction of sites with each level of grazing pressure			Fraction of sites with each type of water connectedness			Fraction of sites with each type of water permanence		
	Clear	Stained	Clear	Cloudy	No	Low	High	Perm	Temp	Isolated	Perm	Semi-perm	Temp
<b>LaBarge</b>	6/8	2/8	5/9	4/9	1/10	6/10	3/10	4/7	1/7	2/7	6/7	0/7	1/7
<b>Gypsum</b>	4/4	0/4	3/4	1/4	0/4	3/4	1/4	1/4	2/4	1/4	3/4	1/4	0/4
<b>Cottonwoods</b>	2/2	0/2	1/2	1/2	1/2	0/2	1/2	1/1	0/1	0/1	2/2	0/2	0/2
<b>All Drainages</b>	12/14	2/14	9/15	6/15	2/16	9/16	5/16	6/12	3/12	3/12	11/13	1/13	1/13

# DRAFT

Table 3. Continued habitat characteristics of Boreal Toad breeding sites in each drainage.

	Fraction of sites with each north shoreline characteristic		Fraction of sites with each type of site origin			Percent of each substrate type at each site					
	Shallows present	Emergent vegetation present	Beaver	Flooding	Unknown	Silt/Mud	Sand	Gravel	Cobble	Boulder	Bedrock
<b>LaBarge</b>	7/7	7/7	5/7	0/7	2/7	96 (7)	0 (7)	3 (7)	1 (7)	0 (7)	0 (7)
<b>Gypsum</b>	2/2	2/2	1/4	1/4	2/4	100 (4)	0 (4)	0 (4)	0 (4)	0 (4)	0 (4)
<b>Cottonwoods</b>	2/2	2/2	2/2	0/2	0/2	100 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
<b>All Drainages</b>	11/11	11/11	8/13	1/13	4/13	98 (13)	0 (13)	2 (13)	<1 (13)	0 (13)	0 (13)

# DRAFT

Table 4. Habitat characteristics of Boreal Chorus Frog breeding sites in each drainage. Sample sizes are indicated in parentheses.

	Avg. Elevation	Avg. water temp (°C)	Avg. distance to forest edge (m)	Fraction of sites with fish present	Fraction of sites associated with beaver ponds	Fraction of sites with grasses as the primary emergent vegetation type	Fraction of sites covered by each percentage of emergent vegetation			Site Depth				
							1-25	26-50	>50	Percent of each site ≤ 50 cm depth	Avg. max depth of site if site is < 1 m (depth in cm)	Sites with max depth < 1 m	Sites with max depth 1-2 m	Sites with max depth > 2 m
<b>LaBarge</b>	8704 (38)	17.0 (34)	169 (13)	4/29	1/38	19/19	10/16	3/16	3/16	82% (22)	26.7 (12)	12/21	9/21	0/21
<b>Gypsum</b>	8942 (18)	25.3 (6)	23 (14)	0/15	0/17	6/11	1/12	2/12	9/12	88% (17)	35.8 (14)	14/17	3/17	0/17
<b>Cottonwoods</b>	8382 (16)	21.4 (8)	13 (10)	1/9	0/16	9/9	4/9	2/9	3/9	80% (11)	40.6 (8)	8/12	4/12	0/12
<b>All Drainages</b>	8692 (72)	18.8 (48)	68 (37)	5/53	1/71	34/39	15/37	7/37	15/37	84% (50)	33.7 (34)	34/50	16/50	0/50

Table 5. Continued habitat characteristics of Boreal Chorus Frog breeding sites in each drainage.

	Fraction of sites with each water color		Fraction of sites with each water turbidity		Fraction of sites with each level of grazing pressure			Fraction of sites with each type of water connectedness			Fraction of sites with each type of water permanence		
	Clear	Stained	Clear	Cloudy	No	Low	High	Perm	Temp	Isolated	Perm	Semi-perm	Temp
<b>LaBarge</b>	12/28	16/28	19/28	9/28	2/27	15/27	10/27	0/20	2/20	18/20	1/12	0/12	11/12
<b>Gypsum</b>	10/16	6/16	12/16	4/16	2/15	6/15	7/15	1/9	0/9	8/9	5/6	1/6	0/6
<b>Cottonwoods</b>	13/13	0/13	11/13	2/13	2/12	2/12	8/12	1/13	2/13	10/13	4/9	5/9	0/9
<b>All Drainages</b>	35/57	22/57	42/57	15/57	6/54	23/54	25/54	2/42	4/42	36/42	10/27	6/27	11/27

# DRAFT

Table 6. Continued habitat characteristics of Boreal Chorus Frog breeding sites in each drainage. Sample sizes are indicated in parentheses.

	Fraction of sites with each north shoreline characteristic		Fraction of sites with each type of site origin				Percent of each substrate type at each site					
	Shallows present	Emergent vegetation present	Beaver	Flooding	Glacial	Unknown	Silt/Mud	Sand	Gravel	Cobble	Boulder	Bedrock
<b>LaBarge</b>	18/18	17/18	0/17	2/17	0/17	15/17	98 (19)	1 (19)	0 (19)	<1 (19)	<1 (19)	0 (19)
<b>Gypsum</b>	8/13	13/14	0/4	0/4	1/4	3/4	100 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)
<b>Cottonwoods</b>	10/12	9/12	1/8	0/8	0/8	7/8	100 (9)	0 (9)	0 (9)	0 (9)	0 (9)	0 (9)
<b>All Drainages</b>	36/43	39/44	1/28	2/28	1/28	24/28	99 (38)	<1 (38)	0 (38)	<1 (38)	<1 (0)	0 (38)

# DRAFT

Table 7. Habitat characteristics of Tiger Salamander breeding sites in each drainage. Sample sizes are indicated in parentheses.

	Avg. Elevation	Avg. water temp (°C)	Avg. distance to forest edge (m)	Fraction of sites with fish present	Fraction of sites associated with beaver ponds	Fraction of sites ranking grasses as the primary emergent vegetation type	Fraction of sites covered by each percentage of emergent vegetation			Site depth				
							1-25	26-50	>50	Percent of each site ≤ 50 cm depth	Avg. max depth of site if site is < 1 m (depth in cm)	Sites with max depth <1 m	Sites with max depth 1-2 m	Sites with max depth >2 m
<b>LaBarge</b>	8730 (8)	15.0 (7)	4 (5)	0/6	0/8	2/2	1/2	1/2	0/2	66 (5)	35 (1)	1/4	3/4	0/4
<b>Gypsum</b>	8812 (22)	20.8 (9)	16 (19)	0/20	0/21	10/15	4/16	2/16	10/16	87 (19)	39 (17)	17/19	2/19	0/19
<b>Cottonwoods</b>	8460 (10)	20.2 (6)	3 (9)	0/5	0/10	7/8	3/6	2/6	1/6	81 (9)	41 (9)	9/10	1/10	0/10
<b>All Drainages</b>	8708 (40)	18.8 (22)	12 (33)	0/31	0/39	19/25	8/24	5/24	11/24	82 (33)	39 (27)	27/33	6/33	0/33

# DRAFT

Table 8. Continued habitat characteristics of Tiger Salamander breeding sites in each drainage. Sample sizes are indicated in parentheses.

	Fraction of sites with each water color		Fraction of sites with each water turbidity		Fraction of sites with each level of grazing pressure			Fraction of sites with each type of water connectedness			Fraction of sites with each type of water permanence		
	Clear	Stained	Clear	Cloudy	No	Low	High	Perm	Temp	Isolated	Perm	Semi-perm	Temp
<b>LaBarge</b>	3/5	2/5	5/5	0/5	0/5	4/5	1/5	0/5	0/5	5/5	0/0	0/0	0/0
<b>Gypsum</b>	10/19	9/19	10/19	9/19	2 <sup>+</sup> /20	8 <sup>+</sup> /20	10 <sup>+</sup> /20	1/15	0/15	14/15	6/10	4/10	0/10
<b>Cottonwoods</b>	9/10	1/10	7/10	3/10	1/9	0/9	8/9	0/10	0/10	10/10	1/5	4/5	0/5
<b>All Drainages</b>	22/34	12/34	22/34	12/34	3/34	12/34	19/34	1/30	0/30	29/30	7/15	8/15	0/15

Table 9. Continued habitat characteristics of Tiger Salamander breeding sites in each drainage. Sample sizes are indicated in parentheses.

	Fraction of sites with each north shoreline characteristic		Fraction of sites with each type of site origin				Percent of each substrate type at each site					
	Shallows present	Emergent vegetation present	Beaver	Flooding	Glacial	Unknown	Silt/Mud	Sand	Gravel	Cobble	Boulder	Bedrock
<b>LaBarge</b>	4/4	4/4	0/5	0/5	0/5	5/5	94 (4)	1 (4)	0 (4)	3 (4)	3 (4)	0 (4)
<b>Gypsum</b>	13/18	17/19	0/10	0/10	1/10	9/10	99 (14)	0 (14)	0 (14)	0 (14)	1 (14)	0 (14)
<b>Cottonwoods</b>	7/9	5/9	0/4	0/4	0/4	4/4	100 (9)	0 (9)	0 (9)	0 (9)	0 (9)	0 (9)
<b>All Drainages</b>	24/31	26/32	0/19	0/19	1/19	18/19	99 (27)	<1 (27)	0 (27)	<1 (27)	<1 (27)	0 (27)

# DRAFT

Table 10. Summary of Boreal Toad surveys performed by Hilda Sexauer's crew on Chall, Buck, and the Cottonwood creeks.

	Boreal Toad Breeding Sites	Boreal Toad Egg-masses	Boreal Toad Tadpoles	Boreal Toad Metamorphs	Boreal Toad Juveniles & Adults
Chall	13	6	~1100	~2970	245
Buck	5	7	~2500	0	256
Cottonwood	1	1	0	0	0
<b>All Drainages</b>	<b>19</b>	<b>14</b>	<b>~3600</b>	<b>~2970</b>	<b>501</b>

Table 11. Numbers of Observations per Drainage sorted by species and life cycle.

Species	Drainage	Cottonwood	LaBarge	Gypsum
	County	Sublette, Co.	Lincoln, Co.	Sublette, Co.
	Survey Hours	280	575	279
Boreal Toad				
	Adults	23	85	43
	Juveniles	16	<u>1760</u>	<u>222</u>
	Tadpoles	<u>200</u>	<u>23104</u>	<u>4925</u>
	Egg Masses	1	9	
	Breeding Site	2	13	4
Boreal Chorus Frog				
	Adults	84	<u>540</u>	192
	Juveniles	1079	39	42
	Tadpoles	163	<u>9459</u>	<u>2184</u>
	Egg Mass		<u>1145</u>	
	Breeding Site	16	38	18
Spotted Frog				
	Adults	12		17
	Juveniles			3
	Tadpoles			24
	Breeding Site			
Tiger Salamander				
	Adult	2	28	<u>35</u>
	Larvae	435	<u>57</u>	<u>1280</u>
	Egg Mass		<u>680</u>	1
	Breeding Site	<b>10</b>	<b>8</b>	<b>22</b>

No distinction was made in this table, between metamorphs and juveniles (sub-adults). Underlined values have some estimated numbers in their calculations.

Table 12. Numbers of Observations survey hour sorted by species and life stage.

<b>Species</b>	<b>Drainage</b>	Cottonwood	LaBarge	Gypsum
	<b>County</b>	Sublette, Co.	Sublette, Co.	Sublette, Co.
	<b>Survey Hours</b>	280	575	279
<b>Boreal Toad</b>				
	Adults	0.082	0.148	0.154
	Juveniles	0.057	<u>3.061</u>	<u>0.796</u>
	Tadpoles	<u>0.714</u>	<u>40.181</u>	<u>17.652</u>
	Egg Mass	0.004	0.016	
	Breeding Site	0.007	0.023	0.0143
<b>Boreal Chorus Frog</b>				
	Adults	0.300	0.939	0.688
	Juveniles	3.853	0.068	0.151
	Tadpoles	0.582	<u>16.450</u>	<u>7.828</u>
	Egg Mass		<u>1.991</u>	
	Breeding Site	0.057	0.066	0.064
<b>Spotted Frog</b>				
	Adults	0.043		0.061
	Juveniles			0.011
	Tadpoles			0.086
	Breeding Site			0.004
<b>Tiger Salamander</b>				
	Adult	0.007	0.049	0.125
	Larvae	1.554	<u>0.099</u>	<u>4.588</u>
	Egg Mass		<u>1.183</u>	0.004
	Breeding Site	0.036	0.014	0.079

No distinction was made in this table, between metamorphs and juveniles (sub-adults).

Underlined values have some estimated numbers in their calculations.

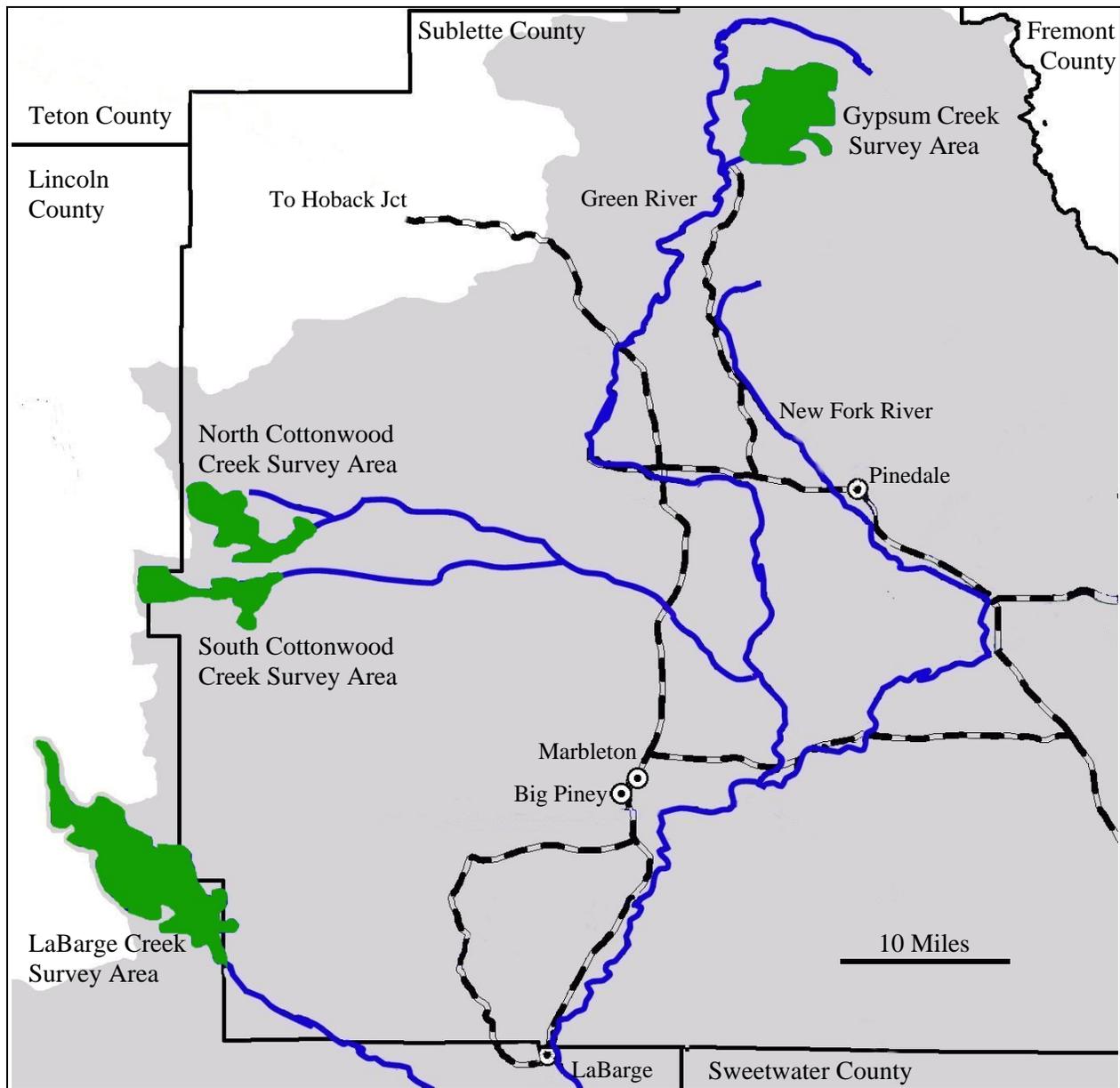
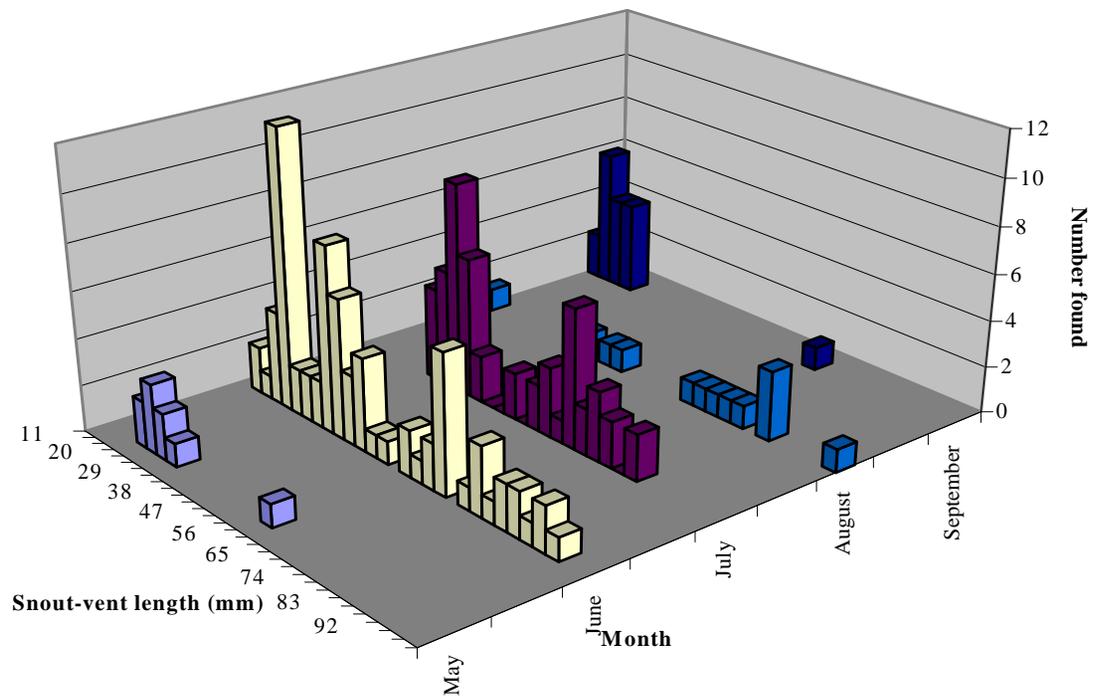


Figure 1. Green River drainage in southwest Wyoming. Herpetological survey areas in four sub-drainages are shown in darkly shaded areas. Larger, lightly shaded area (grey) is Green River watershed. Solid lines are streams (blue) and county lines (black). Dashed lines are major highways.

Figure 2. Snout-vent lengths of Boreal Toads measured in the upper Green River drainage, May to September 2002, graphed by month.



Appendix A. Data sheets and instructions used during surveys.



## Site Descriptions

**Directions:** Fill in one table for each site as completely as possible. Fields in white are required. Please record additional notes regarding the site on the back of this sheet.

<b>Site #</b> _____	<b>Habitat Type:</b> Lake/Pond   Vernal Pool   Wet Meadow   Bog   Fen   Spring/Seep Stream   Backwater/Oxbow   Terrestrial   Ditch/Rut   Beaver Pond: Active or Inactive Notes (potential breeding site?):					
<b>Color:</b>	Clear	Stained	<b>Turbidity:</b>	Clear	Cloudy	
<b>Percent of Site ≤50 cm Depth:</b> _____			<b>Max. Water Depth:</b> _____ cm	1-2m	>2m	
<b>Stream Order:</b> 1   2   3   4   5+	<b>Percent of Site Perimeter Searched:</b> _____					
<b>Grazing Pressure:</b> NG   LG   HG	<b>Stream Flow:</b> Dry   PD   LF   MF   HF   BF   FF					
<b>Fish Present:</b> Yes   No	<b>Fish Species if Known:</b>					
<b>Distance to Forest Edge:</b> _____ m	<b>Forest Tree Species in Order of Abundance:</b>					
<b>Water Connectedness:</b>	<b>North Shoreline Characteristics:</b>					
Permanent   Temporary   Isolated	Shallows		Present	or	Absent	
	Emergent Vegetation		Present	or	Absent	
<b>Water Permanence:</b>	Permanent	Semi-Permanent	Temporary	Unknown		
<b>Site Origin:</b>	Beaver	Flooding	Glacial	Human Altered	Manmade	Unknown
<b>Substrate Type:</b>	Silt/Mud _____	Sand _____	Gravel _____	Cobble _____	Boulder _____	Bedrock _____
<b>% of Water Body with Emergent Vegetation:</b>	0	1-25	26-50	>50		
<b>Rank emergent vegetation in order of abundance:</b>	____ Sedges	____ Grasses	____ Rushes	____ Cattails	____ Shrubs   ____ Water Lily   ____ Other: _____	
<b>Other Taxa:</b>						

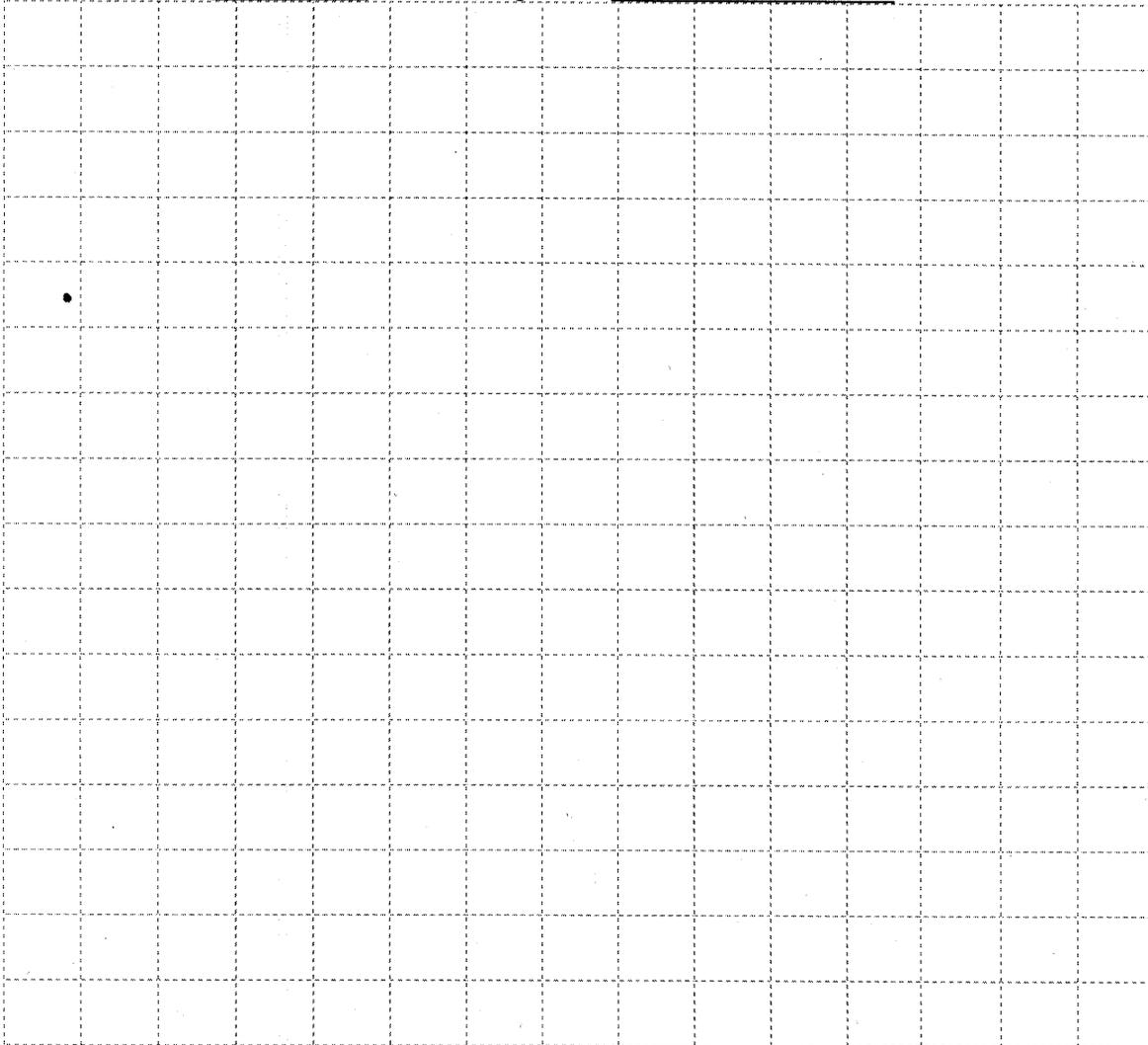
**Drainage/Site Map**

**Directions:** Sketch the drainage and/or site surveyed. Note any unusual features of the drainage or site. If this is a diagram of the drainage, indicate site numbers.



Grid Scale: \_\_\_\_\_

Drainage/Site #: \_\_\_\_\_



**Remarks:**



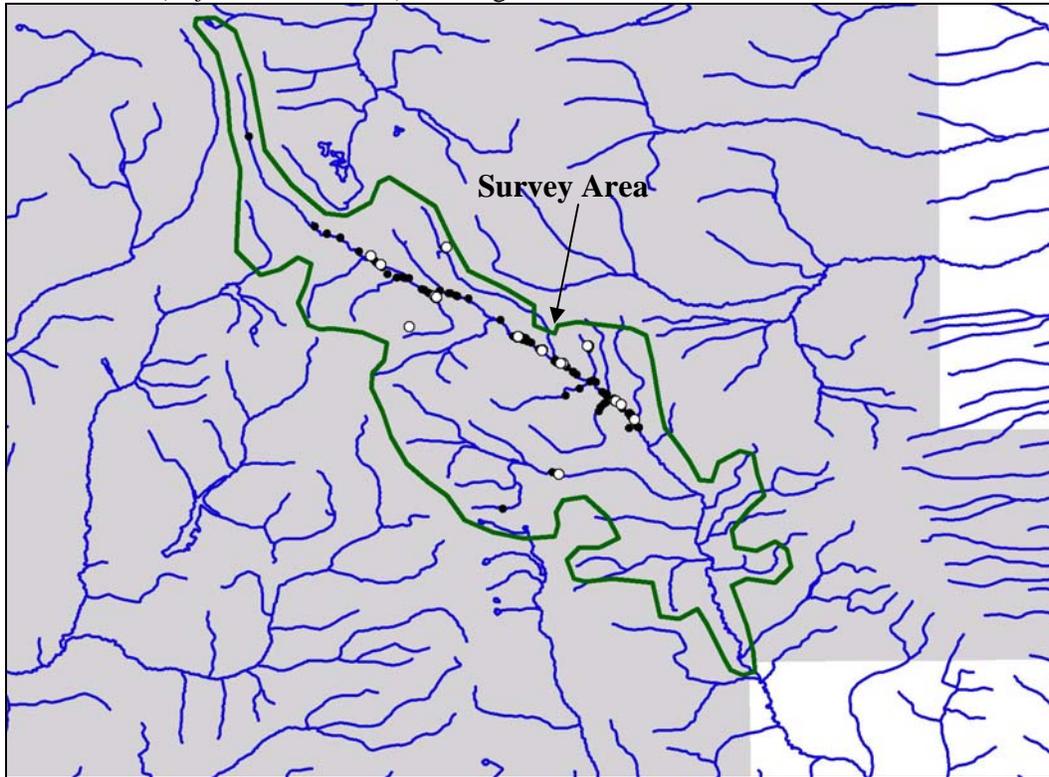
Field Name	Mandatory (Y/N)	Description
Locality (Drainage)	Y	Specific locality (i.e. LaBarge Creek)
Owner	Y	Name of owner (use codes at bottom of Survey Data Sheet)
UTM Zone/GPS Datum	Y	UTM Zone where coordinates were collected/Datum in which the coordinates were collected (recommend NAD27)
Date	Y	Use the format DD-MMM-YY (i.e. 05-JUN-02)
GPS EPE	Y	GPS error in meters
Air Temp	Y	Air temperature at start of survey in degrees Celsius: take in the shade at chest height
Weather	Y	Weather at start of survey (circle one)
Observers	Y	Names or initials of observers, circle name of recorder
County	N	County name
Wind	N	Wind strength at start of survey (circle one)
Topo Map Name	N	Name of the USGS Quadrangle
Weather History	N	Weather over the past few days to one week (note significant precipitation, temperature changes, general trends, etc.)
Site #	Y	Assign each site (or section of stream) a unique site number, and use this number to describe the site in more detail on the Site Description form. Describe the site on this form (Survey Data Sheet) using the top row of descriptors (start point, end point, etc.). Then use the bottom row of descriptors (species, stage, etc.) to describe what was found at this site. If nothing was found, please write "nothing found" under species, then move on to the next site number.
Start Point	Y	Start point of survey in UTM's (Easting, Northing).
End Point	Y	End point of survey in UTM's (Easting, Northing). If site is a distinct place (i.e. a pool, backwater, etc.), enter "same" for end point.
Start Time	Y	Time survey was initiated (military time, i.e. 1:30 PM = 1330)
End Time	Y	Time survey was concluded (military time, i.e. 6:10 PM = 1810)
Water Temp.	Y	Water temperature at start of survey in degrees Celsius: take 1 meter from margin at a point 2 cm below the water surface, or where egg masses/tadpoles are observed.
Site Photo Taken?	Y	Record Yes/No if a photo was taken of the site. Record photo descriptions on the Photo Record Sheet. Draw a sketch of the drainage or site on the Site Map.
Breeding Site?	Y	Evidence of amphibian breeding at this site? (eggs, larvae, or amplexing individuals)
Site Length x Width	N	Estimated maximum length and width of site in meters. For streams, record the length and average width of the reach searched.
Elevation (meters)	N	Feet above sea level, from 1:24,000 topo map
Species	Y	Use capital letters: the first 2 letters of the genus, followed by the first 2 letters of the species name (i.e. <i>Bufo boreas</i> = BUBO)
Stage	Y	Life history stage of the animal: adult, paedomorph (sexually mature individual with characteristics of larvae), juvenile (emergence occurred previously, sub-adult), metamorph (emerged this season, possible that tail/gills not fully resorbed), tadpole (frog/toad: no legs/small hind legs) or larva (salamander: gills present, legs may be present), egg/egg-mass, unknown. For tadpoles/larvae/metamorphs, note the presence/absence of tail/gills, and if front or hind legs are developed.
SVL (mm)	Y	Measure the animal from snout to vent, and record in mm. If there are many animals of the same size, measure the first 5-10 you come across, then note "same as above" for the rest. Use a ~ if this number is an estimate.
Number observed	Y	The number of animals you observed; <b>use a ~ if this number is an estimate</b>
Detection Method	Y	Use the codes at the bottom of the Survey Data Sheet: Visual ID = species was identified by sight without picking it up, Hand-caught = species was picked up and identified in the field, Aural ID = species was identified by call without picking it up.
Photos of animals taken?	Y	Record Yes/No if a photo was taken of the animal. Record photo descriptions on the Photo Record Sheet.
Specimen?	Y	Record Yes/No if a voucher specimen was collected. In the notes section, record number of specimens collected, specimen number, and any additional information.
Notes	N	Note any extra data about the animals. If known, record the sex of the animal. If the animal has a tail (salamanders, tadpoles, metamorphs with tails), measure the animal from snout to tip of tail, and record this total length (TL) in mm. Were the tadpole's/larva's hind/front legs developed? Were the gills partially resorbed? Did the metamorphs have tail nubs? Were the individuals calling or in amplexus? Did they appear healthy? What were the animals doing? How many eggs were in each egg-mass?
If breeding w/fish...	N	If fish are present at the site, and it has been identified as a breeding site, is cover present for amphibians?

 Survey Data Sheet  
 If any of these characteristics change drastically over the course of the survey, please note on the data sheet

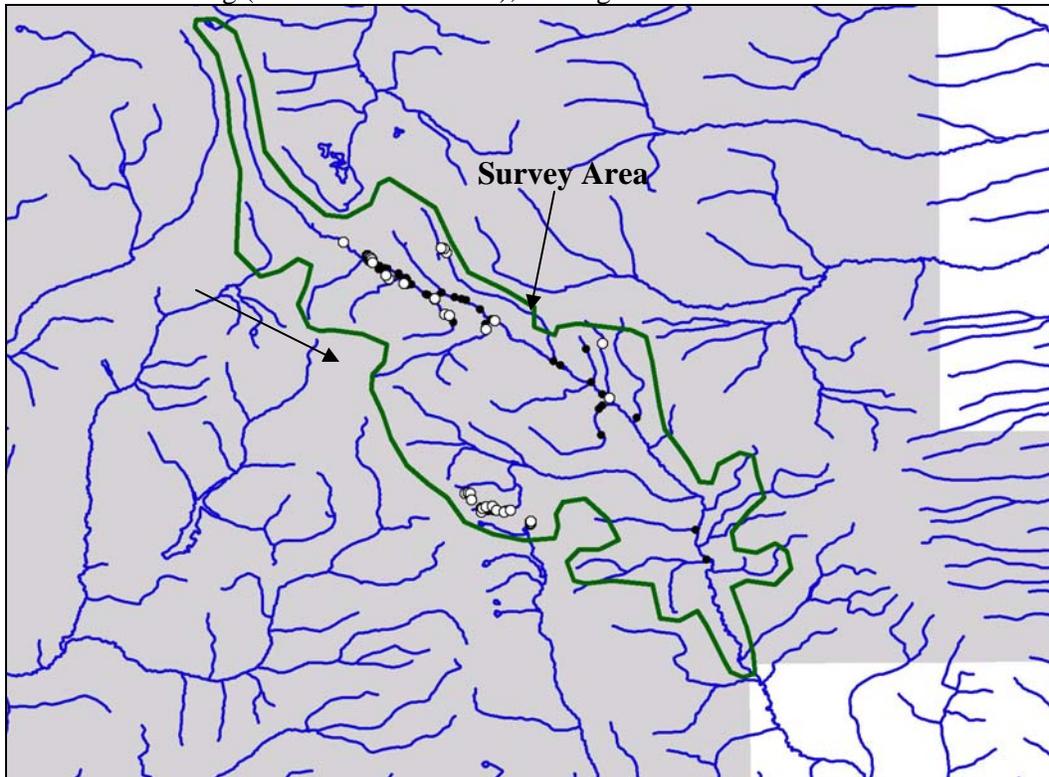
	Field Name	Mandatory (Y/N)	Description
<b>Site Descriptions</b>	<b>Site #</b>	Y	Site number, corresponding to number on Survey Data Sheet
	<b>Habitat Type</b>	Y	Description of the site being searched (circle one). Please include notes about any possible breeding sites or characteristics that might indicate the possibility of breeding (backwaters, old channels, width and characteristics of riparian zone, beaver dams, overhanging banks, etc.)
	<b>Color</b>	N	Color of the water as observed from above (circle one)
	<b>Turbidity</b>	N	Water turbidity from suspended particulate matter (circle one)
	<b>% of Site ≤50 cm Depth</b>	N	Percentage of site with shallows (≤50cm depth)
	<b>Maximum Water Depth (m)</b>	N	Estimate of depth of water at deepest point in meters
	<b>Stream Order</b>	N	The order of the stream surveyed (if applicable, circle one). First order streams have no tributaries, 2nd-order streams are formed by the confluence of two 1st-order streams, etc.
	<b>% of Site Perimeter Searched</b>	N	Percent of site surveyed during this visit
	<b>Grazing Pressure</b>	N	Circle one choice to describe the amount of grazing pressure: NG = No Grazing Pressure (no signs of cattle grazing). LG = Light Grazing Pressure (grasses, forbs & shrubs present, banks not broken down, animal presence obvious only at limited points such as water crossings, cow pies evident). HG = Heavy Grazing Pressure (broken banks, well established cow paths, primarily bare earth or early successional stages of grasses and forbs present).
	<b>Stream Flow</b>	N	If applicable, circle one choice to describe the stream flow observed in riffles: Dry = Dry. PD = Puddled (series of isolated pools connected by surface trickle or subsurface flow). LF = Low Flow (surface water flowing across 50-75% of the active channel). MF = Moderate Flow (surface water flowing across 75-90% of the active channel surface). HF = High Flow (stream flowing completely across active channel surface but not at bankfull). BF = Bankfull Flow (stream flowing at the upper level of the active channel bank). FF = Flood Flow (stream flowing over the tops of the banks onto terraces or flood plain).
	<b>Fish Present</b>	N	Yes if fish are present in the pond or stream, no if fish are absent
	<b>Fish Species if Known</b>	N	Common or scientific name of fish species present
	<b>Distance (m) to Forest Edge</b>	N	Estimated distance, in meters, of forest from closest edge of pond
	<b>Forest Tree Species in Order of Abundance</b>	N	List the most common tree species in order of abundance
	<b>Water Connectedness</b>	N	Connection the target water body has to other water (flowing and/or standing) (circle one)
	<b>North Shoreline Characteristics</b>	N	Presence or absence of shallows and emergent vegetation on <b>NORTH SHORELINE</b> (circle present or absent)
	<b>Water Permanence</b>	N	The frequency with which standing water is typically present at the site (circle one). Permanent = Never dries out, Semi-Permanent = Dries out some years, Temporary = Dries out every year.
	<b>Site Origin</b>	N	Description of how the site was formed geologically or otherwise (circle one)
	<b>Substrate Type</b>	N	Estimate the percentage of each type of substrate covering the bottom of the site, and fill in percentages on the line after each type. Gravel = pea to baseball (2-64 mm), Cobble = baseball to bowling ball (64-256 mm).
	<b>% of Water Body with Emergent Vegetation</b>	N	Percentage of margin of water body with emergent vegetation (circle one)
<b>Rank emergent vegetation in order of abundance</b>	N	Rank vegetation species in order of abundance	
<b>Other Taxa</b>	N	Taxa other than amphibians and reptiles that are observed (common or scientific names)	

Appendix B. Boreal Toad (*Bufo boreas boreas*), Boreal Chorus Frog (*Pseudacris maculata*), Tiger Salamander (*Ambystoma tigrinum*), and Columbia Spotted Frog (*Rana luteiventris*) distributions in the LaBarge, Gypsum, and North and South Cottonwood Creek drainages. Outlined areas = areas surveyed. Black dots = presence. White dots = breeding site. Shaded background is USFS land.

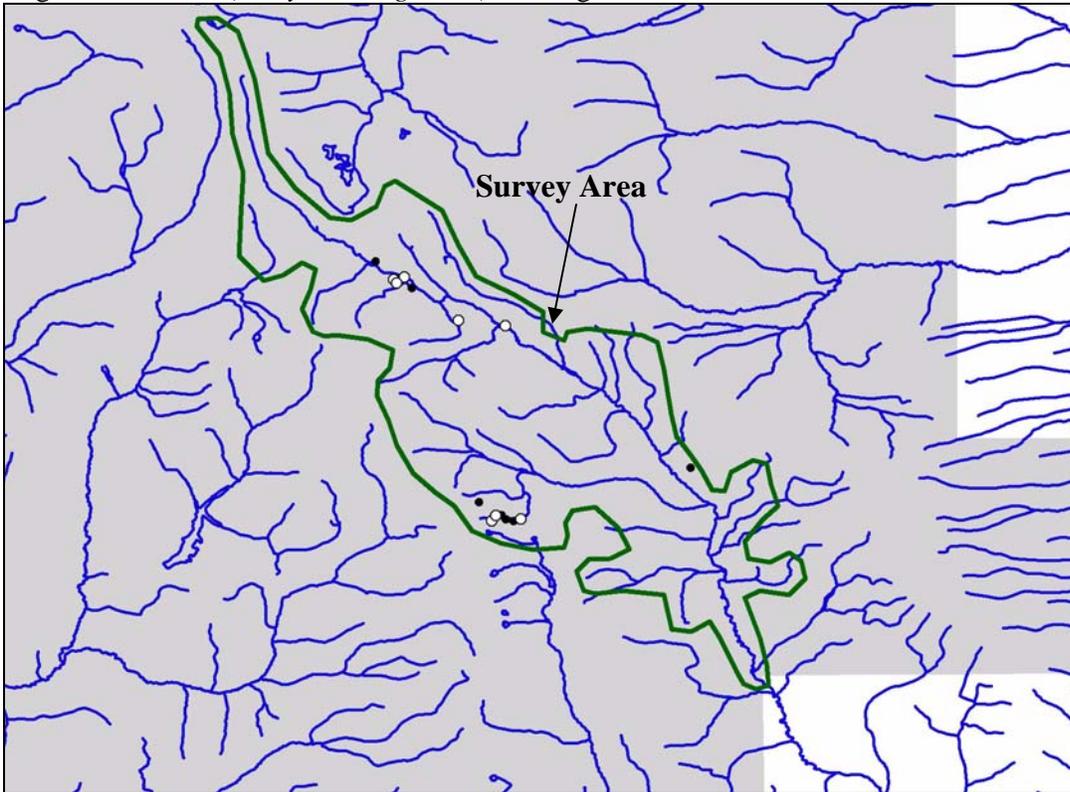
Boreal Toad (*Bufo boreas boreas*), LaBarge Creek



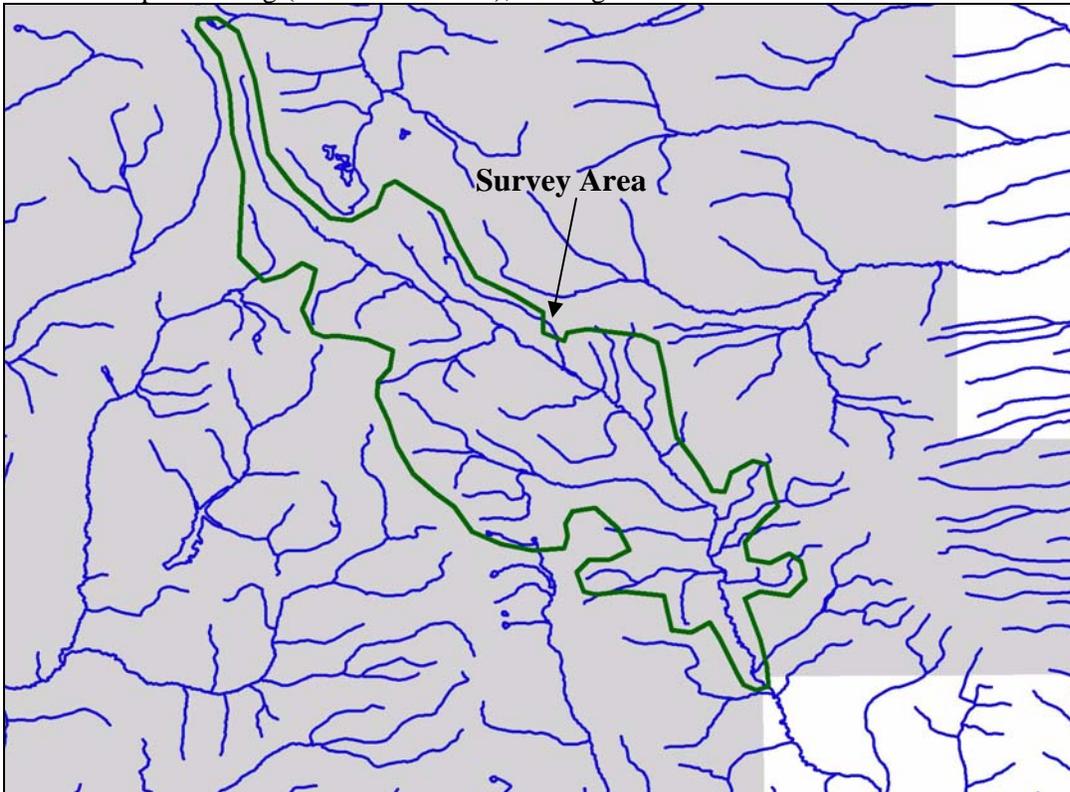
Boreal Chorus Frog (*Pseudacris maculata*), LaBarge Creek



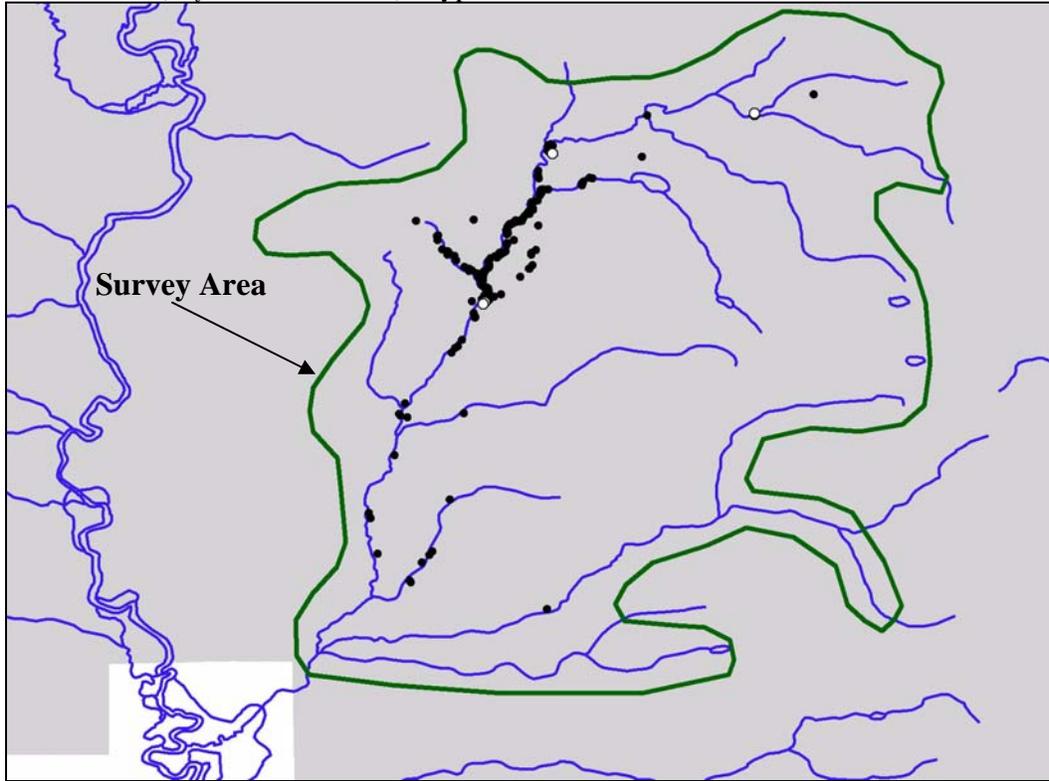
Tiger Salamander (*Ambystoma tigrinum*), LaBarge Creek



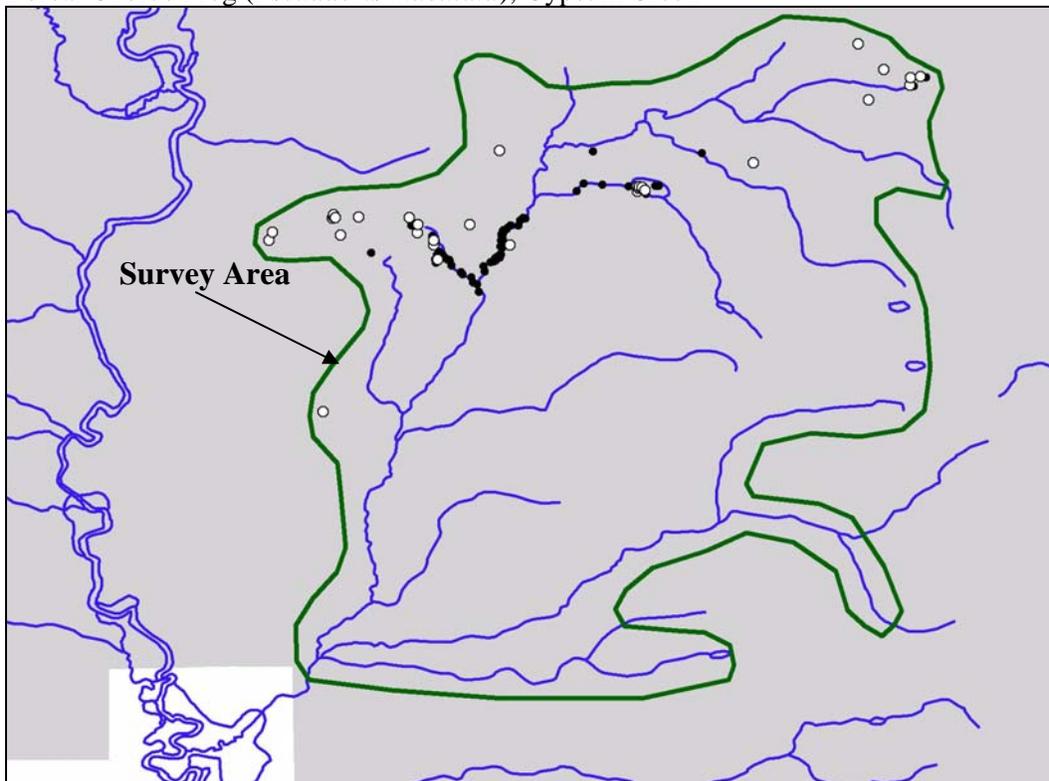
Columbia Spotted Frog (*Rana luteiventris*), LaBarge Creek



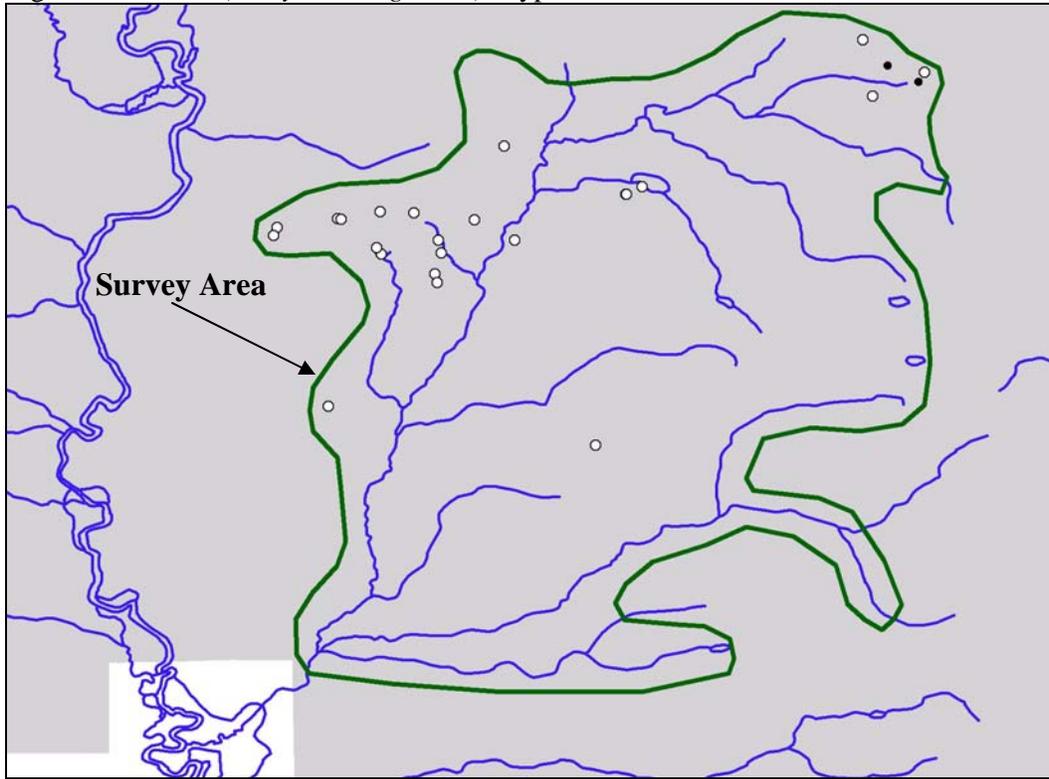
Boreal Toad (*Bufo boreas boreas*), Gypsum Creek



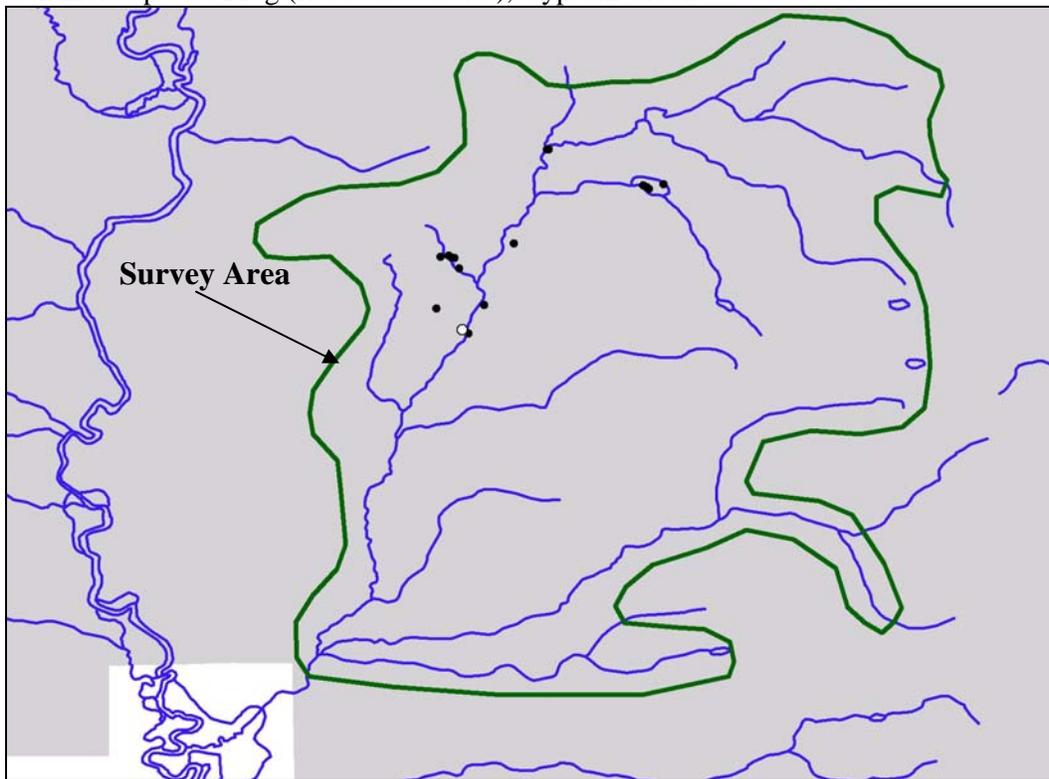
Boreal Chorus Frog (*Pseudacris maculata*), Gypsum Creek



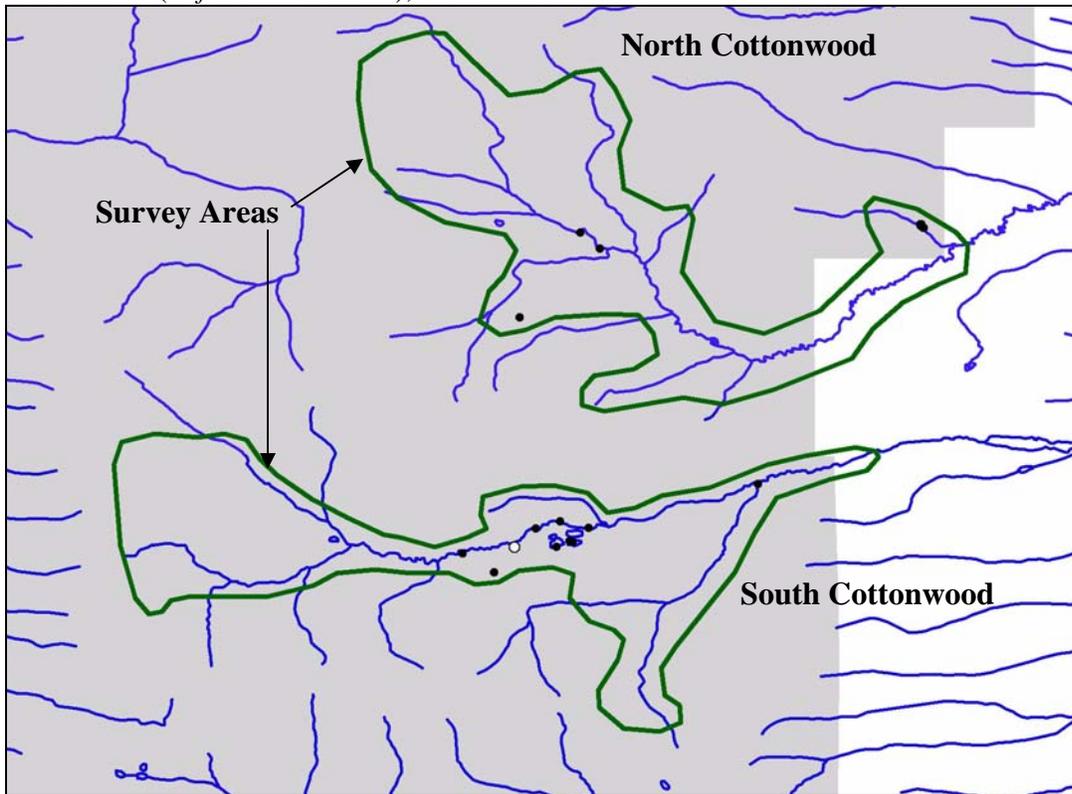
Tiger Salamander (*Ambystoma tigrinum*), Gypsum Creek



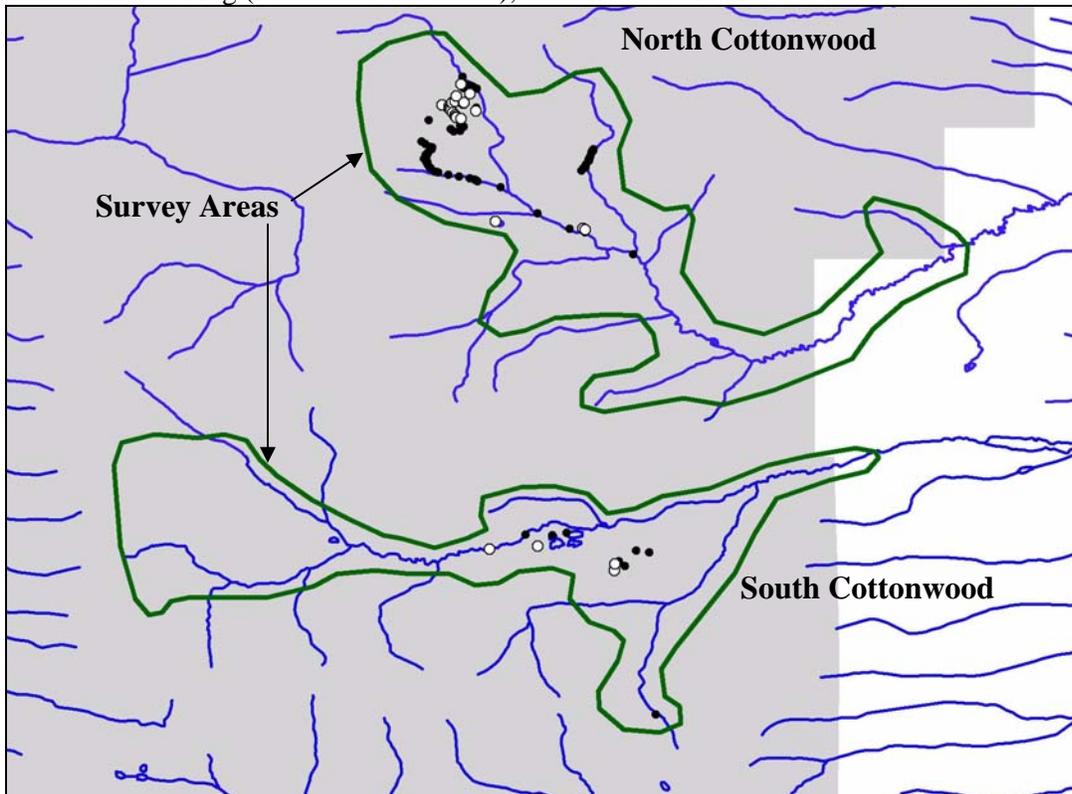
Columbia Spotted Frog (*Rana luteiventris*), Gypsum Creek



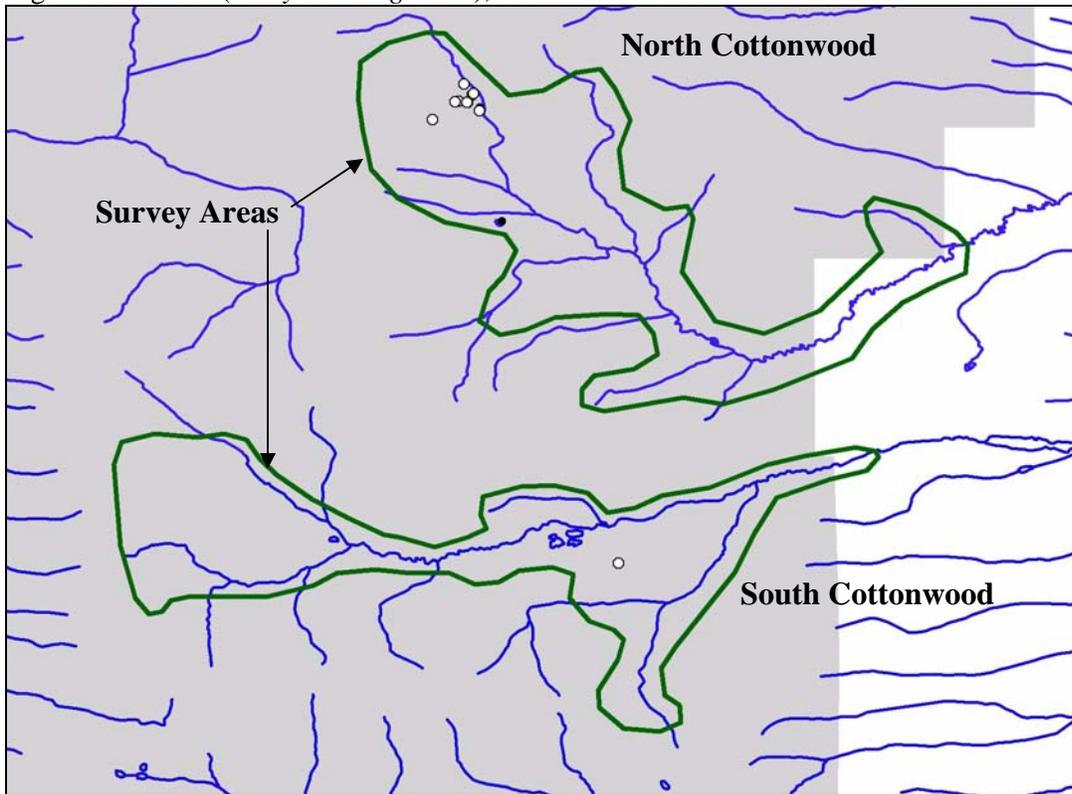
Boreal Toad (*Bufo boreas boreas*), Cottonwood Creeks



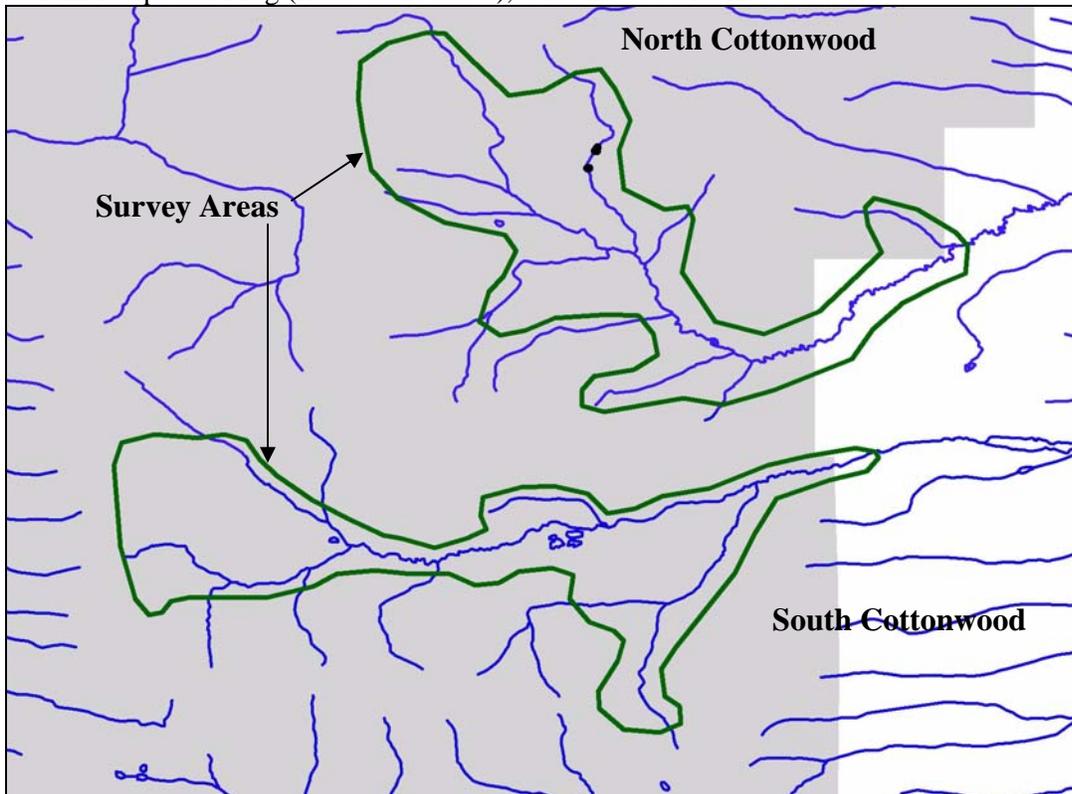
Boreal Chorus Frog (*Pseudacris maculata*), Cottonwood Creeks



Tiger Salamander (*Ambystoma tigrinum*), Cottonwood Creeks



Columbia Spotted Frog (*Rana luteiventris*), Cottonwood Creeks



Appendix C. UTM locations (NAD27) for all Boreal Toads found in the LaBarge Creek drainage. Localities entitled LaBarge Creek could be located on mainstem LaBarge or on an unnamed area (tributary or isolated pool) of the LaBarge Creek drainage.

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Adult	1	07-Jun-02	Cabin Creek	12	532567	4701041
Bufo boreas boreas	Adult	1	07-Jun-02	Cabin Creek	12	532140	4700770
Bufo boreas boreas	Adult	1	07-Jun-02	Cabin Creek	12		
Bufo boreas boreas	Adult	1	13-Jun-02	Crystal Creek	12	527136	4705460
Bufo boreas boreas	Adult	1	13-Jun-02	Crystal Creek	12		
Bufo boreas boreas	Juvenile	1	13-Jun-02	Crystal Creek	12	527301	4705510
Bufo boreas boreas	Adult	1	03-Jun-02	LaBarge Creek	12	531833	4702126
Bufo boreas boreas	Adult	1	03-Jun-02	LaBarge Creek	12	532175	4701912
Bufo boreas boreas	Adult	1	05-Jun-02	LaBarge Creek	12		
Bufo boreas boreas	Adult	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Adult	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Adult	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Adult	1	05-Jun-02	LaBarge Creek	12	528143	4704820
Bufo boreas boreas	Adult	1	17-Jun-02	LaBarge Creek	12	525456	4707071
Bufo boreas boreas	Adult	1	24-Jun-02	LaBarge Creek	12	525060	4707205
Bufo boreas boreas	Adult	1	24-Jun-02	LaBarge Creek	12	525070	4707245
Bufo boreas boreas	Adult	1	24-Jun-02	LaBarge Creek	12	524708	4707519
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	528405	4704952
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	528312	4704681
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	528669	4704857
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	528928	4704749
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	528928	4704749
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	529251	4704643
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	530203	4703787
Bufo boreas boreas	Adult	1	26-Jun-02	LaBarge Creek	12	530687	4703074
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	531346	4702635
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	532864	4701332

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	530956	4703065
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	530967	4703056
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	534328	4699508
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	534266	4699522
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	534092	4700000
Bufo boreas boreas	Adult	1	27-Jun-02	LaBarge Creek	12	533805	4700346
Bufo boreas boreas	Adult	1	28-Jun-02	LaBarge Creek	12	533045	4701317
Bufo boreas boreas	Adult	1	28-Jun-02	LaBarge Creek	12	533640	4700547
Bufo boreas boreas	Adult	1	30-Jun-02	LaBarge Creek	12	522738	4711106
Bufo boreas boreas	Adult	5	23-Sep-02	LaBarge Creek	12	531418	4702569
Bufo boreas boreas	Adult	1	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Adult	1	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Adult	1	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Adult	1	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Adult	24	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Adult	1	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Egg-mass	1	30-May-02	LaBarge Creek	12	532043	4702045
Bufo boreas boreas	Egg-mass	2	05-Jun-02	LaBarge Creek	12	528263	4704691
Bufo boreas boreas	Egg-mass	1	27-Jun-02	LaBarge Creek	12	531977	4702050
Bufo boreas boreas	Juvenile	1	30-May-02	LaBarge Creek	12	532043	4702045
Bufo boreas boreas	Juvenile	1	03-Jun-02	LaBarge Creek	12	531818	4702142
Bufo boreas boreas	Juvenile	1	03-Jun-02	LaBarge Creek	12	531851	4702111
Bufo boreas boreas	Juvenile	1	03-Jun-02	LaBarge Creek	12	531851	4702111
Bufo boreas boreas	Juvenile	2	03-Jun-02	LaBarge Creek	12	531864	4702104
Bufo boreas boreas	Juvenile	1	03-Jun-02	LaBarge Creek	12	531883	4702108
Bufo boreas boreas	Juvenile	1	03-Jun-02	LaBarge Creek	12		
Bufo boreas boreas	Juvenile	4	03-Jun-02	LaBarge Creek	12		
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528292	4704673

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528279	4704701
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528198	4704754
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528198	4704754
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528143	4704820
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528143	4704820
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528143	4704820
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528143	4704820
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528143	4704820
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528103	4704849
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528103	4704849
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528103	4704849
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	528063	4704869
Bufo boreas boreas	Juvenile	2	05-Jun-02	LaBarge Creek	12	528063	4704869
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	527938	4704976
Bufo boreas boreas	Juvenile	4	05-Jun-02	LaBarge Creek	12	527938	4704976
Bufo boreas boreas	Juvenile	1	05-Jun-02	LaBarge Creek	12	527881	4705017
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	527502	4705444
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	528311	4704702
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	528311	4704702
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	528299	4704728
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	528356	4704813
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	528722	4704842
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	528883	4704761
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	530584	4703138
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	530700	4703090
Bufo boreas boreas	Juvenile	1	26-Jun-02	LaBarge Creek	12	530711	4703113
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530960	4703010
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530960	4703010
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530960	4703010

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530976	4702966
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530976	4702966
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530979	4702950
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531027	4702927
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531119	4702875
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531373	4702610
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531437	4702595
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	532359	4701722
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	532361	4701704
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	532463	4701616
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530798	4703127
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530798	4703127
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530810	4703130
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530947	4703078
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530965	4703047
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530863	4703001
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	530863	4703001
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531430	4702579
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531815	4702192
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531801	4702161
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531828	4702135
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531854	4702140
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531863	4702110
Bufo boreas boreas	Juvenile	2	27-Jun-02	LaBarge Creek	12	531863	4702110
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531863	4702110
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531897	4702085
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531897	4702085
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531897	4702085
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531936	4702062
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531968	4702064

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Juvenile	2	27-Jun-02	LaBarge Creek	12	531968	4702064
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	531968	4702064
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	534038	4699488
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	534138	4699853
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	534076	4699928
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	534001	4700064
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	534101	4699919
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	534040	4700072
Bufo boreas boreas	Juvenile	2	27-Jun-02	LaBarge Creek	12	533794	4700365
Bufo boreas boreas	Juvenile	1	27-Jun-02	LaBarge Creek	12	533818	4700262
Bufo boreas boreas	Juvenile	3	27-Jun-02	LaBarge Creek	12	533764	4700389
Bufo boreas boreas	Juvenile	3	27-Jun-02	LaBarge Creek	12	533764	4700389
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533045	4701317
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533230	4700909
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533336	4700829
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533357	4700850
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533363	4700830
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533354	4700763
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533354	4700763
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533370	4700740
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533579	4700671
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533589	4700601
Bufo boreas boreas	Juvenile	4	28-Jun-02	LaBarge Creek	12	533648	4700510
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533650	4700522
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533650	4700522
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533648	4700510
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533648	4700510
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533648	4700510
Bufo boreas boreas	Juvenile	1	28-Jun-02	LaBarge Creek	12	533686	4700510
Bufo boreas boreas	Tadpole	~10000	05-Jun-02	LaBarge Creek	12	528292	4704673

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Tadpole	~750	05-Jun-02	LaBarge Creek	12	528292	4704673
Bufo boreas boreas	Tadpole	7	26-Jun-02	LaBarge Creek	12	530700	4703090
Bufo boreas boreas	Tadpole	~>10	26-Jun-02	LaBarge Creek	12	530711	4703113
Bufo boreas boreas	Tadpole	48	26-Jun-02	LaBarge Creek	12	528296	4704683
Bufo boreas boreas	Tadpole	33	27-Jun-02	LaBarge Creek	12	530706	4703090
Bufo boreas boreas	Tadpole	~3500	27-Jun-02	LaBarge Creek	12	531430	4702579
Bufo boreas boreas	Tadpole	1	27-Jun-02	LaBarge Creek	12	531430	4702579
Bufo boreas boreas	Tadpole	~2500	27-Jun-02	LaBarge Creek	12	533772	4700410
Bufo boreas boreas	Tadpole	>5	27-Jun-02	LaBarge Creek	12	534169	4699809
Bufo boreas boreas	Tadpole	~50	23-Sep-02	LaBarge Creek	12	528239	4704727
Bufo boreas boreas	Adult	1	24-Jun-02	LaBarge Meadows	12	526009	4706512
Bufo boreas boreas	Adult	1	25-Jun-02	LaBarge Meadows	12	526450	4706192
Bufo boreas boreas	Adult	1	25-Jun-02	LaBarge Meadows	12	526467	4706137
Bufo boreas boreas	Adult	1	25-Jun-02	LaBarge Meadows	12	526695	4705889
Bufo boreas boreas	Tadpole	~2500	25-Jun-02	LaBarge Meadows	12	526338	4706329
Bufo boreas boreas	Tadpole	~2000	25-Jun-02	LaBarge Meadows	12	526634	4705995
Bufo boreas boreas	Egg-mass	2	12-Jun-02	Little Clear Creek	12		
Bufo boreas boreas	Tadpole	~300	12-Jun-02	Little Clear Creek	12		
Bufo boreas boreas	Adult	1	19-Jun-02	Mack Creek	12	530298	4696235
Bufo boreas boreas	Adult	1	17-May-02	Nameless Creek	12	533570	4700524
Bufo boreas boreas	Adult	1	29-May-02	Nameless Creek	12	533188	4700317
Bufo boreas boreas	Adult	1	29-May-02	Nameless Creek	12		
Bufo boreas boreas	Adult	1	29-May-02	Nameless Creek	12		
Bufo boreas boreas	Egg-mass	1	29-May-02	Nameless Creek	12	533615	4700543
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	1	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	4	17-May-02	Nameless Creek	12	533342	4700496
Bufo boreas boreas	Juvenile	4	29-May-02	Nameless Creek	12	533133	4700141
Bufo boreas boreas	Juvenile	1	29-May-02	Nameless Creek	12		
Bufo boreas boreas	Juvenile	21	29-May-02	Nameless Creek	12		
Bufo boreas boreas	Adult	1	29-Aug-02	Road Creek	12	532753	4702749
Bufo boreas boreas	Juvenile	1	21-Jun-02	Road Creek	12	532830	4702637
Bufo boreas boreas	Juvenile	1	21-Jun-02	Road Creek	12	532830	4702637
Bufo boreas boreas	Tadpole	~300	21-Jun-02	Road Creek	12	532786	4702762
Bufo boreas boreas	Adult	1	27-Aug-02	South LaBarge Creek	12	531758	4697710
Bufo boreas boreas	Adult	4	27-Aug-02	South LaBarge Creek	12	531939	4697603
Bufo boreas boreas	Adult	1	04-Jun-02	Spring Creek	12	528516	4706687
Bufo boreas boreas	Egg-mass	2	04-Jun-02	Spring Creek	12		

Appendix D. UTM locations (NAD27) for all Boreal Chorus Frogs found in the LaBarge Creek drainage. Localities entitled LaBarge Creek could be located on mainstem LaBarge or on an unnamed area (tributary or isolated pool) of the LaBarge Creek drainage.

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Adult	1	07-Jun-02	Cabin Creek	12		
<i>Pseudacris maculata</i>	Adult	1	11-Jun-02	Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	1	11-Jun-02	Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	4	11-Jun-02	Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	1	16-May-02	Coyote Park Creek	12	534308	4699958
<i>Pseudacris maculata</i>	Adult	35	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Adult	~10-20	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Adult	~5-10	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Adult	many	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Adult	~3	14-May-02	Indian Creek	12	536415	4694300
<i>Pseudacris maculata</i>	Adult	>1	15-May-02	LaBarge Creek	12	533297	4700888
<i>Pseudacris maculata</i>	Adult	~20	28-May-02	LaBarge Creek	12	528732	4704010
<i>Pseudacris maculata</i>	Adult	>20	30-May-02	LaBarge Creek	12	532043	4702045
<i>Pseudacris maculata</i>	Adult	5	03-Jun-02	LaBarge Creek	12		
<i>Pseudacris maculata</i>	Adult	>10	03-Jun-02	LaBarge Creek	12		
<i>Pseudacris maculata</i>	Adult	1	05-Jun-02	LaBarge Creek	12	528103	4704849
<i>Pseudacris maculata</i>	Adult	2	05-Jun-02	LaBarge Creek	12	528103	4704849
<i>Pseudacris maculata</i>	Adult	1	05-Jun-02	LaBarge Creek	12	528103	4704849
<i>Pseudacris maculata</i>	Adult	3	05-Jun-02	LaBarge Creek	12	528063	4704869
<i>Pseudacris maculata</i>	Adult	5	05-Jun-02	LaBarge Creek	12	527622	4705270
<i>Pseudacris maculata</i>	Adult	1	05-Jun-02	LaBarge Creek	12	527622	4705270
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	526831	4705910
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	526831	4705910
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	527504	4705407
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	528311	4704702
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	528528	4704943
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	530065	4703887
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	530065	4703887

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Adult	1	26-Jun-02	LaBarge Creek	12	530065	4703874
<i>Pseudacris maculata</i>	Adult	>3	13-May-02	LaBarge Creek Road	12	545746	4682915
<i>Pseudacris maculata</i>	Adult	1	24-Sep-02	LaBarge Creek Road	12	527240	4705643
<i>Pseudacris maculata</i>	Adult	1	24-Jun-02	LaBarge Meadows	12	526327	4706234
<i>Pseudacris maculata</i>	Adult	3	24-Jun-02	LaBarge Meadows	12	526403	4706236
<i>Pseudacris maculata</i>	Adult	11	24-Jun-02	LaBarge Meadows	12	526350	4706158
<i>Pseudacris maculata</i>	Adult	1	24-Jun-02	LaBarge Meadows	12	526313	4706366
<i>Pseudacris maculata</i>	Adult	1	24-Jun-02	LaBarge Meadows	12	526313	4706366
<i>Pseudacris maculata</i>	Adult	1	24-Jun-02	LaBarge Meadows	12	526322	4706342
<i>Pseudacris maculata</i>	Adult	1	24-Jun-02	LaBarge Meadows	12	526356	4706274
<i>Pseudacris maculata</i>	Adult	1	25-Jun-02	LaBarge Meadows	12	526672	4705996
<i>Pseudacris maculata</i>	Adult	1	25-Jun-02	LaBarge Meadows	12	526695	4705889
<i>Pseudacris maculata</i>	Adult	10	25-Jun-02	LaBarge Meadows	12	526660	4705875
<i>Pseudacris maculata</i>	Adult	1	25-Jun-02	LaBarge Meadows	12	526773	4705893
<i>Pseudacris maculata</i>	Adult	1	28-May-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	>50	28-May-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	1	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	1	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	1	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	23	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	10	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	~27	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Adult	8	19-Jun-02	Mack Creek	12	530476	4696275
<i>Pseudacris maculata</i>	Adult	2	19-Jun-02	Mack Creek	12	530423	4696257
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	530298	4696235
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	530298	4696235
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	530298	4696235
<i>Pseudacris maculata</i>	Adult	7	19-Jun-02	Mack Creek	12	530298	4696235
<i>Pseudacris maculata</i>	Adult	2	19-Jun-02	Mack Creek	12	530092	4696195
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	529930	4696204
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	530570	4696225
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	530570	4696225
<i>Pseudacris maculata</i>	Adult	~20	19-Jun-02	Mack Creek	12	530384	4696164

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Adult	4	19-Jun-02	Mack Creek	12	530156	4696232
<i>Pseudacris maculata</i>	Adult	11	19-Jun-02	Mack Creek	12	529714	4696150
<i>Pseudacris maculata</i>	Adult	5	19-Jun-02	Mack Creek	12	529757	4696293
<i>Pseudacris maculata</i>	Adult	1	19-Jun-02	Mack Creek	12	529847	4696368
<i>Pseudacris maculata</i>	Adult	1	20-Jun-02	Mack Creek	12	530039	4696400
<i>Pseudacris maculata</i>	Adult	1	20-Jun-02	Mack Creek	12	529426	4696639
<i>Pseudacris maculata</i>	Adult	~19	20-Jun-02	Mack Creek	12	529426	4696639
<i>Pseudacris maculata</i>	Adult	6	20-Jun-02	Mack Creek	12	529314	4696925
<i>Pseudacris maculata</i>	Adult	1	20-Jun-02	Mack Creek	12	529314	4696925
<i>Pseudacris maculata</i>	Adult	1	20-Jun-02	Mack Creek	12	529378	4696910
<i>Pseudacris maculata</i>	Adult	~3	17-May-02	Nameless Creek	12	533264	4699276
<i>Pseudacris maculata</i>	Adult	2	29-May-02	Nameless Creek	12		
<i>Pseudacris maculata</i>	Adult	1	29-May-02	Nameless Creek	12		
<i>Pseudacris maculata</i>	Adult	1	21-Jun-02	Road Creek	12	532794	4702711
<i>Pseudacris maculata</i>	Adult	1	14-May-02	Shafer Creek	12	536081	4695491
<i>Pseudacris maculata</i>	Adult	~25	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	~39	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	7	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	17	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	11	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	8	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	1	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	7	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	3	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	14	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Adult	2	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	2	11-Jun-02	Clear Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	30	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	many	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	>100	28-May-02	LaBarge Creek	12	528732	4704010
<i>Pseudacris maculata</i>	Egg-mass	2	17-Jun-02	LaBarge Creek	12	525593	4706937
<i>Pseudacris maculata</i>	Egg-mass	5	24-Jun-02	LaBarge Meadows	12	526313	4706366
<i>Pseudacris maculata</i>	Egg-mass	2	25-Jun-02	LaBarge Meadows	12	526450	4706137

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Egg-mass	>50	28-May-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	5	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	~30	19-Jun-02	Mack Creek	12	530570	4696225
<i>Pseudacris maculata</i>	Egg-mass	~50	19-Jun-02	Mack Creek	12	530384	4696164
<i>Pseudacris maculata</i>	Egg-mass	2	19-Jun-02	Mack Creek	12	530156	4696232
<i>Pseudacris maculata</i>	Egg-mass	7	19-Jun-02	Mack Creek	12	529714	4696150
<i>Pseudacris maculata</i>	Egg-mass	10	19-Jun-02	Mack Creek	12	529707	4696331
<i>Pseudacris maculata</i>	Egg-mass	~16	19-Jun-02	Mack Creek	12	529757	4696293
<i>Pseudacris maculata</i>	Egg-mass	18	19-Jun-02	Mack Creek	12	529847	4696368
<i>Pseudacris maculata</i>	Egg-mass	1	20-Jun-02	Mack Creek	12	530039	4696400
<i>Pseudacris maculata</i>	Egg-mass	170	20-Jun-02	Mack Creek	12	529426	4696639
<i>Pseudacris maculata</i>	Egg-mass	31	20-Jun-02	Mack Creek	12	529238	4696894
<i>Pseudacris maculata</i>	Egg-mass	10	20-Jun-02	Mack Creek	12	529314	4696925
<i>Pseudacris maculata</i>	Egg-mass	7	20-Jun-02	Mack Creek	12	529378	4696910
<i>Pseudacris maculata</i>	Egg-mass	~240	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	~150	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	3	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	58	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	63	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	17	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	16	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	20	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	21	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Egg-mass	9	04-Jun-02	Spring Creek	12		
<i>Pseudacris maculata</i>	Juvenile	9	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	526810	4705911
<i>Pseudacris maculata</i>	Juvenile	2	26-Jun-02	LaBarge Creek	12	526810	4705911
<i>Pseudacris maculata</i>	Juvenile	3	26-Jun-02	LaBarge Creek	12	526831	4705910
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	526918	4705883
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	527251	4705716
<i>Pseudacris maculata</i>	Juvenile	4	26-Jun-02	LaBarge Creek	12	527464	4705523
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	527500	4705460
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	527500	4705460

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Juvenile	2	26-Jun-02	LaBarge Creek	12	527502	4705444
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	527502	4705444
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	528311	4704702
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	528904	4704749
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	529101	4704698
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	529251	4704643
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	529653	4704273
<i>Pseudacris maculata</i>	Juvenile	1	26-Jun-02	LaBarge Creek	12	529989	4703890
<i>Pseudacris maculata</i>	Juvenile	3	25-Jun-02	LaBarge Meadows	12	526660	4705875
<i>Pseudacris maculata</i>	Juvenile	1	25-Jun-02	LaBarge Meadows	12	526660	4705875
<i>Pseudacris maculata</i>	Juvenile	1	29-May-02	Nameless Creek	12	533188	4700317
<i>Pseudacris maculata</i>	Juvenile	1	29-May-02	Nameless Creek	12		
<i>Pseudacris maculata</i>	Tadpole	~10	11-Jun-02	Clear Creek	12		
<i>Pseudacris maculata</i>	Tadpole	~>500	13-Jun-02	Crystal Creek	12		
<i>Pseudacris maculata</i>	Tadpole	13	26-Jun-02	LaBarge Creek	12	528296	4704683
<i>Pseudacris maculata</i>	Tadpole	13	26-Jun-02	LaBarge Creek	12	528296	4704683
<i>Pseudacris maculata</i>	Tadpole	1	26-Jun-02	LaBarge Creek	12	528296	4704683
<i>Pseudacris maculata</i>	Tadpole	~100	28-Jun-02	LaBarge Creek	12	533485	4700736
<i>Pseudacris maculata</i>	Tadpole	15	24-Jun-02	LaBarge Meadows	12	526313	4706366
<i>Pseudacris maculata</i>	Tadpole	~1000	24-Jun-02	LaBarge Meadows	12	526322	4706342
<i>Pseudacris maculata</i>	Tadpole	~1000	24-Jun-02	LaBarge Meadows	12	526356	4706274
<i>Pseudacris maculata</i>	Tadpole	~25	25-Jun-02	LaBarge Meadows	12	526306	4706403
<i>Pseudacris maculata</i>	Tadpole	~350	25-Jun-02	LaBarge Meadows	12	526338	4706362
<i>Pseudacris maculata</i>	Tadpole	~800	25-Jun-02	LaBarge Meadows	12	526338	4706329
<i>Pseudacris maculata</i>	Tadpole	~2500	25-Jun-02	LaBarge Meadows	12	526363	4706295
<i>Pseudacris maculata</i>	Tadpole	~3000	25-Jun-02	LaBarge Meadows	12	526405	4706320
<i>Pseudacris maculata</i>	Tadpole	50	25-Jun-02	LaBarge Meadows	12	526432	4706235
<i>Pseudacris maculata</i>	Tadpole	>20	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Tadpole	>50	12-Jun-02	Little Clear Creek	12		
<i>Pseudacris maculata</i>	Tadpole	~12	19-Jun-02	Mack Creek	12	529707	4696331
<i>Pseudacris maculata</i>	Unknown	1	24-Sep-02	Spring Creek	12	528615	4706568

Appendix E. UTM locations (NAD27) for all Tiger Salamanders found in the LaBarge Creek drainage. Localities entitled LaBarge Creek could be located on main channel LaBarge or on an unnamed area (tributary or isolated pool) of the LaBarge Creek drainage.

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Ambystoma tigrinum</i>	Adult	2	11-Jun-02	Clear Creek	12		
<i>Ambystoma tigrinum</i>	Egg-mass	1	11-Jun-02	Clear Creek	12		
<i>Ambystoma tigrinum</i>	Larva	~22	11-Jun-02	Clear Creek	12		
<i>Ambystoma tigrinum</i>	Adult	1	13-Jun-02	Crystal Creek	12		
<i>Ambystoma tigrinum</i>	Adult	1	13-Jun-02	Crystal Creek	12		
<i>Ambystoma tigrinum</i>	Adult	1	13-Jun-02	Crystal Creek	12		
<i>Ambystoma tigrinum</i>	Egg-mass	3	13-Jun-02	Crystal Creek	12		
<i>Ambystoma tigrinum</i>	Egg-mass	~100	13-Jun-02	Crystal Creek	12		
<i>Ambystoma tigrinum</i>	Adult	1	27-Jun-02	LaBarge Creek	12	535495	4698271
<i>Ambystoma tigrinum</i>	Egg-mass	>400	28-May-02	LaBarge Creek	12	528732	4704010
<i>Ambystoma tigrinum</i>	Larva	~2	28-May-02	LaBarge Creek	12	528732	4704010
<i>Ambystoma tigrinum</i>	Larva	1	26-Jun-02	LaBarge Creek	12	527145	4705707
<i>Ambystoma tigrinum</i>	Larva	1	26-Jun-02	LaBarge Creek	12	527145	4705707
<i>Ambystoma tigrinum</i>	Larva	1	26-Jun-02	LaBarge Creek	12	527145	4705707
<i>Ambystoma tigrinum</i>	Larva	~27	26-Jun-02	LaBarge Creek	12	527145	4705707
<i>Ambystoma tigrinum</i>	Adult	1	25-Jun-02	LaBarge Meadows	12	526334	4706329
<i>Ambystoma tigrinum</i>	Adult	2	19-Jun-02	Mack Creek	12	530570	4696225
<i>Ambystoma tigrinum</i>	Adult	1	19-Jun-02	Mack Creek	12	530384	4696164
<i>Ambystoma tigrinum</i>	Adult	3	19-Jun-02	Mack Creek	12	530156	4696232
<i>Ambystoma tigrinum</i>	Adult	1	19-Jun-02	Mack Creek	12	529714	4696150
<i>Ambystoma tigrinum</i>	Adult	10	19-Jun-02	Mack Creek	12	529847	4696368
<i>Ambystoma tigrinum</i>	Adult	1	20-Jun-02	Mack Creek	12	530039	4696400
<i>Ambystoma tigrinum</i>	Adult	1	20-Jun-02	Mack Creek	12	529378	4696910
<i>Ambystoma tigrinum</i>	Adult	1	20-Jun-02	Mack Creek	12	529378	4696910
<i>Ambystoma tigrinum</i>	Adult	1	20-Jun-02	Mack Creek	12	529378	4696910
<i>Ambystoma tigrinum</i>	Egg-mass	45	19-Jun-02	Mack Creek	12	530570	4696225
<i>Ambystoma tigrinum</i>	Egg-mass	5	19-Jun-02	Mack Creek	12	529714	4696150
<i>Ambystoma tigrinum</i>	Egg-mass	>100	19-Jun-02	Mack Creek	12	529847	4696368

Appendix F. UTM locations (NAD27) for all Boreal Toads found in the Gypsum Creek drainage. Localities entitled Gypsum Creek could be located on mainstem Gypsum or on an unnamed area (tributary or isolated pool) of the Gypsum Creek drainage.

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Adult	1	17-Jul-02	Dago Creek	12	583314	4790120
Bufo boreas boreas	Adult	1	09-Jul-02	Gypsum Creek	12	588422	4795538
Bufo boreas boreas	Adult	1	09-Jul-02	Gypsum Creek	12	587667	4795204
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	585083	4794622
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	585124	4794610
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	585071	4794524
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	585096	4794629
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	584953	4794098
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	584950	4794171
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	584949	4794082
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	585116	4794462
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	584659	4792975
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	584659	4792975
Bufo boreas boreas	Adult	1	11-Jul-02	Gypsum Creek	12	584659	4792975
Bufo boreas boreas	Adult	1	12-Jul-02	Gypsum Creek	12	584322	4792465
Bufo boreas boreas	Adult	1	12-Jul-02	Gypsum Creek	12	584253	4792195
Bufo boreas boreas	Adult	1	12-Jul-02	Gypsum Creek	12	584320	4792149
Bufo boreas boreas	Adult	1	15-Jul-02	Gypsum Creek	12	584266	4791943
Bufo boreas boreas	Adult	1	15-Jul-02	Gypsum Creek	12	584301	4791896
Bufo boreas boreas	Adult	1	15-Jul-02	Gypsum Creek	12	584301	4791896
Bufo boreas boreas	Adult	1	16-Jul-02	Gypsum Creek	12	583244	4789940
Bufo boreas boreas	Adult	1	16-Jul-02	Gypsum Creek	12	583244	4789940
Bufo boreas boreas	Adult	1	16-Jul-02	Gypsum Creek	12	583244	4789940
Bufo boreas boreas	Adult	1	16-Jul-02	Gypsum Creek	12	583263	4789915
Bufo boreas boreas	Adult	1	16-Jul-02	Gypsum Creek	12	583355	4789878
Bufo boreas boreas	Adult	1	16-Jul-02	Gypsum Creek	12	583348	4789877
Bufo boreas boreas	Adult	2	16-Jul-02	Gypsum Creek	12	582995	4787520
Bufo boreas boreas	Adult	1	22-Jul-02	Gypsum Creek	12	583911	4792685
Bufo boreas boreas	Adult	1	23-Jul-02	Gypsum Creek	12	584420	4791994
Bufo boreas boreas	Adult	1	23-Jul-02	Gypsum Creek	12	584362	4791940

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Adult	1	23-Jul-02	Gypsum Creek	12	583416	4793295
Bufo boreas boreas	Adult	1	24-Jul-02	Gypsum Creek	12	585016	4793852
Bufo boreas boreas	Adult	1	24-Jul-02	Gypsum Creek	12	586262	4794438
Bufo boreas boreas	Adult	1	25-Jul-02	Gypsum Creek	12	584062	4789964
Bufo boreas boreas	Adult	1	28-Jul-02	Gypsum Creek	12	583902	4788466
Bufo boreas boreas	Adult	1	30-Jul-02	Gypsum Creek	12	583696	4787562
Bufo boreas boreas	Adult	1	30-Jul-02	Gypsum Creek	12	583659	4787506
Bufo boreas boreas	Adult	1	30-Jul-02	Gypsum Creek	12	583563	4787369
Bufo boreas boreas	Adult	1	30-Jul-02	Gypsum Creek	12	583414	4787054
Bufo boreas boreas	Adult	1	30-Jul-02	Gypsum Creek	12	583425	4787087
Bufo boreas boreas	Adult	1	24-Sep-02	Gypsum Creek	12	587677	4795204
Bufo boreas boreas	Adult	1	28-Jul-02	South Fork	12	585164	4786583
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	585138	4794611
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	585075	4794621
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584872	4793627
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584872	4793627
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584868	4793615
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584971	4793762
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584998	4793830
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584926	4793648
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584926	4793648
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584953	4793662
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584953	4793662
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584921	4793648
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584966	4794040
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584968	4793232
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584981	4793751
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584913	4793643
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584913	4793643
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	585006	4793799
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	585006	4793799
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	585006	4793799
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584953	4794098

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584883	4793618
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584779	4793354
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584882	4793520
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584881	4793524
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584859	4793485
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584731	4793303
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584830	4793438
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584851	4793426
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584884	4793564
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584893	4793517
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584877	4793483
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584898	4793497
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584731	4793292
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584837	4793439
Bufo boreas boreas	Juvenile	3	11-Jul-02	Gypsum Creek	12	584718	4793296
Bufo boreas boreas	Juvenile	3	11-Jul-02	Gypsum Creek	12	584850	4793458
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584812	4793418
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584812	4793418
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584851	4793474
Bufo boreas boreas	Juvenile	9	11-Jul-02	Gypsum Creek	12	584860	4793434
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584763	4793309
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584615	4793254
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584706	4793307
Bufo boreas boreas	Juvenile	6	11-Jul-02	Gypsum Creek	12	584630	4793253
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584599	4793233
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584580	4793206
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584568	4793074
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584564	4793141
Bufo boreas boreas	Juvenile	5	11-Jul-02	Gypsum Creek	12	584677	4793313
Bufo boreas boreas	Juvenile	5	11-Jul-02	Gypsum Creek	12	584575	4793174
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584465	4792696
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12		
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584521	4792764

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584567	4792904
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584476	4792744
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584566	4793069
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584574	4792917
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584678	4793284
Bufo boreas boreas	Juvenile	3	11-Jul-02	Gypsum Creek	12	584683	4793311
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584662	4793297
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584599	4793231
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584584	4793206
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584586	4793195
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584588	4793095
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584576	4792909
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584557	4792785
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584498	4792750
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584498	4792725
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584420	4792678
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584504	4792759
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584545	4792761
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584489	4792733
Bufo boreas boreas	Juvenile	3	11-Jul-02	Gypsum Creek	12	584453	4792667
Bufo boreas boreas	Juvenile	2	11-Jul-02	Gypsum Creek	12	584491	4792745
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584610	4793240
Bufo boreas boreas	Juvenile	3	11-Jul-02	Gypsum Creek	12	584572	4792899
Bufo boreas boreas	Juvenile	1	11-Jul-02	Gypsum Creek	12	584883	4793630
Bufo boreas boreas	Juvenile	10	11-Jul-02	Gypsum Creek	12	584659	4792975
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584370	4792654
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584342	4792606
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584358	4792550
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584350	4792492
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584357	4792513
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584357	4792513
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584302	4792427
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584261	4792219

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Juvenile	2	12-Jul-02	Gypsum Creek	12	584309	4792149
Bufo boreas boreas	Juvenile	2	12-Jul-02	Gypsum Creek	12	584282	4792422
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584285	4792364
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584277	4792335
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584266	4792323
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584264	4792290
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584343	4792128
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584356	4792090
Bufo boreas boreas	Juvenile	3	12-Jul-02	Gypsum Creek	12	584347	4792111
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584322	4792055
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584325	4792067
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584307	4792018
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584278	4792263
Bufo boreas boreas	Juvenile	2	12-Jul-02	Gypsum Creek	12	584267	4792269
Bufo boreas boreas	Juvenile	1	12-Jul-02	Gypsum Creek	12	584304	4792152
Bufo boreas boreas	Juvenile	7	12-Jul-02	Gypsum Creek	12	584287	4792155
Bufo boreas boreas	Juvenile	1	15-Jul-02	Gypsum Creek	12	584167	4791699
Bufo boreas boreas	Juvenile	7	15-Jul-02	Gypsum Creek	12	584301	4791896
Bufo boreas boreas	Juvenile	1	15-Jul-02	Gypsum Creek	12	584301	4791896
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	584187	4791639
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	584180	4791626
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	584025	4791227
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	583980	4791119
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	583937	4791100
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	583200	4789224
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	583895	4791013
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	582888	4788219
Bufo boreas boreas	Juvenile	1	16-Jul-02	Gypsum Creek	12	582905	4788135
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	584223	4792310
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	584193	4792392
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	584136	4792443
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	584097	4792435
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	584102	4792463

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	584042	4792495
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	583935	4792606
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	583838	4792755
Bufo boreas boreas	Juvenile	1	22-Jul-02	Gypsum Creek	12	583820	4792772
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584148	4791902
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584420	4791994
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584362	4791940
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584315	4791919
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584883	4792715
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584948	4792797
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584748	4792344
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584865	4792471
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584871	4792479
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584898	4792538
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584511	4792022
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	584886	4792755
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	583750	4792797
Bufo boreas boreas	Juvenile	2	23-Jul-02	Gypsum Creek	12	583821	4792708
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	583692	4792959
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	583687	4793022
Bufo boreas boreas	Juvenile	1	23-Jul-02	Gypsum Creek	12	583704	4793044
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	584147	4793318
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	584993	4793840
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585020	4793852
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585020	4793852
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585090	4793857
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585090	4793857
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585506	4793922
Bufo boreas boreas	Juvenile	2	24-Jul-02	Gypsum Creek	12	585516	4793963
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585520	4793991
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585520	4793991
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585605	4794059
Bufo boreas boreas	Juvenile	1	24-Jul-02	Gypsum Creek	12	585643	4794048

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Tadpole	~50	09-Jul-02	Gypsum Creek	12	587672	4795201
Bufo boreas boreas	Tadpole	~2200	09-Jul-02	Gypsum Creek	12	587677	4795184
Bufo boreas boreas	Tadpole	~1650	11-Jul-02	Gypsum Creek	12	585124	4794478
Bufo boreas boreas	Tadpole	~825	15-Jul-02	Gypsum Creek	12	584301	4791896
Bufo boreas boreas	Tadpole	~200	15-Jul-02	Gypsum Creek	12	584274	4791861

Appendix G. UTM locations (NAD27) for all Boreal Chorus Frogs found in the Gypsum Creek drainage. Localities entitled Gypsum Creek could be located on mainstem Gypsum or on an unnamed area (tributary or isolated pool) of the Gypsum Creek drainage.

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Tadpole	~100	19-Jun-02	Fontenelle Creek	12	531177	4695791
<i>Pseudacris maculata</i>	Tadpole	~150	19-Jun-02	Fontenelle Creek	12	531180	4695788
<i>Pseudacris maculata</i>	Tadpole	~80	19-Jun-02	Fontenelle Creek	12	531168	4695763
<i>Pseudacris maculata</i>	Tadpole	~200	19-Jun-02	Fontenelle Creek	12	531177	4695723
<i>Pseudacris maculata</i>	Tadpole	~70	19-Jun-02	Fontenelle Creek	12	531166	4695685
<i>Pseudacris maculata</i>	Adult	2	22-Jul-02	Dago Creek	12	582511	4793123
<i>Pseudacris maculata</i>	Adult	1	22-Jul-02	Dago Creek	12	582511	4793123
<i>Pseudacris maculata</i>	Juvenile	1	17-Jul-02	Dago Creek	12	582916	4792813
<i>Pseudacris maculata</i>	Juvenile	2	17-Jul-02	Dago Creek	12	582916	4792813
<i>Pseudacris maculata</i>	Juvenile	2	22-Jul-02	Dago Creek	12	582739	4793436
<i>Pseudacris maculata</i>	Juvenile	1	22-Jul-02	Dago Creek	12	582739	4793436
<i>Pseudacris maculata</i>	Metamorph	2	22-Jul-02	Dago Creek	12	582739	4793436
<i>Pseudacris maculata</i>	Metamorph	1	22-Jul-02	Dago Creek	12	582739	4793436
<i>Pseudacris maculata</i>	Metamorph	1	22-Jul-02	Dago Creek	12	582511	4793123
<i>Pseudacris maculata</i>	Metamorph	1	22-Jul-02	Dago Creek	12	582511	4793123
<i>Pseudacris maculata</i>	Metamorph	3	22-Jul-02	Dago Creek	12	582422	4793472
<i>Pseudacris maculata</i>	Metamorph	2	22-Jul-02	Dago Creek	12	582422	4793472
<i>Pseudacris maculata</i>	Metamorph	8	22-Jul-02	Dago Creek	12	582416	4793440
<i>Pseudacris maculata</i>	Metamorph	1	22-Jul-02	Dago Creek	12	582442	4793416
<i>Pseudacris maculata</i>	Metamorph	2	22-Jul-02	Dago Creek	12	582404	4793412
<i>Pseudacris maculata</i>	Adult	1	09-Jul-02	Gypsum Creek	12	589752	4795796
<i>Pseudacris maculata</i>	Adult	1	09-Jul-02	Gypsum Creek	12	589752	4795796
<i>Pseudacris maculata</i>	Adult	1	09-Jul-02	Gypsum Creek	12	589900	4795947
<i>Pseudacris maculata</i>	Adult	6	09-Jul-02	Gypsum Creek	12	589900	4795947
<i>Pseudacris maculata</i>	Adult	1	09-Jul-02	Gypsum Creek	12	589171	4795544
<i>Pseudacris maculata</i>	Adult	2	09-Jul-02	Gypsum Creek	12	589171	4795544
<i>Pseudacris maculata</i>	Adult	2	09-Jul-02	Gypsum Creek	12	589699	4795939
<i>Pseudacris maculata</i>	Adult	6	09-Jul-02	Gypsum Creek	12	589699	4795939
<i>Pseudacris maculata</i>	Adult	1	09-Jul-02	Gypsum Creek	12	589361	4796073
<i>Pseudacris maculata</i>	Adult	1	10-Jul-02	Gypsum Creek	12	587084	4794593

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584828	4793448
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584797	4793405
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584773	4793320
Pseudacris maculata	Adult	2	11-Jul-02	Gypsum Creek	12	584860	4793434
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584580	4793079
Pseudacris maculata	Adult	3	11-Jul-02	Gypsum Creek	12	584630	4793253
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584599	4793233
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584568	4793074
Pseudacris maculata	Adult	2	11-Jul-02	Gypsum Creek	12	584559	4793160
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584575	4793212
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584564	4793141
Pseudacris maculata	Adult	2	11-Jul-02	Gypsum Creek	12	584671	4793319
Pseudacris maculata	Adult	3	11-Jul-02	Gypsum Creek	12	584677	4793313
Pseudacris maculata	Adult	7	11-Jul-02	Gypsum Creek	12	584575	4793174
Pseudacris maculata	Adult	16	11-Jul-02	Gypsum Creek	12	584623	4793259
Pseudacris maculata	Adult	4	11-Jul-02	Gypsum Creek	12	584465	4792696
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584521	4792764
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584511	4792764
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584550	4792953
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584550	4792953
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584564	4792971
Pseudacris maculata	Adult	2	11-Jul-02	Gypsum Creek	12	584467	4792688
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584482	4792746
Pseudacris maculata	Adult	3	11-Jul-02	Gypsum Creek	12	584559	4793055
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584485	4792746
Pseudacris maculata	Adult	3	11-Jul-02	Gypsum Creek	12	584502	4792752
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584545	4792761
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584570	4793152
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584564	4792973
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584553	4792818
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584482	4792732
Pseudacris maculata	Adult	2	11-Jul-02	Gypsum Creek	12	584572	4792930
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584491	4792702

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Pseudacris maculata	Adult	3	11-Jul-02	Gypsum Creek	12	584559	4792804
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584547	4792764
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584584	4793232
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584428	4792676
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584554	4792937
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584482	4792699
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584582	4793178
Pseudacris maculata	Adult	1	11-Jul-02	Gypsum Creek	12	584610	4793240
Pseudacris maculata	Adult	16	11-Jul-02	Gypsum Creek	12	584659	4792975
Pseudacris maculata	Adult	2	12-Jul-02	Gypsum Creek	12	584358	4792510
Pseudacris maculata	Adult	3	12-Jul-02	Gypsum Creek	12	584342	4792604
Pseudacris maculata	Adult	4	24-Jul-02	Gypsum Creek	12	584147	4793318
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	584147	4793318
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	584147	4793318
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	585506	4793922
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	585587	4794054
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	585829	4794034
Pseudacris maculata	Adult	4	24-Jul-02	Gypsum Creek	12	586162	4794006
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	586256	4794001
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	586283	4794006
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	586325	4793993
Pseudacris maculata	Adult	2	24-Jul-02	Gypsum Creek	12	586384	4793878
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	586277	4793973
Pseudacris maculata	Adult	4	29-Jul-02	Gypsum Creek	12	582331	4790059
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584210	4792314
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584210	4792314
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584079	4792455
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584079	4792455
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584079	4792455
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584063	4792481
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	584056	4792494
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583935	4792606
Pseudacris maculata	Adult	3	22-Jul-02	Gypsum Creek	12	583911	4792685

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583905	4792704
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583905	4792704
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583905	4792704
Pseudacris maculata	Adult	2	22-Jul-02	Gypsum Creek	12	583873	4792723
Pseudacris maculata	Adult	3	22-Jul-02	Gypsum Creek	12	583844	4792747
Pseudacris maculata	Adult	2	22-Jul-02	Gypsum Creek	12	583838	4792755
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583820	4792772
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583816	4792805
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583778	4792846
Pseudacris maculata	Adult	3	22-Jul-02	Gypsum Creek	12	583778	4792846
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583778	4792846
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583778	4792846
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583778	4792846
Pseudacris maculata	Adult	1	22-Jul-02	Gypsum Creek	12	583778	4792846
Pseudacris maculata	Adult	2	24-Jul-02	Gypsum Creek	12	586502	4794020
Pseudacris maculata	Adult	2	24-Jul-02	Gypsum Creek	12	586543	4794024
Pseudacris maculata	Adult	1	24-Jul-02	Gypsum Creek	12	585704	4794607
Pseudacris maculata	Adult	2	23-Jul-02	Gypsum Creek	12	583685	4793119
Pseudacris maculata	Adult	1	23-Jul-02	Gypsum Creek	12	583489	4793311
Pseudacris maculata	Adult	1	23-Jul-02	Gypsum Creek	12	583704	4793044
Pseudacris maculata	Juvenile	2	09-Jul-02	Gypsum Creek	12	589699	4795939
Pseudacris maculata	Juvenile	1	12-Jul-02	Gypsum Creek	12	584263	4792290
Pseudacris maculata	Juvenile	1	12-Jul-02	Gypsum Creek	12	584286	4792154
Pseudacris maculata	Juvenile	1	22-Jul-02	Gypsum Creek	12	584190	4792407
Pseudacris maculata	Juvenile	1	22-Jul-02	Gypsum Creek	12	584079	4792455
Pseudacris maculata	Juvenile	3	22-Jul-02	Gypsum Creek	12	583935	4792606
Pseudacris maculata	Juvenile	4	22-Jul-02	Gypsum Creek	12	583911	4792685
Pseudacris maculata	Juvenile	1	22-Jul-02	Gypsum Creek	12	583873	4792723
Pseudacris maculata	Juvenile	7	22-Jul-02	Gypsum Creek	12	583844	4792747
Pseudacris maculata	Juvenile	2	22-Jul-02	Gypsum Creek	12	583838	4792755
Pseudacris maculata	Juvenile	1	22-Jul-02	Gypsum Creek	12	583838	4792755
Pseudacris maculata	Juvenile	2	22-Jul-02	Gypsum Creek	12	583820	4792772
Pseudacris maculata	Juvenile	3	22-Jul-02	Gypsum Creek	12	583778	4792846

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Juvenile	2	23-Jul-02	Gypsum Creek	12	583750	4792797
<i>Pseudacris maculata</i>	Juvenile	2	23-Jul-02	Gypsum Creek	12	583723	4792716
<i>Pseudacris maculata</i>	Juvenile	2	23-Jul-02	Gypsum Creek	12	583736	4792661
<i>Pseudacris maculata</i>	Juvenile	1	23-Jul-02	Gypsum Creek	12	583731	4792724
<i>Pseudacris maculata</i>	Metamorph	1	29-Jul-02	Gypsum Creek	12	589025	4796516
<i>Pseudacris maculata</i>	Metamorph	~>1000	24-Jul-02	Gypsum Creek	12	584147	4793318
<i>Pseudacris maculata</i>	Metamorph	19	24-Jul-02	Gypsum Creek	12	586256	4794001
<i>Pseudacris maculata</i>	Metamorph	5	24-Jul-02	Gypsum Creek	12	586283	4794006
<i>Pseudacris maculata</i>	Metamorph	7	24-Jul-02	Gypsum Creek	12	586290	4794002
<i>Pseudacris maculata</i>	Metamorph	3	24-Jul-02	Gypsum Creek	12	586325	4793993
<i>Pseudacris maculata</i>	Metamorph	10	24-Jul-02	Gypsum Creek	12	586324	4793974
<i>Pseudacris maculata</i>	Metamorph	7	24-Jul-02	Gypsum Creek	12	586358	4793940
<i>Pseudacris maculata</i>	Metamorph	6	24-Jul-02	Gypsum Creek	12	586277	4793973
<i>Pseudacris maculata</i>	Metamorph	~500	29-Jul-02	Gypsum Creek	12	582331	4790059
<i>Pseudacris maculata</i>	Metamorph	10	29-Jul-02	Gypsum Creek	12	581651	4793155
<i>Pseudacris maculata</i>	Metamorph	5	29-Jul-02	Gypsum Creek	12	581608	4793013
<i>Pseudacris maculata</i>	Metamorph	~500	29-Jul-02	Gypsum Creek	12	584506	4794608
<i>Pseudacris maculata</i>	Metamorph	1	23-Jul-02	Gypsum Creek	12	583486	4793174
<i>Pseudacris maculata</i>	Metamorph	10	23-Jul-02	Gypsum Creek	12	583489	4793311
<i>Pseudacris maculata</i>	Metamorph	24	23-Jul-02	Gypsum Creek	12	583691	4792959
<i>Pseudacris maculata</i>	Metamorph	5	23-Jul-02	Gypsum Creek	12	583697	4793041
<i>Pseudacris maculata</i>	Metamorph	6	23-Jul-02	Gypsum Creek	12	583379	4793430
<i>Pseudacris maculata</i>	Tadpole	4	29-Jul-02	Gypsum Creek	12	589025	4796516
<i>Pseudacris maculata</i>	Tadpole	1	09-Jul-02	Gypsum Creek	12	589171	4795544
<i>Pseudacris maculata</i>	Tadpole	~625	09-Jul-02	Gypsum Creek	12	589171	4795544
<i>Pseudacris maculata</i>	Tadpole	~75	09-Jul-02	Gypsum Creek	12	589697	4795805
<i>Pseudacris maculata</i>	Tadpole	~70	09-Jul-02	Gypsum Creek	12	589824	4795957
<i>Pseudacris maculata</i>	Tadpole	~40	09-Jul-02	Gypsum Creek	12	589699	4795939
<i>Pseudacris maculata</i>	Tadpole	2	09-Jul-02	Gypsum Creek	12	589361	4796073
<i>Pseudacris maculata</i>	Tadpole	2	10-Jul-02	Gypsum Creek	12	587726	4794433
<i>Pseudacris maculata</i>	Tadpole	1200	11-Jul-02	Gypsum Creek	12	584659	4792975
<i>Pseudacris maculata</i>	Tadpole	1	24-Jul-02	Gypsum Creek	12	584147	4793318
<i>Pseudacris maculata</i>	Tadpole	1	24-Jul-02	Gypsum Creek	12	586266	4793921

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Tadpole	1	23-Jul-02	Gypsum Creek	12	583751	4792711
<i>Pseudacris maculata</i>	Tadpole	66	23-Jul-02	Gypsum Creek	12	583379	4793430
<i>Pseudacris maculata</i>	Unknown	3	29-Jul-02	Gypsum Creek	12	581608	4793013
<i>Pseudacris maculata</i>	Unknown	1	23-Jul-02	Gypsum Creek	12	583416	4793295

Appendix H. UTM locations (NAD27) for all Tiger Salamanders found in the Gypsum Creek drainage. Localities entitled Gypsum Creek could be located on mainstem Gypsum or on an unnamed area (tributary or isolated pool) of the Gypsum Creek drainage.

Species	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Ambystoma tigrinum	Larva	1	22-Jul-02	Dago Creek	12	582460	4793311
Ambystoma tigrinum	Adult	5	17-Jul-02	Dago Creek	12	582956	4792729
Ambystoma tigrinum	Adult	1	17-Jul-02	Dago Creek	12	582956	4792729
Ambystoma tigrinum	Larva	1	17-Jul-02	Dago Creek	12	582978	4792704
Ambystoma tigrinum	Larva	~150	17-Jul-02	Dago Creek	12	582916	4792813
Ambystoma tigrinum	Larva	1	22-Jul-02	Dago Creek	12	582951	4793446
Ambystoma tigrinum	Larva	1	22-Jul-02	Dago Creek	12	582951	4793446
Ambystoma tigrinum	Larva	1	22-Jul-02	Dago Creek	12	582951	4793446
Ambystoma tigrinum	Larva	2	22-Jul-02	Dago Creek	12	582420	4793322
Ambystoma tigrinum	Larva	1	22-Jul-02	Dago Creek	12	582460	4793311
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589752	4795796
Ambystoma tigrinum	Adult	~3	09-Jul-02	Gypsum Creek	12	589752	4795796
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589752	4795796
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589171	4795544
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589171	4795544
Ambystoma tigrinum	Adult	2	09-Jul-02	Gypsum Creek	12	589361	4796073
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589361	4796073
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589361	4796073
Ambystoma tigrinum	Adult	1	09-Jul-02	Gypsum Creek	12	589361	4796073
Ambystoma tigrinum	Adult	13	11-Jul-02	Gypsum Creek	12	584659	4792975
Ambystoma tigrinum	Adult	1	11-Jul-02	Gypsum Creek	12	584659	4792975
Ambystoma tigrinum	Adult	1	29-Jul-02	Gypsum Creek	12	581651	4793155
Ambystoma tigrinum	Adult	2	23-Jul-02	Gypsum Creek	12	583737	4792740
Ambystoma tigrinum	Egg-mass	1	23-Jul-02	Gypsum Creek	12	583737	4792740
Ambystoma tigrinum	Larva	80	29-Jul-02	Gypsum Creek	12	589025	4796516
Ambystoma tigrinum	Larva	~225	09-Jul-02	Gypsum Creek	12	589171	4795544
Ambystoma tigrinum	Larva	1	09-Jul-02	Gypsum Creek	12	589171	4795544
Ambystoma tigrinum	Larva	1	09-Jul-02	Gypsum Creek	12	589824	4795957

Species	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
Ambystoma tigrinum	Larva	1	09-Jul-02	Gypsum Creek	12	589824	4795957
Ambystoma tigrinum	Larva	10	11-Jul-02	Gypsum Creek	12	584659	4792975
Ambystoma tigrinum	Larva	~40	24-Jul-02	Gypsum Creek	12	584147	4793318
Ambystoma tigrinum	Larva	2	24-Jul-02	Gypsum Creek	12	586266	4793921
Ambystoma tigrinum	Larva	~15	25-Jul-02	Gypsum Creek	12	585738	4789416
Ambystoma tigrinum	Larva	1	25-Jul-02	Gypsum Creek	12	585738	4789416
Ambystoma tigrinum	Larva	1	29-Jul-02	Gypsum Creek	12	582331	4790059
Ambystoma tigrinum	Larva	9	29-Jul-02	Gypsum Creek	12	582331	4790059
Ambystoma tigrinum	Larva	150	29-Jul-02	Gypsum Creek	12	581651	4793155
Ambystoma tigrinum	Larva	5	29-Jul-02	Gypsum Creek	12	581608	4793013
Ambystoma tigrinum	Larva	9	29-Jul-02	Gypsum Creek	12	584506	4794608
Ambystoma tigrinum	Larva	~150	23-Jul-02	Gypsum Creek	12	583662	4792372
Ambystoma tigrinum	Larva	~400	23-Jul-02	Gypsum Creek	12	583690	4792231
Ambystoma tigrinum	Larva	1	26-Jul-02	Gypsum Creek	12	586062	4793790
Ambystoma tigrinum	Larva	1	26-Jul-02	Gypsum Creek	12	586073	4793790
Ambystoma tigrinum	Larva	15	26-Jul-02	Gypsum Creek	12	586073	4793790
Ambystoma tigrinum	Larva	1	26-Jul-02	Gypsum Creek	12	586073	4793790
Ambystoma tigrinum	Larva	1	23-Jul-02	Gypsum Creek	12	583691	4792959
Ambystoma tigrinum	Larva	3	23-Jul-02	Gypsum Creek	12	583379	4793430

Appendix I. UTM locations (NAD27) for all Columbia Spotted Frogs found in the Gypsum Creek drainage. Localities entitled Gypsum Creek could be located on mainstem Gypsum or on an unnamed area (tributary or isolated pool) of the Gypsum Creek drainage.

Species		Count	Date	Sub-drainage	UTM Zone	Easting	Northing
Rana luteiventris	Adult	1	11-Jul-02	Gypsum Creek	12	585058	4794611
Rana luteiventris	Adult	1	11-Jul-02	Gypsum Creek	12	585086	4794616
Rana luteiventris	Adult	1	11-Jul-02	Gypsum Creek	12	584659	4792975
Rana luteiventris	Adult	1	24-Jul-02	Gypsum Creek	12	584041	4791480
Rana luteiventris	Adult	1	24-Jul-02	Gypsum Creek	12	586290	4794002
Rana luteiventris	Adult	3	24-Jul-02	Gypsum Creek	12	586324	4793974
Rana luteiventris	Adult	1	24-Jul-02	Gypsum Creek	12	586358	4793940
Rana luteiventris	Adult	1	16-Jul-02	Gypsum Creek	12	584103	4791395
Rana luteiventris	Adult	1	22-Jul-02	Gypsum Creek	12	583905	4792704
Rana luteiventris	Adult	1	22-Jul-02	Gypsum Creek	12	583873	4792723
Rana luteiventris	Adult	1	23-Jul-02	Gypsum Creek	12	583693	4791823
Rana luteiventris	Adult	1	24-Jul-02	Gypsum Creek	12	586543	4794024
Rana luteiventris	Adult	1	24-Jul-02	Gypsum Creek	12	586543	4794024
Rana luteiventris	Adult	1	24-Jul-02	Gypsum Creek	12	586543	4794024
Rana luteiventris	Adult	1	23-Jul-02	Gypsum Creek	12	583731	4792724
Rana luteiventris	Juvenile	1	15-Jul-02	Gypsum Creek	12	584301	4791896
Rana luteiventris	Juvenile	1	22-Jul-02	Gypsum Creek	12	583973	4792533
Rana luteiventris	Juvenile	1	22-Jul-02	Gypsum Creek	12	583838	4792755
Rana luteiventris	Tadpole	1	24-Jul-02	Gypsum Creek	12	584024	4791455
Rana luteiventris	Tadpole	1	24-Jul-02	Gypsum Creek	12	584024	4791455
Rana luteiventris	Tadpole	2	23-Jul-02	Gypsum Creek	12	584028	4791437
Rana luteiventris	Tadpole	20	23-Jul-02	Gypsum Creek	12	584028	4791437

Appendix J. UTM locations (NAD27) for all Boreal Toads found in the Cottonwood Creeks drainage. Localities entitled Cottonwood Creek could be located on mainstem North or South Cottonwood Creek or on an unnamed area (tributary or isolated pool) of the Cottonwood Creek drainages.

Scientific Name	Stage	Number	Date	Sub-drainage	Zone	Easting	Northing
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544506	4741893
Bufo boreas boreas	Adult	2	06-Sep-02	Little Maki Creek	12	544474	4741934
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544473	4741928
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544473	4741928
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544473	4741928
Bufo boreas boreas	Adult	2	06-Sep-02	Little Maki Creek	12	544493	4741924
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544479	4741890
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544479	4741890
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544506	4741893
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544528	4741843
Bufo boreas boreas	Adult	1	06-Sep-02	Little Maki Creek	12	544537	4741849
Bufo boreas boreas	Adult	1	07-Aug-02	North Cottonwood Creek	12	538330	4741689
Bufo boreas boreas	Adult	1	07-Aug-02	North Cottonwood Creek	12	538687	4741304
Bufo boreas boreas	Adult	1	21-Aug-02	South Cottonwood Creek	12	536245	4733788
Bufo boreas boreas	Adult	1	21-Aug-02	South Cottonwood Creek	12	537568	4734403
Bufo boreas boreas	Adult	1	21-Aug-02	South Cottonwood Creek	12	538005	4734587
Bufo boreas boreas	Adult	1	21-Aug-02	South Cottonwood Creek	12	538516	4734418
Bufo boreas boreas	Adult	1	22-Aug-02	South Cottonwood Creek	12	541576	4735519
Bufo boreas boreas	Adult	1	04-Sep-02	Trailer Creek	12	536810	4733323
Bufo boreas boreas	Adult	1	14-Aug-02	West Soda Lake	12	537940	4733944
Bufo boreas boreas	Egg-mass	1	29-May-02	Soda Lake	12	538379	4734345
Bufo boreas boreas	Juvenile	1	14-Aug-02	Soda Lake	12	538226	4734075
Bufo boreas boreas	Juvenile	1	14-Aug-02	Soda Lake	12	538170	4734106
Bufo boreas boreas	Juvenile	1	14-Aug-02	Soda Lake	12	538170	4734106
Bufo boreas boreas	Juvenile	1	14-Aug-02	West Soda Lake	12	537940	4733944
Bufo boreas boreas	Tadpole	~200	21-Aug-02	South Cottonwood Creek	12	537166	4733934
Bufo boreas boreas	Adult	1	06-Aug-02	Hardin Creek	12	537240	4739602

Appendix K. UTM locations (NAD27) for all Boreal Chorus Frogs found in the Cottonwood Creeks drainage. Localities entitled Cottonwood Creek could be located on mainstem North or South Cottonwood Creek or on an unnamed area (tributary or isolated pool) in the Cottonwood Creek drainages.

Scientific Name	Stage	Count	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Adult	1	30-Aug-02	Bare Creek	12	539819	4729865
<i>Pseudacris maculata</i>	Adult	4	06-Aug-02	Hardin Creek	12	536843	4741968
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	536190	4743074
<i>Pseudacris maculata</i>	Adult	2	07-Aug-02	North Cottonwood Creek	12	536384	4743025
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	536384	4743025
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	536527	4742958
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	536940	4742804
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	537607	4742169
<i>Pseudacris maculata</i>	Adult	1	06-Aug-02	North Cottonwood Creek	12	535996	4743118
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535503	4743933
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535574	4743861
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535671	4743796
<i>Pseudacris maculata</i>	Adult	3	07-Aug-02	North Cottonwood Creek	12	535703	4743776
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535642	4743679
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535617	4743622
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535558	4743509
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535658	4743279
<i>Pseudacris maculata</i>	Adult	3	07-Aug-02	North Cottonwood Creek	12	535679	4743249
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535679	4743249
<i>Pseudacris maculata</i>	Adult	1	07-Aug-02	North Cottonwood Creek	12	535780	4743188
<i>Pseudacris maculata</i>	Adult	1	13-Aug-02	North Cottonwood Creek	12	536112	4745041
<i>Pseudacris maculata</i>	Adult	2	13-Aug-02	North Cottonwood Creek	12	536248	4744872
<i>Pseudacris maculata</i>	Adult	1	14-Aug-02	North Soda Lake	12	538182	4734316
<i>Pseudacris maculata</i>	Adult	1	12-Aug-02	Nylander Creek	12	538478	4743295
<i>Pseudacris maculata</i>	Adult	1	12-Aug-02	Nylander Creek	12	0	0
<i>Pseudacris maculata</i>	Adult	1	12-Aug-02	Nylander Creek	12	0	0
<i>Pseudacris maculata</i>	Adult	1	13-Aug-02	Sjhoberg Creek	12	536496	4745225
<i>Pseudacris maculata</i>	Adult	1	13-Aug-02	Sjhoberg Creek	12	536496	4745225
<i>Pseudacris maculata</i>	Adult	1	13-Aug-02	Sjhoberg Creek	12	536496	4745225

Scientific Name	Stage	Count	Date	Sub-drainage	UTM Zone	Easting	Northing
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536390	4745306
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536350	4745081
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536492	4744769
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536257	4744881
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536257	4744881
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536088	4744172
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536088	4744172
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536032	4744236
Pseudacris maculata	Adult	5	14-Aug-02	Sjhoberg Creek	12	536032	4744236
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536209	4744199
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536271	4744301
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536199	4744319
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	536199	4744319
Pseudacris maculata	Adult	2	14-Aug-02	Sjhoberg Creek	12	536203	4744486
Pseudacris maculata	Adult	3	14-Aug-02	Sjhoberg Creek	12	536121	4744514
Pseudacris maculata	Adult	3	14-Aug-02	Sjhoberg Creek	12	536095	4744570
Pseudacris maculata	Adult	1	14-Aug-02	Sjhoberg Creek	12	535983	4744790
Pseudacris maculata	Adult	2	14-Aug-02	Sjhoberg Creek	12	535630	4744448
Pseudacris maculata	Adult	2	13-Aug-02	Sjhoberg Creek	12	536342	4745325
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536389	4745300
Pseudacris maculata	Adult	1	13-Aug-02	Sjhoberg Creek	12	536434	4745267
Pseudacris maculata	Adult	2	13-Aug-02	Sjhoberg Creek	12	536434	4745267
Pseudacris maculata	Adult	6	05-Sep-02	South Cottonwood Creek	12	539041	4733398
Pseudacris maculata	Adult	1	06-Sep-02	South Cottonwood Creek	12	539238	4733508
Pseudacris maculata	Adult	1	06-Sep-02	South Cottonwood Creek	12	539127	4733629
Pseudacris maculata	Adult	1	04-Sep-02	Trailer Creek	12	537643	4733978
Pseudacris maculata	Adult	1	09-Aug-02	Upper Nylander	12	538557	4743574
Pseudacris maculata	Adult	2	14-Aug-02	West Soda Lake	12	537921	4734258
Pseudacris maculata	Juvenile	4	07-Aug-02	North Cottonwood Creek	12	536384	4743025
Pseudacris maculata	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	536384	4743025
Pseudacris maculata	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	536473	4742997
Pseudacris maculata	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	536492	4742986
Pseudacris maculata	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	538193	4741792

Scientific Name	Stage	Count	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	538422	4741803
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535503	4743933
<i>Pseudacris maculata</i>	Juvenile	3	07-Aug-02	North Cottonwood Creek	12	535574	4743861
<i>Pseudacris maculata</i>	Juvenile	3	07-Aug-02	North Cottonwood Creek	12	535671	4743796
<i>Pseudacris maculata</i>	Juvenile	4	07-Aug-02	North Cottonwood Creek	12	535703	4743776
<i>Pseudacris maculata</i>	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	535703	4743776
<i>Pseudacris maculata</i>	Juvenile	10	07-Aug-02	North Cottonwood Creek	12	535703	4743776
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535689	4743737
<i>Pseudacris maculata</i>	Juvenile	14	07-Aug-02	North Cottonwood Creek	12	535689	4743737
<i>Pseudacris maculata</i>	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	535689	4743737
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535642	4743679
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535605	4743626
<i>Pseudacris maculata</i>	Juvenile	3	07-Aug-02	North Cottonwood Creek	12	535580	4743607
<i>Pseudacris maculata</i>	Juvenile	8	07-Aug-02	North Cottonwood Creek	12	535586	4743509
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535595	4743502
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535595	4743502
<i>Pseudacris maculata</i>	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	535615	4743420
<i>Pseudacris maculata</i>	Juvenile	5	07-Aug-02	North Cottonwood Creek	12	535607	4743403
<i>Pseudacris maculata</i>	Juvenile	2	07-Aug-02	North Cottonwood Creek	12	535629	4743349
<i>Pseudacris maculata</i>	Juvenile	16	07-Aug-02	North Cottonwood Creek	12	535658	4743279
<i>Pseudacris maculata</i>	Juvenile	7	07-Aug-02	North Cottonwood Creek	12	535679	4743249
<i>Pseudacris maculata</i>	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	535757	4743178
<i>Pseudacris maculata</i>	Juvenile	3	07-Aug-02	North Cottonwood Creek	12	535808	4743170
<i>Pseudacris maculata</i>	Juvenile	5	07-Aug-02	North Cottonwood Creek	12	538475	4741713
<i>Pseudacris maculata</i>	Juvenile	3	07-Aug-02	North Cottonwood Creek	12	538475	4741713
<i>Pseudacris maculata</i>	Juvenile	3	07-Aug-02	North Cottonwood Creek	12	538459	4741751
<i>Pseudacris maculata</i>	Juvenile	8	07-Aug-02	North Cottonwood Creek	12	538459	4741751
<i>Pseudacris maculata</i>	Juvenile	15	07-Aug-02	North Cottonwood Creek	12	538462	4741766
<i>Pseudacris maculata</i>	Juvenile	1	07-Aug-02	North Cottonwood Creek	12	538462	4741766
<i>Pseudacris maculata</i>	Juvenile	8	13-Aug-02	North Cottonwood Creek	12	536255	4745237
<i>Pseudacris maculata</i>	Juvenile	12	13-Aug-02	North Cottonwood Creek	12	536202	4745332
<i>Pseudacris maculata</i>	Juvenile	2	13-Aug-02	North Cottonwood Creek	12	536112	4745041
<i>Pseudacris maculata</i>	Juvenile	1	12-Aug-02	Nylander Creek	12	538554	4743533

Scientific Name	Stage	Count	Date	Sub-drainage	UTM Zone	Easting	Northing
Pseudacris maculata	Juvenile	1	12-Aug-02	Nylander Creek	12	538533	4743515
Pseudacris maculata	Juvenile	1	12-Aug-02	Nylander Creek	12	538526	4743492
Pseudacris maculata	Juvenile	6	12-Aug-02	Nylander Creek	12	538541	4743479
Pseudacris maculata	Juvenile	4	12-Aug-02	Nylander Creek	12	538483	4743381
Pseudacris maculata	Juvenile	18	12-Aug-02	Nylander Creek	12	538478	4743295
Pseudacris maculata	Juvenile	1	12-Aug-02	Nylander Creek	12	538452	4743293
Pseudacris maculata	Juvenile	3	12-Aug-02	Nylander Creek	12	538437	4743284
Pseudacris maculata	Juvenile	1	12-Aug-02	Nylander Creek	12	538402	4743232
Pseudacris maculata	Juvenile	2	14-Aug-02	Sjhoberg Creek	12	536032	4744236
Pseudacris maculata	Juvenile	18	14-Aug-02	Sjhoberg Creek	12	536032	4744236
Pseudacris maculata	Juvenile	1	14-Aug-02	Sjhoberg Creek	12	536203	4744486
Pseudacris maculata	Juvenile	1	14-Aug-02	Sjhoberg Creek	12	536121	4744514
Pseudacris maculata	Juvenile	1	14-Aug-02	Sjhoberg Creek	12	536112	4744532
Pseudacris maculata	Juvenile	1	14-Aug-02	Sjhoberg Creek	12	536095	4744570
Pseudacris maculata	Juvenile	1	14-Aug-02	Sjhoberg Creek	12	536020	4744688
Pseudacris maculata	Juvenile	4	14-Aug-02	Sjhoberg Creek	12	535630	4744448
Pseudacris maculata	Juvenile	1	13-Aug-02	Sjhoberg Creek	12	536236	4745527
Pseudacris maculata	Juvenile	1	13-Aug-02	Sjhoberg Creek	12	536236	4745527
Pseudacris maculata	Juvenile	1	13-Aug-02	Sjhoberg Creek	12	536236	4745527
Pseudacris maculata	Juvenile	49	13-Aug-02	Sjhoberg Creek	12	536236	4745527
Pseudacris maculata	Juvenile	14	13-Aug-02	Sjhoberg Creek	12	536237	4745527
Pseudacris maculata	Juvenile	1	05-Sep-02	South Cottonwood Creek	12	539041	4733398
Pseudacris maculata	Juvenile	1	05-Sep-02	South Cottonwood Creek	12	539041	4733398
Pseudacris maculata	Juvenile	1	05-Sep-02	South Cottonwood Creek	12	539041	4733398
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539052	4733558
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539238	4733508
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539238	4733508
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539238	4733508
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539238	4733508
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539238	4733508
Pseudacris maculata	Juvenile	8	06-Sep-02	South Cottonwood Creek	12	539127	4733629
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539675	4733853
Pseudacris maculata	Juvenile	1	06-Sep-02	South Cottonwood Creek	12	539439	4733886

Scientific Name	Stage	Count	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Juvenile	1	09-Aug-02	Upper Nylander	12	538611	4743749
<i>Pseudacris maculata</i>	Juvenile	7	09-Aug-02	Upper Nylander	12	538614	4743717
<i>Pseudacris maculata</i>	Juvenile	2	09-Aug-02	Upper Nylander	12	538592	4743704
<i>Pseudacris maculata</i>	Juvenile	1	09-Aug-02	Upper Nylander	12	538586	4743699
<i>Pseudacris maculata</i>	Juvenile	2	09-Aug-02	Upper Nylander	12	538584	4743659
<i>Pseudacris maculata</i>	Juvenile	8	09-Aug-02	Upper Nylander	12	538557	4743574
<i>Pseudacris maculata</i>	Metamorph	1	06-Aug-02	Hardin Creek	12	536843	4741968
<i>Pseudacris maculata</i>	Metamorph	2	06-Aug-02	Hardin Creek	12	536843	4741968
<i>Pseudacris maculata</i>	Metamorph	2	06-Aug-02	Hardin Creek	12	536843	4741968
<i>Pseudacris maculata</i>	Metamorph	8	06-Aug-02	Hardin Creek	12	536843	4741968
<i>Pseudacris maculata</i>	Metamorph	1	06-Aug-02	Hardin Creek	12	536843	4741968
<i>Pseudacris maculata</i>	Metamorph	~200	06-Aug-02	Hardin Creek	12	536843	4741967
<i>Pseudacris maculata</i>	Metamorph	1	07-Aug-02	North Cottonwood Creek	12	538422	4741803
<i>Pseudacris maculata</i>	Metamorph	4	07-Aug-02	North Cottonwood Creek	12	538422	4741803
<i>Pseudacris maculata</i>	Metamorph	11	07-Aug-02	North Cottonwood Creek	12	538462	4741766
<i>Pseudacris maculata</i>	Metamorph	1	07-Aug-02	North Cottonwood Creek	12	538462	4741766
<i>Pseudacris maculata</i>	Metamorph	1	07-Aug-02	North Cottonwood Creek	12	538462	4741766
<i>Pseudacris maculata</i>	Metamorph	1	13-Aug-02	North Cottonwood Creek	12	536202	4745332
<i>Pseudacris maculata</i>	Metamorph	1	13-Aug-02	North Cottonwood Creek	12	536112	4745041
<i>Pseudacris maculata</i>	Metamorph	30	13-Aug-02	North Cottonwood Creek	12	536248	4744872
<i>Pseudacris maculata</i>	Metamorph	15	13-Aug-02	Sjhoberg Creek	12	536477	4744682
<i>Pseudacris maculata</i>	Metamorph	18	13-Aug-02	Sjhoberg Creek	12	536257	4744881
<i>Pseudacris maculata</i>	Metamorph	17	13-Aug-02	Sjhoberg Creek	12	536257	4744881
<i>Pseudacris maculata</i>	Metamorph	45	13-Aug-02	Sjhoberg Creek	12	536100	4744915
<i>Pseudacris maculata</i>	Metamorph	57	13-Aug-02	Sjhoberg Creek	12	536040	4744886
<i>Pseudacris maculata</i>	Metamorph	2	14-Aug-02	Sjhoberg Creek	12	536203	4744486
<i>Pseudacris maculata</i>	Metamorph	2	14-Aug-02	Sjhoberg Creek	12	536121	4744514
<i>Pseudacris maculata</i>	Metamorph	1	14-Aug-02	Sjhoberg Creek	12	536112	4744532
<i>Pseudacris maculata</i>	Metamorph	32	14-Aug-02	Sjhoberg Creek	12	536095	4744570
<i>Pseudacris maculata</i>	Metamorph	2	14-Aug-02	Sjhoberg Creek	12	536057	4744636
<i>Pseudacris maculata</i>	Metamorph	24	14-Aug-02	Sjhoberg Creek	12	536020	4744688
<i>Pseudacris maculata</i>	Metamorph	6	14-Aug-02	Sjhoberg Creek	12	536001	4744715
<i>Pseudacris maculata</i>	Metamorph	5	14-Aug-02	Sjhoberg Creek	12	535991	4744741

Scientific Name	Stage	Count	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Pseudacris maculata</i>	Metamorph	144	14-Aug-02	Sjhoberg Creek	12	535983	4744790
<i>Pseudacris maculata</i>	Metamorph	6	14-Aug-02	Sjhoberg Creek	12	535856	4744824
<i>Pseudacris maculata</i>	Metamorph	1	13-Aug-02	Sjhoberg Creek	12	536363	4745095
<i>Pseudacris maculata</i>	Metamorph	25	13-Aug-02	Sjhoberg Creek	12	536363	4745095
<i>Pseudacris maculata</i>	Metamorph	4	05-Sep-02	South Cottonwood Creek	12	538839	4733561
<i>Pseudacris maculata</i>	Metamorph	34	05-Sep-02	South Cottonwood Creek	12	539041	4733398
<i>Pseudacris maculata</i>	Metamorph	1	06-Sep-02	South Cottonwood Creek	12	539052	4733558
<i>Pseudacris maculata</i>	Metamorph	1	21-Aug-02	South Cottonwood Creek	12	536779	4733909
<i>Pseudacris maculata</i>	Metamorph	3	21-Aug-02	South Cottonwood Creek	12	536779	4733909
<i>Pseudacris maculata</i>	Metamorph	12	04-Sep-02	Trailer Creek	12	537643	4733978
<i>Pseudacris maculata</i>	Tadpole	10	07-Aug-02	North Cottonwood Creek	12	538422	4741803
<i>Pseudacris maculata</i>	Tadpole	50	07-Aug-02	North Cottonwood Creek	12	538462	4741766
<i>Pseudacris maculata</i>	Tadpole	3	13-Aug-02	North Cottonwood Creek	12	536202	4745332
<i>Pseudacris maculata</i>	Tadpole	~100	21-Aug-02	South Cottonwood Creek	12	536779	4733909
<i>Pseudacris maculata</i>	Unknown	23	05-Sep-02	South Cottonwood Creek	12	539041	4733398
<i>Pseudacris maculata</i>	Unknown	1	05-Sep-02	South Cottonwood Creek	12	539041	4733398
<i>Pseudacris maculata</i>	Unknown	1	21-Aug-02	South Cottonwood Creek	12	537435	4734268
<i>Pseudacris maculata</i>	Unknown	2	04-Sep-02	Trailer Creek	12	537643	4733978

Appendix L. UTM locations (NAD27) for all Tiger Salamanders found in the Cottonwood Creeks drainage. Localities entitled Cottonwood Creek could be located on mainstem North or South Cottonwood Creek or on an unnamed area (tributary or isolated pool) in the Cottonwood Creek drainages.

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Ambystoma tigrinum</i>	Adult	1	06-Aug-02	Hardin Creek	12	536903	4741963
<i>Ambystoma tigrinum</i>	Adult	1	13-Aug-02	Sjhoberg Creek	12	536492	4744769
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	Sjhoberg Creek	12	536350	4745081
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	Sjhoberg Creek	12	536350	4745081
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	Sjhoberg Creek	12	536350	4745081
<i>Ambystoma tigrinum</i>	Larva	18	13-Aug-02	Sjhoberg Creek	12	536350	4745081
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	Sjhoberg Creek	12	536477	4744682
<i>Ambystoma tigrinum</i>	Larva	21	13-Aug-02	Sjhoberg Creek	12	536477	4744682
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	Sjhoberg Creek	12	536477	4744682
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	Sjhoberg Creek	12	536477	4744682
<i>Ambystoma tigrinum</i>	Larva	13	13-Aug-02	Sjhoberg Creek	12	536477	4744682
<i>Ambystoma tigrinum</i>	Larva	10	13-Aug-02	Sjhoberg Creek	12	536257	4744881
<i>Ambystoma tigrinum</i>	Larva	11	13-Aug-02	Sjhoberg Creek	12	536100	4744915
<i>Ambystoma tigrinum</i>	Larva	16	13-Aug-02	Sjhoberg Creek	12	536040	4744886
<i>Ambystoma tigrinum</i>	Larva	51	14-Aug-02	Sjhoberg Creek	12	535630	4744448
<i>Ambystoma tigrinum</i>	Larva	20	13-Aug-02	Sjhoberg Creek	12	536363	4745095
<i>Ambystoma tigrinum</i>	Larva	207	13-Aug-02	North Cottonwood Creek	12	536202	4745332
<i>Ambystoma tigrinum</i>	Larva	10	13-Aug-02	North Cottonwood Creek	12	536202	4745332
<i>Ambystoma tigrinum</i>	Larva	1	13-Aug-02	North Cottonwood Creek	12	536202	4745332
<i>Ambystoma tigrinum</i>	Larva	20	13-Aug-02	North Cottonwood Creek	12	536248	4744872
<i>Ambystoma tigrinum</i>	Larva	15	13-Aug-02	Sjhoberg Creek	12	536363	4745095
<i>Ambystoma tigrinum</i>	Larva	1	06-Sep-02	South Cottonwood Creek	12	539052	4733558
<i>Ambystoma tigrinum</i>	Larva	1	06-Sep-02	South Cottonwood Creek	12	539052	4733558
<i>Ambystoma tigrinum</i>	Larva	1	06-Sep-02	South Cottonwood Creek	12	539052	4733558
<i>Ambystoma tigrinum</i>	Larva	22	06-Sep-02	South Cottonwood Creek	12	539052	4733558
<i>Ambystoma tigrinum</i>	Larva	1	06-Sep-02	South Cottonwood Creek	12	539052	4733558

Appendix M. UTM locations (NAD27) for all Columbia Spotted Frogs found in the Cottonwood Creek drainages.

Scientific Name	Stage	Number	Date	Sub-drainage	UTM Zone	Easting	Northing
<i>Rana luteiventris</i>	Adult	1	12-Aug-02	Nylander Creek	12	538452	4743293
<i>Rana luteiventris</i>	Adult	1	09-Aug-02	Upper Nylander	12	538625	4743789
<i>Rana luteiventris</i>	Adult	2	09-Aug-02	Upper Nylander	12	538605	4743749
<i>Rana luteiventris</i>	Adult	1	09-Aug-02	Upper Nylander	12	538611	4743749
<i>Rana luteiventris</i>	Adult	1	09-Aug-02	Upper Nylander	12	538614	4743717
<i>Rana luteiventris</i>	Adult	1	09-Aug-02	Upper Nylander	12	538592	4743704
<i>Rana luteiventris</i>	Adult	1	09-Aug-02	Upper Nylander	12	538592	4743704
<i>Rana luteiventris</i>	Adult	2	09-Aug-02	Upper Nylander	12	538592	4743704
<i>Rana luteiventris</i>	Adult	1	09-Aug-02	Upper Nylander	12	538586	4743699