

POSTFIRE AVIAN ECOLOGY IN YELLOWSTONE NATIONAL PARK

Robert J. Jonas & Allan R. Pfister
Washington State University
Pullman, WA 99164

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Objectives

One objective of establishing Yellowstone National Park was to minimize human influence on the biotic communities. However, from the time of establishment (1872) through 1972, the policy has been to suppress forest fires. Since natural fires play an important role in many environments, their importance to the Yellowstone ecosystem is being assessed. Little knowledge exists on avian succession immediately following a forest fire and several years postfire.

The Divide fire burn on the western side of the South Arm of Yellowstone Lake and the Trail Creek burn southeast of the Southeast Arm of Yellowstone provided an opportunity to supplement the knowledge of Yellowstone's fire ecology. Therefore, data gathered during the 1979 summer will be used to strengthen the 1978 summer data in the determination of avian ecology in these postfire areas.

Procedures

The field phase of the research was initiated June 12, 1979 and terminated on August 30, 1979. Data collation was continued subsequent to field research to enable completion of the final report. To the extent required, study plots utilized by Jonas and Pfister (1978) were reestablished in the 1600 acre Divide fire burn (June 12) and the 580 acre Trail Creek fire burn (June 29) within clean burn areas (580 and 280 respectively). These plots were in locations utilized by Gniadek (1977) to compare data collected in this study with that collected by Gniadek (1977). The initial censuses in the twenty-two and two-tenth acre (9 hectare) study plots were conducted on June 13 (Divide) and June 30 (Trail Creek).

Areas on which the spot-map technique were to be utilized were identical to those utilized by Jonas and Pfister (1978). The line transect censuses were also conducted in the same areas as utilized by Jonas and Pfister (1978).

An attempt to determine avian density was through the use of the spot-map technique (Williams 1936) and line transect censuses. The line transect method used was identical to the spot-map method but utilized a smaller area than that encompassed by the spot-map technique. Comparisons will be made between the two techniques to determine the most efficient method. Censuses

were conducted in early morning and early evening using both audio and visual cues to determine avian species present. Mist nets were erected in the burned and unburned plots in both areas for a period of three days each in an attempt to determine if any species were present, but not recorded by the techniques described above.

Field observations were recorded on printed sheets utilizing a computer symbol check-list for species, activity, location, number observed, etc. All species encountered were also placed in their respective feeding categories in relation to foraging level and food type according to the method used by Salt (1953).

Approximately 189 hours were spent censusing the avian communities from June 13 to August 24; 90 hours on the Divide fire area and 99 on the Trail Creek area. Spot mapping the Divide area required 35 hours for the burn and 26 hours for the control, while the line transect required 29 hours; 9 each for the burn and control, and 11 for the edge. Time allocations for the Trail Creek area were the same with the exception of 35 hours being spent in the control. Another 30 hours were spent casually observing avian species present in the study and adjacent areas. Approximately 20 hours were allocated to the establishment and checking of mist nets in each of the two areas. In instances where nests were located, the diameter at breast height (DBH), tree height, and the number of young (if possible) were recorded. Diameter at breast height was also recorded and divided into height class categories for five 25m² plots in an effort to determine critical nesting criteria in a burned area. Two days were spent casually censusing the 1979 Gallatin fire in the northwest portion of Yellowstone Park.

Using canopy coverage, vegetation was sampled along two 285 meter lines within each plot at 15 meter intervals along the lines. The sample plot, as in 1978, was a 4m² circle. Vegetation data for the line transects (edges) was collected along the lines previously established. The categories for which coverage data were obtained were: grasses, shrubs, forbs, logs, bare ground, and both dead and living trees. Approximately 25 hours were spent collecting vegetation data in each of the two areas.

Results and Discussion

A categorization of the species as to where they were observed is found in Table 1. (This table represents utilization by the respective species, but does not necessarily signify utilization as nesting habitat.) Table 1 shows only six species did not utilize an area that was a consequence of the natural fires, while 15 species exclusively utilized habitat that was a result of the burns. These findings lend further support to the preliminary findings of 1978 in indicating the natural fires may promote ecological diversity and may be providing habitat suitable for several species which are considered rare in Yellowstone Park.

Species encountered in the 1979 Gallatin fire 1 month subsequent to burning include the Hairy and Northern Three-toed Woodpeckers, Gray Jay, Yellow-rumped Warbler, Dark-eyed Junco, Pine Siskin, and Cassin's Finch. The presence of these species shows the speed in which burned areas are reestablished as foraging and future nesting sites.

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Table 1. Species Observed in Three Habitat Types, Summer 1979

Burned Areas

All Areas

Tree Swallow
 Western Wood Pewee
 Lincoln's Sparrow
 Olive-sided Flycatcher
 Mountain Bluebird
 White-crowned Sparrow
 Broad-tailed Hummingbird
 Mourning Dove
 Lark Bunting
 Brown-headed Cowbird
 Barrow's Goldeneye

Common Flicker
 Yellow-rumped Warbler
 Dark-eyed Junco
 Robin
 Brown Creeper
 Hairy Woodpecker
 Northern Three-toed Woodpecker
 Chipping Sparrow
 Pine Siskin
 Clark's Nutcracker
 Gray Jay
 Red-breasted Nuthatch
 Osprey
 Mountain Chickadee
 Western Tanager
 Cassin's Finch
 Raven

Unburned Areas

Edges

Hermit Thrush
 Pine Grosbeak
 Ruffed Grouse
 Williamson's Sapsucker
 Owl (spp. unknown)
 Ruby-crowned Kinglet

Wilson's Warbler
 Rufous Hummingbird
 Red Crossbill
 Black-capped Chickadee