BOWMAN DAM HERPETOLOGICAL STUDY REPORT
For Portland General Electric's Crooked River Hydroelectric Project
Northwest Ecological Research Institute
September 19, 2011
NERI Report #11-01

GOAL AND OBJECTIVES

The goal of this study is to assess the potential effects of Portland General Electric's (PGE) proposed hydroelectric project at Bowman Dam (Project) to three amphibian and one reptile species that have special status in Oregon. These target species are Western Toad (*Anaxyrus* [formerly *Bufo*] *boreas*), Oregon Spotted Frog (*Rana pretiosa*), Columbia Spotted Frog (*Rana luteiventris*), and Northern Sagebrush Lizard (*Sceloporus graciosus graciosus*).

The objectives of this study are to:
1. Determine the presence or absence of the four target species within the study area.
2. Inventory amphibian and reptile species, and record bird and mammal species encountered, within and adjacent to the study area.
3. Assess the habitat potential of the study area for the target species.
4. Evaluate potential project effects on the target species and other amphibians and reptiles.

STUDY AREA

PGE proposes to develop hydroelectric power generation at the existing Bowman Dam on the Crooked River, Crook County, Oregon. The area of this herpetological study is the area within the Federal Energy Regulatory Commission (FERC) Project boundary, which is the land and water directly affected by the construction and operation of the Project. This includes the face of the existing dam south of the spillway and west of Highway 27, the wetland at the base of the dam in the former river channel, and all upland and riverbank areas within the Project boundary (Figure 1).

METHODS

Because the study area includes both aquatic and terrestrial habitats, a variety of species, and several life stages of those species, several survey methods were utilized. A team of three people conducted all surveys, working simultaneously in different sections of each of the habitats of the study area.

Aquatic Surveys – To detect the target amphibian species using aquatic habitats, Visual Encounter Surveys (VES) and dip netting were conducted in all still-water areas that were 1 meter deep or less. These areas were the wetland in the former river channel (Figure 2) and the backwater bay below the culvert connecting the former channel to the present main river channel (even though this bay is just outside the Project boundary). The middle of the wetland was only scanned with binoculars because it exceeded wader height and was therefore inaccessible to us. The fast-moving main river channel was not surveyed because it is not appropriate habitat for amphibians or reptiles that might be present in the area. The VES involved walking slowly along the waterline, scanning ahead for animals both in the water and in the surrounding fringe of vegetation, occasionally using binoculars to examine details of the water surface and shoreline.

Every few steps and when movement at or under the surface was observed, a dip net was swept through the water column and bottom sediment, and the contents were examined for amphibian larvae before being returned to the wetland (Figure 3).

Terrestrial Surveys – To detect the target lizard species, VES were conducted in all upland habitats within the study area, except in a small portion of the south edge where the steepness of the slope and the shade from trees made it unsuitable for reptiles. Surveyors walked slowly in parallel transects across the dam face and across the other upland areas, pausing every few steps to scan the rocks and brush for reptiles (Figure 4). Binoculars were used to verify or discount possible reptiles sunning on rocks or moving through the habitat, and were used to identify some of the reptiles observed. One of the surveyors carried a fishing pole with a noose made of fishing line. This was employed where possible to capture some of the observed lizards for positive identification and for photographing key characteristics.

Non-target species – During both aquatic and terrestrial surveys, all species of amphibians and reptiles observed were identified and recorded, and auditory detections of amphibians were also noted. Birds and mammals detected during all of these surveys were also recorded. In addition, bird counts and informal surveys of reptiles and mammals were conducted. These occurred in the mornings and evenings while camping and taking early morning hikes in the vicinity of the study area before the air temperature was deemed warm enough for the target species to be most easily detectable.

Habitat assessments – Aquatic and upland habitats were examined during the surveys and compared with published descriptions and personal knowledge of the habitat characteristics of the four target species. The habitats occurring at the present time were appraised with regard to probable modifications during construction and operation of the Project to ascertain potential effects to their value for the herpetofauna of the area.

RESULTS

Three aquatic surveys were conducted of the wetland and backwater bay, on May 10, May 11, and June 13, 2011. These dates were considered to be within the period of greatest activity for the target frog and toad species, when adults and/or larvae could most reliably be found. Three terrestrial surveys were conducted of the face of the dam and other upland sections of the study area, on May 10, June 13, and June 14, 2011. These dates were considered to be within the period of greatest activity for lizards including the target species.

None of the target species was detected in the study area or in nearby similar habitats. One amphibian and five reptile species were found in the study area and one additional reptile in the Project vicinity (Figure 5 and Table 1). All of these species are habitat generalists that are common in the region. Twenty bird species and two mammals were detected in the study area, and a total of 43 bird species and two mammals were recorded in the vicinity (Figure 6 and Table 2).

Many of the habitats presently occurring in the study area were created by construction of Bowman Dam in 1961 (completion year), and by natural revegetation with both native and exotic plants. The majority of the wetland has rock from the dam construction as a substrate. The

face of the dam has minimal amounts of soil at the surface and therefore little establishment of Big Sagebrush (see Table 3 for names of common plant in the study area) or other shrubs. The remainder of the upland habitat in the study area appears to have received less disturbance but has vegetation typical of slightly disturbed sites in the region. Neither the aquatic nor terrestrial habitats in the study area closely match those typically occurring where any of the four target species are found elsewhere in Oregon.

We assume that construction activities for the Project would involve some rock displacement and disruption of plants that currently exist in the study area. Although these would set back the succession of the plant communities, the effects would be minor compared to the original dam construction.

DISCUSSION

None of the target species was found during our surveys. The habitat conditions presently occurring in the study area do not appear to be suitable for either the three target amphibians or the target lizard species.

The wetland receives water from seepage under the dam, from the bottom of the reservoir, maintaining relatively cool water temperatures in the spring, except in the narrow fringe of sunny shallows. Much of the surface was covered by Common Mare's Tail by mid-June (Figure 2). This mat shades the water beneath, further cooling it, and also provides a platform for bird and snake predators. The substrate is predominantly rock rather than silt or organic mud. In contrast, Western Toads usually breed in extensive shallow water areas with sparse or patchy emergent vegetation and mud substrate, forage in moist riparian or other wooded areas, and shelter and over-winter in rodent burrows or under down wood, often traveling a kilometer or more overland or along stream corridors. Although individual adult toads might use the study area briefly for foraging or migrating, it does not provide breeding, sheltering, or over-wintering habitat. Oregon Spotted Frogs usually breed in extensive shallow water areas with fairly abundant emergent vegetation and mud substrate, forage in similar areas or nearby wet riparian areas, and over-winter at breeding sites or in nearby springs, spending very little time out of water. There is no appropriate habitat for this species in the study area. Columbia Spotted Frogs usually utilize similar habitats to Oregon Spotted Frogs, although they more frequently occur along streams. Although individual adult Columbia Spotted Frogs could use the study area briefly for foraging or migrating, it does not provide breeding, sheltering, or over-wintering habitat.

The upland habitats in the study area are of two types. The face of the dam and the armored river banks are predominantly boulder-sized rock, with little opportunity for development of sagebrush or other upland or riparian vegetation. The surrounding terrestrial habitats apparently received less disturbance during construction of Bowman Dam, and the vegetation is predominantly rabbitbrush, annual grasses, and forbs, with bunchgrass and juniper on the steeper slope on the south side of the study area. In contrast to both of the upland habitat types occurring in the study area, the typical habitat used by Northern Sagebrush Lizards is sandy soil with scattered sagebrush or bitterbrush (*Purshia tridentata*), a significant percentage of open areas free of grass or any other vegetation, and widely scattered junipers or pines (*Pinus* sp.).

The only amphibian found in the study area or vicinity was Pacific Treefrog, arguably the most opportunistic and adaptable frog in the state. Not only were large numbers of larvae found in the shallows of the wetland, but quite a few adults were found on the face of the dam, including near the top of the dam during mid-afternoon surveys when the surface of the rocks exceeded 100 degrees F.

Numerous garter snakes of two species were found in and around the wetland as well as on the lower slopes of the dam. They were doubtless capturing treefrog larvae and adults. Both Common and Western Terrestrial Garter Snakes are adaptable and occur along most streams in the region. A few Western Fence Lizards were found on the face of the dam and in the less disturbed area at the north edge of the study area. Several other individuals were found in relatively undisturbed habitat along the Chimney Rock Trail (approximately 1.8 kilometers north of the study area), including a female digging a hole presumably for egg laying. One Side-blotched Lizard was found on the north edge of the study area, and one along the Chimney Rock Trail. Both Side-blotched Lizards and especially Western Fence Lizards are fairly general in their habitat preferences. According to Storm and Leonard, 1995), Northern Sagebrush Lizards are generally absent where Western Fence Lizards are present.

Because each of the target species typically uses habitat types and conditions very different from those present in the study area, the Project area has minimal potential to provide habitat for any of them. Western Toad and Columbia Spotted Frog occur in the Crooked River drainage, and could possibly be encountered moving through the study area, but neither would be likely to find conditions suitable for remaining. It is extremely unlikely that Oregon Spotted Frog could occur in the study area, nor is there much chance that Northern Sagebrush Lizard could be encountered. None of the four target species was detected in or near the study area, and suitable habitat for them does not exist in the study area; therefore, the Project would be very unlikely to affect individuals or their regional populations.

Construction and operation of the Project would be unlikely to have long-term effects on the amphibian and reptile species that do occur in the study area. Although Project activities would disturb habitat and could disrupt breeding if construction occurred in the spring, impacts would be of short duration. All of the amphibian and reptile species detected in and near the study area are common and highly mobile; therefore, they would be capable of avoiding most impacts of both construction and operation of the Project.

Figure 1. Bowman Dam Herpetological Study Area.

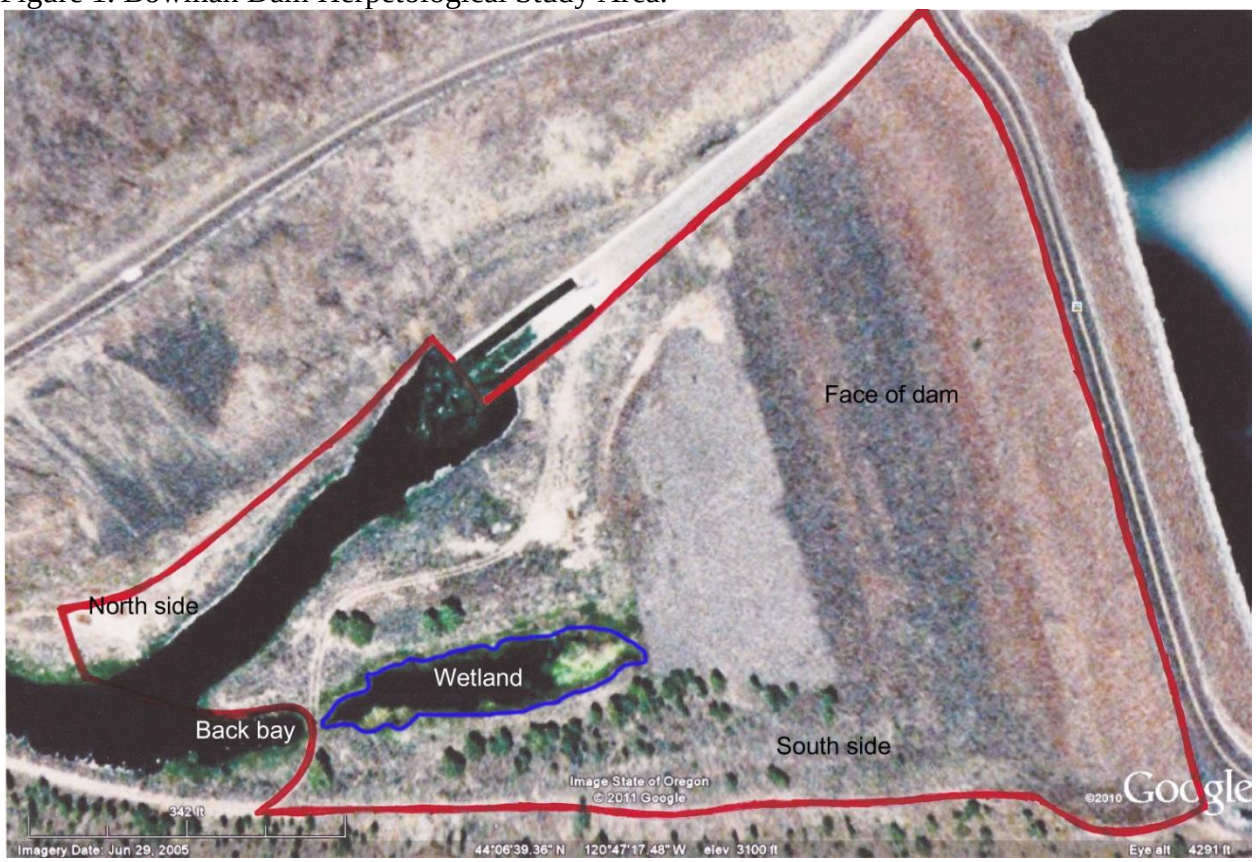


Figure 2. Wetland in June, mostly covered with a mat of vegetation.

Figure 3. Conducting aquatic survey.

Figure 4. Conducting terrestrial survey.

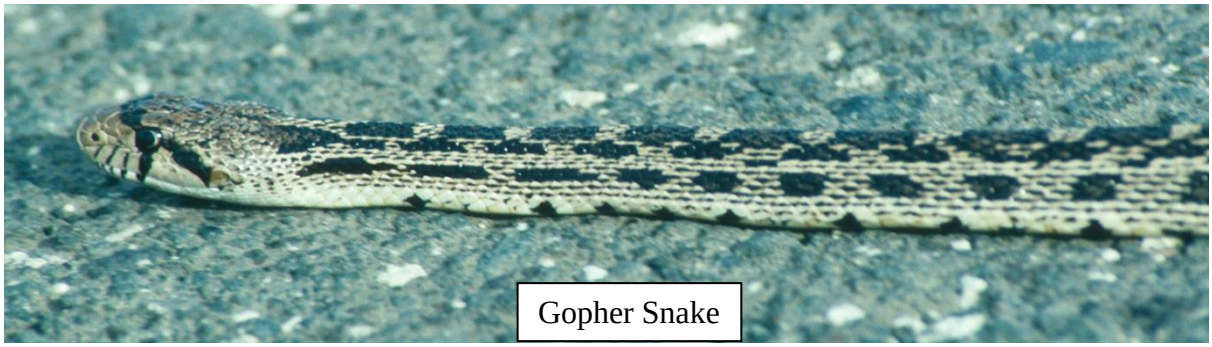
Figure 5. Amphibian and reptile species found in the study area.

Pacific Treefrog, adults and egg mass

Western Fence Lizard

Figure 5. (cont.)

Side-blotched Lizard



Gopher Snake

Common Garter Snake

Western Terrestrial Garter Snake

Western Terrestrial Garter Snake

Figure 6. Bird and mammal species found in the study area.


Mallard nest


Violet-green Swallow


Red-winged Blackbird nest


Mountain Cottontail

Table 1. Amphibian and Reptile Species Detected in the Bowman Dam Study Area and Vicinity [in brackets]

Species	Dates	Number/stage	Habitat
AMPHIBIANS:			
Pacific Treefrog (*Pseudacris [Hyla] regilla*)	5/10/11	5 adults, 6 larvae, 50 egg masses	wetland shallows, back bay – 1 adult, dam face – 2 adults
	[5/10/11]	[6 adults]	[off-channel pool near Chimney Rock Campground]
	5/11/11	3 adults, 50 egg masses	wetland shallows
	6/13/11	4 adults, 5000 larvae	wetland – larvae, dam face - adults
	6/14/11	8 adults	dam face
REPTILES:			
Western Fence Lizard (*Sceloporus occidentalis*)	5/10/11	2 adults	dam face
	6/14/11	2 adults	south side – 1, north side talus – 1
	[6/14/11]	[2 adults (female digging nest), 1 juvenile]	[Chimney Rock Trail]
Side-blotched Lizard (*Uta stansburiana*)	6/14/11	1 adult	north side talus
	[6/14/11]	[1 small adult]	[Chimney Rock Trail]
[Racer (*Coluber constrictor*)]	[6/13/11]	[1 dead adult]	[Hwy. 27 below dam]
Gopher snake (*Pituophis catenifer*)	6/13/11	1 adult	north side talus
	[6/13/11]	[1 dead adult]	[Hwy. 27 below dam]
Common Garter Snake (*Thamnophis sirtalis*)	5/10/11	1 adult	south side talus
	6/13/11	1 juvenile	wetland
Western Terrestrial Garter Snake (*Thamnophis elegans*)	5/10/11	2 adults, 1 juvenile	wetland
	5/11/11	1 adult, 1 juvenile	wetland – adult, near back bay – juvenile
	6/13/11	4 adults, 4 juveniles	wetland – 3 adults ,3 juveniles, dam face – 1 adult, 1 juvenile
	6/14/11	6 adults	dam face lower portion

Table 2. Bird and Mammal Species Detected in the Bowman Dam Study Area and Vicinity

BIRD SPECIES	SCIENTIFIC NAME	STUDY AREA	VICINITY	BREEDING? *
Canada Goose	*Branta canadensis*		√	probably
Mallard	*Anas platyrhynchos*	√	√	yes
Common Merganser	*Mergus merganser*	√	√	
California Quail	*Callipepla californica*	√	√	probably
Western Grebe	*Aechmophorus occidentalis*		√	
Great Blue Heron	*Ardea herodias*		√	yes – small rookery 3 mi. s of Prineville
Turkey Vulture	*Cathartes aura*		√	
Bald Eagle	*Haliaeetus leucocephalus*		√	
Red-tailed Hawk	*Buteo jamaicensis*		√	
Golden Eagle	*Aquila chrysaetos*	√	√	probably (pair seen but nest not located)
American Kestrel	*Falco sparverius*		√	
Spotted Sandpiper	*Actitis macularius*	√	√	
Rock Pigeon	*Columba livia*		√	
Mourning Dove	*Zenaida macroura*		√	
Northern (Red-shafted) Flicker	*Colaptes auratus*	√	√	yes
Gray Flycatcher	*Empidonax wrightii*		√	
Dusky Flycatcher	*Empidonax oberholseri*		√	
Ash-throated Flycatcher	*Myiarchus cinerascens*	√	√	
Western Kingbird	*Tyrannus verticalis*	√	√	
Cassin's Vireo	*Vireo cassinii*		√	
Warbling Vireo	*Vireo gilvus*		√	
Black-billed Magpie	*Pica hudsonia*	√	√	
Common Raven	*Corvus corax*	√	√	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	√	√	yes
Violet-green Swallow	*Tachycineta thalassina*	√	√	yes
Cliff Swallow	*Petrochelidon pyrrhonota*	√	√	yes
Rock Wren	*Salpinctes obsoletus*	√	√	probably
Ruby-crowned Kinglet	*Regulus calendula*		√	
American Robin	*Turdus migratorius*	√	√	yes
Yellow-rumped Warbler	*Dendroica coronata*		√	
Western Tanager	*Piranga ludoviciana*	√		
Chipping Sparrow	*Spizella passerina*		√	
White-crowned Sparrow	*Zonotrichia leucophrys*		√	
Golden-crowned Sparrow	*Zonotrichia atricapilla*		√	
Dark-eyed (Oregon) Junco	*Junco hyemalis*		√	
Lazuli Bunting	*Passerina amoena*		√	
Red-winged Blackbird	*Agelaius phoeniceus*	√	√	yes
Western Meadowlark	*Sturnella neglecta*		√	
Brewer's Blackbird	*Euphagus cyanocephalus*	√	√	yes
Brown-headed Cowbird	*Molothrus ater*		√	
Bullock's Oriole	*Icterus bullockii*	√	√	
House Finch	*Carpodacus mexicanus*		√	
American Goldfinch	*Carduelis tristis*	√		
MAMMAL SPECIES	SCIENTIFIC NAME	STUDY AREA	VICINITY	BREEDING?
Mountain Cottontail	*Sylvilagus nuttallii*	√	√	
Golden-mantled Ground Squirrel	*Spermophilus lateralis*	√	√	

* Yes – Found nest or saw adult carrying food. Probably – Saw pair behavior or adult carrying nest material.

Table 3. Common plants in the Bowman Dam Study Area

COMMON NAME	SCIENTIFIC NAME	HABITAT
Big Sagebrush	*Artemisia tridentata*	shrub steppe
Bluebunch Wheatgrass	*Pseudoroegneria spicata*	shrub steppe
Cheatgrass	*Bromus tectorum*	shrub steppe
Common Mare's Tail	*Hippuris vulgaris*	wetland aquatic
Fuller's Teasel	*Dipsacus fullonum*	wetland edge emergent
Gray Rabbitbrush	*Chrysothamnus nauseosus*	shrub steppe
Green Rabbitbrush	*Chrysothamnus viscidiflorus*	shrub steppe
Lesser Duckweed	*Lemna minor*	wetland aquatic
Narrowleaf Cattail	*Typha angustifolia*	wetland edge emergent
Purple (Grayball) Sage	*Salvia dorrii*	dam face
Soft Rush	*Juncus effusus*	wetland edge emergent
Star Duckweed	*Lemna trisulca*	wetland aquatic
thistle	*Cirsium sp.*	north edge rip-rap
Western Juniper	*Juniperus occidentalis*	shrub steppe

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NORTHWEST ECOLOGICAL RESEARCH INSTITUTE SURVEYORS:

Charlotte Corkran has been an independent wildlife consultant since 1984, specializing in amphibian and bird surveys and amphibian habitat assessments. She is the co-author of *Amphibians of Oregon, Washington and British Columbia* (2006 revised, Lone Pine Publishing).

Emilie Blevins has conducted reptile, bird, and mammal surveys for over seven years. She received her MS degree in biology and is a co-author of two publications examining lizard population ecology.

Christie Galen has been an ecological consultant since 1989, specializing in wildlife habitat assessments, sensitive species surveys and biological assessments, bird and amphibian surveys, and habitat restoration.

Amphibians and reptiles captured for identification and photographs were collected under Oregon Department of Fish and Wildlife Scientific Taking Permit #047-11, and were released at capture sites immediately after handling.