

**R. E. Fitzner**

**W. H. Rickard**

Battelle Pacific Northwest Laboratories  
Richland, Washington 99352

and

**D. E. Clark**

Portland General Electric Company  
Portland, Oregon 97025

## Herpetological Survey at the Trojan Nuclear Plant, Oregon<sup>1</sup>

### Abstract

This paper discusses the findings of a herpetological survey conducted at the Trojan Nuclear Plant, Columbia County, Oregon, from May 1972 through August 1973. Drift fences with pitfalls, night-lighting, and field observations were conducted for the purpose of ascertaining relative abundance. A permanent 750 m<sup>2</sup> plot was searched for snakes to yield data on biomass per unit area. There are apparently no other published records of the reptiles and amphibians of Columbia County.

### Introduction

A field survey of the reptiles and amphibians inhabiting the environs of the Trojan Nuclear Station site in Columbia County, Oregon, was conducted from May 1972 through August 1973. The purpose was to provide general information on their relative abundance and habitat preferences.

The secretive nature of the cold-blooded vertebrates has resulted in an incomplete picture of their geographic and ecologic distribution in Oregon. We found no published records of specimens collected in Columbia County. These data are necessary in order to assess fully the position which reptiles have in the environment and to identify rare and/or endangered species.

The Trojan property consists of approximately 243 ha surrounding the newly constructed nuclear power station. The area borders the west shoreline of the Columbia River and includes pond, forest, and grassy meadow habitats. The most abundant tree species on well-drained soils is Douglas-fir, *Pseudotsuga menziesii* (Rickard, 1975). Winters are moist with temperatures seldom below freezing; summer temperatures are moderate with many days without measurable rainfall. Average January temperatures are 7°C max. and 0°C min. Average July temperatures are 26°C max. and 10°C min. The average annual rainfall is 114.6 cm.

### Methods Employed

General field collections were made by searching preferred reptile or amphibian habitats; i.e., under stones, logs, other surface debris, and by night-lighting roadways and ponds. These observations were supplemented by pitfall traps, each 35 cm in diameter and

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41 cm deep, spaced at 5 m intervals along a 30 m long by 40 cm high strip of drift fence. The fence was a strip of 6 mm mesh hardware cloth. The study site was on a steep, north-facing slope well stocked with mature Douglas-fir trees and an understory of sword fern (*Polystichum munitum*). The pitfalls were checked 19 times between 23 January and 19 July 1973. Gibbons and Bennett (1974) used a similar drift-fence technique in South Carolina and found it to be a valuable method for studying the population dynamics of migrating amphibians.

A special 750 m<sup>2</sup> (5 x 150 m) plot was staked out in a dry, grassy meadow habitat that was cut annually for hay. The plot was searched for snakes. Startled snakes were hand captured and released after identifying individuals to species, weighing, and recording total length and tail length. Individual snakes were marked using ink tattoos on ventral scales (Woodbury, 1953). The plot was searched in mid-morning on 27 September 1972, and 18 July and 14 August 1973.

### Results and Discussion

Six species of newts and salamanders were found on the Trojan property. These were northwestern salamander (*Ambystoma gracili*), long-toed salamander (*A. macrodactylum*), rough-skinned newt (*Taricha granulosa*), Dunn's salamander (*Plethodon dunni*), western red-backed salamander (*Plethodon vehiculum*), and Ensatina (*Ensatina escholtzi*). Three frog species were observed: bull frog (*Rana catesbeiana*), red-legged frog (*Rana aurora*), and pacific tree frog (*Hyla regilla*). The bull frog is not native to the region, having been introduced to Oregon from the eastern United States. The only lizard observed was the northern alligator lizard (*Gerrhonotus coeruleus*) and the only turtle seen was the painted turtle (*Chrysemys picta*). The common garter snake (*Thamnophis sirtalis*) and the northwestern garter snake (*T. ordinoides*) were the only snake species sighted. Gordon (1939), Anderson and Slater (1941), Graf *et al.* (1939), and Stebbins (1953) provide distributional lists which closely match our findings. Their lists, however, were based on specimens collected or observed in areas outside of Columbia County.

Pitfalls, supplemented by a drift fence, were efficient collectors of newts and salamanders. Rough-skinned newts, long-toed, northwestern, and red-backed salamanders, ensatina, and red-legged frogs were captured (Table 1). The amphibian most often

TABLE 1. Total number of amphibians collected in pitfall traps during the period 23 January to 19 July 1973.

Species	January 23 to February 27	February 28 to March 26	March 27 to April 24	April 25 to May 20	May 21 to June 19	June 21 to July 19
Rough-skinned Newt	35	6	2	0	3	2
Long-toed Salamander	1	0	1	0	0	0
Northwestern Salamander	1	1	1	0	1	0
Western Red-backed Salamander	0	0	1	0	0	0
Ensatina	1	1	0	0	0	0
Red-legged Frog	0	0	2	0	0	1
Total	38	8	7	0	4	3

found in the pitfalls was the rough-skinned newt, 48 in all. Pitfall catches were high in winter then declined with the onset of warmer, dry, summer weather. Gordon (1939) indicated that the genus *Taricha* is common in the area we studied but stated the taxonomic status of the species present in Columbia County is as yet uncertain. He further stated that three species of *Ambystoma* (*A. gracili*, *A. macrodactylum*, *A. tigrinum*) are probably more common in the lowlands than in the surrounding mountains. We did not observe *Ambystoma tigrinum* in our study area.

Fifty-four garter snakes were captured on the grassy meadow plot (Table 2). Eighteen were common garter snakes (*Thamnophis sirtalis*) and 36 were northwestern garter snakes (*T. ordinoides*).

TABLE 2. Hand captures of garter snakes on a transect line, Trojan Site, Columbia County, Oregon.

Sept. 27, 1972			July 18, 1973				August 14, 1973					
ID	SP	Wt.	ID	SP	Wt.	L	Tail	ID	SP	Wt.	L	Tail
1	N	2.5	103	N	16.5	384	84	122	N	35.0	514	110
2	C	50.0	104	N	5.0	260	55	123	N	26.0	495	110
3	C	36.0	105	N	32.0	495	113	124	C	28.0	495	115
4	N	6.5	106	N	18.0	429	113	125	C	36.0	514	92
5	C	3.0	107	N	7.5	309	74	126	N	14.0	394	90
6	N	19.0	108	N	24.5	466	113	127	C	21.0	457	114
7	N	5.0	109	N	30.5	478	111	128	C	19.0	360	60
8	N	3.0	110	N	23.0	459	104	129	N	30.0	406	—
9	C	6.0	111	C	18.0	429	111	130	N	27.0	495	130
10	C	20.0	112	N	18.5	423	100	*120	C	38.0	603	153
11	N	30.0	113	C	19.0	413	105					
12	C	117.0	114	N	37.0	453	† 67			Total Wt.	274.0	
13	C	68.0	115	N	33.5	456	85					
14	N	21.5	116	N	20.0	423	110					
15	N	18.0	117	C	13.0	325	76					
16	N	17.0	118	N	14.0	355	94					
17	N	3.0	119	C	50.0	613	168					
18	N	7.0	120	C	39.0	570	141					
19	N	2.0	121	C	23.0	426	69					
20	C	81.0										
21	N	2.5	* 6	N	25.0	441	123					
22	N	27.0										
23	N	2.0	Total Wt.		467.0							
24	N	22.5										
25	N	2.0										
26	N	4.0										
Total Wt.		565.5										

LEGEND  
 C = Common garter snake  
 N = Northwestern garter snake  
 ID = Identification number  
 Wt = Grams  
 L = Total length in mm  
 Tail = Tail length in mm

\* = recapture  
 † = broken tail

Northwestern garter snakes had a mean body weight of 17.1 g SE ± 1.8, ranging from 2.0 to 37.0 g. The common garter snakes were heavier, having a mean body weight of 36.1 g SE ± 6.0, ranging from 3.0 to 117 g.

A common garter snake captured and marked in September 1972 was caught again in 1973; its weight had increased from 19 to 25 g. Another common garter snake marked in July 1973 was captured in August; its weight had declined slightly from 39 to 38 g.

The length of common garter snakes ranged from 325 to 615 mm, tails ranging from 60 to 168 mm. Northwestern garter snakes were shorter and ranged in length from 260 to 514 mm, with tails ranging from 55 to 113 mm. Hebard (1950) examined 533 specimens of *Thamnophis* collected from King County, Washington, and also noted that common garter snakes were longer and heavier bodied than the northwestern garter snake. The greatest biomass of garter snakes on the plot was measured in July 1972—0.7 g/m<sup>2</sup> live weight.

About 40 acres of the Trojan site are occupied by railroads, roadways, buildings and structures, parking lots, and other construction. The remainder of the site continues to be biologically productive and now serves as a refugium for herptofauna. With the exception of the bull frog, herptiles have little or no direct use to humans as a food and some species are secretive and seldom seen by people; nevertheless, they do provide a food base for carnivorous fish and the great blue heron.

#### Literature Cited

- Anderson, O. I., and J. R. Slater. 1941. Life Zone Distribution of the Oregon Reptiles. Occasional Papers. College of Puget Sound, Tacoma, Washington. 10 pp.
- Gibbons, J. W., and D. H. Bennett. 1974. Determination of anuran terrestrial activity patterns by a drift fence method. *Copeia* 1974(1):236-243.
- Gordon, K. 1939. The Amphibia and Reptilia of Oregon. Oregon State College, Oregon State Monographs. Studies in Zoology. No. 1. 82 pp.
- Graf, W., S. G. Jewett, Jr., and K. L. Gordon. 1939. Records of amphibians and reptiles from Oregon. *Copeia* 1939(2):101-104.
- Hebard, W. B. 1950. Relationships and variation in the garter snakes, genus *Thamnophis*, of the Puget Sound region of Washington State. *Herpetologica* 6(4):97-101.
- Rickard, W. H. 1975. Litterfall in a Douglas-fir forest near the Trojan Nuclear Power Station, Oregon. *Northw. Sci.* 49:183-189.
- Stebbins, R. C. 1953. *Amphibians and Reptiles of Western North America*. McGraw-Hill Book Company, New York, New York. 536 pp.
- Woodbury, A. M. 1953. Methods of field study in reptiles. *Herpetologica* 9:87-92.

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