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# Avifaunal Survey of the Trojan Nuclear Power Station[1]

## Abstract

A walking path was established that entered or passed the important bird habitats present on the undeveloped property surrounding the Trojan Nuclear Power Station in Oregon. Ten early morning walks were made at approximately one month intervals in 1973. All identifiable birds were counted. Seventy-eight species were recorded from the path. If faithfully conducted over a period of years, the bird path method of avifaunal censusing can be expected to detect at least gross changes in bird populations as related to changing land use patterns.

## Introduction

The National Environmental Policy Act (NEPA) of 1969 has created a need for providing written statements to evaluate the environmental impacts of construction and operation of nuclear power stations and other kinds of industrial facilities. Birds usually inhabit sites potentially suitable for nuclear power stations and are an important consideration because certain species are regarded as rare, threatened, or endangered. Others are commercially and recreationally valuable.

One of the important questions is: How much of an effort needs to be made to comply fully with the intent of NEPA? Probably the most extensive effort made towards evaluating impact assessments so far is that associated with nuclear power station siting and the United States Nuclear Regulatory Commission (Eberhardt, 1976).

This paper reports the results of an avifaunal survey made prior to the operation of the Trojan nuclear power station.

## The Site

The Trojan nuclear power station is located on a 600-acre site near Prescott, Columbia County, Oregon. The land is mostly undeveloped and is occupied by forest communities. The forests are interrupted by small hay meadows, freshwater ponds, and grassy marshes. The dominant trees are Douglas-fir, *Pseudotsuga menziesii,* growing on the upland soils; and black cottonwood, *Populus trichocarpa,* and Oregon ash, *Fraxinus latifolia,* growing on lowland soils.

## Methods

Prior experience as to the kind of information and detail needed to provide data to assess the long-term impact of power station operations on bird populations was lack-

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ing. Thus, an arbitrary decision was made to establish a survey path to be followed once each month and to record all birds seen along this path. The path was walked in the early morning hours and was approximately 2.5 miles long (Fig. 1). The path penetrated conifer forest and deciduous tree communities, skirted the edges of marsh

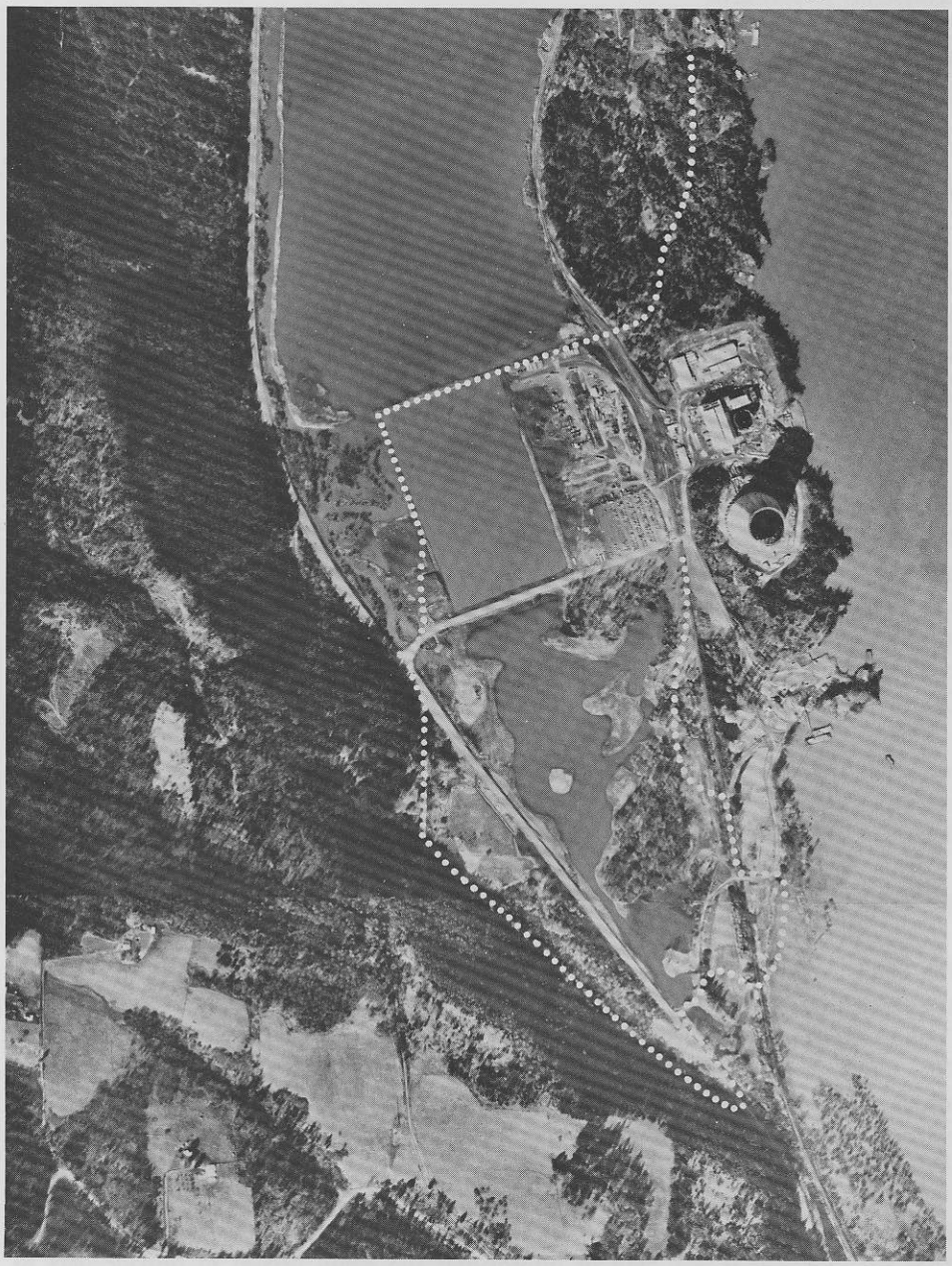

Figure 1. Aerial photograph of the Trojan nuclear power station. The dotted line shows the bird survey path. The path begins at the upper (northern) property boundary and terminates near the prominent cooling tower structure. The rectangular reflection pond west of the cooling tower is approximately 1500 feet in length. (PNL 766-075-1)

and pond habitats, and forest and meadow edges. When in forest stands, the line of sight was often restricted to a few yards, but in open areas line of sight would extend to ½ mile or more.

An aerial photograph (Fig. 1) was taken to provide a record of the extent of plant communities and to serve as an indicator of future changes in communities, such as clear-cut logging or other events that could alter the species composition and relative abundance of birds along the path. In all, 10 visits were made at about 1-month intervals.

Bird identifications were made with the aid of binoculars, but it was not always possible to identify all birds seen, especially those in heavy cover. Unidentified birds were not included in the species lists.

**Results**

Upland game birds were not abundant at the Trojan site even though five species were represented (Table 1). Birds reared on the site property can easily cross boundaries where they could be shot during the hunting season even though hunting is not permitted on the site property.

TABLE 1. Birds counted along an established survey path at the Trojan Power Station Site, 1973.

| Common Name | J | F* | M | A | M | J | J | A | S | O | N* | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upland Game Birds | | | | | | | | | | | | |
| Ruffed Grouse | | | | | | | | | 1 | | | 1 |
| Mountain Quail | | | | | | | | 9 | 7 | | | |
| Mourning Dove | | | | | | | 2 | | | | | |
| Ring-necked Pheasant | | | | | | | | | | 1 | | |
| Band-tailed Pigeon | | | | | | | 2 | | | | | |
| Waterfowl | | | | | | | | | | | | |
| Mallard Duck | | | 11 | 10 | 10 | 3 | 16 | 15 | 18 | ~200 | | 21 |
| Wood Duck | | | | | 6 | | 1 | | 1 | | | |
| American Coot | 1 | | | | | | | | | 10 | | 29 |
| American Wigeon | 75 | | 45 | | | | | | | | | |
| Canada Goose | 50 | | | | | | | | | | | 42 |
| American Merganser | 9 | | 2 | | | | | | | | | |
| Hooded Merganser | | | | | 10 | | | | | | | |
| Green-winged Teal | | | | | | | | | | 13 | | |
| Pintail | | | | | | | | | | 2 | | |
| Hawks and Vultures | | | | | | | | | | | | |
| Red-tailed Hawk | 2 | | 1 | 4 | | 2 | 2 | 1 | 1 | | | 1 |
| Turkey Vulture | | | | 1 | | | | 1 | | | | |
| Gulls and Shorebirds | | | | | | | | | | | | |
| Great Blue Heron | 2 | | 1 | 3 | 10 | 8 | 3 | 17 | 2 | 4 | | 1 |
| Killdeer | | | 2 | 2 | | 3 | 1 | 1 | 1 | 12 | | |
| Spotted Sandpiper | | | | | 3 | 4 | 2 | 2 | | | | |
| Ring-billed Gull | ~240 | | | | 2 | | | | | | | |
| Western Sandpiper | | | | | | | | 3 | | | | |
| Lesser Yellowlegs | | | | | | | | 2 | | | | |
| Herring Gull | | | | 10 | | | | | | | | |
| Black-crowned Night Heron | | | | | | | | 2 | | | | |
| Perching Birds | | | | | | | | | | | | |
| Black-capped Chickadee | 8 | | 10 | 12 | 2 | 6 | 2 | 10 | 10 | 29 | | 15 |
| Song Sparrow | 15 | | 8 | 7 | 10 | 6 | 8 | 8 | 22 | 13 | | 17 |
| Robin | | | 8 | 2 | 8 | 3 | 4 | 4 | 4 | 5 | | 1 |
| Steller's Jay | 1 | | 5 | 1 | 4 | 2 | 2 | 3 | | | | 7 |
| Red-winged Blackbird | | | 1 | 10 | 15 | 10 | 5 | | ~150 | 10 | | 3 |
| Winter Wren | 1 | | 3 | 4 | 2 | 1 | | 4 | | 9 | | 3 |
| Rufous-sided Towhee | 1 | | 1 | 2 | 2 | 3 | 6 | | | | | 4 |
| Dark-eyed Junco | 40 | | 6 | 1 | 2 | | | 6 | | | | 57 |

TABLE 1. (Continued)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| American Goldfinch | | | 2 | 10 | 10 | 15 | ~100 | | | |
| Purple Finch | | | | | 3 | 8 | 2 | 2 | 4 | |
| Common Flicker | | 2 | | 1 | | 2 | 1 | 1 | | |
| Chestnut-backed Chickadee | | | | 1 | | 6 | 14 | | 26 | 2 |
| Rough-winged Swallow | | | | 6 | 6 | 6 | ~100 | 8 | | |
| Barn Swallow | | | | 20 | 9 | 8 | 60 | 8 | | |
| Long-billed Marsh Wren | | | 4 | 2 | | | | | 2 | 4 |
| Common Crow | | | 3 | 2 | 2 | | | | 1 | |
| Starling | | | | 1 | 15 | 8 | | 4 | | |
| White-crowned Sparrow | | 1 | | | | 5 | 6 | 1 | | |
| Common Bushtit | | | 1 | 1 | | 1 | 1 | | | |
| Violet-green Swallow | | | | | 12 | 8 | 60 | 8 | | |
| Pine Siskin | | | | 4 | | 8 | 10 | | | |
| Yellowthroat | | | 3 | 2 | 1 | | | | | |
| Hermit Thrush | | | | | 6 | 2 | 1 | | | |
| Bewick's Wren | | | 2 | | 4 | 4 | | | | |
| Brown-headed Cowbird | | | | 4 | 10 | 18 | | | | |
| Ruby-crowned Kinglet | 2 | | | 1 | | | | | 1 | 1 |
| Northern Oriole | | | | 4 | 4 | 4 | | | | |
| Golden-crowned Kinglet | | | | | 3 | | | | 21 | 54 |
| Orange-crowned Warbler | | | 2 | 1 | | 2 | | | | |
| Hammond's Flycatcher | | | | 2 | 1 | 4 | | | | |
| Olive-sided Flycatcher | | | | 2 | | 3 | 1 | | | |
| Downy Woodpecker | | | | | | | | 1 | | 1 |
| Cliff Swallow | | | | 20 | 8 | | | | | |
| Tree Swallow | | | 8 | 30 | | | | | | |
| Cedar Waxwing | | | | | 1 | 2 | | | | |
| Savannah Sparrow | | | | | | 16 | 2 | | | |
| Black-headed Grosbeak | | | | | 3 | 3 | | | | |
| Rufous Hummingbird | | | 2 | | | 1 | | | | |
| Western Tanager | | | | | | 2 | | 1 | | |
| Hutton's Vireo | | | | | | | | 1 | | 1 |
| Alder Flycatcher | | | | | 4 | 2 | | | | |
| Trail's Flycatcher | | | 3 | 4 | | | | | | |
| Hairy Woodpecker | | | | | | | 2 | 1 | | |
| Warbling Vireo | | | 1 | | | | | | | |
| Black-throated Gray Warbler | | | | | | | 3 | | | |
| Yellow-rumped Warbler | | | 8 | | | | | | | |
| Yellow-bellied Sapsucker | | | | | 1 | | | | | |
| Williamson's Sapsucker | | | | | | | | | 1 | |
| Brewer's Blackbird | | | | | | | | 1 | | |
| House Finch | | | | | | | | | | 1 |
| Varied Thrush | | | | | | | | | | 2 |
| Brown Creeper | | | | | | | | | 4 | |
| White-throated Sparrow | | | | | | | | | 1 | |
| Fox Sparrow | | | | | | | | | | 5 |

Birds observed on the site but not along the established pathway: Pied-billed Grebe, Whistling Swan, Cinnamon Teal, Blue-winged Teal, Ring-necked Duck, Goshawk, American Kestrel, Common Snipe, Great Horned Owl, Calliope Hummingbird, Belted Kingfisher, Pileated Woodpecker, Western Wood Pewee, Bank Swallow, Purple Martin, Scrubjay, Water Pipit, Yellow Warbler, MacGillivray's Warbler, Wilson's Warbler, and House Sparrow.

*=No observations made

Ducks and geese were much more numerous than upland game birds, especially in the autumn months when migrant birds fed and rested on the ponds. The species recorded during this season were similar to those reported on public shooting grounds on Sauvie Island (Oregon Dept. of Fish and Wildlife, 1975). The ponds were not great producers of ducks, although a few broods of mallards and wood ducks were raised (Table 1). Mallards and wood ducks are reported as the principal nesting ducks in Columbia County (Oregon Dept. of Fish and Wildlife, 1975).

Predatory birds were scarce. The most often sighted raptor was the red-tailed hawk (Table 1). The great blue heron was abundant, having been seen on every visit, and 17 individuals were counted during one survey. These birds do not nest on the Trojan property, but a large nesting colony is reported from Bachelor Island located in the Columbia River upstream from the Trojan property.

The diversity of habitats at the Trojan site is mainly responsible for the variety of bird species. Seventy-eight species were recorded from the census path and twenty-one additional species were identified during the course of other biological studies on the site property (Table 1).

There were no rare, threatened, or endangered species observed during the course of field observations, although the whistling swan is protected from hunting kills in Oregon (U.S. Dept. of Interior, 1973; Marshall, 1969).

**Discussion**

The purpose of avian surveys at nuclear power station sites is to establish whether rare, threatened, or endangered species occur on the property and, if so, to determine if their existence would be threatened by construction and operation of the site. Another purpose is to determine if common, commercially, or recreationally valuable bird populations would be seriously affected by construction and operation of the station.

Nuclear power stations, like other kinds of massive building complexes, pre-empt natural avian habitats. Unlike many other kinds of industrial complexes, nuclear power stations are sited with a large buffer zone of undeveloped land around the buildings. The acreage varies, but 1,000 acres is probably fairly representative. The land use in the buffer zone varies according to site, but human residences are not permitted.

Depending on future land use priorities, the buffer zone lands can provide habitat for birds for the life of the nuclear station, *i.e.,* 30-40 years, in a zone in which wildlife habitats could dwindle with the development of housing, agriculture, or other industrial facilities.

The anticipated proliferation of nuclear power stations in the United States has increased public concern as to the deleterious potential for nuclear power station operation on wild bird populations, and this concern has prompted Mellinger and Schultz (1975) to review the literature involving wild birds and ionizing radiation. The normal operation of a modern nuclear power station is expected to release only small amounts of radionuclides into the surrounding atmosphere. Low level atmospheric releases are expected to produce ecological effects that would be inseparable from those produced by an array of concomitant environmental stresses. Some bird mortality may result from collisions with buildings, towers, and other structures such as transmission lines. This kind of mortality can be ascertained by observing if dead birds are

found at the bases of the structures. To date, there has been no bird mortality as a result from collisions with buildings, the cooling tower, or other man-made structures on the Trojan site. Eberhardt (1976) reviewed environmental statements prepared for 15 nuclear stations in the United States in terms of their contributions to quantitative ecological methods and concluded that the limitations of animal census methods and substantial variability make it doubtful that anything less than gross population changes can be detected in the usual sequence of pre- and post-operational ecological observations.

The bird path survey has some advantages over the plot census technique as employed by Anderson (1973). It is less time-consuming and permits coverage of more habitats. The bird path survey is expected to detect at least gross changes in species composition and abundance. The major disadvantage is that population density (*i.e.,* individuals per unit area) is not obtainable. Density data are essential if comparison between different habitats and regions is to be made, but they are not so important if each nuclear power station site is treated individually.

A bird path survey was conducted on a riparian tree-shrub community in south-central Washington and seemed to assess adequately changes in avian populations after a 10-year time lapse (Rickard and Rickard, 1972).

Although bird populations are more amenable to census methodologies than most other kinds of wild vertebrates, and considerable time and effort have been expended to elucidate ecological principles in northwestern forest communities (e.g., Wiens and Nussbaum, 1975; Anderson, 1972), the bird path census appears adequate for nuclear power plant impact assessment, particularly if done faithfully, frequently, and in conjunction with knowledge of changing plant community patterns as indicated by changing land uses and on-going radiological surveillance programs.

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