FIELD INVESTIGATIONS OF THE HERPETOLOGICAL TAXA IN SOUTHEAST ALASKA

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ABSTRACT

Herpetological investigations were conducted at 285 transects from 28 March through 31 September 1992 in southeast Alaska. Key museum collections were examined and a complete review of the state of Alaskan herpetological literature was undertaken. The 1992 vouchers were inventoried and analyzed from 1993 through 1995. Several thousand individual specimen observations of six amphibian species were tabulated. The six herpetological species encountered in 1992 were: rough-skinned newt (*Taricha granulosa*), western toad (*Bufo boreas*), long-toed salamander (*Ambystoma macrodactylum*), spotted frog (*Rana pretiosa*), wood frog (*R. sylvatica*), and Pacific chorus frog (*Pseudacris regilla*). In many cases combinations of these species were found to breed sympatrically (i.e., at the same location and concurrently over the period of observations). Special attempts to trap and/or observe various additional herpetological taxa were made but with negative results. The herpetological species which were specifically searched for but which were not encountered were: the Alaskan slender salamander (*Batrachoseps caudatus*), northwestern salamander (*Ambystoma gracile*), Pacific giant salamanders (genus *Dicamptodon*), tailed frog (*Ascaphus truei*), Siberian salamanders (genus *Hynobius*), garter snakes (*Thamnophis* spp.), and sea turtles (Families: Cheloniidae and Dermochelyidae). The presence of garter snakes in the state of Alaska could not be verified during this study though considerable effort was put forth to this end. No sea turtles were observed by boat or plane in many hours of observation throughout the Alexander Archipelago and the coastal waters of southeast Alaska. This report briefly describes the major salient results of the entire review effort but more specific data sets, though referred to here, remain to be fully analyzed due to lack of time and funding. A considerable number of new distributional records, life history observations and data concerning several undescribed subspecies in southeast Alaska are presented here for the first time.

During the study all herpetological specimens from Alaska in the Robert Parker Hodge collection, then in the Tongass Historical Society Museum, Ketchikan, Alaska (Hodge 1976), the National Marine Fisheries Service Auke Bay Fish Laboratory collection, Juneau, Alaska, and the James R. Slater Natural History Museum, University of Puget Sound, Tacoma, Washington, were re-identified, staged, measured, weighed, and assessed for condition. In addition, museum data on amphibian holdings originating in Alaska were obtained from the following institutions: UMMZ=University of Michigan, Museum of Zoology, Ann Arbor; USNM=United States National Museum, Washington DC; MVZ=Museum of Vertebrate Zoology, Berkeley, California; PSM=James R. Slater Natural History Museum, University of Puget Sound, Tacoma, Washington; THSM=Tongass Historical Society Museum, Ketchikan, Alaska; NMFS=National Marine Fisheries Service Fish Laboratory Collection, Auke Bay, Juneau, Alaska; CAS =California Academy of Sciences, San Francisco, California; UAF =University of Alaska, Fairbanks; and LACM=Los Angeles County Museum.

Herpetological field investigations were conducted during the 1992 field season from 28 March through 31 September. Several thousand individual amphibian specimen observations of six species were tabulated to field notes on file at the U.S. Fish & Wildlife Service (USFWS), Ecological Services Office, Juneau, Alaska. The six herpetological species encountered during field observations were: rough-skinned newt (*Taricha granulosa*), western toad (*Bufo boreas*), long-toed salamander (*Ambystoma macrodactylum*), spotted frog (*Rana pretiosa*), wood frog (*R. sylvatica*), and the Pacific chorus frog (*Pseudacris regilla*). Special attempts to trap and/or observe various additional herpetological taxa were made but with negative results. Species specially searched for but not encountered were: the Alaskan slender salamander (*Batrachoseps caudatus*), northwestern salamander (*Ambystoma gracile*), garter snakes (*Thamnophis* spp.), Pacific giant salamanders (genus: *Dicamptodon*), tailed frog (*Ascaphus truei*), Siberian salamanders (genus *Hynobius*) and sea turtles (Families: Cheloniidae and Dermochelyidae).

The subspecific taxonomy of all herpetological taxa encountered in the field and of the museum specimens examined was studied through the literature available, phenotypic evaluations of relevant variation characteristics specific to each species, comparisons of voucher collections, and in some cases genetic analysis by An-ming Tan, Museum of Vertebrate Zoology, University of California, Berkeley, for *T. granulosa* samples, and by David Parichy (University of California, Davis) for *A. macrodactylum* samples, sent to them during this study.

As a result of the ongoing taxonomic work, B. Norman is preparing to designate, describe or resurrect several new or heretofore neglected subspecific taxa from southeast Alaska. These new taxa may include: *Ambystoma macrodactylum hodgei*, new subspecies; *Ambystoma macrodactylum sokolofensis*, new subspecies; *Taricha granulosa insularae*, new subspecies; *Bufo boreas karlstromi*, new subspecies; *Rana pretiosa mitkofensis*, new subspecies; *Rana pretiosa stikinensis*, new subspecies; *Rana pretiosa vankensis*, new subspecies; and *Rana pretiosa* X *sylvatica*, new combination. Collections made during 1992 provide the first substantial opportunity for these taxonomic analyses to be conducted.

The phenology of five naturally occurring and one introduced species (*P. regilla*) was studied at 285 localities spanning 14 Townships and 15 Ranges of the Tongass National Forest and adjacent lands, including the Stikine-LeConte Wilderness Area and extensive areas of the Alexander Archipelago. A number of newly discovered populational demes of *Rana pretiosa*, are reported, along with five newly discovered *Rana sylvatica* demes.

Methods

The 1992 investigations were intended to augment work done by Waters during 1991 (Waters 1991a, 1991b, 1991c, 1992a, and 1992b) and independent investigation by B. Norman in 1991 (unpublished data). Nearly all of the general areas visited by Waters in 1991 were revisited in 1992 with the exceptions of Crittenton Creek, the Alpine Lakes of the Stikine Wilderness Area (Goat, Alpine, Government, and Andrews Lakes), Virginia Lake, and Paradise Creek. Only 16 of Water's original 1991 transects were positively identified by flagging and re-surveyed.

Transects were usually traversed on foot and an attempt was made to capture all herpetological specimens encountered except in cases where hundreds of larvae were encountered. When a specimen was captured it was immediately identified, sexed if possible, staged if immature using Gosner (1960), weighed to the nearest tenth of a gram using a Pesola spring scale, measured in millimeters (mm), examined for parasites, scars, and abnormalities such as fused or missing toes or deformities, and variational characters depending on the species being examined.

Adult ranid frogs were sexed using the size of the thumb, the presence of nuptial pads, overall size dimorphism, gravid state when apparent and/or position in amplexus when applicable. Determination of sex was verified by dissection in voucher specimens used for reproductive effort measures and/or taxonomic diet, and parasitic studies. Adult toads were sexed using nuptial pads on feet, overall size, presence of call, position in amplexus, gravid condition and/or dissection when applicable. Adult newts were easily sexed in the field by the appearance of the cloacal opening as illustrated by Twitty (1942) and Stebbins (1985) and by gravid condition, skin texture, and dissection when applicable. Long-toed salamanders were sexed using the appearance of the cloacal opening but sex was indeterminable in all but the most gravid females and only verifiable through dissection when appropriate.

At a number of the transects visited in 1992, permanent monitoring stations were setup and mark/recapture studies were initiated. Such permanent monitoring areas were established at Chief Shakes Hot Springs, Mallard Slough and Twin Lakes in the Stikine River Area; the Haugen Drive Area and Falls Creek Rockpit Area on Mitkof Island; at Highbush Lake and Pat's (=Trout) Lake on Wrangell Island; at Sites A and B of the Starfish Timber Sale Area on Etolin Island; and at the Ward Creek Pond System Site and Harriett Lake, Revillagigedo Island.

New distributional records for *B. boreas*, *R. pretiosa*, *R. sylvatica*, *R. pretiosa* X *sylvatica* intergrades, *T. granulosa*, and *A. macrodactylum* are reported. Information on diet, parasites, predators, mortality, ecology, and associated fauna and flora was documented for a number of the areas studied and many of these relationships for the first time.

Breeding sites of the western toad were studied at Big Level Island, Kuiu Island, and the Thomas Bay region of mainland southeast Alaska in 1991, Blind Slough on Mitkof Island in 1991 and 1992, Revillagigedo Island, Onslow Island, Chief Shakes Hot Springs area, Twin Lakes (=Figure Eight Lake), and on Etolin Island in 1992. Breeding sites of the long-toed salamander were studied on Sokolof Island and at the Cheliped Bay and Mallard Slough areas in 1992. Breeding sites of the spotted frog were studied on Mitkof Island in 1991 and 1992, at Chief Shakes Hot Springs, the Cheliped Bay and Mallard Slough areas, on Vank Island, and at Twin Lakes in 1992. Breeding sites of the rough-skinned newt were studied on Mitkof Island and Kuiu Island in 1991 and at two sites on Mitkof Island, two sites on Etolin Island, on Wrangell Island, Revillagigedo Island, Zarembo Island, the Twin Lakes area, and Chief Shakes Hot Springs in 1992.

At localities intended for long-term monitoring and recapture study sites, as well as at various other sites, water chemistry tests were conducted during and/or just immediately before or after transect surveys were conducted. The following water tests were commonly conducted: alkalinity and pH with AquaChek™ test strips, free and total chlorine with AquaLab™ II test strips, total hardness with AquaLab™ I test strips, specific gravity with a hydrometer, nitrate and nitrite with Dry-Tab™ kits, and air, substrate, and water temperature with hand-held Taylor thermometers. Data on water depth, weather conditions, time, date, and associated zoological and botanical taxa was also collected at most survey sites. In 1992, 285 transects were conducted in at least one of five ways depending on the survey conditions at each site (Appendix I). Transect types were: 1) submerged baited trap transects, 2) shoreline foot-traversed transects, 3) shoreline boat-traversed transects, 4) boat-traversed mid-water transects and 5) terrestrial patch transects. At selected localities a specific trapping regime (type 1 of above) was instigated and mark/recapture techniques were utilized when a long-term monitoring site was designated. Usually long-term monitoring sites were initiated where fairly large breeding congregations of amphibians were encountered or suspected.

Specialized bait was used based on observations of Henderson (1973) principally to determine the presence of aquatic salamanders and specifically the presence of the northwestern salamander (*A. gracile*) which is found terrestrially only rarely early during its breeding season (Hodge 1976; Nussbaum et al. 1983; Stebbins 1985) and which was considered a problematic species with regards to sampling techniques during the 1991 field work (Waters 1992a). Standard wire-mesh minnow traps were modified by enlargement of the openings on both sides of the trap so that even larger gravid salamanders (perhaps the size of neotenic giant salamanders of the genus *Dicamptodon*, not yet known to occur in Alaska but postulated as possible by Waters 1991a) could easily fit into trap openings. The edges of each funnelled wire opening were then bent inward and downward so that no sharp wire was protruding into the funnelled opening. This was meant to facilitate ease of access for salamanders and insure that the delicate epidermis of their ventral parts would not be injured upon a salamander's attempt to enter a trap opening.

Traps were deployed usually in water less than 30 cm in depth and partially exposed above the present water surface to allow for atmospheric respiration by captives when possible. At some sites deployment in deeper areas was necessary and every effort was made to check such traps within several hours to reduce the possibility of mortality. Each trap was either attached to a branch with a white nylon cord or a red and white fishing bobber was attached to the cord and left floating on the surface at the trap site to facilitate trap retrieval. Traps were baited with minced clam as Henderson (1973) demonstrated a feeding preference for mollusks in a Canadian population of *A. gracile*. One full can of bait was used in nearly every trap deployed to ensure maximum amount of liquid bait being dispersed at each trap site. Effort was taken to ensure that each can of bait was not spilled prior to deployment and that each can of bait was punctured using the same instrument and in a characteristic fashion throughout the study period.

Often selected specimens were studied in the laboratory and maintained in plastic or glass containers at room temperature or under refrigeration to document larval developmental rates, verify larval species indentifications, study parasitic or symbiotic relationships, breeding and egg-laying behaviors, and/or cannibalistic tendencies.

Vouchers were prepared in a variety of ways. Some vouchers were anesthetized with various concentrations of anhydrous clove-oil in water, fixed in 10% formalin and labeled in separate containers while specimens found dead in the field were simply fixed in strong formalin. Specimens intended for electrophoretic analysis were preserved directly in 90% ethanol or sent live.

Prey studies and analyses of reproductive status and internal parasites in the series available for study are presently underway on many of the vouchers and will be presented in upcoming reports specific to the various species, localities and/or topics involved. Stomach contents and specific organs were preserved in isopropyl and/or ethanol in separate vials and receive identical museum numbers with the specimens from which they come. In some cases, associated insect, mollusk or ichthylogical species were collected with certain vouchers and these were preserved in isopropyl, ethanol or formalin depending on their types and the intent of their future use.

Botanical samples were pressed and affixed to appropriate sheets of heavy paper and labeled as to the relationship they have with the various study areas. All vouchers including botanical and herpetological samples will be deposited in the aquatic collection of the University of Alaska Museum, Fairbanks, Alaska, with the exception of the specimens previously sent to California for genetic analysis. These are deposited at the Museum of Vertebrate Zoology, Berkeley, and the University of California, at Davis.

Access to the various sites was obtained using a variety of modes of transportation including: aluminum skiffs outfitted with outboard motors, single-engine aircraft, helicopter, Forest Service trucks and/or automobiles, and commercial flight aircraft. During extended field trips U.S. Forest Service (USFS) and Alaska Department of Fish and Game maintained cabins were utilized through cooperative agreements with these agencies. Additional office space, computer facilities, housing, first aid, bear safety, fixed-wing flight safety, helicopter safety, firearms training, small boat safety and handling training were provided by the USFS and USFWS.

At all important transect sites, breeding localities or at field specimen voucher locales, an extensive photographic record was made as baseline data to assist in future monitoring activities at such sites and to document the botanical and geophysical conditions. A photographic record of selected specimens was also developed and negatives, slides, and prints of transects and specimens are on file at the USFWS Ecological Services Office, Juneau, Alaska.

Results and Discussion

An extensive data set regarding all the herpetological taxa known to occur within the state of Alaska was produced and expanded over the last three years subsequent to the field work. The data set was expanded as vouchers were examined for dietary, parasitic, variational, and reproductive data and as literature reviews were conducted. This report summarizes only some of the basic findings of these ongoing efforts at this time. The known distributions and populational status of each of the six herpetological species encountered during the 1992 fieldwork has been extensively improved through this study. Individual papers are in preparation regarding these developments for each respective species studied. The Pacific chorus frog population brought to the attention of biologists in 1991 by Waters (1992a, 1992b) is a case in point. A manuscript regarding the distribution of this introduced species on Revillagigedo Island was completed (Waters, Hassler and Norman 1996; Appendix 2). A draft summary of the wood frog observations recorded by colleagues in the Wrangell-St. Elias National Park and Preserve was also developed (Appendix 3).

A large amount of data was collected on the most commonly encountered amphibian species of Alaska, namely the western toad, spotted frog, rough-skinned newt, and the long-toed salamander during the 1992 field work. New locality and new island records were documented for all of the last five listed species. Apparent hybrids of the spotted frog and wood frog (*Rana* *pretiosa* X *sylvatica*, new combination) were discovered on Little Dry Island/Farm Island, two adjacent Stikine River delta localities where both species occur sympatrically, the available breeding ponds consisting mainly of relatively small muskeg-like tidal flat pools with apparently no brackish content.

Amphibians were observed or trapped at 113 of the 285 transects in 1992 (Appendix 4). The spotted frog, wood frog, and the long-toed salamander were found to breed sympatrically in the Mallard Slough and Cheliped Bay areas just north of the Stikine River delta and at Binkleys Slough on Farm Island. The western toad, spotted frog, and rough-skinned newt were found to breed sympatrically at the Chief Shakes Hot Spring Area. The western toad and rough-skinned newt were found to breed sympatrically at two sites on Etolin Island in the Alexander Archipelago.

<u>Long-toed Salamander</u>: The known distribution of the long-toed salamander was expanded by the study in 1992 (Hodge 1976; Waters 1992a). New localities for this species were discovered at the Andrew Slough area of the Stikine River basin (the first record of the species south of the Stikine River in mainland Alaska). A previously unreported voucher of this species from the Taku River area in the NMFS Auke Bay Fish Collection, Juneau, Alaska, was examined. The first insular record of this species for Alaska was discovered during 1992 on Sokolof Island in the Alexander Archipelago's Vank Island Group when a breeding pond of the species was discovered. Long-toed salamanders were only observed at 13 transects and only at Andrew Slough, Cheliped Bay area, Farm Island, Mallard Slough, and Sokolof Island (Appendix 4). Of the areas, Andrew Slough, Cheliped Bay, Farm Island and Sokolof Island, were new localities.

The Sokolof Island record for the long-toed salamander constitutes the southernmost and westernmost record for the species in Alaska and the first known insular record for the species outside the state of Washington where the species is known to occur on Maury Island, Stretch Island, Bainbridge Island, and Whidbey Island (Brown and Slater 1939; Slater and Brown 1941) and outside of British Columbia where it occurs on Vancouver Island, (Carl 1942; Logier and Toner 1961; Green and Campbell 1984). A second new Alaskan insular record for this species was documented at Binkleys Slough, Farm Island in the Stikine Delta Island Group. It is one of a total of four new range extension records of the long-toed salamander as a result of this study. Previously this salamander had been reported from only two Alaskan localities, one at Twin Lakes in the Stikine River drainage (Hodge 1973, 1976), and at Mallard Slough (Waters 1991c, 1992a). Both of these are mainland southeast Alaska localities. Hodge (1976) seems to indicate a Taku River site as a literature record but his maps are too undetailed to be sure. Thus, the Taku River voucher examined (AB84-47) can be considered a range extension as well.

The one transformed specimen of *A. macrodactylum* from the Sokolof Island population available for study differs significantly in phenotype from those of two mainland populations (Mallard Slough area and Andrew Slough area) studied in 1992. The phenotype also differs from photographs in Hodge (1976) of another mainland *A. macrodactylum* population from the Twin Lakes area. In 1992, during extensive study not a single specimen of *A. macrodactylum* was captured during many hours of terrestrial and aquatic searches and trapping in the Twin Lakes area. Waters (1992a) also searched the Twin Lakes area in 1991 for this species with negative results and suggested that the population there may be extinct. The specimen from Sokolof Island differs in phenotype from another specimen examined (UAF 1993-10:#30) that was secured by Mr. Sam MacDonald of the University of Alaska Museum, Fairbanks; the specimen was from the newly discovered population occurring on Farm Island in the Stikine Delta Island Group. The Farm Island locality record for the long-toed salamander, which is at Binkleys Slough (T61S R62E Sect. 3), is reported here for the first time.

In contrast with Sokolof Island, Farm Island is barely separated from mainland Alaska near the mouth of the Stikine River by that river's North Arm which at low tide does not provide any barrier at all to the natural colonization of Farm Island by amphibians. The spotted frog, the wood frog, and western toad have all been confirmed for Farm Island. Sokolof Island is about 3.0 square miles, has been extensively logged previous to this study and is a member of the slightly more maritime Vank Island Group which includes, Vank, Fivemile, Leisnoi, Rynda, Greys, Kadin, and Sokolof islands. Kadin Island, Greys Island, and Rynda Island are at the interface between the two island groups, being at the periphery of the Koknuk Flats, and could be considered as members of both the Vank Island Group and the Stikine River Delta Island Group. These three islands (Kadin, Greys, and Rynda) would be predicted to have perhaps more herpetological diversity than the outer Vank Group islands given their proximity to the Stikine River corridor discussed by Waters (1992a) and Hodge (1976) while having perhaps less diversity than the Delta Group islands which are closely associated with the Koknuk Flats. The flats, at periods of low tide, are one of the more probable means of amphibian dispersal to all the islands in the immediate area.

Because the one metamorphosed specimen of *A. macrodactylum* from Sokolof Island is so distinctly unique in phenotype with respect to the other Alaskan vouchers available for study, in conjunction with the fact that its population of origin is essentially isolated from other mainland populations by several miles of saltwater, and given the facts that a visit to the island to secure additional material for study at this time is unlikely, and the forest resources of southeast Alaska are currently being altered and managed to a higher degree than ever before, we will propose that the Sokolof Island long-toed salamander population be recognized as a distinct subspecies, *A. m. sokolofensis*.

Hodge was the first to recognize the distinctively different phenotype of southeast Alaska mainland long-toed salamander populations (Hodge 1973) and he presented color photographs of the distinctive phenotype in his monograph of Alaskan herpetology (Hodge 1976). Up until the 1992 field work so few specimens existed of this species from Alaska that Hodge was hesitant to name the Alaskan populations as a distinct subspecies (Hodge 1973). In light of the larger series of specimens now available and in light of the distinct phenotypic differences easily visible to experienced workers in the field, the remoteness of the populations existing in Alaska at the northern periphery of the species' range, and the apparent restriction of this species to coastal areas where it occurs in Alaska, as opposed to inland habitat use in southern areas of its range, we will propose that the Alaska populations of *A. macrodactylum* exclusive of the Sokolof Island population, also be subsequently recognized as a distinct subspecies, *A. m. hodgei*.

Rough-skinned Newt: The known Alaskan distribution of the rough-skinned newt was expanded in 1992. New locations include Chief Shakes Hot Springs, Zarembo Island, Etolin Island, Wrangell Island (three new locations), Mitkof Island (three new locations), and Revillagigedo Island (three new locations). Rough-skinned newts were observed at 32 transects (Appendix 4) and tagged at Etolin, Mitkof, Revillagigedo, and Wrangell islands (Appendix 4).

Rough-skinned newts breed sympatrically with spotted frogs on Mitkof Island, with western toads on Etolin Island, and with western toads and Pacific chorus frogs on Revillagigedo Island. One breeding site was studied on Mitkof Island in 1991 and 1992. The newt was absent from Mallard Slough where spotted frogs, wood frogs, and long-toed salamanders breed sympatrically.

Rough-skinned newts were encountered at transects less in the Stikine River area than on islands. Some island populations exhibit unusual color patterns and genetic studies have shown that Alaskan populations differ from populations in California and Oregon (Tan 1993a; Tan and Wake 1993).

Spotted Frog: A number of newly discovered populational demes of the spotted frog were determined as a result of this study. Spotted frogs were found on 56 transects at the following areas: Andrew Slough, Mallard Slough, Cheliped Bay, Chief Shakes Hot Springs, Chief Shakes Hot Springs Slough, Twin Lakes, and Barnes Lake, all within the Stikine River area; on Vank Island of the Vank Island Group in the Alexander Archipelago (verifying their presence there as reported by Waters 1992a); on Mitkof Island in muskegs adjacent to Haugen Drive, the Airport, the City of Petersburg Reservoir, near the City of Petersburg Refuse Disposal site; and on Farm Island and Little Dry Island of the Stikine Delta Group.

Breeding activity of spotted frogs was confirmed or reported for all of the sites above with the exception of the Andrew Slough area and Little Dry Island. Large breeding concentrations of spotted frogs and/or eggs, larvae, and/or young-of-the-year transformed froglets were observed at Mallard Slough, Cheliped Bay, Barnes Lake, Twin Lakes, the thermally affected waters of small creeks at Chief Shakes Hot Springs, and the upper slough entering Chief Shakes Hot Springs area, the Haugen Drive study area Petersburg on Mitkof Island (as in 1991), at the Petersburg Reservoir and Refuse Disposal sites (new records), in muskegs adjacent to Petersburg Airport, the USFS Tongass National Forest Supervisor's Office in Petersburg, and a single gravid female was observed to excrete ova at the Vank Island site. Reports of frogs being seen were given to B. Norman but could not be confirmed by field work at: muskegs near Wrangell, Pat's Lake on Wrangell Island, Blind Slough on Mitkof Island, along the Powerline right-of-way on Mitkof Island, Fredrick Point on Mitkof Island, Prince of Wales Island, Kuiu Island, Onslow Island, the Bradfield Canal area, Zarembo Island, Haines, and Kupreanof Island.

Preserved vouchers of spotted frogs that represent unreported range extensions were examined by B. Norman from: the Taku River area (NMFS Auke Bay Fish Collection Numbers AB78-70, AB84-48) and Hyder on the Portland Canal (Hodge Collection Number 098, collected 4 August 1985, R.P. Hodge). The following localities where spotted frogs were observed in 1992 are considered extensions to the known published range of the spotted frog in southeast Alaska: Cheliped Bay tidal flats, Andrew Slough in the Stikine River drainage, Chief Shakes Hot Springs in the Stikine River area, Barnes Lake in the Stikine River area, Haugen Drive muskeg Petersburg, Petersburg Reservoir area, and Petersburg Refuse Disposal Site both on the northern end of Mitkof Island in the Alexander Archipelago. Hodge (1976) lists specimens from Petersburg but is not specific about individual demes.

Documented museum records of spotted frog that have not been reported in the literature have been obtained by B. Norman and these are from: Haines Junction and Aiyansh, Mt. Hoeft (5000 ft. elev.), 10 miles S of Aiyans (Royal B.C. Museum 0905.00 and 0912.00 respectively); Twin Glacier Area, Taku River Drainage (as mentioned above and Museum of Vertebrate Zoology, University of California Numbers 63360, 63364, 63365 collected August 1954); Hyder (as mentioned above); Vank Island, Alexander Archipelago (mentioned by Waters 1992a but as yet unpublished in the scientific literature, Aquatic Collection of the University of Alaska Museum, Fairbanks, Numbers 1992-7:AF15 & AF16).

Multiple mortalities of spotted frog were observed at Chief Shakes Hot Springs where adults were found that were crushed by skiffs of recreational users, and at small muskeg pools on northern Mitkof Island where obvious indications of pool use by Mallards *Anas platyrhynchos* was visible. Symbiotic algae, as previously observed in ambystomid salamander egg masses in Washington state and as observed in red-legged frog *Rana aurora* egg masses in northern California (Norman, pers. observ.) were observed in nearly every spotted frog egg mass seen in the wild during the 1992 Alaskan field work.

Fungal spoilage of spotted frog egg masses was observed on Mitkof Island and at Mallard Slough breeding sites in 1992. Spotted frogs were observed to be externally parasitized by leeches at Chief Shakes Hot Springs Slough. Internal worm parasites were observed in the dissected contents of spotted frog stomachs and intestines in 1991 and 1992 samples.

The Petersburg Reservoir deme was observed to exhibit a distinct phenotype with heavy dusky gray coloring ventrally which in some cases appears to obscure the usual pinkish to orange ventral coloration. A similar tendency was observed in a very limited sample of specimens from Andrew Slough.

Cannibalism by adult spotted frogs on larval and younger frogs was documented in confined laboratory containers and in live traps in the field at the Mallard Slough study area but the degree of impact this phenomenon has in natural populations is unknown.

Mark/recapture studies involving spotted frogs were initiated at one site at Barnes Lake, Chief Shakes Hot Springs (where spotted frogs were documented to breed sympatrically with the western toad in geothermally-warmed waters), at two sites at Mallard Slough, and four sites on northern Mitkof Island.

The historic record for spotted frogs on Sergief Island reported by Stebbins (1951) is of specimens collected in late August and early September in 1919 by H.S. Swarth and J. Dixon (Museum of Vertebrate Zoology, Berkeley, museum records). Apparently Waters (1991c, 1992a) was not able to confirm the presence of spotted frogs on Sergief Island in 1991 and we did not confirm the presence of spotted frogs on Sergief Island in 1992. Since the island records for 1919 are some of the oldest, if not the oldest known localities for this species in Alaska, the island should be surveyed extensively in future studies to determine if the spotted frog population is still extant on the island or if the population has become extinct.

Western Toad: In 1992, evidence of western toads breeding was observed at Twin Lakes (ova), Chief Shakes Hot Springs (ova and larvae), Mitkof Island (ova and calling males), Revillagigedo Island(ova and larvae), Etolin Island (amplexed pairs, calling males, ova and larvae at the Starfish Timber Sale area, and larvae at Kunk Lake), Onslow Island (larvae and metamorphosing toadlets), and Red Slough (transforming toadlets). In 1991, B. Norman (unpublished data) observed evidence of western toad reproduction at Big Level Island (larvae and transforming toadlets) in an artificial plastic-lined water basin near two large diesel storage tanks, on Kuiu Island(larvae and transforming toadlets) in a stream in a clear-cut area, on Mitkof Island (larvae and transforming toadlets at the Blind Slough pond), and in the Thomas Bay/Patterson River area on the mainland (transforming toadlets and larvae). The western toad was observed to have bred at a pond at Blind Slough on Mitkof Island both in 1991 and 1992 (B. Norman, pers. observation), but most of the 1992 eggs were spoiled by the time they were discovered. Toads metamorphosed there from larvae in July in 1991 but in 1992 very few, if any, larvae reached metamorphosis at that site.

Western toads were observed at 31 transects in 1992 at the following areas: Revillagigedo Island, Mitkof Island, Etolin Island, Onslow Island, Zarembo Island, Rynda Island, Shrubby Island, Little Dry Island, the Chief Shakes Hot Springs area, the Red Slough area, the Twin Lakes area, the Mallard Slough area, and Wrangell Island. They were observed on Kupreanof Island, Kuiu Island, Big Level Island, Thomas Bay/Patterson River area, and Mitkof Island by B.Norman in 1991 (unpublished data).

In 1992, one dead adult toad was found at Mallard Slough, three at Chief Shakes Hot Springs, and two at Revillagigedo Island. A small pile of toad bones from multiple specimens was found adjacent to a lake on Onslow Island.

The Revillagigedo Island sample, freshly killed near a breeding pond, consisted of at least one adult female with ova (present with the eviscerated skins) and was probably the result of predation by common ravens *Corvus corax* and/or American crows *C. brachyrhynchos* as described by Corn (1993) and Brothers (1994) respectively, as the remains appeared to be left in similar fashion. The Mallard Slough adult carcass was dehydrated and not preyed on as in the Revillagigedo Island specimens. Hodge (1976) reported that gulls *Larus* spp. prey on breeding toads and hang them on tree branches similar to how shrikes *Lanius* spp. have been known to impail lizards for later use. The Hot Springs specimens were apparently killed by thermal exhaustion and exhibited a slight fungus growth when found in the warmer portions of a small creek where living and spoiled ova of the western toad were also seen. Hundreds of transforming toadlets were seen in this area later in 1992. In 1991, several dead toads were found on Mitkof Island roads where they had been hit by traffic during rainy nights. Live toads were seen on roads during rainy nights on Revillagigedo Island and Wrangell Island in 1992.

At Site A, Etolin Island, where the phenology of a breeding congregation of western toads was studied over several months in 1992, a red-tailed hawk *Buteo jamaicensis* was seen to prey on and eviscerate two adult toads that were recently tagged and released with several others from the site. The hawk left the skin fairly intact as described for the *Corvus* predations and as seen at the Revillagigedo site in 1992 and in the vicinity of Mount St. Helens, Washington state during field work in 1988 through 1991 (B. Norman, pers. observations, unpublished data). The predator that caused the Mt. Saint Helens mortalities was not known.

Two specimens from Rynda and Shrubby islands respectively in the Alexander Archipelago, collected by Sam MacDonald of the University of Alaska Museum, Fairbanks, in 1992 and given to B. Norman, exhibit a distinctive phenotype with a very wide dorsal stripe bordered by very wide coffee-brown bands laterally, gray-colored warts and large paratoid glands. Since these specimens are from two proximate islands separated from the mainland by miles of saltwater and since their phenotypes are so distinctive, the populations they represent may require subspecific designation. In this case, the scientific name *B. boreas karlstromi*, new subspecies, will be proposed in honor of Dr. Ernest L. Karlstrom, Professor Emeritus of the University of Puget Sound, Tacoma, Washington, who has devoted much of his life to the study of toads in Alaska, Washington, and California (Karlstrom 1956, 1958, 1966).

At Site B, Etolin Island, where the western toad was found to breed sympatrically with the rough-skinned newt, about 10,000 ova were observed in late April 1992 and thousands of larvae were observed there in May 1992. At a later visit however, mallards *Anas platyrhynchos*, lesser yellowlegs *Tringa flavipes* and greater yellowlegs *Tringa melanolueca* were observed at the breeding site and only 11 larvae were observed from the entire perimeter of the breeding pond. At later visits no larvae were observed at the site indicating that bird predation had resulted in virtually no reproductive success for toads at the site in 1992. Odonata (dragonfly) and water beetle larvae probably also had a smaller predatory impact on the larval toad population at the site.

Parasitic intestinal worms were found to nearly clog the digestive tract of one emaciated sub-adult toad found on Kupreanof Island by B.Norman in 1991 (only voucher known for that year from the island). Flesh-eating fly larvae were found to inhabit wounds in two toad specimens from Kuiu Island (B. Norman, unpublished data). It is apparent that the western toad, apparently the most numerous and most commonly encountered amphibian in southeast Alaska, also has a number of natural enemies in the area.

Wood Frog: The wood frog, though the most widely distributed frog in the state of Alaska (Behler and King 1979; Stebbins 1985), is known from fewer validated records and sites in southeast Alaska than is the spotted frog. In 1992, wood frogs were observed on 30 transects at only Chief Shakes Hot Springs, on Farm Island, in the Cheliped Bay area, the Mallard Slough area, and on Little Dry Island. Sightings were reported to B. Norman from Prince of Wales Island in 1992. The wood frog reported from Petersburg, Mitkof Island by Hodge (1976, Specimen 038) was examined by B. Norman in 1992 and reidentified as a spotted frog, thus wood frogs are still not validated as occurring on Mitkof Island to date. No Taku River wood frog specimens were found in the NMFS Auke Bay Collection, so the presence of wood frogs in the Taku River area was not confirmed by this study. The Farm Island localities (Binkleys Slough ponds, and supra-tidal muskegs pools near Little Dry Island) and the Little Dry Island sites (near creek on north side of island and in supra-tidal muskeg pools on south side of island) all represent previously unreported expansions for this species' distribution in southeast Alaska. The Mallard Slough area and Hot Springs site have been previously reported (Hodge 1976; Waters 1992a).

During this study we have obtained museum records from throughout the state of Alaska but were only able to verify the identifications of wood frogs in three collections: 1) James R. Slater Museum of Natural History, University of Puget Sound, in Tacoma, Washington; 2) Hodge's Collection (1976), now housed with the NMFS Auke Bay Fish Lab Collection; and 3) the NMFS Auke Bay Fish Laboratory Collection, Juneau, Alaska. Wood frog specimens from the Museum of Vertebrate Zoology at Berkeley, California are from: Bethel, Camp Denali, Chicken, Chitina, College, Fairbanks, Spenard, Goose Lake near Anchorage, 12.7 miles north of Seward, 10 miles southeast of Kenai, Gulkan River Bridge, Gulkena Bridge at milepost 127 on the Richardson Highway, Haines Highway, Howling Dog Rock on the Porcupine River, Iliama Lake near Iliama, Junction of the Glenn and Richardson Highways, Junction of the Tasnunge and Copper Rivers, Livergood, Matanuska Valley, milepost 109 on the Sterling Highway near Kasilof, mile 11 on Haines Highway, mile 139 on Richardson Highway, mile 5.1 on Tok Turnoff, mile 68 Sterling Highway near Skiklak Lake, Sergief Island at Mouth of Stikine River, Naraskiak, near Campsite at Gulkana Airstrip, Rat Lake near College, Sinona Creek, Sleetmute, small lake 5 miles upstream from mouth of Bremmer [River?] along east side of river, Blueberry and Frog Hole Lakes near Spenard, Susitna River Basin in the Chalatna Lake area, Tazlina Trading Post 10 mile north of Copper Center on Highway 1, east branch of Tiane [River?], Tonsina River bridge 79.1 milepost from Valdez, Yakutat, 1 mile southwest of Gakona Lodge on Highway 3, 2 miles west of College, and Fairbanks Airport, all in Alaska.

Wood frog records for Alaska from the Royal British Columbia Museum are from Wasilla Lake and Chilkat River; for the University of Alaska Museum from Anaktuvuk Pass, confluence of the Amble and Kobuk Rivers, and Mallard Slough. For the NMFS Collection at Auke Bay, Juneau we have records from: Texas Creek of the Yukon River near Rampart, Yukon River mile 1 above Kirkman Creek, and 10 miles above mouth of Bremmer River, and Copper River basin. For the Hodge Collection stored at the Auke Bay Lab: Circle City, Homer, Reed Pond in College, Twin Lakes near Stikine River, Hot Springs near Stikine River, Anchorage, Petersburg, Fort Yukon, College, Fairbanks, Livengood, and Bethel. The Petersburg record as explained above was identified as a sub-adult spotted frog by B. Norman in 1992 when the entire Hodge Collection was re-examined, thus no valid record was found for wood frogs on Mitkof Island.

Wood frog records for the L.A. County Museum were from: Kenai Peninsula at Hidden Creek mile 3 North of Skilak lake, Ptarmigan Creek near Kenai Lake, Bettles at 66 degrees 54' north and 151 degrees 34' west, 50 miles northwest of Anchorage at the Susitria River, 5 miles northwest of Anchorage at the Deshka River, Carousel Lake in the Matanuska-Susitna Valley, Lake Beth in the

Matanuska-Susitna Valley, and Kenai Peninsula in the Kenai National Wildlife Refuge.

Wood frogs from the records of the U.S. National Museum of Natural History, Washington, D.C. were from: Nulato, Nushagak north of Lake Aleknagik, Lake Aleknagik, southern Alaska (Feb. 1885), Alaska (Aug. 1879), Fort Yukon (Aug. 1875), Fort Cosmos, Camp Davidson on the Yukon River, Dall River, Rampart, Eagle, Kuskokwim River near junction of McKinley Fork, North Fork of Kuskokwim River near Base of Mt. Sischoo, Tyonek in Cook Inlet area, Bonanza Creek, Palmer 3 miles northwest of Brazil Springs, 10 miles west of Fort Yukon, Beaver, 18 miles south of Tok on Slana-Tok Highway, Meadow Lake 3 miles south of Anchorage, Kenai Peninsula, Bettles Field, and Porcupine River.

Wood frogs from the records of the California Academy of Science Collection in San Francisco were from: mouth of the Yukon River, Iliama at Cook Inlet, Klutina River, Indian River, 18 miles west of Northway Junction on Alaskan Highway, Fox 11.5 miles northeast of Fairbanks, Galena Air Base on Yukon River, mile 140 on Richardson Highway, 3 miles southwest of Palmer on Glenn Highway, Goose Bay on Cook Inlet, Otter Lake 4 miles northeast of Anchorage, Otter Creek 5 miles northeast of Anchorage, Wasilla, milepost 150 on Richardson Highway, Spenard, 83 miles north of Tetlin on Taylor Highway, milepost 1260 on Alaskan Highway, Arctic Circle Hot Springs Road milepost 4 off Central milepost 128 Steese Highway, Earthquake Park in Anchorage, mile 11 on Haines Highway, north of Central along Steese Highway.

From the above and additional records from the University of Michigan collection not listed, it is apparent that very few validated records exist for the wood frog in southeast Alaska. It is reported in southeast Alaska now from Yakutat and Sergief Island(MVZ records), Twin Lakes, Mallard Slough, Chief Shakes Hot Springs (Hodge 1976), Dry Island and Chief Shakes Slough in the Stikine River area (Waters 1992a), and now it is known also from the Cheliped Bay area, Farm Island and Little Dry Island as a result of this study.

The historical 1919 Sergief Island population could not be validated during the 1991 or 1992 field work, as with the Sergief Island spotted frog records (Norman, pers. observation and Waters 1992a). The historical Twin Lakes area records of Hodge (1976) could not be validated during the 1992 field work nor by the 1991 studies (Waters 1992a, Norman, pers. observation and unpublished data). The Wrangell Island and Mitkof Island sightings reported by Waters (1992a) could not be confirmed during this study though extensive efforts were expended on these islands.

Wood frogs were observed calling and in amplexus, along with freshly laid ova clusters in supra-tidal pools on Farm Island in late April 1992. Calling males and freshly deposited ova clusters were observed at the Mallard Slough and Cheliped Bay study areas in late April. Ova were deposited in supra-tidal pools at the last two areas sympatrically with spotted frog ova and long-toed salamander ova. More mature larvae were studied over a period of months at the Mallard Slough area where they developed concurrently with spotted frog and long-toed salamander larvae.

Significant differences between spotted frog ova masses and wood frog ova masses were observed. Most wood frog ova masses lacked the symbiotic algal development so commonly encountered in the spotted frog masses. Wood frog masses were fewer in number and overall they were smaller in size than spotted frog ova masses. Wood frog ova masses were usually observed as exhibiting less overall mass adherence, between individual ova and less adherence to vegetation. Wood frogs called at cooler times of the morning, at dusk, and after dark. Spotted frogs were observed to call only in direct sunlight on warm clear days.

Wood frogs were not seen breeding sympatrically with a large congregation of breeding spotted frogs in May 1992 at Barnes Lake and apparently bred generally earlier than the spotted frogs in the Stikine River area. Recently transformed young wood frogs were studied at the Chief Shakes Hot Springs area in mid to late summer 1992 sympatric with transforming spotted frogs and western toads.

One young wood frog was found in 1992 in an apparently diseased condition similar to that described by Gilbert (1942) in which sub-dermal lymph sacs were inflated by clear liquid due to an unknown cause. The partial remains of one sub-adult wood frog were observed on Little Dry Island of the Stikine Delta Island Group, in a wet area near a small creeklet. The specimen appeared to have been partially preyed upon by a sharp-beaked bird, perhaps a common raven.

The wood frog appears to be the least common frog in Southeast Alaska though it occurs at a considerable number of sites throughout the remainder of the state. Additional work in defining this species' range in southeast Alaska should be directed at the Vank Island Group, Onslow Island, Etolin Island, Mitkof Island, Kupreanof Island, Wrangell Island, Prince of Wales Island, and the Bradfield and Taku River drainages. All of these areas and the areas between Yakutat and the Taku River drainage, including the Juneau area would represent expansions of the wood frog range in southeast Alaska.

<u>*Pacific Chorus Frog*</u>: See Appendix 2.

<u>*Pacific Giant Salamanders and Tailed Frogs*</u>: Waters (1991a) postulated that the Pacific giant salamander genus *Dicamptodon* and the tailed frog, *Ascaphus truei*, might occur within the boundaries of the state of Alaska and most probably in the southeast Alaska panhandle. He based his postulation on the fact that both types of amphibian are widely distributed in the Pacific Northwest, occur north into coastal British Columbia often in disjunct relict populations (Nussbaum et al. 1983; Logier and Toner 1961; Stebbins 1985), are cryptic in their coloration and habits and are difficult to find unless experienced field workers search specific habitat, especially cold, lower order streams (Bury and Corn 1991). Special efforts were made to sample for these species in such habitats but with no success. The possibility that relict populations of these amphibians may occur in little-studied remote localities such as southeast Alaska remains very real in our opinion and continued efforts should be made to determine the presence and/or absence of these taxa there.

<u>*Garter Snakes*</u>: The presence of garter snakes (genus: *Thamnophis*) within the state of Alaska could not be verified. An attempt to validate reports of a garter snake voucher being present in the State Museum, Juneau (Foley 1976; Hodge 1976 and pers. comm. 1992) could not be verified through written and verbal communications with museum staff. They made considerable effort to locate the specimen and records regarding it at our request. If such a specimen ever existed it is now apparently lost and no record of it is available at the State Museum in Juneau. Extensive records from many other museums have been obtained and none to date validate the presence of naturally occurring garter snakes in Alaska. This finding is opposite of those expressed by Foley (1976) and Hodge (1976).

One area which was searched extensively in 1992 and which appeared ideal for garter snakes was the vicinity of Chief Shakes Hot Springs in the Stikine River Basin. The breeding amphibian populations there were large, amphibian and fish prey was abundant, temperatures there are tolerable for such snakes apparently all year round due to the thermal input of the hot springs, and the site lies within the Stikine River drainage which has been hypothesized to be a main corridor of dispersal for herpetological species entering southeast Alaska from British Columbia (Hodge 1976; Waters 1991c, 1992a) where garter snakes of at least three species are known to occur (Nussbaum et al. 1983; Stebbins 1985). It is probably only a matter of time until the presence of garter snakes in the Stikine River area is documented.

Sea Turtles: Four species of sea turtles have been documented as reaching, at least rarely, the coastal waters of the state of Alaska (Anonymous 1978; Hodge 1979, 1981, 1992; Wing pers. comm., 1992). These confirmed species are: the leatherback sea turtle (*Dermochelys coriacea*), Pacific green sea turtle (*Chelonia mydias agassizi*), Pacific loggerhead sea turtle (*Caretta caretta gigas*), and Pacific Ridley's sea turtle (*Lepidochelys kempi*) (Anonymous 1978; Hodge 1979, 1981, 1992; Wing, pers. comm., 1992). No live sea turtles were observed during the 1992 field work and no new information on their Alaskan distribution was obtained directly by the author during the study period. Considering the amount of effort expended in 1992 to observe sea turtles by boat and by air this result is somewhat surprising. Robert Parker Hodge, however, has collected some recent Alaskan sea turtle records and has made them available to us. One such record has been recently published (Hodge 1992).

One specimen of the Leatherback sea turtle from Alaska that apparently has not been reported in the literature to date was examined closely by B. Norman in 1992. It is preserved in the James R. Slater Natural History Museum, University of Puget Sound, Tacoma, Washington. Its site of origin is listed in the museum catalog as "off Cape Addington, Noyes Island," southeast Alaska.

Alaskan Slender Salamander: The presence of the enigmatic Alaskan slender or worm salamander (*Batrachoseps caudatus*) within the state of Alaska was also not confirmed during the study. The type locality, which is believed by some to be on Annette Island (Stejneger and Barbour 1939, Hodge 1976), now occurs on native reservation lands. In his original description Cope (1889) listed the type locality as "Hassler Harbor". Hassler Harbor is mapped as occurring on the northern shore of Annette Island and this is the main reason that Stejneger and Barbour (1939) have linked that locality name with that island (Bishop 1943, Stebbins and Lowe 1949, Stebbins 1951).

There is a Hassler Island near the northwest shore of Revillagigedo Island (Orth 1967), which apparently has never been considered as a possible site, and Hassler Island has a small harbor on its southern shore. In any case, the presence of a disjunct population of slender salamanders (genus: *Batrachoseps*) in Alaska has never been fully verified or discounted (Hodge 1976). Presumably such a relict population could have survived the last glacial period in Southeast Alaska as much of the area apparently acted as a glacial refugium during that period ca. 10,000 to 35,000 years before present (Swarth 1936, Anonymous 1991). Yakutat is an example (de Laguna et al. 1964), as is Dall Island in the Alexander Archipelago (Anonymous 1991). In any case, the taxon was not included in a species list of Alaskan taxa published in 1979, perhaps inadvertently (Taylor 1979), nor it is included in recent field guides of amphibians covering the region (Behler and King 1979; Stebbins 1985). The presence of various endemic subspecies of mammals and birds in the vicinity of southeast Alaska lends additional weight to the possibility that such relict populations, especially of a basically subterranean group of salamanders, may still exist (Swarth 1936).

Dr. David Wake, of the Museum of Vertebrate Zoology, Berkeley, California, had extensive conversations with B. Norman regarding that possibility and regarding the status of the Alaskan Slender Salamander in general over the course of the study period and he has independently come to the conclusion that the type specimen in the U.S. National Museum (Number USNM 13561) is possibly a mislabeled specimen collected by Capt. Henry Ezra Nichols at Mare Island, San Francisco Bay, California during a period in the early 1880's that Nichols was between expeditions to southeast Alaska where he collected large series of fish which were subsequently sent to the National Museum. However, Dr. Tarleton Bean, the curator of fish at the National Museum at the time, in publishing on the collections sent to him by Nichols states the collections sent to him by Nichols were among the most carefully preserved that he had the pleasure to receive from field workers, thus the possibility that the type specimen of *Batrachoseps caudatus* was mislabeled, though not impossible, does not seem to correlate well with what Bean had to say about Nichols' efforts (Bean 1882; 1884).

Only extensive and intensive field work at the proposed type locality of the species, Annette Island, and at other possible glacial refugia in southeast Alaska, such as the Yakutat Bay area and Dall Island, and other sites such as Hassler Island, will be conclusive as to whether the Alaskan slender salamander is still extant in Alaska or really ever was a valid taxon.

<u>Asian Salamanders Naturally Occurring in Alaska</u>: The possibility that the Asian salamander genus *Hynobius* exists in the vast herpetologically unexplored interior of Alaska was first suggested by Hodge (1976). As with the Alaskan slender salamander, extensive efforts were made in all areas visited in 1992 to search terrestrial habitats for salamanders. Additional searches were conducted by B. Norman for these and other amphibians on Kodiak Island in 1989, on the Alaskan Peninsula (Chignik, Egegik and Ugashik areas) in 1982, 1983, and 1984, and on the Aleutian Islands of Akutan in 1985, Unimak in 1984 and Unalaska in 1982. No *Hynobius* species and no amphibians of any species were encountered during these efforts.

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Appendix 1. Location of transects for the 1992 herpetological studies, Southeast Alaska. Adjacent = Adj, Canal = C, East = E, Island = I, River = R, Road = Rd, South = S, Transect = Trans, Yard = Yd.

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
001	Juneau	Dredge Lake Ponds	--	--	--	2 Apr
002	Petersburg	Muskeg Off Haugen Drive	58S	79E	27	8 Apr
003	Wrangell I	Pat's (=Trout on Topo Map) Lake Area, Ditch	64S	84E	5	8 Apr
004	Wrangell I	Pat's Lake Area, Lake Edge Near Rd	64S	84E	5	8 Apr
005	Wrangell I	Pat's Lake Area, Pond Near Lake and Rd	64S	84E	5	8 Apr
006	Wrangell I	Beaver Dam Off Rd 6265	64S	84E	15	8 Apr
007	Wrangell I	Stream Under Rd 6265	64S	84E	24	8 Apr
008	Wrangell I	Palustrine Environs Off Rd 6265 at Junction of Rd 6290	64S	84E	24	8 Apr
009	Wrangell I	Muskeg Pools Off Rd 6265	64S	84E	14	8 Apr
010	Wrangell I	Earl Cove Marsh Off Rd 6265	64S	85E	21/22	8 Apr
011	Wrangell I	Ponds at Entrance to Long Lake Rec Area	64S	85E	34	8 Apr
012	Mitkof I	Muskeg Near Petersburg Reservoir	58S	79E	2	14 Apr
013	Sergief I	Tidal *Carex* Flat Near Cabins	61S	83E	15	17 Apr
014	Sergief I	*Hippuris* Ponds Just Inland of Cabin Area	61S	83E	15	17 Apr
015	Sergief I	Slough Shore	61S	83E	21	17 Apr
016	Sergief I	More Inland *Carex* Flat	61S	83E	14	17 Apr
017	Sergief I	Inland Conifer Stand/*Carex*/*Salix* Interface	61S	83E	15	17 Apr
018	Sergief I	Pond in *Salix* Stand	61S	83E	15	17 Apr
019	Sergief I	*Spaghnum* Pool Just In Wooded Area	61S	83E	15	17 Apr
020	Wrangell I	Muskeg Area Behind USFS Compound	62S	83E/84E	24/19	19 Apr
021	Wrangell I	Palustrine Area Behind USFS Compound	62S	83E	24	19 Apr
022	Wrangell I	Muskeg Pools Along Bennett Street	62S	84E	19	19 Apr

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
023	Wrangell I	Bennett Street, Rd	62S	84E	19	19 Apr
024	Etolin I	Seep and Ditch Near USFS Dock, Anita Bay	65S	84E	32	20 Apr
025	Etolin I	Stream I at Camp Carl	66S	84E	5	20 Apr
026	Etolin I	Stream II at Camp Carl	66S	84E	5	20 Apr
027	Etolin I	Old-Growth/Clear-Cut Interface Near Burnett Inlet	66S	84E	5	20 Apr
028	Etolin I	Palustrine Area Near Burnett Inlet	66E	84E	5	20 Apr
029	Etolin I	Riparian Area Near Burnett Inlet	66S	84E	5	20 Apr
030	Etolin I	Estuarine Area Near Burnett Inlet	66S	84E	5	20 Apr
031	Etolin I	Stream III at Camp Carl	66S	84E	5	20 Apr
032	Etolin I	*Ambystoma* Trap-Line Creek Adj to Camp Carl	66S	84E	5	20 Apr
033	Etolin I	Barrow Pit Pools Behind Camp Carl	66S	84E	5	20 Apr
034	Etolin I	Barrow Pit Pond Timber Storage Yd Off Rd 6540	66S	83E	2	20 Apr
035	Etolin I	Ditch/Muskeg/Pond Area Off Rd 6540, Site A	66S	83E	4	20 Apr
036	Etolin I	Muskeg Ponds Off Rd 6540, Site B	65S	83E	32	21 Apr
037	Farm I	Pond in *Carex* Flat, *Rana sylvatica* Breeding Site A	60S	82E	33	27 Apr
037B	Farm I	Pond in *Carex* Flat, *Rana sylvatica* Breeding Site B	60S	82E	33	27 Apr
038	Farm I	Other Ponds Near *R. sylvatica* Breeding Site A	60S	82E	33	27 Apr
039	Little Dry I	Conifer Stand/*Carex* Flat Interface A	61S	83E	6	27 Apr
040	Little Dry I	Slough and Smaller Channels at Farm I Interface	61S	83E	6	27 Apr
041	Little Dry I	Creek Running to Slough of Trans 040	60S	82E	33	27 Apr
042	Little Dry I	Conifer Stand Edge Pools B	61S	83E	6	27 Apr
043	Stikine R Area	Mallard Slough, Pond 1	59S	82E	32	29 Apr

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
044	Stikine R Area	Mallard Slough, Pond 2	59S	82E	32	29 Apr
045	Stikine R Area	Mallard Slough, Pond 3	59S	82E	32	29 Apr
046	Stikine R Area	Mallard Slough, Pond 4	59S	82E	32	29 Apr
047	Stikine R Area	Mallard Slough, Pond 5	59S	82E	32	29 Apr
048	Stikine R Area	Mallard Slough, Pond 6	59S	82E	32	29 Apr
049	Stikine R Area	Mallard Slough, Pond 7	59S	82E	32	29 Apr
050	Stikine R Area	Mallard Slough, Pond 8	59S	82E	32	29 Apr
051	Stikine R Area	Mallard Slough, Small Channel	59S	82E	32	29 Apr
052	Stikine R Area	Mallard Slough, 1991 Termograph Site	59S	82E	32	29 Apr
053	Stikine R Area	Mallard Slough, Alder Stand/*Carex* Beach Area	59S	82E	32	29 Apr
054	Stikine R Area	Mallard Slough, Slough Edge	59S	82E	32	29 Apr
055	Stikine R Area	Mallard Slough, Smaller Side Channel A	59S	82E	32	29 Apr
056	Stikine R Area	Mallard Slough, Smaller Side Channel B	59S	82E	32	29 Apr
057	Stikine R Area	Mallard Slough, Head of Main Slough	59S	82E	33	29 Apr
058	Stikine R Area	Mallard Slough, Beaver Lake Edge	59S	82E	33	29 Apr
059	Stikine R Area	Mallard Slough, Adjacent Muskeg Area A	59S	82E	32	29 Apr
060	Stikine R Area	Mallard Slough, Adjacent Muskeg Area B	59S	82E	33	29 Apr
061	Stikine R Area	Mallard Slough, Adjacent Muskeg Area C	59S	82E	33	29 Apr
062	Stikine R Area	Cheliped Bay Area, Pool Trans A	59S	82E	32	29 Apr
063	Stikine R Area	Cheliped Bay Area, Pool Trans B	59S	82E	32	29 Apr
064	Stikine R Area	Cheliped Bay Area, Pool Trans C	59S	82E	32	29 Apr
065	Stikine R Area	Cheliped Bay Area, Pool Trans D	59S	82E	32	29 Apr
066	Stikine R Area	Cheliped Bay Area, Pool Trans E	59S	82E	32	29 Apr
067	Stikine R Area	Cheliped Bay Area, Conifer Stand Trail	59S	82E	32	29 Apr

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
068	Sokolof I	*Ambystoma* Pool Off Abandoned Alder Rd Near Rock Slide	62S	82E	15	5 May
069	Sokolof I	Abandoned Alder Rd Trans	62S	82E	15	5 May
070	Sokolof I	Creek Bed	62S	82E	15	5 May
071	Sokolof I	Rockslide Seep	62S	82E	15	5 May
072	Sokolof I	Debris Along Rd Trans	62S	82E	15	5 May
073	Sokolof I	Area Around Beach and Forest Interface	62S	82E	15	5 May
074	Vank I	Powerline Trail Below Beaver Dam	62S	82E	16/21	6 May
075	Vank I	Along Powerline Station Fence	62S	82E	16	6 May
076	Vank I	Beaver Dam	62S	82E	21	6 May
077	Vank I	Palustrine Area Above Beaver Dam	62S	82E	21	6 May
078	Vank I	Pool A Above Beaver Dam	62S	82E	21	6 May
079	Vank I	Pool A Above Beaver Dam	62S	82E	21	6 May
080	Vank I	Pool B Above Beaver Dam	62S	82E	21	6 May
081	Vank I	Beach/Conifer Interface Palustrine Area	62S	82E	16	6 May
082	Wrangell I	Muskeg Pool 4.0 Milepost Rd 6265	64S	84E	24	6 May
083	Mitkof I	Falls Creek Rock Pit, Pool A	60S	79E	11	9 May
084	Mitkof I	Falls Creek Rock Pit, Pool B	60S	79E	11	9 May
085	Mitkof I	Falls Creek Rock Pit, Pool C	60S	79E	11	9 May
086	Mitkof I	Falls Creek Rock Pit, Pool D	60S	79E	11	9 May
087	Mitkof I	Falls Creek Rock Pit, Pool E	60S	79E	11	9 May
088	Mitkof I	Falls Creek Rock Pit, Pool F	60S	79E	11	9 May
089	Mitkof I	Falls Creek Rock Pit, Pool G	60S	79E	11	9 May
090	Mitkof I	Blind Slough, *Bufo* Breeding Pond of 1991	60S	81E	23	9 May

Appendix 1. (Continued)

Trans.	Location	Habitat	Township	Range	Sect.	Date Estab.
091	Mitkof I	South Lobe Ditch Off Mitkof Highway, *Ambystoma* Trans A	61S	81E	36	9 May
092	Mitkof I	South Lobe Ditch Off Mitkof Highway, *Ambystoma* Trans B	61S	82E	22/23	9 May
093	Mitkof I	South Lobe Ditch Off Mitkof Highway, *Ambystoma* Trans C	61S	82E	13	10 May
094	Mitkof I	Muskeg Near Tent City, Pool I	58S	79E	35	10 May
095	Mitkof I	Muskeg Near Tent City, Pool II	58S	79E	35	10 May
096	Mitkof I	Ditch S of Petersburg Landfill Off Rd 6217	58S	79E	35	11 May
097	Mitkof I	Ditch Near Reservoir	59S	79E	2	11 May
098	Mitkof I	*Carex* Flat Toward Petersburg Near Reservoir	59S	79E	2	11 May
099	Stikine R Area	Cabin Area Chief Shakes Slough	59S	84E	36	13 May
100	Stikine R Area	River Shore Near Cabin Area Chief Shakes Slough	59S	84E	36	13 May
101	Stikine R Area	Small *Equisetum* Pond Off Mainstem River Bank	60S	85E	4	13 May
102	Stikine R Area	Chief Shakes Hot Springs Slough Shore	59S	85E	33	13 May
103	Stikine R Area	Chief Shakes Hot Springs Slough Mid-Water	59S	85E	33	13 May
104	Stikine R Area	Chief Shakes Hot Springs Creeks/*Carex* Flat Creek 1	59S	85E	34	13 May
105	Stikine R Area	Chief Shakes Hot Springs Creeks/*Carex* Flat Creek 2	59S	85E	34	13 May
106	Stikine R Area	Chief Shakes Hot Springs Creeks/*Carex* Flat Creek 3	59S	85E	34	13 May
107	Stikine R Area	Chief Shakes Hot Springs Creeks/*Carex* Flat Creek 4	59S	85E	34	13 May
108	Stikine R Area	River Shore Near Elbow (1991 Thermograph Site)	60S	86E	18	14 May

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
109	Stikine R Area	Guerin Slough Northern Shore	60S	86E	18	14 May
110	Stikine R Area	Ketili River	60/59S	86/85E	--	14 May
111	Stikine R Area	Guerin Slough to Barnes Lake	60S	86E	18/17	14 May
112	Stikine R Area	Barnes Lake Shore	60S	86E	17	14 May
113	Stikine R Area	Flemmer Cabin Area	60S	86E	28	14 May
114	Stikine R Area	Twin Lakes Cabin Area/Trail Trans	59S	83E	1	15 May
115	Stikine R Area	Twin Lakes Dock Area at Trail Terminus	59S	83E	1	15 May
116	Stikine R Area	Twin Lakes Shore A From Dock	59S	83E	1	15 May
117	Stikine R Area	Twin Lakes Shore B From Dock	59S	83E	1	15 May
118	Stikine R Area	Twin Lakes Center Slough at Low Water Level	59S	83E	1	15 May
119	Stikine R Area	Twin Lakes Shore A2 From Dock	59S	83E	1	15 May
120	Stikine R Area	Twin Lakes, Pond Left in Far Lake From Dock at Low Water Level	59S	83E	1	15 May
121	Etolin I	Muskeg Pool, Site C	66S	83E	2	19 May
122	Etolin I	Small Lake/Pond Area, Starfish Timber Sale	66S	83E	2	19 May
123	Revillagigedo I	Seep A	75S	91E	--	23 May
124	Revillagigedo I	Small Falls	75S	92E	--	23 May
125	Revillagigedo I	Small Pond Near Ward Lake (*Pseudacris* Intro. Site)	74S	90E	--	23 May
126	Revillagigedo I	Muskeg Pool at End of Rd With Gate	74S	90E	--	23 May
127	Revillagigedo I	Stream Surveys Off Rd With Gate	74S	91E	--	23 May
128	Revillagigedo I	Ward Creek Survey	74S	90E	--	23 May
129	Revillagigedo I	Mouth of Creek at Ward Lake	74S	90E	--	23 May
130	Revillagigedo I	Pond and Colvert at Other Side of Rd at Trans 125	74S	90E	--	23 May
131	Revillagigedo I	Settler's Cove Recreation Area Trail	74S	90E	--	23 May

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
132	Revillagigedo I	Small Creek	73S	90E	--	23 May
133	Revillagigedo I	Ward Lake Shore A	74S	90E	--	24 May
134	Revillagigedo I	Ward Lake Shore B	74S	90E	--	24 May
135	Revillagigedo I	End of Rd at Thorton Mountain	74S	90E	--	24 May
136	Revillagigedo I	Small Stream in Clear-Cut, USFS Firewood Area	74S	91E	--	24 May
137	Revillagigedo I	Pond to Right as Entering to Lake Harriett Parking Area	73S	91E	4	24 May
138	Revillagigedo I	Lake Harriett Trap Site	73S	91E	4	24 May
139	Revillagigedo I	Ward Lake Shore C	74S	90E	35	24 May
140	Revillagigedo I	Streambed and Seep Off Rd to Lake Harriett	74S	91E	8	24 May
141	Revillagigedo I	Rd Survey During Rain at Night to Lake Harriett	74S	91E	8	25 May
142	Zarembo I	*Equisetum* Pond in Barrow Pit Off Rd to St. John's	63S	82E	8	2 June
143	Zarembo I	Muskeg Area Off Rd to St. John's	63S	81E	3	2 June
144	Zarembo I	Logging Storage Yard at St. John's	63S	81E	7	2 June
145	Zarembo I	Rd Ditch A Near St. John's	63S	80E	7	2 June
146	Zarembo I	Pool A Near St. John's	63S	80E	8	2 June
147	Zarembo I	Rd Ditch B Near St. John's	63S	80E	8	2 June
148	Zarembo I	Rd Ditch C Near St. John's	63S	80E	8	2 June
149	Zarembo I	Pool B Off Rd Near St. John's	63S	80E	8	2 June
150	Zarembo I	Pool B Off Rd Near St. John's	63S	80E	8	2 June
151	Stikine R Area	ADF&G Cabin Basecamp	60S	84E	3	9 June
152	Stikine R Area	Twin Lakes Area, Farside Inlet A Trapsite	60S	83E	1	9 June
153	Stikine R Area	Twin Lakes Area, Farside Inlet B Trapsite	60S	83E	1	9 June

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
154	Stikine R Area	Red Slough New Trans	60S	86E	27	9 June
155	Stikine R Area	Red Slough 1991 Trans 29, Bearing 270 West	60S	86E	28	9 June
156	Stikine R Area	Red Slough 1991 Trans 28	60S	86E	33	10 June
157	Stikine R Area	Red Slough 1991 Trans 30 Bearing 144SE	60S	86E	27	10 June
158	Farm I	Boardwalk/Trail	60S	83E	31	11 June
159	Farm I	Abandoned Farm Area	60S	83E	31	11 June
160	Farm I	Stough Cabin Area Bog	60S	83E	31	11 June
161	Limb I	Delta Island Group, Sandy Beach	60S	83E	12	11 June
162	Stikine R Area	Alpine Creek, Mid-Water/Shore to Log	59S	85E	29	12 June
163	Wrangell I	Highbush Lake Trail/Skunk Cabbage Area	64S	85E	11	18 June
164	Wrangell I	Highbush Lake Edge With *Carex*/Log/Trap Site	64S	85E	11/12	18 June
165	Wrangell I	Muskeg Pools in Route to Long Lake	64S	85E	34	18 June
166	Wrangell I	Stream Under Trail in Route to Long Lake	64S	85E	34	18 June
167	Wrangell I	Long Lake Shore Trap Site	64S	85E	35	18 June
168	Wrangell I	Pat's Lake Shore Trap Site B	64S	84E	5	18 June
169	Onslow I	Estuarine/Stream/Forest Interface	69S	85E	22	25 June
170	Onslow I	Muskeg Pond 1	69S	85E	15	25 June
171	Onslow I	Terrestrial Muskeg/Forest Trans	69S	85E	15	25 June
172	Onslow I	Small Lake Edge	69S	85E	15	25 June
173	Etolin I	Kunk Lake	64S	83E	35	5 July
174	Baranof I	Vicinity of Gate to Rd to Dam at Blue Lake	56S	64E	4	8/9 Jul
175	Baranof I	Seep A Off Rd to Blue Lake Dam	55S	64E	34	8/9 Jul
176	Baranof I	Thimbleberry Lake Shore	56S	64E	4	8/9 Jul
177	Baranof I	Trail to Thimbleberry Lake Shore	56S	64E	4	8/9 Jul

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
178	Baranof I	Seep B Off Rd to Blue Lake Dam	55S	64E	34	8/9 Jul
179	Baranof I	Rd to Blue Lake Dam	55S	64E	34	8/9 Jul
180	Baranof I	Sitka, Swan Lake Trap A in City Park	55S	63E	36	8/9 Jul
181	Baranof I	Sitka, Swan Lake Trap B in City Park	55S	63E	36	8/9 Jul
182	Baranof I	Sitka, Swan Lake Shore in City Park	55S	63E	36	8/9 Jul
183	Etolin I	Beaver Pond	66S	83E	5	10 July
184	Stikine R Area	Twin Lakes, Alledged Hot Springs Creek 1	60S	83E	1	14 July
185	Stikine R Area	Twin Lakes, Alledged Hot Springs Creek 2	60S	83E	1	14 July
186	Stikine R Area	Twin Lakes, *Carex* Shore Far Side of Dock	60S	83E	1	14 July
187	Stikine R Area	Twin Lakes, Mid-Water Traps	60S	83E	1	14 July
188	Stikine R Area	Twin Lakes, Area of 1991 Trans 1	60S	83E	1	14 July
189	Stikine R Area	Twin Lakes, Shore Alder Strip Trans	60S	83E	1	14 July
190	Wrangell I	Nemo Point Rd 6267	64S	85E	29	15 July
191	Mitkof I	Petersburg, USFS Supervisor's Office, Boardwalk Trans	58S	79E	27	18 July
192	Mitkof I	Petersburg, Baseball Field Fill Edge	58S	79E	27	18 July
193	Rynda I	Vank Island Group, Shore/Forest Interface	62S	82E	2	21 July
194	Stikine R Area	Twin Lakes, Entrance Slough	60S	83E	1	21 July
195	Stikine R Area	Twin Lakes, Entrance Slough	60S	83E	1	21 July
196	Stikine R Area	Twin Lakes, Inlet Entrance Slough	60S	83E	1	21 July
197	Stikine R Area	Twin Lakes, Beaver Dam at Head of Side Channel	60S	83E	2	21 July
198	Stikine R Area	Twin Lakes, Backwater Slough	60S	83E	1	21 July
199	Stikine R Area	Twin Lakes, Backwater Slough	60S	83E	1	21 July

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
200	Stikine R Area	Twin Lakes, Backwater Slough	60S	83E	1	21 July
201	Stikine R Area	Twin Lakes, Backwater Slough	60S	83E	1	21 July
202	Stikine R Area	Twin Lakes, Backwater Slough	60S	83E	1	21 July
203	Stikine R Area	Stikine R Level Gauging Station, North Shore	60S	85E	5	22 July
204	Stikine R Area	Waterfall/Seep South Shore Stikine R	60S	84E	3	22 July
205	Stikine R Area	US/Canada Border North Bank of Stikine R	60S	86E	22	23 July
206	Stikine R Area	Trail at Basecamp	60S	84E	3	23 July
207	Prince of Wales I	Polk Inlet	74S	85E	3	23 July
208	Farm I	Binkleys Slough	61S	83E	3	25 July
209	Mitkof I	Fredrick Point Board Walk	58S	79E	35/36	30 July
210	Kupreanof I	Mouth of Petersburg Creek	58S	79E	20	30 July
211	Bradfield C Area	*Carex* Flat/Drainage Gully at Bradfield R Delta	65S	90E	15	5 Aug
212	Bradfield C Area	Bradfield Delta Carex Flat Pool 1	65S	90E	15	5 Aug
213	Bradfield C Area	Bradfield Delta Carex Flat Pool 2	65S	90E	15	5 Aug
214	Bradfield C Area	Bradfield Delta Carex Flat Pool 3	65S	90E	15	5 Aug
215	Bradfield C Area	Muskeg Above Wanagan Bight, Campbell Timber Sale	65S	89E	28	5 Aug
216	Bradfield C Area	"Inner-Tube Lake" Shore Trans	65S	89E	28	5 Aug
217	Bradfield C Area	Muskeg/Old-Growth/Lake Transition Area	65S	89E	28	5 Aug
218	Bradfield C Area	Coastal Stand Incline/Seep Trans	65S	89E	28	5 Aug
219	Bradfield C Area	Intertidal/Creek System Interface	65S	89E	28	5 Aug
220	Bradfield C Area	USFS Campbell Timber Sale Wanagan Bight Trap 1	65S	89E	28	5 Aug
221	Bradfield C Area	USFS Campbell Timber Sale Wanagan Bight Trap 2	65S	89E	28	5 Aug

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
222	Bradfield C Area	Campbell Lake Trap 1	64S	88E	33	5 Aug
223	Bradfield C Area	Campbell Lake Outlet Trap 2	64S	88E	33	5 Aug
224	Bradfield C Area	Tom Lake Trap 3	65S	89E	6	5 Aug
225	Bradfield C Area	Heliport, *Carex*/Intertidal/Forest Interface	65S	89E	28	5 Aug
226	Bradfield C Area	Campbell Timber Sale Muskeg Area	65S	89E	28	5 Aug
227	Bradfield C Area	Bradfield R Delta Tyee *Carex* Flat	65S	90E	15	5 Aug
228	Bradfield C Area	Thomas Creek Mid-Water	65S	89E	20	6 Aug
229	Bradfield C Area	Thomas Creek Shore	65S	89E	20	6 Aug
230	Bradfield C Area	Bradfield R Delta Pool Trap 2 Recovery	65S	90E	15	7 Aug
231	Bradfield C Area	Bradfield R Delta Pool Trap 2 Recovery	65S	90E	15	7 Aug
232	Bradfield C Area	Bradfield R Delta Pool Trap 3 Recovery	65S	90E	15	7 Aug
233	Stikine R Area	Twin Lakes, Slough Shore With 1991 Flag	60S	83E	1	11 Aug
234	Stikine R Area	Border Area, Sandy Beach, S Shore Stikine R	60S	86E	22	12 Aug
235	Stikine R Area	Shore of Guerin Slough Farther Inland	60S	86E	18	12 Aug
236	Stikine R Area	Border Area, Willow Thicket	60S	86E	22	12 Aug
237	Stikine R Area	Border Area, Shore Pool 1	60S	86E	22	12 Aug
238	Stikine R Area	Border Area, Shore Pool 2	60S	86E	22	12 Aug
239	Stikine R Area	Chief Shakes Slough/Lake Area, 1991 Trans 6	59S	84E	36	18 Aug
240	Stikine R Area	Chief Shakes Slough/Lake Area, 1991 Trans 7	59S	84E	36	18 Aug
241	Stikine R Area	Chief Shakes Slough/Lake Area	59S	84E	36	18 Aug
242	Stikine R Area	Chief Shakes Slough/Lake Area	59S	84E	14	18 Aug
243	Stikine R Area	Chief Shakes Lake Area, Mid-Water Glacier View	59S	84E	2	18 Aug
244	Stikine R Area	Chief Shakes Lake, 1991 Trans 10	59S	84E	14	18 Aug
245	Stikine R Area	Chief Shakes Lake, Shore	59S	84E	14/23	18 Aug

Appendix 1. (Continued)

Trans.	Location	Habitat	Town-ship	Range	Sect.	Date Estab.
246	Stikine R Area	Chief Shakes Lake, Small Creek Bed	59S	84E	14	18 Aug
247	Stikine R Area	Chief Shakes Lake, Large Creek Bed	59S	84E	14	18 Aug
248	Stikine R Area	Chief Shakes Hot Springs Upper Slough	59S	85E	34	18 Aug
249	Prince of Wales I	Skowl Arm, N Shore of Virginia Creek	74S	85E	24	18 Aug
250	Stikine R Area	Andrew Slough Area, 1991 Shore Trans 13	60S	84E	18	19 Aug
251	Stikine R Area	Andrew Slough Area	60S	84E	19	19 Aug
252	Stikine R Area	Andrew Slough Area, 1991 Shore Trans 66	60S	84E	18	19 Aug
253	Stikine R Area	Andrew Slough	60S	84E	20	19 Aug
254	Stikine R Area	Andrew Slough Area, 1991 Trans 49	60S	84E	20	19 Aug
255	Stikine R Area	Andrew Slough Area, 1991 Trans 48	60S	84E	20	19 Aug
256	Stikine R Area	Andrew Slough Area	60S	84E	20	19 Aug
257	Stikine R Area	Andrew Slough Area	60S	84E	20	19 Aug
258	Wrangell I	9.5 Milepost Zimovia Highway	63S	84E	3	20 Aug
259	Wrangell I	Thom's Place/Appleman's Property	66S	86E	6	22 Aug
260	Wrangell I	Thom's Creek Thermograph Site Rd 6270	65S	86E	31	24 Aug
261	Mitkof I	Quarry Permit Application Site Rd	58S	79E	35	26 Aug
262	Mitkof I	Quarry Permit Application Site Ditch	58S	79E	35	26 Aug
263	Mitkof I	Quarry Permit Application Site, Pool at Quarry	58S	79E	35	26 Aug
264	Mitkof I	Quarry Permit Application Site, *Carex* Pools Near Fill	58S	79E	35	26 Aug
265	Mitkof I	Quarry Permit Application Site, Edge of Fill	58S	79E	35	26 Aug
266	Mitkof I	Quarry Permit Application Site, Airport Rd Muskeg	58S	79E	35	26 Aug

Appendix 1. (Continued)

Trans.	Location	Habitat	Township	Range	Sect.	Date Estab.
267	Mitkof I	Quarry Permit Site, Airport Rd Muskeg Breeding Pool	58S	79E	35	26 Aug
268	Zarembo I	St. John's Rd (*Bufo* on Rd)	63S	80E	8	27 Aug
269	Wrangell I	Road Survey to Highbush Lake Trap Site	64S	85E	1,6,8, 9,14,15	29 Aug
270	Stikine R Area	Mallard Slough Area, Pool 9	59S	82E	32	1 Sept
271	Stikine R Area	Cheliped Bay Area, Pool A	59S	82E	32	2 Sept
272	Stikine R Area	Cheliped Bay Area, Pool B	59S	82E	32	2 Sept
273	Stikine R Area	Cheliped Bay Area, Pool C	59S	82E	32	2 Sept
274	Stikine R Area	Cheliped Bay Area, Pool D	59S	82E	32	2 Sept
275	Stikine R Area	Cheliped Bay Area, Pool E	59S	82E	32	2 Sept
276	Stikine R Area	Cheliped Bay Area, Pool F	59S	82E	32	2 Sept
277	Stikine R Area	Cheliped Bay Area, Pool G	59S	82E	32	2 Sept
278	Stikine R Area	Cheliped Bay Area, Pool H	59S	82E	32	2 Sept
279	Stikine R Area	Cheliped Bay Area, Pool I	59S	82E	32	2 Sept
280	Stikine R Area	Cheliped Bay Area, Pool J	59S	82E	32	2 Sept
281	Stikine R Area	Cheliped Bay Area, Pool K	59S	82E	32	2 Sept
282	Stikine R Area	Cheliped Bay Area, Pool L	59S	82E	32	2 Sept
283	Stikine R Area	Cheliped Bay Area, Pool M	59S	82E	32	2 Sept
284	Prince of Wales I	Khayyam Point Near Saltery Cove	74S	86E	33	17 Sept

Appendix 2.

Translocation and Establishment of the Pacific Chorus Frog (*Pseudacris regilla*) to Ketchikan, Alaska

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Abstract.- The only known breeding population of the Pacific Chorus Frog (*Pseudacris regilla*) occurring in Alaska was studied in 1991 and 1992. Interviews, site visits, and extra-site transect surveys for amphibian species were conducted on Revillagigedo Island of the southeast Alaskan Alexander Archipelago to determine the distributional status of the present chorus frog population. Information available to date indicates that the population of Pacific Chorus frogs inhabiting a muskeg pond system in the Ward Lake Recreation Area, Ketchikan, Alaska was probably introduced ca.1960. Despite field verifications of breeding activity by chorus frogs at this site in May 1992, numerous extra-site transect surveys for amphibians along the existing road system of Revillagigedo Island conducted during May and July of 1992 failed to detect additional specimens or populations elsewhere on the island. It is reported that the introduced population was observed to breed in 1992, 1993, and 1994 and that males begin calling individually or in choruses when Spring temperatures begin to approach 9.5-10.0 °C (49.0-50.0 °F). Two vouchers, one male and one female, are preserved in ultra-cold storage awaiting electrophoretic or histological work.

Only three amphibian species (*Bufo boreas, Taricha granulosa,* and *Pseudacris regilla*) have been verified as occurring on Revillagigedo Island in the Alexander Archipelago of Southeast Alaska (Hodge 1976; Taylor 1979; Waters 1991, 1992a,b). We have determined that the Ketchikan, Alaska, population of the Pacific chorus frog was probably introduced. Previously we theorized that the frogs travelled to Ketchikan aboard a timber barge (Chase 1992a,b,c), similar to how the clouded salamander (*Aneides ferreus*) was introduced to Vancouver Island, British Columbia (Jackman 1993) or that the population was possibly native (Waters 1992a).

In 1991, the Pacific chorus frogs were observed by R. Hauver (U.S. Forest Service) at the Ward Creek Recreation Area, Ketchikan, Southeast Alaska. Two live adult specimens were collected on 21 June 1991 and sent to D. Waters for identification and then forwarded to the University of Alaska, Fairbanks for ultra-cold storage (Waters 1991, 1992a,b).

In 1992, B. Norman located the population during breeding choruses and gained the interest of the local newspaper, the Ketchikan Daily News, which published a brief article on the existence of the population and how it may have arrived (Chase 1992). The next day, E. DeBoer, Ketchikan resident of more than 45 years, came forward and told the Ketchikan Daily News and B. Norman that he had released the frogs as early as 1960 (Chase 1992a,b,c).

According to Mr. DeBoer, small and large (>4.0 cm) tadpoles and some small transformed frogs were collected from Kirkland, King County, Washington (E. DeBoer, pers. comm.). Animals were transported in a 5-gallon bucket by plane to Ketchikan with DeBoer and released by him at the exact muskeg pond system site where B. Norman heard ca. 30 chorusing males in late May 1992.

Mr. DeBoer reported that the contents of the bucket used in transporting the introduced specimens may have contained at least one other species of frog in addition to the chorus frogs. Both *Rana aurora aurora* (the Northern red-legged frog), which is native to western Washington, and *Rana catesbeiana* (the Bullfrog), an introduced species to western Washington, occur commonly and breed in King County, Washington. These species are sympatric with *Pseudacris regilla* in the Kirkland, Washington area, occupy similar habitats, and breed at approximately the same time of year there (Leonard et al. 1993; B. Norman, pers. observ.). Our own recent fieldwork and work by Ketchikan field biologists has not produced any observations of ranids on Revillagigedo Island and at this time no evidence exists that either *R. aurora* or *R. catesbeiana* has been successfully introduced to Alaska.

Dominant vegetation types at the introduction site where B. Norman heard chorusing males in May 1992 were studied through photographs of the area. A list of the botanical species present is presented in Table 1. No frogs were seen at the site by B. Norman though several hours of effort was expended in searching out calling males. Nor were any frogs heard or observed during a 1-hour time-constrained search made by B. Norman and E. DeBoer at the chorus site in July of 1992 (Table 2).

While in the field with Mr. DeBoer in July of 1992 at the introduction site, B. Norman verified the exact location where DeBoer claims to have made the original release of transforming frogs and tadpoles. The site was exactly where B. Norman had heard chorusing males in May 1992. The specific information reported in paragraphs four and five above as regarding tadpole size classes and types was obtained by B. Norman during two extended telephone conversations in June and one extended introduction site visit with Mr. E. DeBoer in July 1992.

Amplexed pairs, individual frogs, and egg masses of the Pacific chorus frog were observed at the introduction site in June 1992 by Mr. Paul Zellmer (U.S. Forest Service, Tongass National Forest). Additionally, Mr. Zellmer has also observed breeding activity at the introduction site in 1993 and 1994 (Zellmer, pers. comm. 1995). He insists, however, that no new localities have been verified on Revillagigedo Island since he began his seasonal observations on the population in 1992 (U.S. Forest Service, unpublished data). His more specific observations to date are: 1) the frogs are utilizing clumps of grasses (Family: Gramineae) and sedges (*Carex* sp.) for cover adjacent to the pond system margins; 2) males begin initiating calling behaviors as Spring temperatures approach 9.5-10.0 °C (49.0-50.0 °F) at the site; 3) as darkness increases less perturbation is tolerated by calling males without resulting in males ceasing calling behavior in response; and 4) both green-dominated and brown-dominated color phases of this extremely varied species of frog are present at the introduction site (Zellmer, pers. comm., 3 June 1992 and 24 January 1995).

The distribution of the chorus frog in Southeast Alaska appears to be limited to the single muskeg pond system in the Ward Creek Recreation Area where they were originally introduced (Figures 1, 2 and 3). Extra-site transect amphibian surveys conducted by B. Norman on Revillagigedo Island during May and July 1992 are summarized in Table 2. No additional populations or individuals of the Pacific chorus frog were discovered during these efforts. This data seems to indicate that the chorus frog population has not significantly expanded its range on Revillagigedo Island since its introduction there.

New localities on Revillagigedo Island for the rough-skinned newt (*T. granulosa*) and the boreal toad (*Bufo boreas*) were discovered during the fieldwork (Hodge 1976; Waters 1992b) and these will be reported on specifically elsewhere. Both of these amphibian species are native to the island but only *T. granulosa* was found sympatric with the calling male chorus frog population at the introduction site. A just recently metamorphosed newt was found under cover about 1.0 meter from the chorus pond's shore during the July 1992 visit indicating that *T. granulosa* probably breeds at the site as well. Adult *T. granulosa* (females and males) in breeding condition were collected at the site during May 1992. *B. boreas* was found at a nearby Ward Lake locality and on the unpaved road bisecting the introduction site from the main Ward Lake area but not at the chorus site *per se*.

In studying Pacific chorus frogs in Oregon, Jameson (1956) determined that most juveniles were found to disperse <200 yards from one rearing pond. It would be interesting to study whether or not similar dispersal patterns are in operation at the introduction site. Perhaps selective pressures limiting dispersal have resulted in an extremely limited insular distribution for this usually ubiquitously occurring taxa which inhabits all available and varied habitats within its range in the lower western United States and British Columbia, Canada (Stebbins 1985; Leonard et al. 1993).

We invite interested workers to genetically compare *Pseudacris* from Kirkland, Washington and from Ketchikan, Alaska. Two specimens have been collected from Ketchikan and are stored at the University of Alaska, Fairbanks, Museum. Please refer to Waters (1992a) for locality and museum information. In addition, further research into the impacts this introduction is presently exhibiting on the native amphibian populations of Revillagigedo Island, if any, is strongly encouraged.

Table. 1. Botanical taxa found to be associated with the introduction site of the Pacific chorus frog (*Pseudacris regilla*) at the Ward Creek Recreational Area, Ketchikan, Revillagigedo Island, Alaska, May and July 1992. Taxonomy follows Robuck (1985) and USDA (1990).

Common Name	Scientific Name
Alder	*Alnus* sp.
Spaghnum moss	*Spaghnum* sp.
Yellow Pond-Lily	*Nuphar polysepalum* Engelm.
Sedge	*Carex* sp. (Family: Cyperaceae)
Sitka Spruce	*Picea sitchensis* (Bong.) Carr.
Western Hemlock	*Tsuga heterophylla* (Raf.) Sarg.
Grasses	Family Gramineae
Yellow Skunk-Cabbage	*Lysichiton americanum* Hult. & St. John
Old Man's Beard Lichen	*Usnea* sp.
Salmonberry	*Rubus* sp.
Buttercup	*Ranunculus* sp.

Table 2. Transect amphibian survey localities and numbers of amphibians observed for each survey conducted on Revillagigedo Island by Bradford Norman, May and July 1992. BUBO=*Bufo boreas*, TAGR=*Taricha granulosa*, PSRE=*Pseudacris regilla*. Number of each species seen appears in parentheses following species code. Voucher specimens are or will be deposited in the Aquatic Collection, University of Alaska Museum, Fairbanks. Photographic vouchers are on file at the USFWS, Ecological Services Office, Juneau, Alaska. Odometer (od) at start of surveys read: 18850.8 miles.

Transect Number	Date Surveyed	Locality	Species Observed
001	23 May	seep @ 15.3 miles from Victorian Hotel on water-front, Ketchikan, going to hatchery gate @ end of rd. (od 18866.1)	none
002	23 May	small falls @ 16.0 miles from Victorian Hotel going toward hatchery (od 18866.8)	none
003	23 May	gate and hatchery area	none
004	23 May	small pond left side of rd. going to Ward Lk., off Ward Lk. Rd. (od 18885.6)	TAGR(1 adult)
005	23 May	muskeg pools nr. end of rd. w/private gate (od 18892.7)	none
006	23 May	small pond (od 18894.5)	none
007	23 May	stream survey N to S directly in stream	none
008	23 May	dam @ Connell Lk.	none
009	23 May	shore of Ward Lk. *per se*	BUBO(1 adult)
010	23 May	mouth of Ward Crk. @ Ward Lk. shore (od 18900.1)	none
011	23 May	mouth of Ward Crk. @ Ward Cove (od 18901.0)	none
012	23 May	Settler's Cove State Recreation Area trail transect w/ small crk.	none
013	23 May	End of Road opposite side of island from hatchery	none
014	24 May	nr. Ward Lk. Recreation Area (Pacific chorus frog Introduction Site)	PSRE(ca. 10 calling males heard)
015	24 May	summit of Thorton Mt. (od 18950.1)	none

Table 2, continued:

016	24 May	small seep/stream in clear-cut USFS Firewood Cutting Area: #1 (od 18956.2) (water 14.5 °C; W-aspect; little moss)	none
017	24 May	as above: #2 (od 18956.2) (W-aspect; little moss)	none
018	24 May	as above: #3 (od 18956.3) (W-aspect; little moss)	none
019	24 May	Cape Fox Corp. Logging Area (od 18958.0)	none
020	24 May	Harriett Lk. Rec. Area Trap transect: Visit #1(T73/74S, R19E) (od 18958.4). Two salamander traps set off shore	none
021	24 May	small E-facing riverette (od 18961.0) as leaving Harriett Lk.	none
022	24 May	small muskeg lk. off rd. as returning from Harriett Lk. on L (od 18961.8) 45 minute search	TAGR(2 adults BUBO(2000 larvae)
023	24 May	shore of Ward Lk. site B (od 18968.8)	none
024	24 May	shore of Ward Lk. trap transect site C (od 18969.4)	none
025	24 May	Site of Transect #014 above: salamander trap A	TAGR(6 adults)
026	24 May	as above: salamander trap B	TAGR(5 adults)
027	24 May	as above: transect around pond	PSRE(1 male heard calling)
028	24 May	Harriett Lk. Rec. Area @ end of USFS Rd. 3415	none
029	25 May	Odometer: 18983.1 in town of Ketchikan- Transect #014 site (=Introduction Site) (od 18990.9); pH 6.9; water 14.8 °C; air 12.5 °C. Traffic est. 11 cars in 1733-1744 hours	TAGR(8 adults) no frogs heard until 1740 pm
030	25 May	Transect #014 Repeat visit (traffic est. 20 cars by 1805 hours)	PSRE(1 male calling from SW side of pond)

Table 2, continued:

031	25 May	Trap C Site @ Ward Lk. (od 18991.2)	sticklebacks & salmonids; trap full, uncounted
032	25 May	small creek running to Ward Lk. on W-side of rd. (od 18993.1)	none
033	25 May	Seep on W-side of rd. (od 18994.5) checked 24 May also	none
034	25 May	Harriett Lk. Visit #3: Trap D	TAGR(4 adults)
035	25 May	as above: Trap E	TAGR(4 adults)
036	25 May	small lk. checked before; coming from Harriett Lk. (od 19002.2)	2 Plover-like birds seen foraging and BUBO (remains of 1 adult w/ova fd.)
037	25 May	Transect #014 site (od 19009.7) (traffic 2 cars in 1843-1745 hours)	PSRE(1 heard)
038	25 May	as above: salamander traps	TAGR(7 adults)
039	25/26 May	new visit to Transect #014 site to released tagged TAGR from last trap effort(1148 hours; light rain)	PSRE(ca. 30 males heard calling and not disturbed by lights or traffic)
040	26 May	Rd. to Harriett Lk. and back (rain)	BUBO(2 adults on rd.)
041	26 May	Back @ Transect #014 Introduction Pond Site (0128 hours)	PSRE(ca. 15 males now heard calling; much cooler now)
042	9 July	Rd. from Airport Parking Area nr. Gravina Island to Introduction Site (=Transect #014)(rain)	none
043	9 July	Introduction Site (=previous Transect #014)	TAGR (1 juvenile) no PSRE heard
044	9 July	Rd. from Transect #014 to Airport Parking Area (rain)	none

Figure 1. Introduction site of an established breeding non-native *Pseudacris regilla* population, Ketchikan, Ward Lake Recreation Area, Revillagigedo Island, southeast Alaska. Chorusing males were heard calling from within and throughout the Alder strip and *Carex* patches shown here which are the dominant botanical species at the immediate introduction site of DeBoer ca. 1960 in the shore interface zone. Facing West from 30 meters West of the parking area adjacent to road. May 1992. Photo by B. Norman.

Figure 2. Same locality as in Fig. 1, moving left from Fig. 1 which overlaps in the right portion of this frame. Note the fairly mature spruce and hemlock stand/muskeg interface at the far end of the main pond of the introduction site pond system. May 1992. Photo by B. Norman.

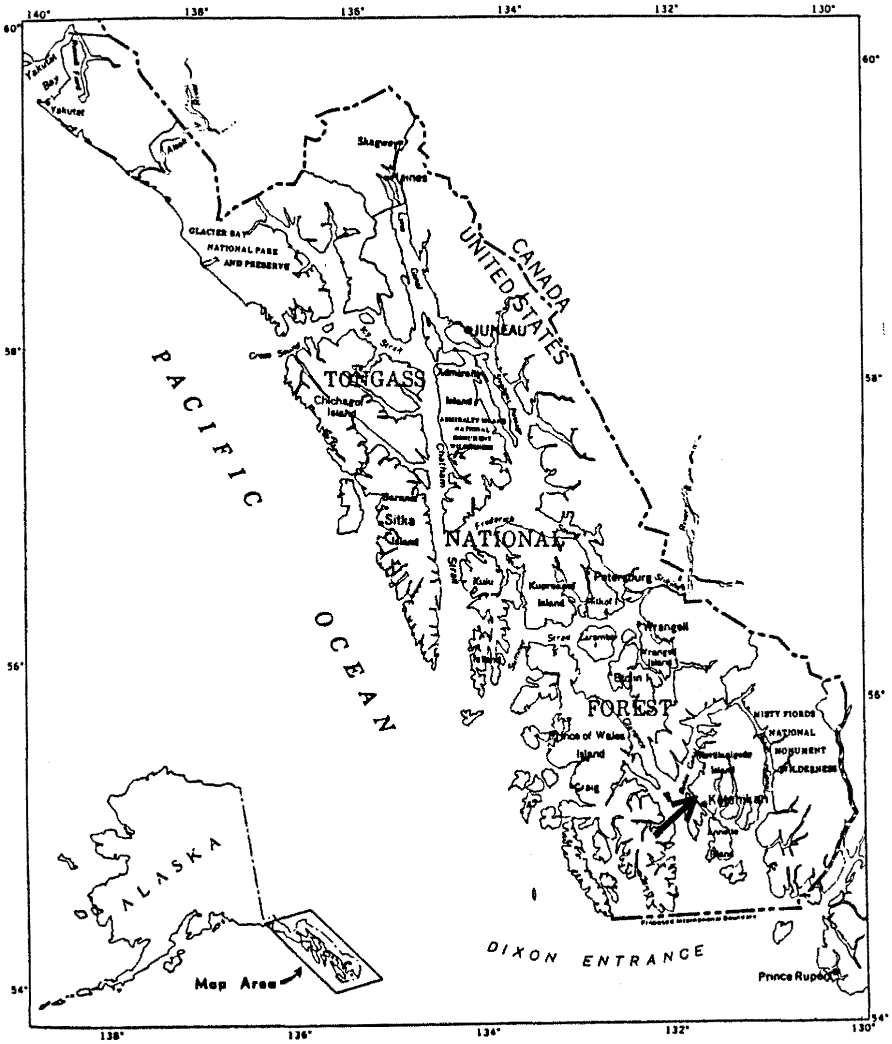

Figure 3. Map showing the location of the only known established population of *Pseudacris regilla* introduced to and breeding within the state of Alaska.

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Appendix 3.

A SUMMARY OF WOOD FROG (*RANA SYLVATICA)* OBSERVATIONS MADE AT THE WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE, ALASKA DURING 1991 AND 1992.

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Abstract.- The Wood Frog, *Rana sylvatica*, is the only truly panarctic anuran species inhabiting North America, the most wide-spread ranid species inhabiting North America and the most wide-spread amphibian species throughout the state of Alaska (Conant 1975; Behler and King 1988). Observations on calling *R. sylvatica* presence/absence, activity, relative abundance, habitat and thermal conditions at potential breeding sites visited were tabulated from field data forms provided to the third author (B.N.) by the second author, Karen Kozie, Resource Management Specialist, Wrangell-St. Elias National Park and Preserve (WSENPP). The quantified data is presented in tabular form as summarized by the third author on 31 December 1993. Wood frogs were heard at nine of ten survey sites in 1991, and four of ten sites surveyed in 1992.

Observations.- A pre-observational assessment was made prior to species-specific audio and time-constrained surveys at potential breeding sites of *Rana sylvatica* along McCarthy Road, WSENPP, Alaska. Observations made during the species-specific survey periods were recorded on datasheets using a protocol developed by R. Anderson, D. Jansen and R. Hine of the University of Wisconsin (R.A. and D.J.) and the Wisconsin Department of Natural Resources (R.H.), respectively (Anderson et al. 1981). The protocol was modified by the third author (B.N.) in 1992. The first author (B.R.) conducted the 1991 and 1992 species-specific surveys with one assistant (Andria Blakesley in 1991 and Rick Lee in 1992). The quantified data collected during actual survey periods was tabulated from copies of the original datasheets and is presented in Tables 1 and 2. Localities surveyed are presented in Table 3.

Observations made previous to actual surveys are presented immediately below; these were not recorded on datasheets *per se* but were made by the observers on separate sheets:

> 5 May 1991: Along McCarthy Rd. Water temperature on 1 pond clear of ice=60.0 degrees F, according to Jim Baker, Kurt Jenkins and Bill Route who observed and heard calling frogs.

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[1]Present address: 3225 National Parks Highway, Carlsbad, New Mexico 88220

[2]Present address: 3390 William St., Eureka, California 95503

20 May 1992: Bill Route and Karen Kozie heard wood frogs at T-3 (Amphibian Survey Pond off McCarthy Road); some ponds still had ice and frog activity seemed low.

In 1991 no precipitation occurred during the survey period. In 1992, some rain to heavy rains fell during the survey period. Heavy rain was reported for locality G-7, and some rain was reported to fall at all other survey stations during surveys in that year.

Table 1. Quantified *Rana sylvatica* data as tabulated from copies of 1991 field data forms. Observers: Bill Route and Andria Blakesley. Numbers in parentheses below a Location Code denote an odometer mileage reading at the time of observations. When no data is available for a given table heading this is denoted as ND in the tables. A scale of 0 to 2 was used in the field to estimate relative abundance of wood frogs: 0=no frogs heard; 1=individual frogs few enough to be counted; 2=calling frogs more numerous than observers were able to individually count. All sites had zero precipitation recorded during the observational period. Precipitation was recorded on the data forms on a relative scale from 0 to 3 where 0=none, 1=drizzle, 2=some rain, and 3=heavy rain, snow or hail.

Date	Time hours	Location	Habitat Type	Water Depth (cm)	Temperature (C) Water	Relative Abundance
20 May	2203	T-3 (2776.4)	Marsh[1]	18.5	4.0	2
	ND	L-6 (2779.8)	Pond	24.5	6.0	2
	2247	L-3 (2785.3)	Lake	30.0	8.0	0
	ND	L-1 (2790.4)	Pond	44.0	5.0	1
	2331	G-7 (2759.8)	Lake[2]	6.5	6.0	2
21 May	0003	G-1 (2805.6)	Pond	13.5	6.0	2
	0027	KU-6 (2810.6)	Pond	9.0	5.0	2
	0109	KO-5 (2819.8)	Pond	17.0	5.0	1
	0055	KU-1 (2816.0)	Pond	14.5	6.0	1
	0117	KO-3 (2822.3)	Pond	18.0	6.0	1

[1]Near culvert.

[2]Difficult to hear frogs due to calling ducks.

Table 2. Quantified *Rana sylvatica* data as tabulated from copies of 1992 field data forms. Observers: B. Route and Rick Lee. See Table 1 heading for symbol explanations. Observers commented on the apparent decline in frog numbers as compared with the 1991 surveys and postulated that the surveys in 1992 were conducted perhaps too late in the year.

				Temperature (C)		
Date	Time hours	Location	Habitat Type	Water	Air	Relative Abundance
29 May	1447	T-3	Marsh	10.0	ND	0
	1503	L-6	Pond	16.0	23.0	1
	1527	L-3	Lake	12.5	24.0	0
	1611	L-1	Pond	17.0	23.0	0
	1628	G-7	Lake	15.5	ND	0
	1658	G-1	Pond	14.0	21.0	1
	1716	KU-6	Pond	17.0	19.0	1
	1738	KU-1	Pond	15.0	20.0	1
	1758	KO-5	Pond	19.0	21.0	0
	1803	KO-3	Pond	17.0	ND	0

[illegible]	[illegible]	[illegible]	[illegible]	SW1/4	1250
KU-6[2]	5S	8E	2	NW1/4	1350
G-1[3]	5S	9E	4	SE1/4	1550
G-7[4]	6S	10E	3	SW1/4	1457
L-1[5]	6S	11E	9	NE1/4	1395
L-3	6S	11E	1	SE1/4	1475
L-6	5S	12E	35	NE1/4	1630
T-3	5S	13E	29	SE1/4	1580

[1]ca. 1.0 mile SE of Strelna, Alaska and 42.0 miles NW of McCarthy.

[2]ca. 6.0 miles SE of Strelna, Alaska.

[3]ca. 1.5 miles W of Chokosna, Alaska.

[4]Moose Lake, ca. 9.0 miles SE of Chokosna, Alaska.

[5]Ruth Lake.

Table 3. Locations of *Rana sylvatica* survey sites in Wrangell-St. Elias National Park/Preserve of Tables 1 and 2 above. Data taken from ten observation locations penciled on topographic maps by K. Kozie and provided to B. Norman. These locations are all along an unpaved road extending between the Chugach Mountain Range on the south and the Wrangell Mountain Range on the north, running generally through the Chitia River Valley (Source: Offical Map & Guide: Wrangell-St. Elias National Park & Preserve, AK. Nat. Park Service, U.S. Dept. of Interior.)

Locality Code	Township	Range	Section	Quarter	Approximate Elevation (Ft.)
KO-3	4S	7E	18	NW1/4	1250
KO-5	4S	7E	16	NW1/4	1000
KU-1[1]	4S	7E	23	SW1/4	1250
KU-6[2]	5S	8E	2	NW1/4	1350
G-1[3]	5S	9E	4	SE1/4	1550
G-7[4]	6S	10E	3	SW1/4	1457
L-1[5]	6S	11E	9	NE1/4	1395
L-3	6S	11E	1	SE1/4	1475
L-6	5S	12E	35	NE1/4	1630
T-3	5S	13E	29	SE1/4	1580

[1]ca. 1.0 mile SE of Strelna, Alaska and 42.0 miles NW of McCarthy.

[2]ca. 6.0 miles SE of Strelna, Alaska.

[3]ca. 1.5 miles W of Chokosna, Alaska.

[4]Moose Lake, ca. 9.0 miles SE of Chokosna, Alaska.

[5]Ruth Lake.

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Appendix 4. Distribution of observed amphibians in 1992, Southeast Alaska. Canal = C, Island = I, River = R. In the 1991 transect column an asterisk (*) denotes a transect established in 1991 by B. Norman revisited in 1992; no asterisk denotes a transect area established in 1991 by D. Waters revisited in 1992.

Trans.	Location	Amphibians 1992[1]	Breeding Area[2]	Trapping Transect[2]	Specimen Marked-Released[2]	1991 Transect[2]
001	Juneau	N	N	N	N	N
002	Petersburg	Rapr,Tagr	Y	Y	Y	Y*
003	Wrangell I	N	N	N	N	N
004	Wrangell I	Tagr	N	Y	Y	Y
005	Wrangell I	Tagr	N	Y	Y	Y
006	Wrangell I	Tagr	Y	Y	N	Y
007	Wrangell I	N	N	N	N	N
008	Wrangell I	N	N	N	N	N
009	Wrangell I	N	N	N	N	N
010	Wrangell I	Bubo	Y	N	N	N
011	Wrangell I	Tagr	Y	Y	N	Y
012	Mitkof I	Rapr	Y	N	N	N
013	Sergief I	N	N	N	N	Y
014	Sergief I	N	N	N	N	Y
015	Sergief I	N	N	N	N	N
016	Sergief I	N	N	N	N	N
017	Sergief I	N	N	N	N	N
018	Sergief I	N	N	N	N	N
019	Sergief I	N	N	N	N	N
020	Wrangell I	N	N	N	N	N
021	Wrangell I	N	Y	Y	N	N
022	Wrangell I	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
023	Wrangell I	N	N	N	N	N
024	Etolin I	N	N	N	N	N
025	Etolin I	N	N	N	N	N
026	Etolin I	N	N	N	N	N
027	Etolin I	N	N	N	N	N
028	Etolin I	N	N	N	N	N
029	Etolin I	N	N	N	N	N
030	Etolin I	N	N	N	N	N
031	Etolin I	N	N	N	N	N
032	Etolin I	N	N	Y	N	N
033	Etolin I	N	N	N	N	N
034	Etolin I	N	N	N	N	N
035	Etolin I	Bubo,Tagr	Y	Y	Y	N
036	Etolin I	Bubo,Tagr	Y	Y	Y	N
037	Farm I	Rasy	Y	N	N	N
037B	Farm I	Rasy	Y	N	N	N
038	Farm I	N	N	N	N	N
039	Little Dry I	Rasy	N	N	N	N
040	Little Dry I	Bubo	N	Y	N	N
041	Little Dry I	N	N	N	N	N
042	Little Dry I	N	N	N	N	N
043	Stikine Area	Rapr,Amma,Rasy	Y	Y	Y	Y
044	Stikine Area	Rapr,Amma,Rasy	Y	Y	Y	Y
045	Stikine Area	Rapr,Amma,Rasy	Y	Y	Y	Y

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
046	Stikine R Area	Rapr,Amma,Rasy	Y	Y	Y	Y
047	Stikine R Area	Rapr,Amma,Rasy	Y	Y	Y	Y
048	Stikine R Area	Rapr,Rasy	Y	Y	Y	Y
049	Stikine R Area	Rapr,Rasy	Y	Y	Y	Y
050	Stikine R Area	Rapr,Rasy	Y	Y	Y	Y
051	Stikine R Area	Rapr	Y	N	N	Y
052	Stikine R Area	Rapr,Amma,Rasy	N	N	N	Y
053	Stikine R Area	Rapr,Amma,Rasy	Y	N	Y	N
054	Stikine R Area	Rapr,Amma,Rasy	Y	N	Y	Y
055	Stikine R Area	Rapr,Amma,Rasy	Y	N	N	N
056	Stikine R Area	Rapr,Rasy	Y	N	N	N
057	Stikine R Area	Rapr,Rasy	Y	N	N	Y
058	Stikine R Area	N	N	N	N	N
059	Stikine R Area	Bubo	N	N	N	N
060	Stikine R Area	N	N	N	N	N
061	Stikine R Area	N	N	N	N	N
062	Stikine R Area	Rapr,Rasy	Y	N	N	N
063	Stikine R Area	Rapr,Amma,Rasy	Y	N	N	N
064	Stikine R Area	Rasy,Rapr	Y	N	N	N
065	Stikine R Area	Rasy,Rapr	Y	N	N	N
066	Stikine R Area	Rasy,Rapr	Y	N	N	N
067	Stikine R Area	Bubo	N	N	N	N
068	Sokolof I	Amma	Y	N	N	N
069	Sokolof I	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
070	Sokolof I	N	N	N	N	N
071	Sokolof I	N	N	N	N	N
072	Sokolof I	N	N	N	N	N
073	Sokolof I	N	N	N	N	N
074	Vank I	N	N	N	N	Y
075	Vank I	N	N	N	N	N
076	Vank I	N	N	N	N	Y
077	Vank I	Bubo,Rapr	Y	N	N	Y
078	Vank I	N	N	N	N	N
079	Vank I	N	N	N	N	N
080	Vank I	N	N	N	N	N
081	Vank I	N	N	N	N	N
082	Wrangell I	Tagr	Y	N	N	N
083	Mitkof I	Tagr	Y	Y	Y	N
084	Mitkof I	Tagr	Y	Y	Y	N
085	Mitkof I	Tagr	Y	Y	Y	N
086	Mitkof I	Tagr	Y	Y	Y	N
087	Mitkof I	Tagr	Y	Y	Y	N
088	Mitkof I	Tagr	Y	Y	Y	N
089	Mitkof I	Tagr	Y	Y	Y	N
090	Mitkof I	Bubo	Y	Y	Y	Y*
091	Mitkof I	N	N	N	N	N
092	Mitkof I	N	N	N	N	N
093	Mitkof I	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
094	Mitkof I	Rapr	Y	N	Y	Y*
095	Mitkof I	Rapr	Y	N	Y	Y*
096	Mitkof I	Rapr	Y	N	N	N
097	Mitkof I	Rapr,Tagr	Y	N	Y	N
098	Mitkof I	Rapr	Y	N	Y	N
099	Stikine R Area	N	N	N	N	Y
100	Stikine R Area	N	N	N	N	Y
101	Stikine R Area	N	N	N	N	N
102	Stikine R Area	Rapr	N	N	Y	Y
103	Stikine R Area	N	N	N	N	Y
104	Stikine R Area	Bubo,Rapr,Rasy,Tagr	Y	Y	Y	Y
105	Stikine R Area	Bubo,Rapr,Rasy	Y	Y	Y	Y
106	Stikine R Area	Bubo,Rapr,Rasy	Y	Y	Y	Y
107	Stikine R Area	Bubo,Rapr,Rasy	Y	Y	Y	Y
108	Stikine R Area	N	N	N	N	N
109	Stikine R Area	N	N	N	N	Y
110	Stikine R Area	N	N	N	N	Y
111	Stikine R Area	N	N	N	N	N
112	Stikine R Area	Rapr	Y	N	Y	Y
113	Stikine R Area	N	N	N	N	Y
114	Stikine R Area	N	N	N	N	N
115	Stikine R Area	Bubo	N	Y	Y	Y
116	Stikine R Area	Bubo	N	Y	Y	Y
117	Stikine R Area	N	N	Y	Y	Y

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
118	Stikine R Area	N	N	N	N	N
119	Stikine R Area	N	N	Y	Y	Y
120	Stikine R Area	Bubo,Rapr	Y	N	Y	N
121	Etolin I	Bubo (Dead)	Y	N	N	N
122	Etolin I	Tagr	Y	N	N	N
123	Revillagigedo I	N	N	N	N	N
124	Revillagigedo I	N	N	N	N	N
125	Revillagigedo I	Psre,Tagr	Y	Y	Y	N
126	Revillagigedo I	N	N	N	N	N
127	Revillagigedo I	N	N	N	N	N
128	Revillagigedo I	N	N	N	N	N
129	Revillagigedo I	N	N	N	N	N
130	Revillagigedo I	Tagr	Y	N	N	N
131	Revillagigedo I	N	N	N	N	N
132	Revillagigedo I	N	N	N	N	N
133	Revillagigedo I	Bubo	N	N	N	N
134	Revillagigedo I	N	N	N	N	N
135	Revillagigedo I	N	N	N	N	N
136	Revillagigedo I	N	N	N	N	N
137	Revillagigedo I	Bubo,Tagr	Y	N	Y	N
138	Revillagigedo I	Tagr	Y	Y	Y	N
139	Revillagigedo I	N	N	Y	N	N
140	Revillagigedo I	N	N	N	N	N
141	Revillagigedo I	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
142	Zarembo I	N	N	N	N	N
143	Zarembo I	Tagr	Y	N	N	N
144	Zarembo I	Bubo	Y	N	N	N
145	Zarembo I	N	N	N	N	N
146	Zarembo I	N	N	N	N	N
147	Zarembo I	N	N	N	N	N
148	Zarembo I	N	N	N	N	N
149	Zarembo I	N	N	N	N	N
150	Zarembo I	N	N	N	N	N
151	Stikine R Area	Amma	N	Y	N	Y
152	Stikine R Area	N	N	Y	N	N
153	Stikine R Area	N	N	Y	N	N
154	Stikine R Area	Bubo	N	N	Y	N
155	Stikine R Area	N	N	N	N	Y
156	Stikine R Area	N	N	N	N	Y
157	Stikine R Area	N	N	N	N	Y
158	Farm I	Bubo	N	N	N	N
159	Farm I	N	N	N	N	N
160	Farm I	N	N	N	N	N
161	Limb I	N	N	N	N	Y
162	Stikine R Area	N	N	N	N	N
163	Wrangell I	N	N	N	N	N
164	Wrangell I	Tagr	Y	Y	Y	N
165	Wrangell I	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
166	Wrangell I	N	N	N	N	N
167	Wrangell I	N	N	Y	N	N
168	Wrangell I	Tagr	Y	Y	Y	N
169	Onslow I	N	N	N	N	N
170	Onslow I	Bubo	N	N	Y	N
171	Onslow I	N	N	N	N	N
172	Onslow I	Bubo	Y	N	N	N
173	Etolin I	Bubo	Y	N	N	N
174	Baranof I	N	N	N	N	N
175	Baranof I	N	N	N	N	N
176	Baranof I	N	N	N	N	N
177	Baranof I	N	N	N	N	N
178	Baranof I	N	N	N	N	N
179	Baranof I	N	N	N	N	N
180	Baranof I	N	N	Y	N	N
181	Baranof I	N	N	Y	N	N
182	Baranof I	N	N	N	N	N
183	Etolin I	Tagr	Y	N	N	N
184	Stikine R Area	N	N	N	N	Y
185	Stikine R Area	N	N	N	N	Y
186	Stikine R Area	N	N	Y	N	Y
187	Stikine R Area	N	N	Y	N	N
188	Stikine R Area	N	N	N	N	Y
189	Stikine R Area	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
190	Wrangell I	Bubo	N	N	N	N
191	Mitkof I	Rapr	Y	N	Y	N
192	Mitkof I	Rapr	Y	N	Y	N
193	Rynda I	Bubo	N[3]	N	N	N
194	Stikine R Area	Tagr	Y	Y	Y	Y
195	Stikine R Area	N	N	Y	N	N
196	Stikine R Area	N	N	Y	N	N
197	Stikine R Area	N	N	Y	N	N
198	Stikine R Area	Tagr	Y	Y	Y	N
199	Stikine R Area	Tagr,Rapr	Y	Y	Y	N
200	Stikine R Area	N	N	Y	N	N
201	Stikine R Area	N	N	Y	N	N
202	Stikine R Area	N	N	Y	N	N
203	Stikine R Area	N	N	N	N	Y
204	Stikine R Area	N	N	N	N	N
205	Stikine R Area	N	N	N	N	N
206	Stikine R Area	Bubo	N	N	Y	N
207	Prince of Wales I	Rasy	N	N	N	N
208	Farm I	Amma,Rapr,Rasy	Y	N	N	Y
209	Mitkof I	N	N	N	N	N
210	Kupreanof I	Bubo	Y	N	N	N
211	Bradfield C Area	N	N	N	N	N
212	Bradfield C Area	Bubo	N	Y	N	N
213	Bradfield C Area	N	N	Y	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
214	Bradfield C Area	N	N	Y	N	N
215	Bradfield C Area	N	N	N	N	N
216	Bradfield C Area	N	N	Y	N	N
217	Bradfield C Area	Tagr	N	N	N	N
218	Bradfield C Area	N	N	N	N	N
219	Bradfield C Area	N	N	N	N	N
220	Bradfield C Area	N	N	Y	N	N
221	Bradfield C Area	N	N	Y	N	N
222	Bradfield C Area	N	N	Y	N	N
223	Bradfield C Area	N	N	Y	N	N
224	Bradfield C Area	N	N	Y	N	N
225	Bradfield C Area	N	N	N	N	N
226	Bradfield C Area	N	N	N	N	N
227	Bradfield C Area	N	N	N	N	N
228	Bradfield C Area	N	N	N	N	N
229	Bradfield C Area	N	N	Y	N	N
230	Bradfield C Area	N	N	Y	N	N
231	Bradfield C Area	N	N	Y	N	N
232	Bradfield C Area	N	N	N	N	N
233	Stikine R Area	N	N	N	N	N
234	Stikine R Area	N	N	N	N	N
235	Stikine R Area	N	N	N	N	N
236	Stikine R Area	N	N	N	N	N
237	Stikine R Area	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
238	Stikine R Area	N	N	N	N	N
239	Stikine R Area	N	N	N	N	Y
240	Stikine R Area	N	N	N	N	Y
241	Stikine R Area	N	N	N	N	N
242	Stikine R Area	N	N	N	N	N
243	Stikine R Area	N	N	N	N	N
244	Stikine R Area	N	N	N	N	Y
245	Stikine R Area	N	N	N	N	N
246	Stikine R Area	N	N	N	N	N
247	Stikine R Area	N	N	N	N	N
248	Stikine R Area	Rapr	Y	N	Y	Y
249	Prince of Wales I	Rasy	N	N	N	N
250	Stikine R Area	N	N	N	N	Y
251	Stikine R Area	N	N	N	N	Y
252	Stikine R Area	N	N	N	N	Y
253	Stikine R Area	N	N	N	N	Y
254	Stikine R Area	N	N	N	N	Y
255	Stikine R Area	N	N	N	N	Y
256	Stikine R Area	Rapr	Y	Y	Y	Y
257	Stikine R Area	N	N	Y	N	Y
258	Wrangell I	Bubo	N	N	N	N
259	Wrangell I	Tagr	N	N	N	N
260	Wrangell I	N	N	N	N	Y
261	Mitkof I	N	N	N	N	N

Appendix 4. (Continued)

Trans.	Location	Amphibians 1992	Breeding Area	Trapping Transect	Specimen Marked-Released	1991 Transect
262	Mitkof I	N	N	N	N	N
263	Mitkof I	N	N	N	N	N
264	Mitkof I	N	N	Y	N	N
265	Mitkof I	N	N	N	N	N
266	Mitkof I	N	N	N	N	N
267	Mitkof I	Rapr	Y	N	N	N
268	Zarembo I	Bubo	N	N	N	N
269	Wrangell I	N	N	N	N	N
270	Stikine R Area	Rapr,Rasy	Y	N	Y	N
271	Stikine R Area	Rapr	Y	N	N	N
272	Stikine R Area	Rapr	Y	N	N	N
273	Stikine R Area	Rapr	Y	N	N	N
274	Stikine R Area	Rapr	Y	N	N	N
275	Stikine R Area	Rapr	Y	N	N	N
276	Stikine R Area	Rapr	Y	N	N	N
277	Stikine R Area	Rapr	Y	N	N	N
278	Stikine R Area	Rapr	Y	N	N	N
279	Stikine R Area	Rapr	Y	N	N	N
280	Stikine R Area	Rapr	Y	N	N	N
281	Stikine R Area	Rapr	Y	N	N	N
282	Stikine R Area	Rapr	Y	N	N	N
283	Stikine R Area	Rapr	Y	N	N	N
284	Prince of Wales I	Tagr	N	N	N	N

[1]Rapr = *Rana pretiosa*; Amma = *Ambystoma macrodactylum*; Rasy = *Rana sylvatica*; Bubo = *Bufo boreas*; Tagr = *Taricha granulosa*; Psre = *Pseudacris regilla*; N = none.
[2]N = No; Y = Yes.
[3]Adult Bubo present was a gravid female.