Restoration of historic Coyote Creek

Surveys for amphibians and reptiles with observations of mollusks

Report to

Long Tom Watershed Council

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Funded by

Oregon Watershed Enhancement Board

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Introduction

There have been few studies that have followed the amphibians and reptiles of a managed habitat through time. Most herpetological surveys are like photographic snap-shots and are reported with little or no speculation about the possible effects of environmental management. It is usually not hard to detect amphibians and reptiles but it can be difficult to compare surveys from different times. Results can be affected by many factors including methods used and habitats searched.

Because the modern populations of amphibians and reptiles are largely remnants that reflect their prehistoric distributions, their present occurrences can be interpreted as indicators of recent prehistoric conditions. Because they are not as mobile nor as physiologically buffered as birds or mammals, local amphibians and reptiles are relatively more sensitive to environmental conditions and to changes in those conditions resulting from management. However, generalities have their exceptions, and the exception here is the Bullfrog, which is an exotic species native to eastern North America (east of the 100th meridian). Unlike the native species, the Bullfrog is a weed species that is remarkably efficient at reproducing, dispersing, and establishing new populations.

The present herpetofaunal surveys were intended to detect the local species in the Coyote Creek Environmental Restoration Area, and to provide defined survey methods and locations for any future surveys that monitor this area. This project area is in Lane County, Oregon, and is roughly 4 airline km south of the town of Cheshire. It is about 100 acres of privately owned land on the east side of the present Long Tom River (a channelized and regulated flow) and on the south side of Franklin Road. This land is in adjacent parts of sections 27 and 28 in Township 6 south, Range 5 west. Entry is by permission from land owner Art Johnson or project manager Cindy Thieman.

This is old bottom land that is nearly level (the elevation is generally 100 m or 330 feet) and is where, in prehistoric times, the meandering channels of Coyote Creek joined the free-flowing Long Tom River. There had been a stand of large oak trees, as evidenced by the large cut oak stumps near the south boundary of the project area and by the many young oaks now growing in the non-cultivated parts of the project area and on adjacent lands. The Calapooya Indians found shelter under these riparian oak trees (Mike Southard of the Eugene BLM, personal communication), as evidenced by the archaeological sites explored and described by Miller in Aikens (1975).

The Calapooya had a cultural tradition of burning back the brushy vegetation. These deliberately set fires favored grassland vegetation, and that in turn favored the resources of elk and camas, and the fires probably spared the older, fire-resistant trees. The prehistoric occurrence and abundance of the native amphibians and reptiles should have reflected this culturally determined fire disclimax, which was a continuously repeated modification of the otherwise natural vegetation of this area.

The historic management of the project area has included fire suppression (which would explain the dense stands of young oaks), grazing by domestic livestock (there are still cattle immediately south of the project area), and cultivation of the land for crop production. The trampling of the ground by domestic livestock can collapse the subsurface spaces used by many small animals. For example, this may be why the Sharp-tailed Snake is now rare in seemingly suitable oak-woodlands

of the Willamette Valley. Repeated plowing of the cultivated parts of the project area is likely to have eliminated most species of native small animals, and of the few that are found in the cropped land some may be transients and some may be exotic crop pests (such as the Gray Fieldslug).

Pesticides and fertilizers have been used in the project area over the past 50 to 60 years (Cindy Thieman, personal communication). Applied chemicals have probably reduced the diversity of invertebrate species (that are food for many vertebrates) but not necessarily the numbers within the surviving species. Any reduction of the amphibian and reptile species diversity is presumed to be a result both of past management actions and of unintended consequences of management, such as the invasion by harmful exotic species such as blackberries, reed canarygrass, and bullfrogs.

In addition to being the remnants of prehistoric animal populations, the present fauna is also governed by the dynamic interaction of the surviving native species, the invading exotic species, the past agricultural activities, and the new management measures that are intended to restore the native vegetation and its contribution to the health of the watershed and its wildlife. As a historical document and a potential guide for future environmental management, the present herpetological surveys were intended to detect species presence, to note relative abundance and habitat use, and to provide a defined baseline to which future surveys can be compared. In general the herpetological survey methods are those described by Applegarth (1994b, 2003). In this project the primary methods have been the use of placements and subjective searches (described in Appendix 1). If technical questions ever need to be addressed, research methods are described by Olson et al (1997) and Heyer et al (1994). Survey protocols for the Western Pond Turtle are being developed.

Incidental observations of terrestrial mollusks (gastropods = slugs and snails) are included in these surveys. Mollusks are often found under the same sorts of objects that reptiles and amphibians use for cover, including those that have been imported and deliberately set out. Although the ecological requirements of mollusks are not understood as well as those for amphibians and reptiles, there is the potential that this additional line of evidence can contribute to understanding past conditions and to guiding future management. Mollusks do have the advantage of being more numerous in both individuals and species. In the future, the addition of beetle surveys, especially for those in the family Carabidae, could provide more evidence for interpreting the local ecosystem and guiding its management. Beetles are often found under debris, natural and manufactured, and under imported placements, and the taxonomy and habitat associations of beetles are fairly well understood.

For information about and color photographs of the amphibians and reptiles of western Oregon, please refer to recent field guides. The excellent guide by Stebbins (2003) covers western North America. Regional field guides can provide more illustrations and detailed information about local species. Recent regional guides for amphibians are by Leonard et al (1993) and by Corkran and Thoms (1996), and recent guides for reptiles are by Storm et al (1995) and St. John (2002).

Special thanks are extended to Cindy Thieman (Long Tom Watershed Council) and the Oregon Watershed Enhancement Board for making this study possible, to Jim Ekins for help and good company in the field, to Rick McMullen (Eugene BLM) for assistance with GPS equipment and data, and to Rob Stein (Eugene BLM) for producing the excellent maps at the end of this report.

Table 1. Herpetofauna -- Observed and Potential

C = common in the study area
E = Extirpated (regionally extinct)
S = scarce in the study area
? = expected in the study area
/ = not expected in the study area
t = uses terrestrial habitats
a = uses pond (lentic) habitats
X = exotic (non-native) species

Amphibians

/.....	t....a... ..... Northwestern Salamander.....	*Ambystoma gracile*
?.....	t....a... ..... Long-toed Salamander.....	*Ambystoma macrodactylum*
?.....	t..... Clouded Salamander.....	*Aneides ferreus*
/.....	t....a... ..... Pacific Giant Salamander.....	*Dicamptodon tenebrosus*
?.....	t..... Ensatina (salamander).....	*Ensatina eschscholtzii*
C....	t....a... ..... Pacific Treefrog.....	*Hyla regilla*
C....	t....a... ..... Red-legged Frog.....	*Rana aurora*
C.....	.a... X....Bullfrog.....	*Rana catesbeiana*
/.....	.....a... E....Oregon Spotted Frog.....	*Rana pretiosa*
C....	t....a... ..... Rough-skinned Newt.....	*Taricha granulosa*

Reptiles

/.....	t..... Rubber Boa.....	*Charina bottae*
S....	t....a... ..... Western Pond Turtle.....	*Clemmys marmorata*
?.....	t..... Racer (snake).....	*Coluber constrictor*
/.....	t..... Sharp-tailed Snake.....	*Contia tenuis*
?.....	t..... Ring-necked Snake.....	*Diadophis punctatus*
?.....	t..... Southern Alligator Lizard.....	*Elgaria multicarinata*
?.....	t..... Western Skink.....	*Eumeces skiltonianus*
?.....	t..... Gopher Snake.....	*Pituophis catenifer*
/.....	t..... Western Fence Lizard.....	*Sceloporus occidentalis*
/.....	t..... Western Terrestrial Garter Snake.....	*Thamnophis elegans*
S....	t..... Northwestern Garter Snake.....	*Thamnophis ordinoides*
C....	t....a... ..... Common Garter Snake.....	*Thamnophis sirtalis*

Table 2. Mollusk Fauna -- Observed and Potential

C = common in the study area
S = scarce in the study area
? = expected in the study area
/ = not expected in the study area
t = uses terrestrial habitats
a = uses pond (lentic) habitats
X = exotic (non-native) species

?	t		Oregon Lancetooth (snail)	*Ancotrema hybridum*
C	t		Beaded Lancetooth (snail)	*Ancotrema sportella*
C	t		(Pacific) Banana Slug	*Ariolimax columbianus*
/	t		Western Thorn (snail)	*Carychium occidentale*
?	t		Glossy Pillar (snail)	*Cochlicopa lubrica*
C	t	X	Gray Fieldslug	*Deroceras reticulatum*
/	t		Brown Hive (snail)	*Euconulus fulvus*
S	t		Robust Lancetooth (snail)	*Haplotrema vancouverense*
?		a	Great Basin Ramshorn	*Helisoma newberryi*
/	t	X	Brown Gardensnail	*Helix aspersa*
/		a	Glassy Juga (water snail)	*Juga silicula*
?	t		(Pacific) Sideband Snail	*Monadenia fidelis*
?	t		Threaded Vertigo (snail)	*Nearctula rowelli*
/	t	X	glass-snail(s)	*Oxychilus* species
C		a	physoid aquatic snail(s)	*Physa*-like species
/	t		Western Flat-whorl (snail)	*Planogyra clappi*
?	t		Denticulate Tightcoil (snail)	*Pristiloma lansingi*
C	t		Reticulate Taildropper (slug)	*Prophysaon andersoni*
/	t		Blue-gray Taildropper (slug)	*Prophysaon coeruleum*
/	t		Pappilose Taildropper (slug)	*Prophysaon dubium*
?	t		Conical Spot (snail)	*Punctum randolphi*
?	t		Northwest Striate (snail)	*Striatura pugetensis*
C	t		hesperian snail(s)	*Vespericola* species
/	t		Western Glass-snail	*Vitrina pellucida*

Results by species ---- Amphibians

The Northwestern Salamander (***Ambystoma gracile***) was not detected during this survey. This large salamander is associated with ponds in the moist forests of the Pacific Northwest. The terrestrial adults are seldom seen because by day they are usually under rocks or logs or in holes in the ground. This species is easily detected by searching for their large globular egg masses in the margins of ponds. Larvae have been caught in minnow traps in sluggish streams east of Corvallis, so there is a possibility that this species was in the beaver ponds and back waters of the Long Tom in prehistoric times. The present occurrence of this species within the project area was thought to be unlikely, but the ambystomatid larva that was glimpsed on September 3 could have been this species (Map 3). The multiple searches for frog egg masses did not detect any of the relatively conspicuous egg masses that are deposited by this salamander on submerged stems near shore.

The Long-toed Salamander (***Ambystoma macrodactylum***) was not detected during this survey. This small salamander breeds in early spring using the same sort and often the very same seasonal puddles that the Pacific Treefrog is using. This species inhabits grasslands including the prairies of the Willamette Valley. It should have been common in the study area in prehistoric times. In the future this species may be found by means of placements, especially in a wet year. If detected, the presence of this species would be an indication there had been grassland here in prehistoric times. The ambystomatid larva seen on 3 September 2003 (Map 3) could have been a Long-toed Salamander. Unfortunately, on 3 September 2003, I was carrying GPS equipment and not a dip net, and on 20 March 2004 when I did have a dip net then I caught only fish and tadpoles.

The Clouded Salamander (***Aneides ferreus***) was not detected during this survey. This small and semi-arboreal salamander is an associate of douglas-fir forests, and sometimes survives after the douglas-fir forests are gone, as it did on College Hill in Eugene (Kezer, 1988). If future surveys in the project area detect this species, then it would be an indication that douglas-fir trees had been here in the past. However a failure to find this species could be due to many factors (such as the weather) and should not be interpreted as indicating the prehistoric absence of douglas-fir trees.

The Pacific Giant Salamander (***Dicamptodon tenebrosus***) was not detected during this survey. This large salamander mainly inhabits mountain streams in the Pacific Northwest. Adults roam the floor of coniferous forests when conditions are wet, and seek subsurface dampness at other times. Larvae of this species are common in Coast Range streams, and a few individuals have been found in or near streams on the floor of the Willamette Valley. There is a chance that they still move this far down the Long Tom, but it seems unlikely that any will ever be found within this study area.

The Ensatina (salamander) (***Ensatina eschscholtzii***) was not detected during this survey. This small salamander is common in both the conifer forests and the oak-woodlands of this region, and it would be surprising if it were not found under placements during future surveys. The presence of this species would only indicate there had been some trees in the area in prehistoric times.

The Pacific Treefrog (***Hyla regilla***) was calling at multiple locations within the study area (Map 4). This small frog with the loud voice breeds in seasonal puddles, in forests and grasslands, and then

seeks shelter in tree cavities or holes the ground during the dry summer. It may occur adjacent to fish-bearing waters but normally does not breed where there are any fish. The presence of mosquitofish in the main channels of the project area is not a problem because there are many seasonal puddles, including the large shallow pond in the woods to the east of the sugarbeet field. The loud chorus from the pond in the woods indicated it was the best breeding site within hearing distance (these small frogs can be heard a kilometer or more away). Most of the local treefrogs were at this large pond, a few were along the east side of the channels, one was calling on the west side of the circular field, and none was on the west side of the study area adjacent to the Long Tom River (between the north and south "stop-log" outlets). One sweep of the dip net caught 5 treefrog tadpoles in a drying-up puddle near the north end of the old channel in the sugarbeet field on 27 May 2003 (on 3 September 2003 this was given the GPS name of "puddle now dry"). Treefrog reproductive success at the forest pond is probably much greater than for ponds within the study area (the old channel may dry up too fast and now seem to occupy most of the main channel). On 3 September (at 1454 hours) there was one treefrog that called from a thicket of reed canarygrass apparently in response to the beeping sound being made by the Trimble Pathfinder GPS unit. The use of sounds other than recorded frog calls may have some potential for use as a survey device.

The Red-legged Frog (***Rana aurora***) was found within the project area (Map 5). On 11 March 2003 one Red-legged Frog (an adult male or subadult female) was clearly observed as it sat on the west bank of the main channel south of the "big culvert" (see Appendix 2 for UTM coordinates). On this same day other ranid frogs (*Rana* species -- not treefrogs) jumped into the water at roughly a dozen other locations (during the GPS survey on 3 September the flags at 9 of those locations were found). On 11 March none of the ranid frogs vocalized when they jumped, and the weather was cool and overcast (which does not favor Bullfrog activity), so most if not all of the ranid frogs detected on that date were probably Red-legged Frogs. Another sighting of a Red-legged Frog was reported to Jim Ekins by Christopher Pear (USFWS) who was also working in the project area on that day. On 18 March 2003 Jim Ekins and I surveyed the north and main channels using his canoe and polarized sun glasses; we were looking for Red-legged Frog egg masses but failed to find any. During the first week of March 2004 Chris spotted another Red-legged Frog "in the main slough" (per his email dated 5 March 2004). On 13 May 2003 (a warm and clear day) all but one of the ranid frogs that jumped in (before they were visually located) gave a distinctive vocal squeak or squawk that identified them as young Bullfrogs. However on 3 September 2003, while Bullfrogs were still active, two juvenile Red-legged Frogs were visually identified and an adult Red-legged Frog gave a series of calls (apparently in response to the sound of voices when I was talking to Jim Ekins). On 20 March 2004 I saw another juvenile Red-legged Frog and succeeded in spotting four Red-legged Frog egg masses (all apparently spent), all along the west side of the "circular field" -- in an area where many newts and no Bullfrogs were detected during these surveys. The Red-legged Frog has been termed the "western wood frog" because of its tendency of dispersing into the forest during the summer. However the presence of this frog in this bottom lands area is consistent with its presence in the marshes of Fern Ridge Reservoir (on 6 March 1993 there were 50 or more egg masses of this frog in shallow water, about 1 km NE of Elmira).

The Bullfrog (***Rana catesbeiana***) was detected at 20 locations in the project area (Map 6) but most of these locations were along the northern channel, from the area of station CC-07 to the area of

CC-10. The exceptions were one juvenile Bullfrog near station CC-06, one Bullfrog tadpole near CC-18, and one Bullfrog tadpole in the side channel east of CC-03. This exotic and invasive species may have recently colonized the project area (only one adult was detected), or the vegetation of the southern part, until the recent management, made the water too shady for this sun-loving species. There is a third possibility, that the presence of many Rough-skinned Newts (*Taricha granulosa*) in the southern half of the project area may be an obstacle to the Bullfrog. As a non-native predator the Bullfrog does not know that the newt is too poisonous to eat, and elsewhere dead Bullfrogs have been found with recently eaten newts inside them (Nussbaum et al 1983, page 116). Not only do adult Bullfrogs eat other vertebrates, but the presence of Bullfrog tadpoles has a negative effect on the larvae of native amphibians (Kiesecker and Blaustein, 1997 and 1998; Kupferberg, 1997; Kiesecker et al, 2001). Action to reduce the number of Bullfrogs in the study area should help the survival of native fauna. Permanent eradication probably is not possible because they are efficient at re-invading from adjacent areas. Therefore Bullfrog control measures will probably need to be part of the routine management of this valuable natural area.

The Oregon Spotted Frog (***Rana pretiosa***) may have been the most common ranid frog in this area in prehistoric times. Now it is gone. Spotted frogs are similar in size to the Red-legged Frog but unlike the Red-legged Frog, spotted frogs are summer breeders that prefer relatively warm waters that are exposed to plenty of sunlight. Because the Calapooya had a cultural tradition of setting wildfires to favor grass and camas, this area should have been relatively open, except for groves of old oaks, and where the meandering stream channels would have been in the sun they would have been ideal habitat for spotted frogs. One of the last Oregon Spotted Frogs in the Willamette Valley was found about 1941 roughly 5 km NNE of the study area (where Amazon Creek crosses state route 36). The Oregon Spotted Frog is now an endangered species that is completely extirpated from the Willamette Valley (by the Bullfrog, bass, fire suppression, and other habitat alterations). It survives at a few locations on the Cascade Crest. Mainly because of the well-established Bullfrog the reintroduction of the Oregon Spotted Frog to the Willamette Valley does not seem feasible. It was interesting to read that in Montana, reproduction of the closely related Columbia Spotted Frog (*Rana luteiventris*) "was affected more by vegetation and habitat than by predation by introduced trout" (Bryce Maxell *in* Werner, 2004). Nevertheless, any introduction of trout or other large fishes into the waters of the Coyote Creek project area should be done with caution.

The Rough-skinned Newt (***Taricha granulosa***) is a regionally common salamander that was found in the southern half of the project area (Map 3) but not seen in the northern half. At least 42 adult newts were observed, all in the water, from placement station CC-16 to station CC-24 (with concentrations near those two stations). Newts breed in quiet waters of ponds, lakes, and streams where there is submerged vegetation on which they can attach their eggs (singly). The presence of predacious fishes is not an obstacle because the skin of the newt and the eggs contain a strong toxin. Presumably because they are toxic if eaten (touching them is not dangerous), newts are not as secretive as most amphibians, but they are relatively long-lived and slow to reproduce, so their conservation could become a management concern. There is one native predator that is immune to this poison, and that is the Common Garter Snake (*Thamnophis sirtalis*). As noted above, the abundance of newts in the southern part of the project area could be keeping the Bullfrog out of that part, and conversely the hungry and naïve Bullfrog could be a deterrent to newts entering the

parts of the Willamette Valley wherever there are rocks and/or oak trees to offer cover. The presence of this species in the project area in prehistoric times seems reasonable because of the oak trees, so there is a reasonable possibility that it will be found in the course of future surveys.

The Western Terrestrial Garter Snake (***Thamnophis elegans***) was not detected during this survey. Outside of the Willamette Valley this species of garter snake has a wide distribution in western North America (St John 2002, page 221) and wherever it occurs it is usually common. Inside the Willamette Valley this species seems to be relatively rare and to have a very patchy distribution. There are three species of garter snakes in the Willamette Valley, each with somewhat different diet and habitat preferences. Within the Willamette Valley the Western Terrestrial Garter Snake seems to prefer relatively open and dry locations and to favor lizards as food, so wherever there is a variety of lizard species (more than just fence lizards) there is the possibility of finding this garter snake. Because this snake can be mistaken for a Northwestern Garter Snake at a glance, a positive identification needs to be made by catching the snake and counting the upper labial scales (8 scales on both sides and the 6th and 7th scales tend to be much larger than the other lip scales).

The Northwestern Garter Snake (***Thamnophis ordinoides***) is present in the project area (Map 7). On 20 March 2004 a juvenile Northwestern Garter Snake was found under the tin (corrugated sheet metal) placement at survey station CC-22. This species of garter snake is common in the woodland areas of the Willamette Valley and it can survive in disturbed areas such as farms and residential areas if there is cover and food. Slugs are its favorite food but it will eat other prey such as salamanders (but not newts). This snake should have been common in the project area in prehistoric times, and future surveys should continue to find this species. The dorsal coloration of this species is remarkably variable (e.g., the stripes may be yellow, orange, red, blue, or white). If any red is present in the coloration, then it typically gets into the mid-dorsal stripe. Because of the possible presence of the Western Terrestrial Garter Snake, positive identifications are needed (catch the snake and count the upper labial scales -- there should be 7 on one or both sides).

The Common Garter Snake (***Thamnophis sirtalis***) seems to be the most common snake in the study area (Map 7). Individuals of this species were observed at 7 locations that are scattered along the margins of the channels. This snake is strongly associated with wetlands -- streams, lakes, and marshes -- and its presence in this bottom land where streams have meandered is to be expected. It eats mainly amphibians and, as noted above, is the only predator that is immune to the toxin in the skin of the newt. Therefore the newts in the southern part of the study area are a food resource for this snake. So are the treefrogs and ranid frogs. In contrast to the Northwest Garter Snake, there is little variation in the coloration of the Common Garter Snake. The variety (subspecies) that inhabits the Willamette Valley has a rusty red head and red spots on its sides, but there is no red within the mid-dorsal stripe (see illustrations in St John (2002, pages 213-214).

Results by species ---- Mollusks

The Oregon Lancetooth snail (***Ancotrema hybridum***) was not detected during this survey. This is a common land snail of the forest floor in this region, and it does occur in oak woodlands. There is a good possibility that this carnivorous snail was present in prehistoric times and might still persist

in some parts of the riparian oak woods. Identification generally requires magnification.

The Beaded Lancetooth snail (***Ancotrema sportella***) was found in the southern part of the study area (Map 8). This is possibly the most abundant land snail of the forest floor in this region (certainly the most often detected, but some micro-snails may have larger numbers). This species is also known from the West Eugene Wetlands. Its presence at two locations in the southern part of the study area suggests that part may have been less impacted by past management practices.

The (Pacific) Banana Slug (***Ariolimax columbianus***) was found at six scattered locations in the study area (Map 9). This is the largest terrestrial mollusk of western Oregon, so individual slugs are relatively mobile. This species is also known from the West Eugene Wetlands. It should be expected in all uncultivated parts of the study area (especially during warm and wet weather).

The Western Thorn snail (***Carychium occidentale***) was not found during the present survey. This tiny, white snail (cone-shaped and about 2 mm long) inhabits the forest floor of western Oregon. It might be present in the study area. Normally they are not noticed during surveys unless the undersides of objects (including placements) are scrutinized with the aid of a magnifying visor.

The Glossy Pillar snail (***Cochlicopa lubrica***) was not found during the present survey. This small and shiny land snail has been found in the seasonally flooded parts of the West Eugene Wetlands, so it seems quite reasonable that this snail should have been in the project area in prehistoric times.

The Gray Fieldslug (***Deroceras reticulatum***) was found at five locations in the study area (Map 9). This is an exotic (non-native) species that is now abundant in the farm lands of the Willamette Valley and can be a major crop pest. What effect it might have on native mollusks or ecosystems is unknown, but as yet it does not seem to have invaded generally healthy forests and woodlands.

The Brown Hive snail (***Euconulus fulvus***) was not detected in the study area. This is an arboreal snail that might have been present in prehistoric times. Although there are few records for Lane County, this is a small snail that is easy to overlook, so it could still be present in the riparian trees.

The Robust Lancetooth snail (***Haplotrema vancouverense***) was found at one location in the study area (Map 8). This moderately large snail is common on the floor of forests in western Oregon. It is also know from the West Eugene Wetlands, so it could be present as a wetland or a woodland species. Together with the other snail records, this detection suggests the native mollusks (and possibly the other invertebrates) have the most intact habitat in the southern part of the study area.

The Great Basin Ramshorn (***Helisoma newberryi***) was not detected in the study area. This is a medium-sized aquatic snail that is known from ponds in other wetlands in the Willamette Valley, so there is a good possibility that this species was present in the study area in prehistoric times.

The Brown Gardensnail (***Helix aspersa***) was not found in the study area. This medium-sized land snail is an exotic (non-native) species that has become a garden pest in most of the temperate parts of North America. Although it can be abundant in Lane County suburbs, there are no records of

this species having invaded the conifer forest or native wetland habitats of western Oregon.

The Glassy Juga snail (***Juga silicula***) was not found in the study area. This aquatic snail normally inhabits streams with rocky bottoms but has been found in slow streams on the Willamette Valley floor. It can be abundant in foothill streams, and it may have occurred within the study area.

The (Pacific) Sideband Snail (***Monadenia fidelis***) was not detected in the study area. This is the largest native land snail of the Pacific Northwest, and is common in the mixed conifer/hardwood forests of western Oregon. Smaller sideband snails inhabit rocky situations in the eastern half of Lane County (possibly an unrecognized species). Although no sideband snails have yet been found in the West Eugene Wetlands, the presence of oak forests along Coyote Creek suggest that sideband snails could be present within the study area (or were present here until recently).

The Threaded Vertigo snail (***Nearctula rowelli***) was not detected within the study area. This is a tiny arboreal snail that seems to be common in western Oregon, but it is not usually found unless special searches are made. There is no reason why it should be absent from the study area.

The glass-snails (***Oxychilus* species**) were not detected in the study area. There are 3 species of these small snails that came from Europe and are widely introduced in North America. They are generally found in damp situations (under things) in gardens and greenhouses. They do not seem to be invading relatively the intact habitats of the forests and native wetlands of western Oregon.

A physoid aquatic snail (***Physa***-like species) was found at three locations within the study area (Map 8). These detections were incidental to efforts to catch fish and tadpoles with a D-net (no specimens of this snail have been collected as yet). This small aquatic snail is probably abundant in all of the permanent and semi-permanent pools in the old stream channels within the study area.

The Western Flat-whorl snail (***Planogyra clappi***) was not detected within the study area. This tiny land snail has been found at several locations in Lane County, but it seems to be scarce and have a patchy distribution. Therefore this snail is possibly present but more likely is not in the study area.

The Denticulate Tightcoil snail (***Pristiloma lansingi***) was not detected within the study area. Land snails in the genera *Planogyra* and *Pristiloma* are tiny (generally less than 3 mm in diameter) and are not likely to be noticed unless the surveyor is looking for them through a magnifying visor. Of the several species of tightcoil snails that occur in western Oregon, this is by far the most common and the most likely to be found in the study area if a special effort is ever made to detect them.

The Reticulate Taildropper slug (***Prophysaon andersoni***) was represented by 3 slugs found at one station in the study area (Map 9). Examination of available literature and specimens indicates this species is closely related to the Yellow-bordered Taildropper (*Prophysaon foliolatum*) and that these two species may have been separated from each other by the old Columbia River (Mount Hood erupted out of the bed of the old river about a million years ago and forced it north to where it cut the present gorge). There are other species (salamanders and other snails) that also seem to have been isolated by the old Columbia River, so this fits a pattern (and any reports of *Prophysaon*

foliolatum from Lane County should be viewed with suspicion). The Reticulate Taildropper inhabits woodlands and riparian zones, so it should have been common here in prehistoric times.

The Blue-gray Taildropper slug (***Prophysaon coeruleum***) was not detected in the study area. This moderately small slug is fairly easy to see because of its bluish coloration (blue-white in the Coast Range and blue-gray in the Cascade Range). This fungivorous species seems to be an associate of conifer forests that have a hardwood component, so its occurrence in the study area seems unlikely.

The Pappilose Taildropper slug (***Prophysaon dubium***) was not found in the study area. This slug is both small (usually less than 2 cm long) and cryptically colored (dark with black blotches), so their detection is not likely unless one is carefully looking for them. Diet and habitat are about the same as for the Blue-gray Taildropper (so called because the posterior part of their body can be shed, much like the tail of some lizards and salamanders, as a decoy to distract a predator).

The Conical Spot snail (***Punctum randolphi***) was not found in the study area. This tiny land snail is not likely to be detected unless the surveyor is using a magnifying visor (adult snails are about 1.2 mm in diameter). There is a reasonable possibility that this species occurs in the study area.

The Northwest Striate snail (***Striatura pugetensis***) was not found in the study area. This tiny land snail is not likely to be detected unless the surveyor is using a magnifying visor (adult snails are about 1.4 mm in diameter). There is a good possibility that this species occurs in the study area.

A hesperian snail (***Vespericola*** species) was represented at three stations in the study area (Map 8). The taxonomy of this genus is not well work out for this region, and most hesperians in Lane County probably represent undescribed species. The Coyote Creek hesperians have few to no bristles on their shells, so at first it was thought they might represent the "Bald Hesperian" of the West Eugene Wetlands (which is on List 1 of the Oregon Natural Heritage Program). However further examination of the specimens revealed that the Coyote Creek hesperians are similar in shell shape to the hesperians that are abundant on the floor of the conifer forests of western Oregon. In contrast, the Bald Hesperian has a distinctly different shell shape (a low spire and large umbilicus). The scarcity of setae on the Coyote Creek hesperians may simply be an artifact of moving about in a substrate that contains mineral particles that polish off the setae. This may also be why the Bald Hesperian (and hesperians in northern California that live under streamside rocks) lack setea. In contrast, the furry hesperians that live in the duff and decaying wood of the forest floor are not rubbing against mineral particles and as a result do not loose the fur that covers their shells. It is interesting to note that the two mature snails found at CC-24 on 13 May 2003 have remarkably dissimilar sizes. Both have a well-developed (mature) reflected peristomal lip, but one is 13.5 mm in diameter and the other is only 10.8 mm. Either there is considerable variation in the mature size or there could be more than one hesperian species represented in the Coyote Creek study area.

The Western Glass-snail (***Vitrina pellucida***) was not detected in the study area. This small land snail lives near streams in other parts of Oregon but has not been documented from Lane County, as yet. It has a fragile and transparent shell with a green tint. This snail is widely distributed in North America but seems to be regionally absent, so it is not likely to occur in the study area.

Conclusions.

The restoration of historic Coyote Creek is an opportunity to conserve and enhance the native fauna and flora, to protect an important archaeological area, and to improve the health and functioning of this part of the Long Tom watershed. Because the present surveys for amphibians and reptiles found large numbers of the Bullfrog (*Rana catesbeiana*), and because the Bullfrog is known to be harmful to native wildlife, there is a need for active management of that exotic (non-native) species.

As noted in the results section, the Bullfrog is a weed species that is remarkably good at dispersing and colonizing -- and therefore presumably good at recolonizing locations from which it has been removed. The situation seems to be similar to that for the exotic blackberries, that the numbers of the invaders will have to be repeatedly reduced by management actions until effective biological controls are found. Biological controls, such as exotic pathogens, should only be applied after the risk to native species has been exhaustively explored. Until then, Bullfrog control should be a matter of removal. Adult Bullfrogs can be removed by hunting them, the egg masses can be removed with fine-mesh dip nets, and the tadpoles can be removed by netting or trapping them.

Removal of reproducing adult Bullfrogs should have the greatest impact, but the adult frogs can be difficult to locate (they are the wise and cautious survivors). Furthermore any Bullfrog hunters looking for eye-shine at night will need to distinguish between Bullfrogs and Red-legged Frogs (and possibly other animals). Any surveys that try to estimate the number of Bullfrogs by means of eye-shine may underestimate the total number by half or more because there is no eye-shine from frogs that are facing in other directions or submerged. The removal of Bullfrog egg-masses has been done elsewhere but the difficulty is locating them before the eggs hatch, which can be in four to five days (Nussbaum, 1983). Although one egg mass can yield thousands of tadpoles, one possible means of control is trapping the tadpoles (but traps would need to be designed and set so they are harmless to juvenile Pond Turtles). Probably the best approach would be continuing efforts to remove all Bullfrog life stages while exercising care to avoid harming native species.

Although the mosquitofish (*Gambusia* species) is an exotic species, for the time being its presence seems to be beneficial (to prevent the channel pools from becoming huge mosquito farms). The exotic Gray Fieldslug (*Deroceras reticulatum*) is not known to be harmful to native wildlife. It would be interesting to see if it dies out as the the native plants and animals recover. Future faunal monitoring of this area should aim to detect such changes in the wildlife community, especially the response of the Bullfrogs to management efforts and the presence of any new invading species.

Biological surveys should be documented with on-the-spot field notes and the results should be reported so that they can be consulted by subsequent investigators and land managers of this and other areas. Future monitoring should provide a measure of the effectiveness of past management actions and serve to guide the planning of further management. Monitoring also provides an opportunity for methods research. Because so much of the Willamette Valley has been converted to intensive cultivation, the conservation and restoration of riparian areas such as Coyote Creek is vital to stabilizing streams and maintaining options for future generations of land managers, and thereby ultimately contribute to restoring the health and functioning of Oregon's watersheds.

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Appendix 1. Methods

The placement method of surveying for small terrestrial animals.

This section is condensed from Applegarth (2003). The "placement" method of surveying for amphibians, reptiles, and other small terrestrial animals consists of preparing and transporting suitable objects into a study area, placing them on the ground at selected locations, and then returning at intervals to lift them and observe what animals might be hiding under them. The following descriptions of materials and procedures are intended to qualify how the results were obtained and to enable future surveyors to use materials and procedures sufficiently similar to allow them to directly compare their survey results with the results reported in the present study.

By way of history, Richard Hoyer found that the Rubber Boa (*Charina bottae*) was relatively easy to find by looking under old roofing tins and other debris that were laying about in rural fields. By "purposeful redistribution" of these debris, he found he could test other locations for the presence of Rubber Boas. With the help of roofing tins and other deliberately placed objects (placements), he has monitored populations of Rubber Boas in western Oregon for four decades (Hoyer, 1974; Hoyer and Storm, 1992). He finds other reptiles under his placements, including the Sharp-tailed Snake (*Contia tenuis*), a small snake that is scarce in western Oregon and generally associated with oak woodlands. Engelstoft and Ovaska (2000) also found *Contia tenuis* by means of placements.

The present study used sets of four different materials for placements. At each subjectively chosen survey station there was a piece of roofing tin (galvanized corrugated steel), a piece of plywood, a piece of carpet, and a piece of black plastic (which was held down by pieces of wood for weights).

Galvanized steel (tin). Roofing tins absorb solar heat. In the summertime the tins can become too hot, but at other times local reptiles evidently appreciate the combination of cover and warmth (Applegarth, 2003, table 5). Commercial roofing tins are about 26 inches wide and vary in length from 8 to 16 feet. Hoyer generally used roofing tins in their original dimensions. Applegarth (1994b, page 25) experimented with smaller (16-inch square) placements but found that they could be soon overgrown and hidden by green vegetation. As a compromise between large size and transportability, the "tin" placements are 2-foot (60 cm) lengths cut from roofing tins. In an effort toward a uniformity of materials, painted steel and corrugated aluminum have not been used.

Plywood. In the present study the plywood placements are 24-inch squares cut from new 4x8 foot sheets of 3/8th inch thick exterior (CDX) plywood. The corners and edges of each square have been filed and sanded to minimize the presence of splinters and risk to the hands of the surveyor.

Plastic. In the present study the "plastic" placements are photo-opaque liners salvaged from bags that were used to protect commercial rolls of photographic paper. They look like sheets of black polyethylene but they are laminated and, unlike ordinary black plastic, they are completely opaque to light. These sheets vary in size but in general measure 20x30 inches (50x75 cm). During the drier parts of summer small animals seem to appreciate the moisture that tends to condense on the underside of the plastic. However, the plastic placements are much lighter than the other materials

and need to be weighted down with rocks or short (cut) lengths of wood. When they are checked, the weights need to be moved off and then put back, so it takes a bit longer to check these placements. In the future if this photo-opaque plastic is not available then thick (6 mil) black polyethylene would probably work nearly as well (and could be cut into larger sheets).

Carpet. The carpet placements were cut from used short-pile carpet that had been removed from offices (and is known in the trade as "commercial pull-up"). The large scraps of discarded carpet were cut into uniform 30x30 inch squares. These squares of carpet vary in color (most are a speckled mixture of color designed to hide dirt) and are roughly 1/4th inch thick. All fibers appear to be synthetic. Carpet can hold moisture from precipitation at some times of year, and may be favored as cover by those animals that need damp conditions, such as amphibians and mollusks.

Active. The term "active" is used for live animals that were not under any kind of cover when they were first noticed. It does not mean the animals were moving. Some animals may try to avoid being noticed by remaining motionless, at least until they are directly approached and forced to flee.

Natural cover. Amphibians and reptiles often hide under natural objects when there is enough space for them under those objects. If there are suitable natural objects in the immediate vicinity of a placement station, such as rocks or slabs of bark, then they can be checked when the placements are checked, and they can be moved so they are next to the imported placements. Suitable natural objects vary in size, shape, and local abundance. Some are too heavy to lift and some are too small to be worth the effort. Some are easy to move and replace without damaging them, and others may be so fragile that they fall apart in spite of efforts to avoid having this happen (this will degrade their quality as potential cover). At survey stations in this study there were no rocks suitable for moving. Most of the available natural objects were logs or parts of logs. Although natural cover cannot be equated to imported placements, Hoyer and Stewart (2000) did keep track of time when searching for Rubber Boas, and they found that looking under placements was more efficient than searching the available natural cover. They found 0.40 snakes per hour when looking under natural objects and 1.76 snakes per hour when looking under their imported placements.

Selecting trails and stations. In the present study the imported placements were arranged in sets of 4 at subjectively chosen stations along the margins of the channels with riparian vegetation. Normally the first step is to review available maps and then to draw tentative survey routes on the maps. The project area is a fenced unit of cultivated land that includes old stream channels and associated riparian vegetation. The existing trails along the margins of those channels provided convenient survey routes. Survey routes are basically loops but, in this case, the southern stations on the east and west side of the main channel had to be visited separately because there is no way to cross the main channel at the south end of the study area. Minor bends and detours were made in order to include various habitat features, such as an oak tree or marshy clearing. In theory the visiting of stations along a trail should be easier and less damaging to the vegetation than roaming about looking for natural cover while tripping, stumbling, and trampling plants in the process.

Placement stations were chosen subjectively, partly to sample various kinds of potential habitats and partly to space them out along the survey routes. Because of the uneven availability of habitat

features (the ponds) and because the objective was to test for presence and not for non-randomness of distribution, placement stations were not evenly spaced. Portable objects that already offered natural cover in this area are scarce, and none was moved to the proximity of any station. Many of the animals in this project area find safety by jumping into the water or going down a hole.

Preparation of materials. The placement materials used in the present study were gathered from a variety of sources but with an effort toward uniformity. In the spirit of recycling, used materials were utilized as much as possible. The new material used in the present study were plywood and tins. Relatively smooth edges of the tins were obtained by using tin snips while curling the cut parts in opposite directions. Burrs and corners are snipped and filed to reduce the danger to the bare-handed surveyors. The carpet was salvaged. After being marked using a yard stick and a crayon, it was cut into 30x30 inch squares using a knife. Then the carpet squares were repeatedly pressure-washed to remove dirt and soluble chemicals, mainly detergents (the first few hosings usually produced some foam). The carpet squares were then hung to drain and dry. The pieces of black plastic were stripped from between layers of brown paper (of bags that had been used to ship photographic paper) and then rinsed in hot water to remove any photochemical residues.

Installing placements. In this study, the placements were "dug in" because if they had been placed on top of the dense grass and forbs then any amphibians and reptiles could be concealed by the plant matter whenever the placements were lifted. The ground-baring process was accelerated by using a garden hoe to clear a small area before the placements were placed on the bared ground. The hoe was also handy for leveling lumps in the ground. The placements were close together at each station, partly so they would all be sampling the same microhabitat and partly so they would be easier to find after vegetation grows up around them. At some stations a single strip of ground was cleared and then the placements were placed side by side. At other stations the placements were separated in order to accommodate local situations. The carpet placements were placed upside down, with the idea that amphibians would prefer being contact with the soggy pile (when the carpet is wet) instead of the stiff backing material. Finally, a nursery marker was used to write the station number on each of the placements. This may help the note taker to record the correct station number, and can also help to identify any placements that have been blown away or carried away.

Checking placements. When placements are checked, each station should be approached with the anticipation that there may be active animals that flee and other animals that are motionless and inconspicuous, such as a brown Red-legged Frog sitting on brown leaves. Motionless frogs are often not noticed until you happen to move directly towards them and they try to leap out of your way. Banana Slugs may be traveling but not moving fast enough to be conspicuous, so watch where you step. Before lifting any placements, watch where you are putting your hands. Poison oak may have been manually suppressed but is quick to grow back. Long sleeves and gloves may give you some protection. Occasionally there are ants or wasps under placements, but getting a good look at what is present normally means kneeling or squatting next to the placement before you lift it. If you stand and use a long-handled potato rake to lift a placement you may not see some of the smaller animals, and by being farther from the ground you have less of a chance of catching anything, such as a fleeing garter snake that might be either *Thamnophis elegans* or *Thamnophis ordinoides* and needs to be examined in hand. Be confident of all identifications.

If there is no need for trail repairs and station maintenance, then a routine check of placements can be fairly rapid. When a team of two does a routine check the work should go faster, with one person lifting the placements while the other takes notes. Having two people together provides a safety factor (in case one is hurt), provides an additional pair of eyes for making observations between stations, and provides better perspective on the area when a fast-moving animal dashes off the instant a placement is lifted. The person standing back may be able to see where the fleeing animal goes and thereby get a good look at it and gain a positive identification.

A general procedure is to visit the placements once a month, with flexibility to allow for the vagaries of weather and personal schedules. Additional visits in the spring can be valuable because of the seasonal increase in activity (many species seem to reach a peak around May 10th). Winter storms bring down limbs, and clearing those from trails and stations is part of routine maintenance. Manual measures to suppress thistles, blackberry vines, and poison oak are time-consuming, so they will hinge on a cost-benefit consideration of the effort. Observations are recorded in a field notebook when and where they were made. All live amphibian and reptile observations have the time of day noted. Bones and snail shells were opportunistically collected without noting the time. However, in future surveys if the time is recorded for all observations then it provides an identifier that can be useful in record keeping and the resolution of any data questions that may arise.

Subjective searching.

Subjective searching is mainly a matter of looking for "active" animals and suitable objects that can be moved. The following is edited from Applegarth (1994b). This method is a matter of making subjective guesses about where animals might be found, and then taking some time to investigate whenever potential habitat is encountered. It is your decision as to which and how many objects to move and where to walk as you search for situations where you might find the animals of interest.

A basic item of equipment for searches on land is a long-handled potato rake, which can be made a bit safer by grinding off the pointed ends of the tines (removing 1 cm or more to make them dull just in case anyone ever falls on them). Use it to lift objects that are easy to move and large enough to conceal an animal. Try to minimize damage to rotten logs because when broken apart the pieces are more vulnerable to drying out. Take advantage of opportunities. If you see an open area next to a pond, walk through that area to see if you can scare a frog into jumping away from you. Frogs are cryptically colored and usually difficult to see if they don't move. If you see an "ugly" heap of trash, such as tar paper or old boards, stop to look under what you can. This stuff is not ugly to small animals. They often seek shelter under loose, flat objects, both natural and manufactured.

When searching for animals in the water, polarized sunglasses will reduces the glare off the surface of the water. A D-net (a long-handled dip net with a straight outer rim) can be used to test for animals in muddy water or in soft aquatic vegetation, generally by reaching out, plunging the net to the bottom, and quickly drawing it back toward the shore -- and then returning the contents back to the water when you have finished searching through them. Try to minimize the disturbance to both the aquatic environment and the shoreline for the sake of the ecosystem and other people (it is not good public relations to leave an area looking "trashed" after you have done a subjective search).

Appendix 2. Observations with UTM coordinates.

The following is is a chronological list of observations of amphibians, reptiles, and mollusks that were detected by John Applegarth in the historic Coyote Creek restoration area in 2003 and 2004. The first item of each entry is the date and time, written as year-month-day-hour (24-hour). Each entry is for a single species, although examples of several species may have been found at the same time in a particular situation. The species (or genus) name is followed by number and relative age of the individuals, their situation, and their location in UTM coordinates. The coordinates that are within parentheses were derived by means of estimation or offset. All other coordinates were measured directly using a Trimble Pathfinder GPS, either at the time of the observation or later by relocating flagging tape that was tied to vegetation at the time of the observation. An asterisk (*) indicates that a mollusk specimen was collected for further study. A squiggle (~) indicates that what follows is an approximation (such as a distance or the developmental age of an individual). A pound sign (#) indicates that an observation was made close to but outside of the managed project area (and therefore is not plotted on the distribution map for that species at the end of this report).

2003 March 11

2003-03-11-1004, *Taricha granulosa*, 1 adult swimming in channel.....(477046E....4888190N)
2003-03-11-____, *Rana*, 2 frogs [#5] silently jumped into channel.....476849E....4888500N
2003-03-11-____, *Rana*, 1 frog [#4] silently jumped into channel.....476877E....4888540N
2003-03-11-____, *Rana*, 1 frog [#3] silently jumped into channel.....476884E....4888553N
2003-03-11-1300, *Rana aurora*, 1 ~adult [#2] sitting on W bank..... 476887E....4888568N
2003-03-11-____, *Rana*, 1 frog [#1] silently jumped into channel.....476894E....4888581N
2003-03-11-1320, *Thamnophis sirtalis*, 1 young adult on W bank..... 476905E....4888706N
2003-03-11-____, *Rana*, 1 frog [#9] silently jumped into channel.....476890E....4888812N
2003-03-11-____, *Rana*, 1 frog [#8] silently jumped into channel.....477010E....4888751N
2003-03-11-____, *Rana*, 2 frogs [#7] silently jumped into channel.....477115E....4888621N
2003-03-11-____, *Rana*, 1 frog [#7] silently jumped into channel.....477074E....4888571N
2003-03-11-____, *Rana*, 1 frog [#6] silently jumped into channel.....476994E....4888594N
2003-03-11-1545, *Taricha granulosa*, 1 adult swimming in main channel.(476958E....4888240N)
2003-03-11-1555, *Taricha granulosa*, 1 adult swimming in main channel.. 477016E....4888277N
2003-03-11-1602, *Taricha granulosa*, 1 adult swimming in side channel.. (477042E....4888291N)

2003 March 18

2003-03-18-1045, *Taricha granulosa*, 1 adult swam down in midchannel.(477040E....4888381N)
2003-03-18-1052, *Taricha granulosa*, 1 adult in shallow water with grass(477017E....4888391N)
2003-03-18-1109, *Taricha granulosa*, 1 adult on bottom in main channel..(476878E....4888234N)
2003-03-18-1125, *Taricha granulosa*, 1 adult swimming in main channel.(476990E....4888252N)
2003-03-18-1131, *Taricha granulosa*, 1 adult on submerged vegetation....(477016E....4888277N)
2003-03-18-____, *Gambusia*, 2 fish in main channel S of fence #.....(477106E....4888136N)
2003-03-18-1420, *Thamnophis sirtalis*, 1~adult active by oak [CC-01].....477082E....4888192N
2003-03-18-1430, *Hyla regilla*, 1 subadult in grass at S edge of pond #.....(477377E....4888327N)
2003-03-18-1439, *Hyla regilla*, 2 ~adults in grass at S edge of pond #.....(477412E....4888340N)
2003-03-18-1500, *Vespericola*, 5 adult snails* under black plastic #..... (477477E....4888398N)

2003-03-18-2017, *Hyla regilla*, 3 adults calling from edges of channel.....477079E....4888672N
2003-03-18-2028, *Hyla regilla*, 2 adults calling from edges of channel.....477063E....4888559N
2003-03-18-2037, *Hyla regilla*, 5 adults calling from flooded marsh..... 476994E....4888594N
2003-03-18-2052, *Hyla regilla*, 2 adults calling from edges of channel.....476989E....4888445N
2003-03-18-2124, *Hyla regilla*, 1 adult calling at mouth of side channel.....477016E....4888277N
2003-03-18-2221, *Hyla regilla*, 1 adult calling from SW corner of pond #.(477343E....4888334N)
2003-03-18-2238, *Hyla regilla*, 2 adults calling from marsh along channel..477040E....4888204N
2003-03-18-2242, *Hyla regilla*, 2 adults calling from marsh along channel..476990E....4888252N
2003-03-18-2250, *Hyla regilla*, 1 adult calling from edge of main channel.(476809E....4888341N)

2003 April 22

2003-04-22-1611, *Thamnophis sirtalis*, 1 adult active on rim at CC-15.....476861E....4888526N

2003 April 26

2003-04-26-1700, *Thamnophis sirtalis*, 1 juvenile found dead at CC-24.....477040E....4888193N

2003 May 13

2003-05-13-1027, *Rana catesbeiana*, 1 juvenile [#8] squawked in..... 476868E....4888766N
2003-05-13-1041, *Rana catesbeiana*, 1 adult calling at edge of channel.....477090E....4888658N
2003-05-13-____, *Deroceras reticulatum*, 1 slug* under carpet at CC-07...476992E....4888603N
2003-05-13-____, *Prophysaon andersoni*, 1 slug* under carpet at CC-07...476992E....4888603N
2003-05-13-____, *Deroceras reticulatum*, 1 slug* under plastic at CC-07..476992E....4888603N
2003-05-13-____, *Prophysaon andersoni*, 1 slug* under plywood CC-07..476992E....4888603N
2003-05-13-1104, *Vespericola*, 1 adult snail* under plywood CC-06.....476905E....4888476N
2003-05-13-____, *Gambusia*, 4 fish in bay on N side of channel.....(476974E....4888470N)
2003-05-13-1117, *Ariolimax columbianus*, 2 juv. slugs plywood CC-05.... 476998E....4888446N
2003-05-13-____, *Deroceras reticulatum*, 1 slug* under plywood CC-04..477008E....4888334N
2003-05-13-1117, *Deroceras reticulatum*, 2 slugs under plywood CC-05..476998E....4888446N
2003-05-13-1127, *Rana*, 1 small frog silently jumped in.....(477009E....4888280N)
2003-05-13-1127, *Taricha granulosa*, 11 newts in water next to CC-03....(477009E....4888280N)
2003-05-13-1135, *Ariolimax columbianus*, 1 adult slug plastic CC-02..... 477054E....4888262N
2003-05-13-1138, *Haplotrema vancouverense*, 1 subad. snail tin CC-02.... 477054E....4888262N
2003-05-13-1140, *Ancotrema sportella*, 1 ad. snail under carpet CC-02.....477054E....4888262N
2003-05-13-1140, *Vespericola*, 1 juvenile shell* under carpet CC-02.....477054E....4888262N
2003-05-13-1144, *Ancotrema sportella*, 1 ad. snail plywood CC-02..... 477054E....4888262N
2003-05-13-1144, *Ariolimax columbianus*, 1 juv. under plywood CC-02....477054E....4888262N
2003-05-13-1210, *Taricha granulosa*, 12 newts in water next to CC-03....(477009E....4888280N)
2003-05-13-____, *Rana catesbeiana*, 1 juv. squealed in E of CC-12..... 476961E....4888774N
2003-05-13-1232, *Rana catesbeiana*, 3 juv. squealed in SE of CC-12.....477007E....4888728N
2003-05-13-1239, *Rana catesbeiana*, 1 juv. squawked into channel.....(477071E....4888658N)
2003-05-13-1243, *Rana catesbeiana*, 2 juv. squealed into channel.....477101E....4888614N
2003-05-13-1247, *Rana catesbeiana*, 2 juv. squawked into channel..... 477058E....4888577N
2003-05-13-1252, *Ariolimax columbianus*, 2 juv. under plywood CC-13....477010E....4888669N
2003-05-13-1256, *Ariolimax columbianus*, 1 juv. under tin at CC-14.....476999E....4888638N

2003-05-13-1312, *Deroceras reticulatum*, 1 ~adult under carpet CC-16.....476848E....4888475N
2003-05-13-1315, *Taricha granulosa*, 10 ad. in water 15 m E of CC-16... (476863E....4888475N)
2003-05-13-1323, *Ariolimax columbianus*, 1 juv. under carpet CC-18..... 476997E....4888405N
2003-05-13-1357, *Taricha granulosa*, 1 adult in water E of CC-24..... (477046E....4888190N)
2003-05-13-1400, *Deroceras reticulatum*, 1 ad. under plywood CC-24.....477040E....4888193N
2003-05-13-1400, *Vespericola*, 2 adult snails* plywood CC-24..... 477040E....4888193N
2003-05-13-1415, *Taricha granulosa*, 15 ad. in water 15 m E of CC-16... (476863E....4888475N)

2003 May 27

2003-05-27-____, *Ancotrema sportella*, 1 juv. shell* under plastic CC-01..477082E....4888192N
2003-05-27-0950, *Ancotrema sportella*, ad. & juv. under carpet CC-02..... 477054E....4888262N
2003-05-27-0954, *Ancotrema sportella*, 1 juv. snail under tin at CC-02..... 477054E....4888262N
2003-05-27-1000, *Gambusia*, 8+ fish in shallow end of side channel..... (477060E....4888282N)
2003-05-27-1008, *Taricha granulosa*, 1 ad. in water 10 m ENE CC-03.... (477017E....4888289N)
2003-05-27-1022, *Ariolimax columbianus*, 1 juv. under plywood CC-05....476998E....4888446N
2003-05-27-1037, *Prophysaon andersoni*, 1 slug under plastic at CC-07....476992E....4888603N
2003-05-27-1040, *Rana catesbeiana*, 1 ~subadult squawked in.....(476998E....4888588N)
2003-05-27-1047, *Hyla regilla*, 5+ tadpoles in drying puddle.....477110E....4888572N
2003-05-27-1123, *Rana catesbeiana*, subad. & juv. squawked in.....477007E....4888728N
2003-05-27-1135, *Ariolimax columbianus*, 2 juv. slugs under tin CC-13.... 477010E....4888669N
2003-05-27-1137, *Ariolimax columbianus*, 1 juv. under carpet at CC-13.....477010E....4888669N
2003-05-27-1151, *Taricha granulosa*, 1 ad. in water 20 m ESE CC-16.....(476867E....4888469N)
2003-05-27-1202, *Ariolimax columbianus*, 1 juv. under carpet at CC-18.....476997E....4888405N
2003-05-27-1212, *Ariolimax columbianus*, 1 juv. under carpet at CC-20.....476808E....4888323N
2003-05-27-1229, *Deroceras reticulatum*, 1 slug under carpet at CC-24.....477040E....4888193N
2003-05-27-1229, *Vespericola*, 1 adult snail* under carpet at CC-24.....477040E....4888193N

2003 September 3

2003-09-03-____, *Gambusia*, 100+ fish in pool by S stop-log.....(476850E....4888513N)
2003-09-03-1118, *Thamnophis sirtalis*, 1 young adult on W bank..... 476802E....4888348N
2003-09-03-1241, *Rana catesbeiana*, 1 juv. squcaked into pool..... (476923E....4888483N)
2003-09-03-1340, *Ambystoma*, 1+ small larva in shallow pool.....476991E....4888766N
2003-09-03-1340, *Gambusia*, 100+ fish in shallow pool.....476991E....4888766N
2003-09-03-1340, *Rana catesbeiana*, 100+ tadpoles in shallow pool.....476991E....4888766N
2003-09-03-1400, *Rana catesbeiana*, 24+ tadpoles in S end of pool.....477013E....4888572N
2003-09-03-1410, *Rana catesbeiana*, 24+ tadpoles in N end of pool.....477007E....4888617N
2003-09-03-____, *Rana catesbeiana*, 24+ tadpoles in middle of pool.....477000E....4888585N
2003-09-03-1430, *Rana aurora*, 1 juvenile frog on mud near pool.....477015E....4888569N
2003-09-03-1438, *Rana aurora*, 1 juvenile frog on mud near pool.....477029E....4888566N
2003-09-03-1454, *Hyla regilla*, 1 adult calling from reed canarygrass..... (477035E....4888566N)
2003-09-03-1500, *Gambusia*, 2+ fish in shallow channel pool.....(477035E....4888569N)
2003-09-03-1500, *Rana catesbeiana*, 2+ tadpoles in shallow pool..... (477035E....4888569N)
2003-09-03-1500, *Rana* species, 2+ small tadpoles in shallow pool..... (477035E....4888569N)
2003-09-03-1519, *Rana aurora*, 1 adult calling from channel pool.....(477067E....4888679N)

2004 March 20

2004-03-20-1055, *Gambusia*, 2 fish in net sample from pool.....(476902E....4888592N)
2004-03-20-1055, *Physa*-like aquatic snail, 2+ in net sample from pool.....(476902E....4888592N)
2004-03-20-1055, *Rana catesbeiana*, 4 tadpoles in net sample from pool...(476902E....4888592N)
2004-03-20-____, *Physa*-like aquatic snail, 2+ in net sample from pool.....(476855E....4888476N)
2004-03-20-1122, *Gambusia*, 2+ fish in shallow water.....(477013E....4888416N)
2004-03-20-1122, *Rana aurora*, 1 juvenile frog in shallow water.....(477013E....4888416N)
2004-03-20-____, *Gambusia*, 2+ fish in shallow water.....(477038E....4888384N)
2004-03-20-1136, *Rana catesbeiana*, 1 tadpole in net sample from pool....(476983E....4888406N)
2004-03-20-1139, *Thamnophis sirtalis*, 1 adult ~9 m WNW of CC-18.....(476989E....4888410N)
2004-03-20-____, *Rana aurora*, 1 egg mass (spent) ~1 m from shore.....(476825E....4888384N)
2004-03-20-1212, *Taricha granulosa*, 1 ad. in net sample from channel....(476805E....4888351N)
2004-03-20-____, *Rana aurora*, 1 egg mass (spent) ~2 m from shore.....(476813E....4888317N)
2004-03-20-1220, *Hyla regilla*, 1 adult calling from 21 m SSE of CC-20..(476817E....4888303N)
2004-03-20-____, *Rana aurora*, 1 egg mass (spent) ~2 m from shore.....(476826E....4888268N)
2004-03-20-1240, *Taricha granulosa*, 1 adult active below surface.....(477002E....4888262N)
2004-03-20-____, *Gambusia*, 10+ fish in shallow water.....(477040E....4888268N)
2004-03-20-____, *Gambusia*, 10+ fish at flooded CC-24.....477040E....4888193N
2004-03-20-____, *Physa*-like aquatic snail, 10+ at flooded CC-24.....477040E....4888193N
2004-03-20-1307, *Thamnophis ordinoides*, 1 juvenile under tin at CC-22...476934E....4888225N
2004-03-20-____, *Rana aurora*, 1 egg mass (spent) ~1 m from shore.....(476863E....4888390N)
2004-03-20-1330, *Rana*, 1 juvenile frog silently jumped into ditch.....(476908E....4888609N)
2004-03-20-1332, *Gambusia*, 4 fish in net sample from ditch.....(476908E....4888609N)
2004-03-20-1332, *Rana catesbeiana*, 2 tadpoles in net sample from ditch..(476908E....4888609N)
2004-03-20-____, *Rana*, 1 frog silently jumped into channel.....(476868E....4888766N)
2004-03-20-____, *Rana*, 1 small frog skitted down into water.....(476872E....4888781N)
2004-03-20-1416, *Clemmys marmorata*, 1 adult basking on log.....(476987E....4888759N)
2004-03-20-1439, *Rana catesbeiana*, 2 tadpoles (1 found dead).....(477106E....4888591N)
2004-03-20-____, *Rana catesbeiana*, 1 juvenile squeaked into channel.....(477097E....4888584N)
2004-03-20-____, *Gambusia*, 10+ fish at flooded station CC-07.....476992E....4888603N
2004-03-20-____, *Rana*, 3 small frogs silently jumped in.....(476992E....4888598N)
2004-03-20-1511, *Rana*, 2+ small frogs silently jumped in.....(476981E....4888347N)
2004-03-20-1511, *Taricha granulosa*, 1 adult in net sample.....(476981E....4888347N)
2004-03-20-1512, *Thamnophis sirtalis*, 1 adult active at CC-04.....477008E....4888334N
2004-03-20-1538, *Rana catesbeiana*, 1 tadpole netted in side channel.....(477054E....4888294N)
2004-03-20-1612, *Rana catesbeiana*, 1 tadpole netted at CC-07.....476992E....4888603N

Appendix 3. Field notes -- edited and annotated for clarity.

2003 March 4. I met with Cindy Thieman (project leader) at the BLM Red House, then followed her out to the Art Johnson property on Coyote Creek, where she gave me a tour of the project area.

2003 March 7. I met with Cindy Thieman at the BLM Red House for maps and project planning.

2003 March 11. I met Jim Ekins (who is doing vegetation management) at the project area and we did a walking visual survey of all sides of all of the ponds and water channels in the project area.

---- An adult Rough-skinned Newt (***Taricha granulosa***) was active in the water of the main channel at the bend that turns north from the south property line [at estimated UTM 477046E 4888190N, next to the future site of placement station CC-24 - see field notes from 2003 Sep 3 for the UTM coordinates of all 24 placement stations] at 1004 hours. On the adjacent west bank there was a jungle of berry vines, some ash and willow trees, wild rose, reed canarygrass, and spirea.

---- We visually searched the shoreline along the west side of the ponds beginning from the south property line. Ranid frogs (***Rana*** species - not treefrogs) silently jumped into the water at several locations, and I marked these locations by tying white flagging tape to vegetation on the adjacent bank. There were two frogs at one location [at GPS point "frogs5" = UTM 476849E 4888500N] that was SE of the south "stop log" where we stopped for lunch. Then two separate frogs jumped in [at GPS point "frog4" = UTM 476877E 4888540N, and at GPS point "frog3" = UTM 476884E 4888553N] between the future site of station CC-15 and the "big culvert." Most likely these were all *Rana aurora* because of the time of year (early spring) and because they did not vocalize when they jumped. Bullfrogs normally squeak or squeal when they jump in. The weather was cool and overcast, and there was a light mist in the air -- not weather that would favor bullfrog activity.

---- Finally we got a positive visual identification of a subadult Red-legged Frog (***Rana aurora***) as it was sitting motionless [at GPS point "raau" = UTM 476887E 4888568N] on the west shore of the channel between the "big culvert" and the south "stop log" at 1300 hours. I tied flagging tape on a nearby (cherry?) tree. Other vegetation included blackberry vines and reed canarygrass.

---- A frog (***Rana***) jumped into the channel [at GPS point "frog1" = UTM 476894E 4888581N].

---- We observed a young adult Common Garter Snake (***Thamnophis sirtalis***) that was active [at UTM 476905E 4888706N] on the grassy west bank of the borrow ditch, east of the Long Tom levee, between the "big culvert" and the north "stop log." The term "active" only means that an animal was found out in the open instead of being under some form of cover and does not mean the animal was moving when was first spotted. This particular snake fled from us by swimming eastward across the flooded borrow ditch [toward the future site of station CC-11] at 1320 hours.

---- More frogs (***Rana***) jumped into the water at multiple locations along the north channel (an ear-shaped linear pool), and I continued to mark locations with white flagging tape. One frog jumped in [at GPS point "frog9" = UTM 476890E 4888812N] near the north end of the north channel.

Then another jumped in [at GPS point "frog8" = UTM 477010E 4888751N] about midway on the NE side of the north channel. Then two frogs jumped in [at GPS point "frogs7" = UTM 477115E 4888621N] near the SE corner of the north channel. Then another jumped in [at GPS point "frog7" = UTM 477074E 4888571N] near the south end of the north channel (or bottom of the "earlobe"). Finally, another frog jumped in [at GPS point "frog6" = UTM 476994E 4888594N] on the SW side of the north channel (or west side of the "earlobe").

---- An adult Rough-skinned Newt (***Taricha granulosa***) swam into deep water [at estimated UTM 476958E 4888240N] on the south side of the circle field [near future site of CC-22] at 1545 hours.

---- An adult Rough-skinned Newt (***Taricha granulosa***) swam into deep water at the mouth of the oxbow channel [at UTM 477016E 4888277N, and near future location of CC-03] at 1555 hours.

---- There was an adult Rough-skinned Newt (***Taricha granulosa***) in the water near the south end of the "reopened oxbow" side channel [at estimated UTM 477042E 4888291N, and between the future locations of placement stations CC-02 and CC-03] at 1602 hours.

---- There are 3 large cut stumps of "old-growth" oak trees [in an area centering on estimated UTM 477076E 4888190N] within the stand of young oak and riparian trees that is on the east side of the main channel near the south boundary [SW of the future location of station CC-01]. These stumps are about 18 m north of the wire fence along the south boundary, and very roughly 22 m east of the main channel where it bends to the north. One stump without bark is over a meter in diameter.

---- This survey ended about 1600 hours, then Jim and I went to look at the large pond in the oak woods east of the project area (east boundary is a wire fence on the east side of the cultivated field).

2003 March 18. Jim Ekins and I did a daytime visual survey from a canoe provided and paddled by Jim. We were using polarized sunglasses and primarily looking for egg masses of Red-legged Frogs. Although this was within the right time of year to be looking, no egg masses were detected.

---- An adult Rough-skinned Newt (***Taricha granulosa***) swam down in mid channel [at estimated UTM 477040E 4888381N] roughly 150 feet north of the north bank of the opening into the "circular field" [between future stations CC-04 and CC-05] at 1045 hours. During this survey from a canoe all newt locations were flagged but none was relocated during the GPS survey.

---- An adult Rough-skinned Newt (***Taricha granulosa***) was in shallows with reed canarygrass and blackberry canes [at estimated UTM 477017E 4888391N] east of the peninsula where the main channel turns NW [and somewhere near future placement station CC-04] at 1052 hours.

---- An adult Rough-skinned Newt (***Taricha granulosa***) was resting on submerged vegetation in the main channel [at estimated UTM 476878E 4888234N] near an oak tree at 1109 hours.

---- An adult Rough-skinned Newt (***Taricha granulosa***) was swimming in the main channel [at estimated UTM 476990E 4888252N, near where treefrogs would be calling at 2242 hours later

this same day] roughly 60 m downstream from the opening to the "circular field" at 1125 hours.

---- An adult Rough-skinned Newt (***Taricha granulosa***) was on submerged vegetation [at estimated UTM 477016E 4888277N, roughly at the mouth of the side channel] at 1131 hours.

---- We reached the fence along the south boundary of the project area at 1147 hours. We pulled the canoe out at noon at the mouth of the side channel and wheeled it back to Art Johnson's shed.

---- There were a few mosquitofish (***Gambusia*** species) in the main channel [at estimated UTM 477106E 4888136N] just south of the south boundary fence. Even though this observation was made outside of the study area, the presence of these fish seemed noteworthy because Jim had told me the channels within the study area had dried up seasonally before the "stop-log" dams were recently built (in 2002?), and because I had not yet detected any fish during my visual surveys of the pools within the study area. I was wondering where these fish had come from (upstream?).

---- Jim spotted an active Common Garter Snake (***Thamnophis sirtalis***) at the base of a small oak [the future location of placement station CC-01, at UTM 477082E 4888192N], just NW of the shallow pond near the south boundary fence, at 1420 hours.

---- We found a subadult male Pacific Treefrog (***Hyla regilla***) active in the grassy south margin [at estimated UTM 477377E 4888327N] of the large shallow pond within the forest of young oak trees that is east of the sugarbeet field, at 1430 hours. Although just outside of the study area, this pond is a major breeding site and possibly the source of most of the treefrogs in the project area.

---- Two more Pacific Treefrogs (***Hyla regilla***) were active in the grassy SE margin [at estimated UTM 477412E 4888340N] of the large shallow pond in the young oak forest just east of the study area at 1439 hours. This location was marked with flagging tape in a tree.

---- While Jim went to investigate another pond that was off to the SE according to our maps, I explored the east side of the forest pond where there is some trash that can be lifted. I found five adult hesperian snails (***Vespericola*** unnamed species) under some old black plastic sheeting [at estimated UTM 477477E 4888398N] in an area with other trash. This location is about 36 m east of the center of the east edge of the forest pond (stepped off as 18 yards south then 40 yards west).

---- Jim left at 1500 hours and (on my own time) I salvaged the partial skeletons of a Nutria, an Opossum, and a Coyote-size canid (skull missing) that were next to a vehicle trail roughly 50 m SE of the forest pond. The bones were collected for possible addition to a reference collection (which is used in the identification of unknown bones recovered by archaeologists from prehistoric sites).

2003 March 18. On the same day I returned after dark to do an auditory survey in which I try to triangulate the locations of treefrog breeding choruses. Earlier this evening treefrogs were calling in a ditch east of Cal Young Middle School near my home, so weather conditions were favorable.

---- There were multiple Pacific Treefrogs (***Hyla regilla***) calling in the Coyote Creek project area

when I parked my truck by the shed at 2000 hours (a full moon was rising in the east).

---- A group of 3 Pacific Treefrogs (***Hyla regilla***) were calling [at UTM 477079E 4888672N] from vegetation at the edge of the water in the north channel (on the NE side of the "earlobe") at 2017 hours. There were scattered small groups of calling treefrogs on the east side of the north channel (I marked locations with flagging), but none was detected along the west side of the north channel.

---- Two Pacific Treefrogs (***Hyla regilla***) were calling [at UTM 477063E 4888559N] from pond-edge vegetation of the SE part of the north channel (the south end of the "earlobe") at 2028 hours.

---- At least five Pacific Treefrogs (***Hyla regilla***) were calling [at UTM 476994E 4888594N] from a flooded marsh of the north channel (more precisely on the SW side of the "earlobe" and roughly 9 m south of the location of future placement station CC-07) at 2037 hours.

---- Two Pacific Treefrogs (***Hyla regilla***) were calling [at UTM 476989E 4888445N] from the margins of the main channel NW of the north end of the narrow peninsula (and about 9 m west of the future location of placement station CC-05) at 2052 hours.

---- One lone Pacific Treefrog (***Hyla regilla***) was calling [at UTM 477016E 4888277N] at the mouth of the side channel (and roughly 8 m SE of the future location of station CC-03), at 2124 hours, while hundreds were calling to the east in the area of the large pond in the woods.

---- I hiked over to the forest pond east of the sugarbeet field (just outside of the project area), but when I waded up to the south side of that pond, the treefrogs hushed and seemed unusually shy (reluctant to resume calling). As I was leaving, one lone Pacific Treefrog (***Hyla regilla***) began calling [at estimated UTM 477343E 4888334N] near the the SW corner of the forest pond at 2221 hours. Then I crossed to the west side of the main channel at the "big culvert" and went south.

---- A Great Horned Owl (***Bubo virginianus***) was calling in the oak woods to the south of the south boundary fence (roughly 100 m SE of the future location of station CC-24) at 2234 hours.

---- Two Pacific Treefrogs (***Hyla regilla***) were calling [at UTM 477040E 4888204N] from the marsh on the west side of the main channel (roughly 11 m N of future CC-24) at 2238 hours.

---- Two Pacific Treefrogs (***Hyla regilla***) were calling [at UTM 476990E 4888252N] from the marsh along the main channel on the SE side of the "circular field" (and roughly 36 m SW of the mouth of the "reopened oxbow" side channel), at 2242 hours.

---- One lone Pacific Treefrog (***Hyla regilla***) was calling [at UTM 476805E 4888339N] from the edge of the main channel on the west side of the "circular field" (and roughly 17 m north of the future location of placement station CC-20), at about 2250 hours. There were no treefrogs calling near the south "stop-log" outlet, and no treefrogs calling anywhere near the north "stop-log" outlet.

2003 April 22. I met with Jim Ekins at the shed (at UTM 476986E 4888902N) at 1410 hours and

together we selected the locations for 24 placement stations. We dropped stacks of placement materials (and short lengths of boards to weight them down) at most of these locations.

---- An adult Common Garter Snake (***Thamnophis sirtalis***) was on the west bank rim of the main channel [at UTM 476861E 4888526N], roughly 20 meters NE of the south "stop-log" outlet and at the location we had marked for station CC-15, at 1611 hours.

---- I worked on baring patches of ground and arranging placements at some of the stations until I ran out of daylight (the next day there was too much rain to continue working on the stations).

2003 April 26. I resumed work on the placement stations at 1135 hours. Since my last visit, Jim Ekins had hoed the grass and blackberries to make bare patches of ground at most of the stations, and his work made it possible for me to complete all 24 stations in a single afternoon, in spite of my spending an hour chatting with Jock Beal who walked up while I was working on station CC-22 (Jock helped by spotting a missing piece of plastic that had blown out onto the water).

---- A juvenile Common Garter Snake (***Thamnophis sirtalis***) was found dead at station CC-24 [at UTM 477040E 4888193N] at 1700 hours. The cause of death was trauma of an unknown nature.

---- A small pack of Coyotes (***Canis latrans***) was singing in the forest of young oak trees to the south of the Coyote Creek project area at 2020 hours (dusk).

2003 May 13. This was my first visit to see if any animals were hiding under the placements (in theory the placements should be more effective in the spring of 2004). Jim Ekins met me at 1000 hours and handed me the plastic sheets from CC-22 and CC-23. These sheets had blown into the water, apparently after they had been dislodged from under their weights by the digging of curious elk. On this visit all stations were checked (but not in numerical order) beginning at 1023 hours.

---- A juvenile Bullfrog (***Rana catesbeiana***) jumped into the water with a vocal squawk [at GPS point "bullf8" = UTM 476868E 4888766N] near the NW corner of the north channel (and about 30 m south of station CC-10), at 1027 hours (I flagged this and most other bullfrog locations).

---- Nothing was found under the placements at stations CC-10 and CC-09.

---- An adult male Bullfrog (***Rana catesbeiana***) was calling [at GPS point "bullfcalling" = UTM 477090E 4888658N] from the NE shore of the north channel a bit north of the east point of the north channel, and roughly 74 m SE of station CC-09, at 1041 hours.

---- Nothing was found under the placements at station CC-08.

---- At station CC-07 there were 2 Gray Fieldslugs (***Deroceras reticulatum***), one* under the carpet and one* under the black plastic, and 2 Reticulate Taildropper slugs (***Prophysaon andersoni***), one* under the carpet and one* under the plywood (* = collected) [at UTM 476992E 4888603N].

---- At station CC-06 there was an adult hesperian snail* (***Vespericola*** species) under the plywood [at UTM 476905E 4888476N], at 1104 hours.

---- About 4 small fish that looked like mosquitofish (***Gambusia*** species) were [at estimated UTM 476974E 4888470N] in a bay on the north side of the main channel between CC-05 and CC-06.

---- At station CC-05 there were 2 juvenile Banana Slugs (***Ariolimax columbianus***) and 2 Gray Fieldslugs (***Deroceras reticulatum***) under the plywood [UTM 476998E 4888446N], 1117 hours.

---- At station CC-04 there was a Gray Fieldslug* (***Deroceras reticulatum***) under the plywood [at UTM 477008E 4888334N]. The weather was clear and warm with light breezes.

---- Nothing was found under the placements at station CC-03 (the plywood had been moved, the plastic was missing, and there were artiodactylous elk-size hoof prints in the dirt).

---- There were at least 11 adult Rough-skinned Newts (***Taricha granulosa***) moving about in the water [at estimated UTM 477009E 4888280N] next to station CC-03, and one small frog (***Rana*** species) that jumped into the water without making any vocal sound, at 1127 hours.

---- At station CC-02 there were 2 adult Beaded Lancetooth snails (***Ancotrema sportella***), one under the carpet and one under the plywood, 2 Banana Slugs (***Ariolimax columbianus***), one adult under the plastic and one juvenile under the plywood, one subadult Robust Lancetooth snail (***Haplotrema vancouverense***) under the tin, and a juvenile hesperian snail shell* (***Vespericola*** species) under the carpet [all at UTM 477054E 4888262N], during 1135-1144 hours.

---- To my surprise, I found nothing under the placements at station CC-01.

---- There were 12 adult Rough-skinned Newts (***Taricha granulosa***) in the water [at estimated UTM 477009E 4888280N] next to station CC-03, at 1210 hours (one more than at 1127 hours).

---- Nothing was found under the placements at stations CC-11 and CC-12.

---- A juvenile Bullfrog (***Rana catesbeiana***) squealed as it jumped into the water [at GPS point "bullf1" = UTM 476961E 4888774N] on the SW side of the nearly straight NE leg of the north channel, and roughly east of station CC-12 (and the wooden love seat).

---- Three more juvenile Bullfrogs (***Rana catesbeiana***) squealed as they jumped into the water [at GPS point "3bullf" = UTM 477007E 4888728N] at 1232 hours, at about 65 m further SE along the SW shore from the previous sighting (and WNW across the channel from station CC-09).

---- A subadult Bullfrog (***Rana catesbeiana***) squawked as it jumped into the water [at estimated UTM 477071E 4888658N] at 1239 hours, from the SW shore of the relatively straight NE leg of the north channel, and west of the Bullfrog calling from the NE shore.

---- An adult male Bullfrog (***Rana catesbeiana***) was calling [at GPS point "bullfcalling" = UTM 477090E 4888658N] from the NE shore of the north channel, roughly 74 m SE of station CC-09, at 1240 hours (apparently this was the same frog that was calling earlier this day at 1041 hours).

---- Two juvenile Bullfrogs (***Rana catesbeiana***) squealed as they jumped into the water [at GPS point "bullf3" = UTM 477101E 4888614N] on the west shore of the eastern-most bend of the north channel (or on the east side of the "earlobe"), at 1243 hours.

---- Two juvenile Bullfrogs (***Rana catesbeiana***) squealed as they jumped into the water [at GPS point "bullf4" = UTM 477058E 4888577N] on the north shore just east of the southern-most bend of the north channel (or on the south side of the "earlobe" and SE of station CC-14), at 1247 hours.

---- At station CC-13 there were 2 juvenile Banana Slugs (***Ariolimax columbianus***) under the plywood [at UTM 477010E 4888669N], at 1252 hours.

---- At station CC-14 there was 1 juvenile Banana Slug (***Ariolimax columbianus***) under the tin [at UTM 476999E 4888638N] at 1256 hours. The tin was in full sun and becoming hot, so the slug was moved and released under the plywood at this station. The weather was clear and warm.

---- Nothing was found under the placements at station CC-15.

---- At station CC-16 there was 1 adult Gray Fieldslug (***Deroceras reticulatum***) under a nearly dry carpet [at UTM 476848E 4888475N] at 1312 hours.

---- There were at least 10 adult Rough-skinned Newts (***Taricha granulosa***) moving about in the water [at estimated UTM 476863E 4888475N] about 15 m east of station CC-16, at 1315 hours.

---- Nothing was found under the placements at station CC-17.

---- At station CC-18 there was 1 juvenile Banana Slug (***Ariolimax columbianus***) under a relatively dry carpet [at UTM 476997E 4888405N] at 1323 hours.

---- Nothing was found under the placements at stations CC-19, CC-20, and CC-21.

---- The placements at stations CC-22 and CC-23 had been disturbed, apparently by curious elk. At CC-22 the carpet and plywood were askew, and I reinstalled the plastic that Jim had rescued from the water. At CC-23 I reinstalled the plastic that Jim had found in the water (when the black plastic sheets are pulled from under the boards holding them down, they are easily blown away).

---- An adult Rough-skinned Newt (***Taricha granulosa***) was in the water [at estimated UTM 477046E 4888190N] just east of station CC-24, at 1357 hours.

---- At station CC-24 there were 1 Gray Fieldslug (***Deroceras reticulatum***) and 2 adult hesperian snails* (***Vespericola*** species) under the plywood [at UTM 477040E 4888193N] at 1400 hours.

---- At least 15 adult Rough-skinned Newts (***Taricha granulosa***) were moving about in the water of the main channel [at estimated UTM 476863E 4888475N] about 15 m east of station CC-16, at 1415 hours (5 more than at 1315 hours earlier this day).

---- I met with Jim Ekins at Johnson's shed at 1420 hours. He gave me a map of the stations that he had made by means of his Etrex GPS and a list of the station latlongs. [These were included as an appendix to the draft of this report submitted in August 2003 but in September 2003 I used a Trimble Pathfinder GPS to get more precise UTM definition of the station locations (Map 1).]

2003 May 27. This was my second survey of the placement stations in the Coyote Creek project area, this time visiting the stations in numerical order, beginning at 0935 hours. As for weather, the air temperature was mild and there were high scattered clouds and micro-breezes.

---- At station CC-01 [at UTM 477082E 4888192N] there was the shell* of a juvenile Beaded Lancetooth snail (***Ancotrema sportella***) under the plastic.

---- At station CC-02 [at UTM 477054E 4888262N] there were 2 (adult and juvenile) Beaded Lancetooth snails (***Ancotrema sportella***) under the carpet at 0950 hours, and 1 juvenile Beaded Lancetooth snail (***Ancotrema sportella***) under the tin at 0954 hours.

---- There were at least 8 small fish that looked like mosquitofish (***Gambusia*** species) in the shallow end of the side channel [at estimated UTM 477060E 4888282N] between stations CC-02 and CC-03, next to a burned brush pile, at 1000 hours (observed by means of binoculars).

---- Nothing was found under the placements at station CC-03.

---- Next to CC-03 the water in the main channel was brown-stained and seemed to be roughly 6 inches (15 cm) lower than it had been 2 weeks earlier (on 13 May 2003). I looked for newts in this stained water by means of polarized sunglasses but at first no newts were visible.

---- One adult Rough-skinned Newt (***Taricha granulosa***) was in the stained water [at estimated UTM 477017E 4888289N] roughly 10 m to the ENE at 55° from station CC-03 at 1008 hours.

---- Nothing was under the placements at station CC-04 (the carpet had been flipped ~1 m away).

---- At station CC-05 there was 1 juvenile Banana Slug (***Ariolimax columbianus***) under the plywood [at UTM 476998E 4888446N] at 1022 hours. All of the stagnant water in the channels seems to be growing a large crop of mosquitoes -- many larvae/pupae are active in the water.

---- Nothing was found under the placements at station CC-06.

---- At station CC-07 there was 1 ~adult Reticulate Taildropper slug (***Prophysaon andersoni***) under the plastic [at UTM 476992E 4888603N] at 1037 hours.

---- A subadult Bullfrog (***Rana catesbeiana***) made a vocal squawk as it jumped in [at estimated UTM 476998E 4888588N] about 16 m SSE at 160° from station CC-07, at 1040 hours.

---- Nothing was under the placements at CC-08 (except for a million black ants under the carpet).

---- Pacific Treefrog (***Hyla regilla***) tadpoles are dying in a roughly 1x2 m puddle that was drying up [at UTM 477110E 4888572N] by the culvert pipe through which the old channel drains, and about 28 m E of station CC-08. One sweep of my D-net caught 5 tadpoles with tiny hind legs.

---- Nothing was under the placements at CC-09 (except for a million tiny ants under the plastic). The tin and plywood were offset, apparently by a burrowing mammal (there was a hole by the tin).

---- Nothing was found under the placements at stations CC-10, CC-11, and CC-12.

---- Two Bullfrogs (***Rana catesbeiana***), a subadult and a juvenile, vocalized as they jumped in [at UTM 477007E 4888728N] at a beach on the north channel (already flagged as a bullfrog location on May 13) that is about 112 meters ESE at 113° from station CC-12, at 1123 hours.

---- At station CC-13 [at UTM 477010E 4888669N] there were 2 juvenile Banana Slugs (***Ariolimax columbianus***) under the tin (warm) at 1135 hours, and 1 juvenile Banana Slug (***Ariolimax columbianus***) under the carpet at 1137 hours.

---- Nothing was found under the placements at stations CC-14, CC-15, and CC-16.

---- An adult Rough-skinned Newt (***Taricha granulosa***) was swimming in the brown-stained water [estimated UTM 476867E 4888469N] about 20 m ESE at 108° from CC-16, at 1008 hours.

---- Nothing was found under the placements at stations CC-17.

---- At station CC-18 there was 1 juvenile Banana Slug (***Ariolimax columbianus***) under the carpet [at UTM 476997E 4888405N] at 1202 hours.

---- Nothing was found under the placements at stations CC-19.

---- At station CC-20 there was 1 juvenile Banana Slug (***Ariolimax columbianus***) under the carpet [at UTM 476808E 4888323N] at 1212 hours.

---- Nothing was found under the placements at stations CC-21, CC-22, and CC-23.

---- At station CC-24 there were 1 Gray Fieldslug (***Deroceras reticulatum***) and 1 adult hesperian snail* (***Vespericola*** species) both under the carpet [at UTM 477040E 4888193N], at 1229 hours.

2003 Sep 03. The main objective of this visit was a GPS survey, using the BLM's Trimble Pathfinder, to define the UTM coordinates for all of the placement stations and all of the flagging

that I could relocate (these flags marked locations where I had seen frogs in the spring of 2003) plus the locations of new observations made during this survey. Field work began at 1015 hours. Weather was clear with a haze (said to be from the B&B wildfire), hot (high was 95F) and humid.

---- I talked with Jim Ekins, who drove the "Gator" over to where I had parked on the Long Tom levee, and then I began collecting GPS point data in the first file, which I named "CCAPPLE."

---- First point is "bigculvertjct" for the center of the junction of dirt roads by the large culvert pipe.

---- I found a frog flag at 181° and 26 m from the junction but could not get GPS under the oak and ash canopy because of poor satellite configuration. Later in the day this point was defined by GPS as "frog1mar11" and that came within a couple meters of the location as defined by the offset.

---- GPS files were collected for all 24 placement stations (and rearranged here into numerical order). The UTM location coordinates have been rounded off to the nearest meter.

Station CC-01	477082 east	4888192 north
Station CC-02	477054 east	4888262 north
Station CC-03	477009 east	4888283 north
Station CC-04	477008 east	4888334 north
Station CC-05	476998 east	4888446 north
Station CC-06	476905 east	4888476 north
Station CC-07	476992 east	4888603 north
Station CC-08	477083 east	4888575 north
Station CC-09	477041 east	4888714 north
Station CC-10	476872 east	4888796 north
Station CC-11	476936 east	4888637 north
Station CC-12	476904 east	4888770 north
Station CC-13	477010 east	4888669 north
Station CC-14	476999 east	4888638 north
Station CC-15	476861 east	4888526 north
Station CC-16	476848 east	4888475 north
Station CC-17	476933 east	4888449 north
Station CC-18	476997 east	4888405 north
Station CC-19	476879 east	4888400 north
Station CC-20	476808 east	4888323 north
Station CC-21	476845 east	4888242 north
Station CC-22	476934 east	4888225 north
Station CC-23	477031 east	4888246 north
Station CC-24	477040 east	4888193 north

---- At the flag "frog4mar11" the main channel was dry and choked with dry reed canarygrass.

---- Northeast of the south "stop-log" outlet, the channel was dry. There was a low pool containing

algae and many (easily over a hundred) mosquitofish (***Gambusia*** species) at the south "stop-log" and this pool extended an unknown distance to the southeast. No bullfrogs were detected but there were many tracks in the mud that were most likely made by Nutria (***Myocastor coypus***).

---- The main channel adjacent to station CC-19 has wet mud but no water in its bottom.

---- A young adult Common Garter Snake (***Thamnophis sirtalis***) was on the west bank of the main channel, at UTM 476802E 4888348N, on the west side of the "circular field" at 1118 hours.

---- The "1hyla18mar" flag is in a young oak tree but the treefrog probably was ~4 m ENE of the tree, so the GPS coordinates are adjusted from UTM 476805E 4888339N to 476809E 4888341N.

---- At station CC-21 the PDOP was too high (the number of satellites was too low to collect GPS files out in the open), so I walked ahead and rested in the shade while waiting for better satellites.

---- The channel by stations CC-23 and CC-24 was empty and the bed varied from damp to dry.

---- A small juvenile Bullfrog (***Rana catesbeiana***) squeaked as it jumped into the channel-bottom pool at 1241 hours. The bullfrog was at 71° ENE from station CC-06, and the GPS was recorded on shore at UTM 476923E 4888485N, which is at 64° ENE from CC-06, so the northing of this location is reduced by 2 meters, which results in a corrected UTM.of 476923E 4888483N.

---- All three channels that meet at the "big culvert" junction have dried up. I shut down the Trimble Pathfinder when I stopped here (at my truck) for lunch, then after lunch began a new file that I named "CC2APPLE" (a condensation for Coyote Creek - file #2 - Applegarth).

---- There was still some water in the north channel at UTM 476991E 4888766N, and there were hundreds (possibly thousands) of Bullfrog tadpoles (***Rana catesbeiana***) visible here at 1340 hours. There was a slight current going NW (later Jim Ekins told me he had briefly opened the north "stop-log" and that was probably why the water was moving). Also visible were hundreds of mosquitofish (***Gambusia*** species) and at least one small ambystomatid salamander larva (***Ambystoma*** species) but unfortunately I did not have a dip net with me so I was not able to determine which species (*Ambystoma gracile* or *Ambystoma macrodactylum*). In between this location and "bullf1may13" was a broad dry shelf that had been under shallow water on May 13th.

---- On the SW side of the "earlobe" of the north channel, there was an 18 m gap between channel bottom pools. I collected GPS files to document where these pools ended. There were dozens of Bullfrog tadpoles (***Rana catesbeiana***) in the second pool that began at UTM 477013E 4888572N on the west side of the "earlobe" at 1400 hours. The weather was hot, hazy and humid.

---- The bay by station CC-13 had no water, only damp mud that was firm enough to walk on. I looped back to the south, collecting GPS point data at station CC-14 on the way.

---- There were dozens of Bullfrog tadpoles (***Rana catesbeiana***) in the shallow water at the north

end of the second pool, at UTM 477007E 4888617N, at 1410 hours. The north end of the second pool is at the mouth of the new channel that runs WSW towards the "big culvert" junction.

---- There were dozens of Bullfrog tadpoles (***Rana catesbeiana***) in shallow water near the middle of the second pool, at UTM 477000E 4888585N, at about 1420 hours.

---- There was a juvenile Red-legged Frog (***Rana aurora***) with a head+body length of about 4 cm, at UTM 477014E 4888569N on wet mud, firm enough to walk on but within 1 m of the water, at 1430 hours. Up the south bank, about 1 m from the water, there was a jungle of reed canarygrass.

---- On the exposed mud were many tracks of what are probably Nutria (***Myocastor coypus***).

---- There was a second juvenile Red-legged Frog (***Rana aurora***) on the mud at the end of the first pool (somewhat more shaded than the second pool), at UTM 477029E 4888566N, at 1438 hours.

---- An adult male Pacific Treefrog (***Hyla regilla***) gave a series of 1-note calls from a thicket of reed canarygrass, at estimated UTM 477035E 4888566N, about 6 m east of the second juvenile Red-legged Frog, apparently in response to the beeping of the Pathfinder GPS, at 1454 hours.

---- There were some mosquitofish (***Gambusia*** species), Bullfrog tadpoles (***Rana catesbeiana***) and small ranid frog tadpoles (***Rana*** species) in the shallow water of the SW end of the first pool, at estimated UTM 477035E 4888569N, at about 1500 hours. Here and elsewhere along the north channel pools the cattails look beat-up and are mostly lying on the water.

---- Jim Ekins and his friend Bern drove up to meet me as I was walking north along the east side of the "earlobe" of the north channel. After we had been talking for about 5 minutes, an adult male Red-legged Frog (***Rana aurora***) gave several series of calls from the vicinity of the channel pool, at estimated UTM 477067E 4888679N, roughly 15 m at 274° west of Jim's car (where I collected the GPS point data), apparently in response to the sound of our voices, at 1519 hours.

2004 Mar 20. This was my only visit to the project area in the spring of 2004. The main objective was a visual search for the egg masses of Red-legged Frogs. I did look under some placements but did not do a systematic check of all of them. The water level was higher that it had been at any time in the previous year. I began a walking patrol of the pond margins at 1050 hours.

---- A sweep of my D-net in the submerged dead reed canarygrass in the channel just south of the "big culvert" produced 2 mosquitofish (***Gambusia*** species), 1 transforming and 3 small Bullfrog tadpoles (***Rana catesbeiana***), and some *Physa*-like snails, at estimated UTM 476902E 4888592N, at 1055 hour. I was trying to get a better look at the fish and had not noticed the tadpoles.

---- Another net sweep in the main channel by station CC-16, this time looking for tadpoles, produced only the *Physa*-like aquatic snails, at estimated UTM 476855E 4888476N. Net sweeps in between CC-16 and CC-17, and next to CC-17, also failed to capture any tadpoles.

---- There were a few small fish that looked like mosquitofish (***Gambusia*** species), and a juvenile Red-legged Frog (***Rana aurora***) with a head+body length of about 3 cm, that were active in the shallow water at estimated UTM 477013E 4888416N, about 17 m NE at 56° from station CC-18, at 1122 hours. The shady conditions under the riparian forest along this part of the channel should favor the Red-legged Frog. The weather was cool and breezy with some high wispy clouds.

---- Only small numbers of small fish, presumably mosquitofish (***Gambusia*** species) were seen at estimated UTM 477038E 4888384N, in the shallows along the peninsula SE of station CC-18.

---- A medium-sized Bullfrog tadpole (***Rana catesbeiana***) was produced by a net sweep through the submerged vegetation in the main channel at estimated UTM 476983E 4888406N, about 14 m west at 278° from station CC-18, at 1136 hours. I was using polarized sunglasses to look for egg masses in the water, and sweeps of the D-net to test for the presence of bullfrog tadpoles.

---- An adult Common Garter Snake (***Thamnophis sirtalis***) was active on the floor of the riparian forest at estimated UTM 476989E 4888410N, on dead oak leaves and blackberry canes under young oak trees, about 4 m north of the water in the channel, and about 9 m WNW at 300° from station CC-18, at 1139 hours. This snake had a red head and no lateral stripes, and those characters define the Willamette Valley subspecies, *Thamnophis sirtalis concinnus*.

---- At placement station CC-19 the carpet and plastic were missing, and the tin was badly dented (as though it had been stepped on by curious elk). The carpet was later found and repositioned.

---- A Red-legged Frog (***Rana aurora***) egg mass (the embryos have already hatched = spent) was resting on submerged dead reed canarygrass at estimated UTM 476825E 4888384N, about 1 meter out from the west bank of the main channel, near the NW corner of the "circular field" and about 56 m WSW at 254° from station CC-19, and north at 15° from CC-20. The eggs were represented by large gelatinous spheres (~1 cm each) in a sloppy mass that measured roughly 25 x 15 cm.

---- While dredging through submerged vegetation for tadpoles with the D-net, I caught an adult Rough-skinned Newt (***Taricha granulosa***) at estimated UTM 476805E 4888351N, in the channel on the west side of the "circular field" about 28 m north at 355° from station CC-20 at 1212 hours.

---- A second Red-legged Frog (***Rana aurora***) spent egg mass was on submerged dead vegetation (reed canarygrass etc) at estimated UTM 476813E 4888317N, about 2 m out from the steep west bank of the channel on the west side of the "circular field" and about 7 m at 138° SE from CC-20.

---- An male Pacific Treefrog (***Hyla regilla***) gave a series of 1-note calls from a thicket (willow?) at estimated UTM 476817E 4888303N, about 21 m SSE at 159° from CC-20, at 1220 hours.

---- A third Red-legged Frog (***Rana aurora***) spent egg mass was on submerged vegetation at estimated UTM 476826E 4888268N, near the SW corner of the "circular field" and about 2 m out from the west shore in a thicket of woody vegetation, about 56 m at 162° SSE from CC-20. I spotted this egg mass by its pale green color, 15 to 20 cm size, and its irregular blob-like shape.

---- While dredging with my D-net in weedy shallow water for tadpoles, I saw an active adult Rough-skinned Newt (***Taricha granulosa***) below the surface at estimated UTM 477002E 4888262N, about 34 m at 296° WNW from placement station CC-23, at 1240 hours.

---- There were many mosquitofish (***Gambusia*** species) in the shallow water at estimated UTM 477040E 4888268N, to the NNE of station CC-23, but no bullfrog tadpoles were detected.

---- At station CC-24 all placements are under water, roughly 15 cm deep. Many mosquitofish (***Gambusia*** species) and *Physa*-like aquatic snails were visible here, at UTM 477040E 4888193N.

---- At station CC-22 there was a juvenile Northwestern Garter Snake (***Thamnophis ordinoides***) with a single (mid-dorsal) yellow stripe and 7+7 upper labial scales, at UTM 476934E 4888225N, under the tin at 1307 hours. I'm only checking the most promising placements (such as the tins).

---- A fourth Red-legged Frog (***Rana aurora***) spent egg mass was on submerged dead blackberry canes at estimated UTM 476863E 4888390N, in the main channel on the NW side of the "circular field" and about 1 m out from a very steep west bank, and about 18 m at 239° WSW from CC-19.

---- I found and repositioned the carpet at station CC-19. It had been blown or carried roughly 30 m to the north, out into the field. The black plastic sheet was not found.

---- At the west end of the new channel that is NE of the "big culvert" junction, a small ranid frog (***Rana*** species) jumped into the pond without vocalizing, at estimated UTM 476908E 4888609N, and at about 1330 hours. I tried to net the frog with my D-net but only caught 2 Bullfrog tadpoles (***Rana catesbeiana***) and 4 mosquitofish (***Gambusia*** species), at 1332 hours.

---- At station CC-11 the placements are under about 25 cm of water. Weather is cool and windy.

---- I was not able to detect any bullfrog tadpoles in the channel to the north of station CC-13 nor anywhere along the inner shore of the "earlobe" of the north channel. CC-14 was under water.

---- A small ranid frog (***Rana*** species) without vocalizing jumped into the north channel, north of the north "stop-log" outlet, at estimated UTM 476868E 4888766N.

---- A small ranid frog (***Rana*** species) without vocalizing "skitted" down to the water of the north channel, north of the north "stop-log" outlet, at estimated UTM 476872E 4888781N. This behavior of skitting, when a frog propels itself on the ground with a rapid series of swimming kicks, seems more like the behavior of a juvenile bullfrog than that of a young red-legged frog.

---- An adult Western Pond Turtle (***Clemmys marmorata***) was basking on the distal part of a log out in the water of the north channel, at estimated UTM 476987E 4888759N, at 1416 hours. I had just come around some trees on the north bank when I saw the turtle. I dropped to the ground, got my binoculars out of my pack, and got a good look at it through my binoculars. As expected, when I started to slowly stand up at 1422 hours, the turtle dove off of the far side of the log. This

log is due south (180°) from Art Johnson's 3-door garage (the shed), and east at 98° from CC-12. This is a management dilemma, because if the area has a minimum of trees to favor pond turtles, then that will also favor bullfrogs. Conversely, if the trees increase along the north loop and make the habitat more favorable for red-legged frogs, then that will work against the pond turtles. The best management option seems to be a combination of open conditions and bullfrog removal.

---- There were 2 Bullfrog tadpoles (***Rana catesbeiana***) near the SE corner of the "earlobe" of the north channel, at estimated UTM 477106E 4888591N, at 1439 hours. A large tadpole was dead and floating in the water, and I caught a small tadpole with a sweep of my D-net.

---- A juvenile Bullfrog (***Rana catesbeiana***) made its distinctive vocal squeak as it jumped into the water (near the valve handle at the end of the pipe that drains the old channel) at estimated UTM 477097E 4888584N, about 16 m NE at 55° from station CC-08.

---- Three small ranid frogs (***Rana*** species) jumped into the water without vocalizing, next to some boards from station CC-07, at estimated UTM 476992E 4888598N. Sweeps with the net in the area of CC-07 (submerged) only produced many mosquitofish (***Gambusia*** species). Someone has marked the present margins of the water with dark blue wire flags.

---- At station CC-05 the placements are within a meter of the water of the main channel. At station CC-04 the carpet is gone (not found) and the tin needed straightening.

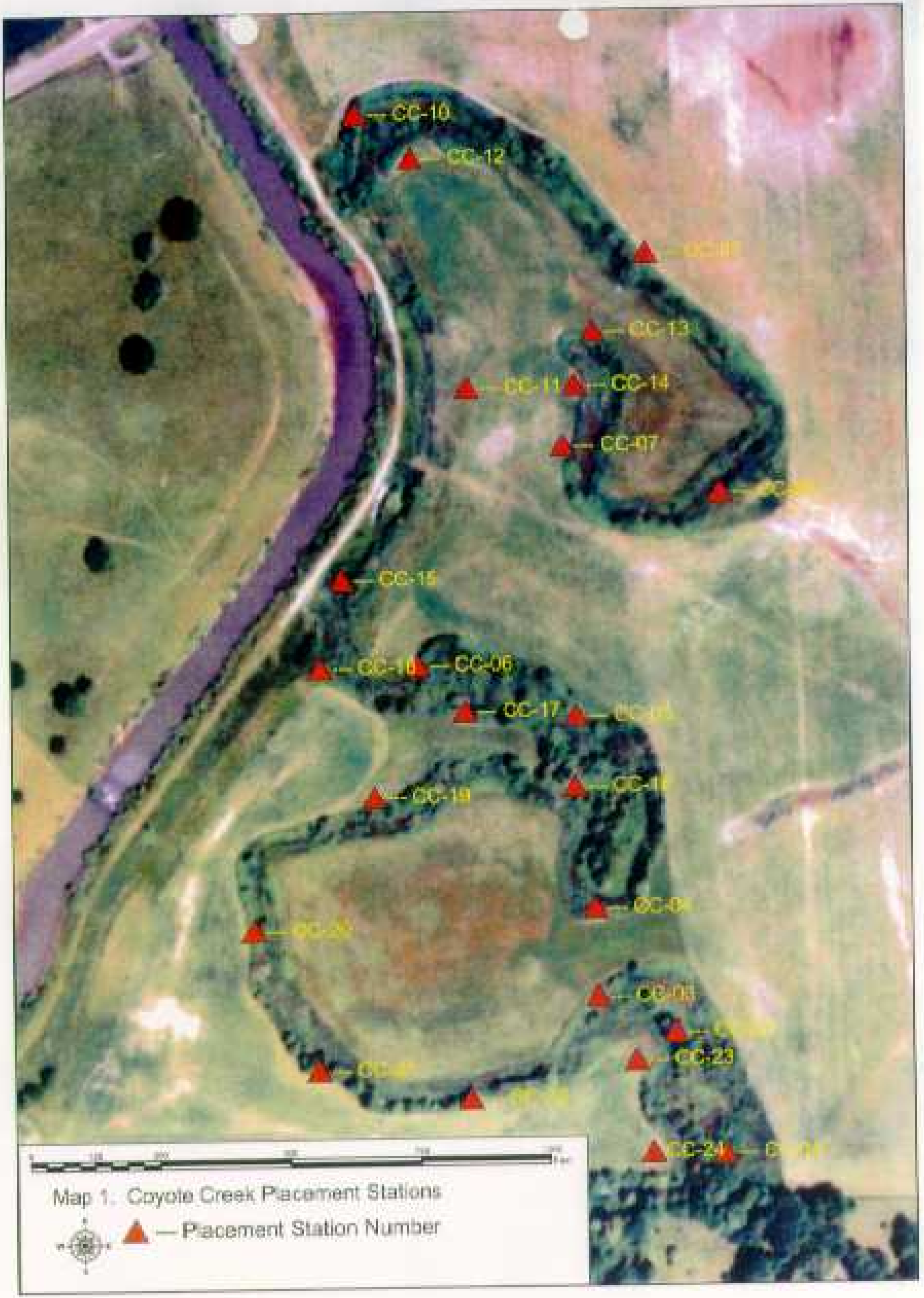
---- I tried to net some small ranid frogs (***Rana*** species) after they hopped into the water without vocalizing but instead caught an adult Rough-skinned Newt (***Taricha granulosa***), at estimated UTM 476981E 4888347N, about 30 m at 295° WNW from station CC-04, at 1511 hours.

---- An adult Common Garter Snake (***Thamnophis sirtalis***), with a red head and no lateral stripes, was active at station CC-04, at UTM 477008E 4888334N, at 1512 hours.

---- At station CC-03 there were many deep hoof prints, presumably made by curious elk, and the placements were scattered (only the plywood was in its original place).

---- I netted a large Bullfrog tadpole with hind legs (***Rana catesbeiana***) from the "reopened oxbow" side channel, at estimated UTM 477054E 4888294N, about 46 m north at 357° from placement station CC-02, and east at 76° from station CC-03, at 1538 hours.

---- I tried again at station CC-07, and finally netted one small Bullfrog tadpole (***Rana catesbeiana***) at UTM 476992E 4888603N, at 1612 hours, then ended the survey and hiked back to the truck.



Map 1. Coyote Creek Placement Stations

▲ — Placement Station Number

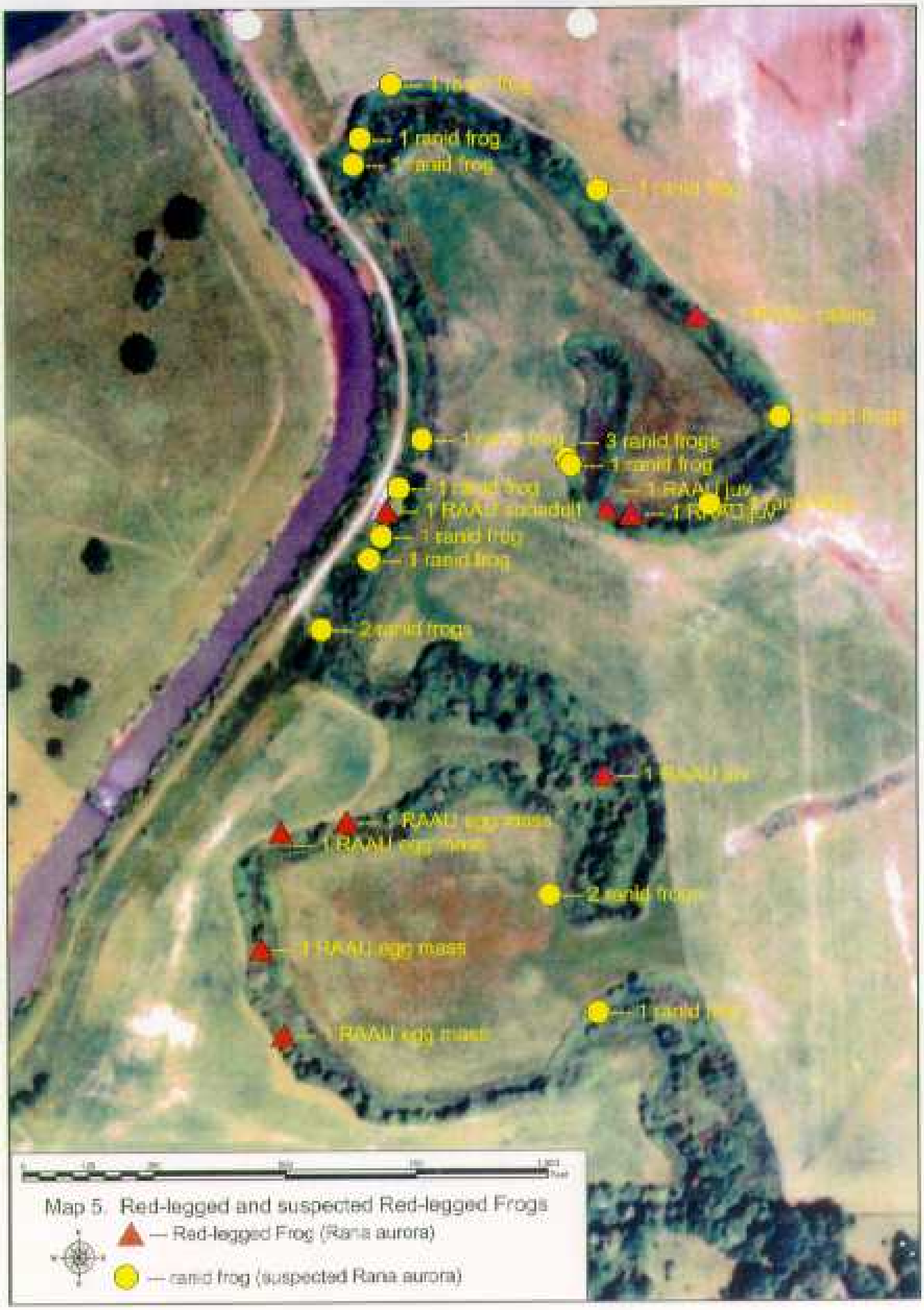
Map 2. Fish

▲ — Mosquitofish (Gambusia)


25 newts
1 newt
1 newt
1 newt
1 newt
12 newts
2 newts
1 newt
2 newts
Map 3. Salamanders
— amoystomatid salamander (Amoystoma species)
— Roughskin Newt (Taricha granulosa)

Map 4. Treefrogs

▲ — Pacific Treefrog (Hyla regilla)

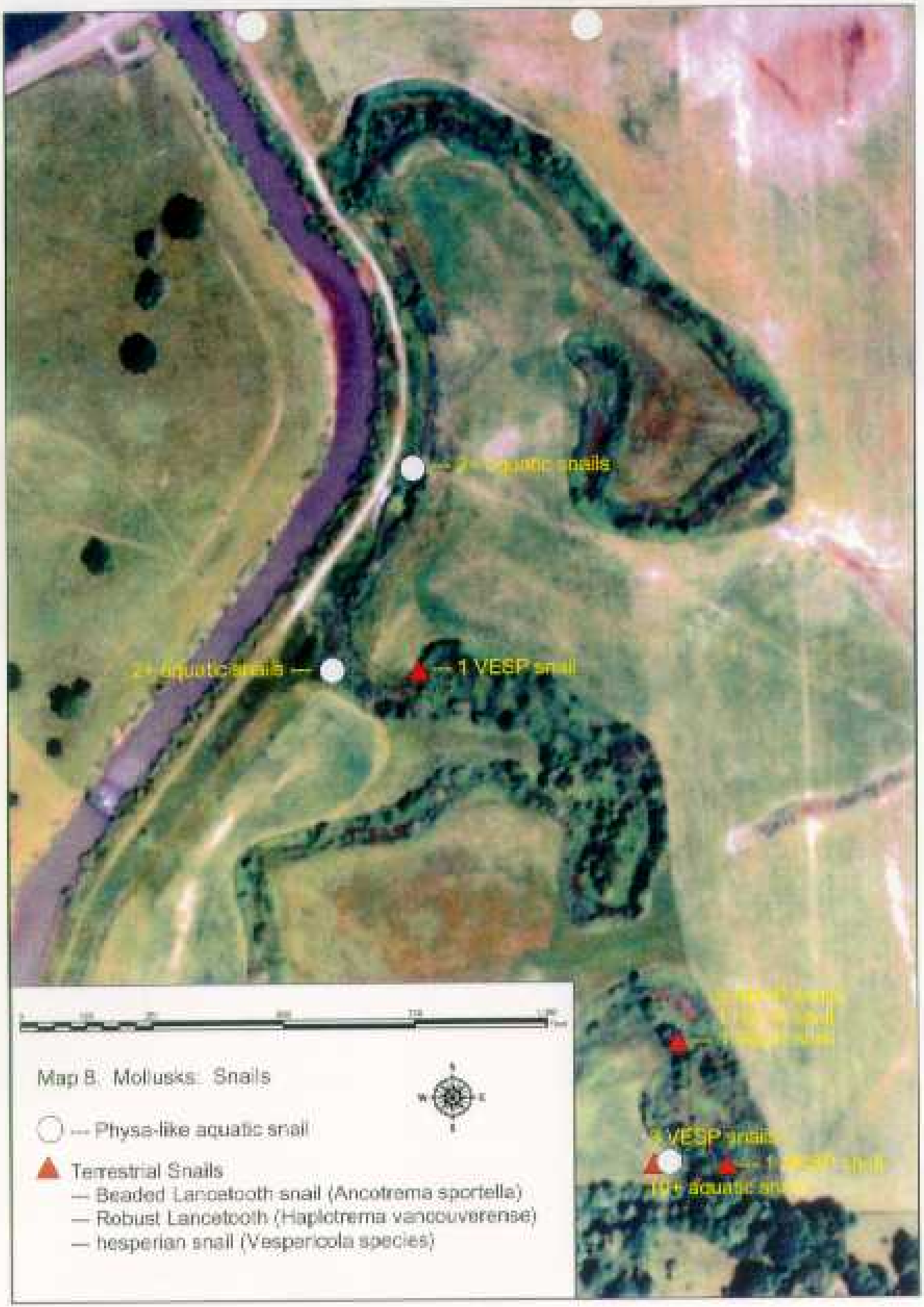

1 ranid frog
1 ranid frog
3 ranid frogs
1 ranid frog
1 RAAU adult
1 ranid frog
1 ranid frog
2 ranid frogs
2 ranid frogs
1 RAAU egg mass
1 RAAU egg mass
1 RAAU egg mass
1 RAAU egg mass
Map 5. Red-legged and suspected Red-legged Frogs
— Red-legged Frog (Rana aurora)
— ranid frog (suspected Rana aurora)

Map 6. Bullfrogs and probable Bullfrogs

▲ — Bullfrog (Rana catesbeiana)

● — probable Bullfrog (Rana catesbeiana)


1 Common Garter Snake
1 Common Garter Snake adult
1 Common Garter Snake adult
1 Common Garter Snake adult
1 Common Garter Snake adult
1 NW Garter Snake juv
1 Common Garter Snake
Map 7. Reptiles
Pond Turtle (Clemmys marmorata)
Northwest Garter Snake (Thamnophis ordinoides)
Common Garter Snake (Thamnophis sirtalis)


— 1 VESP snail
Map 8. Molusks: Snails
— Physa-like aquatic snail
Terrestrial Snails
— Beaded Lancetooth snail (Ancotrema sportella)
— Robust Lancetooth (Haplotrema vancouverense)
— hesperian snail (Vesericola species)


— 1 bananaslug
— 3 taildroppers
2 fieldslugs
— 1 fieldslug
— 2 bananaslugs
— 2 fieldslugs
Map 9. Mollusks: Slugs
N
W
E
S