

**Articles and abstracts that will appear in the Fall 2001 issue of *Northwest Science***

**Current Status of the Western Gray Squirrel Population in the Puget Trough, Washington**

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**Abstract**

The Puget Trough population of Washington's state-threatened western gray squirrel is centered in Oregon white oak ecotones adjacent to conifer forests and prairies on the Fort Lewis Military Reservation. Our goal was to determine the current status of western gray squirrels in this region. In 1998, we found five western gray squirrels in 538 hours of foot surveys in 133 oak sites. In 1999, we expanded our survey effort and included surveys on foot, surveys with simulated squirrel calls, live trapping, and bait stations with motion-sensitive cameras. No western gray squirrels were detected in any oak sites in 1999. One western gray squirrel was photographed in a ponderosa pine stand adjacent to oaks. The western gray squirrel population on Fort Lewis appears to have declined severely since low population numbers were reported in 1992-1993. Our ability to formulate mutually exclusive hypotheses underlying the decline of the western gray squirrel on Fort Lewis is limited by our lack of understanding of how these squirrels persist in highly-fragmented oak ecotones. Without intervention, however, the continued existence of this species in the Puget Trough may be doubtful.

**SMALL MAMMALS IN OAK WOODLANDS IN THE PUGET TROUGH, WASHINGTON**

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**Abstract**

We surveyed the 22 largest sites dominated by Oregon white oaks on the Fort Lewis Military Reservation, Washington, to determine small-mammal community structure and population abundances. Study areas were in the Puget Trough physiographic province and western hemlock vegetation zone. Most oak communities were ecotonal between prairie and Douglas-fir forest. Small mammals were sampled at each site using paired lines of live traps for four nights, July and August 1999. In order of decreasing abundance, the deer mouse, vagrant shrew, Trowbridge's shrew, and creeping vole were the most abundant and widespread species. The dusky shrew and the southern red-backed vole were infrequently captured in oak ecotones but were abundant in nearby second-growth Douglas-fir forest. The relative influences of prairie versus Douglas-fir

forest on oak ecotones determined understory plant composition and occurrences of small mammal species. The combination of abundant vagrant shrews and few dusky shrews in oak ecotones suggest that soil food webs and organic matter accumulation differed between oak ecotones and Douglas-fir forest.

### **Additional Information on the Distributions of Small Mammals at the Hanford Site, Washington**

**Robert A. Gitzen, Stephen D. West, and Brent E. Trim**, Wildlife Science Group, College of Forest Resources, University of Washington, Box 352100, Seattle, Washington 98195-2100

#### **Abstract**

The Hanford Site is a refuge for shrub-steppe organisms, including several small mammal species of concern in Washington. We inventoried species occurrence and relative abundance of small mammals in areas of Hanford that had not been surveyed extensively. During 1997 and 1998, we performed trapping surveys for shrews and small rodents; visual searches and trapping surveys for ground squirrels; and spotlight surveys for jackrabbits. We captured nine small mammal species during 21,743 trap days/nights with snap traps, Sherman traps, pitfall traps, Tomahawk traps, and rat traps. The Great Basin pocket mouse and deer mouse dominated captures. Total captures were highest in antelope bitterbrush/Indian ricegrass dune communities. Capture rates were lowest in cheatgrass fields. In contrast to most upland habitats at low elevation on Hanford, deer mice were captured in relatively high numbers near active dunes. Northern grasshopper mice were captured in low elevation sandy areas, with most captures in a large needle-and-thread patch. We observed and captured Washington ground squirrels within Hanford's northern boundary. Only six jackrabbits were seen during 118.5 km of spotlight surveys. We did not observe or capture Merriam's shrew, least chipmunk, Piute ground squirrel, or Ord's kangaroo rat. Low elevation areas of Hanford support a different small mammal fauna than higher elevation shrub-steppe areas on nearby lands of the Arid Lands Ecology Reserve and the Yakima Training Center.

### **Estimating the Carrying Capacity of the Snake River for Fall Chinook Salmon Redds**

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### **Abstract**

Recovery planning for imperiled populations of anadromous salmonids can require estimates of the carrying capacity of a river for redds (i.e., redd capacity). We estimated redd capacity for the 106 known fall chinook salmon spawning sites in the upper and lower reaches of the Snake River. We used a modification of the Instream Flow Incremental Methodology to estimate spawning area ( $m^2$ ) for 12 representative study sites. We estimated that one redd occupied  $70 m^2$  of spawning area at the most heavily utilized site. Spawning area was estimated at the 12 study sites using a stable flow that was implemented to prevent redd de-watering, and two other flows that encompassed natural fluctuation. We estimated redd capacity for each study site by dividing the amount of spawning area modeled at each of the three flows by  $70 m^2$ . We input the redd capacity estimates for the study sites into the equation for a stratified random sample to make three estimates of redd capacity for all 106 known spawning sites. The estimates ranged between 2,446 and 2,570 redds. We conclude that the Snake River can support the 1,250 redds needed to satisfy Endangered Species Act de-listing criteria. However, annual surveys should be conducted to eventually determine if recruitment efficiency is affected by density dependent factors before the recovery goal is achieved.

### **Blue Grouse Winter Movements, Habitat, and Survival in Northeastern Oregon**

**Eric C. Pelren** and **John A. Crawford**, Department of Fisheries and Wildlife, 104 Nash Hall, Oregon State University, Corvallis, Oregon 97331

### **Abstract**

Winter movements, habitat associations, and survivorship were compared among blue grouse age and sex groups in northeastern Oregon from 1991 to 1993. Distances moved between winter and breeding ranges were greater for adult females (1450 m) than adult males (774 m). Among birds located more than six times within the winter period, 13 immature grouse exhibited greater mean movement between sequential winter locations (594 m) and all possible pairs of winter locations (848 m) than adults (457 m and 661 m). All age and sex groups preferred parkland habitats to forested stands, and forested stands to grasslands. Immature grouse used Douglas-firs to a greater degree than adult males. Adult female survivorship (95%) was higher than immature survivorship (71%) in winter. Blue grouse management practices should consider differential life history characteristics among age and sex groups.

### **Decay Dynamics and Avian Use of Artificially Created Snags**

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and **Michael A. Borysewicz**, USDA Forest Service, Colville National Forest, Sullivan Lake Ranger District, Metaline Falls, Washington 99153

### **Abstract**

The loss of standing dead trees (snags) from logging has led to artificial creation of snags to help maintain cavity-nesting species. We compared two methods of snag creation: cutting tops and girdling. A total of 1,189 trees of 10 coniferous species was treated between 1991 and 1997 on timber sales in northeastern Washington. We monitored 1,108 trees at approximately 2-yr intervals to determine degree of decay (on a nine-point scale), signs of foraging, and presence of cavities. Nearly 7% of the girdled trees were still alive after 4-7 yr, whereas all but one topped tree died. Initial decline (i.e., reaching decay class 2) was faster for ponderosa pine and western larch than for Douglas-fir. Western larch lost bark (decay class 4) earlier than other species. Topped trees declined more quickly than girdled trees, but girdled trees reached decay class 4 faster. The proportion of trees with evidence of foraging and cavities increased with decay class. Western larch was used more for foraging than other species, and there was no effect of treatment on foraging use. In contrast, topped Douglas-fir and grand fir were used more for foraging than girdled trees at later decay classes. Cavities were observed only in trees that were topped. Interspecific differences in presence of cavities were not observed before decay class 4; western larch had the lowest frequency of cavities, whereas grand fir had the highest. The use of specific treatments for creating snags and selection of species may make these habitat elements available over long time periods.

### **Effects of Stand-Replacement Fire and Salvage Logging on a Cavity-Nesting Bird Community in Eastern Cascades, Washington**

**Maryellen Haggard**, USDA Forest Service, Leavenworth Ranger District, 600 Sherbourne, Leavenworth, WA 98826 and **William L. Gaines**, USDA Forest Service, Wenatchee National Forest, 215 Melody Lane, Wenatchee, WA 98801

### **Abstract**

We monitored the response of cavity-nesting species to three snag density treatments (high = 37-80 snags/ha, medium = 15-35 snags/ha, and low = 0-12 snags/ha) during two breeding seasons 4-5 yr post-fire and logging in Douglas-fir-ponderosa pine forests in the eastern Cascades, Washington. Snag surveys were used to describe habitat, and both breeding bird surveys and nest surveys were used to characterize the bird community. Stands with the medium snag density treatment had the highest abundance, species richness, and nesting population of cavity nesters. The reasons for this may be: 1) snags were not evenly distributed within a stand such that both clumped and dispersed snag density habitats were interspersed in this treatment, and 2) a greater proportion of ponderosa pine snags in medium density treatments may have attracted species that prefer ponderosa pine for nesting and foraging. Ponderosa pine was preferred for nest sites and large snags (> 48 cm dbh) provided nesting habitat for more species than smaller snags. However, smaller snags were used for nesting and foraging by some species.

## **Estimating populations of whitebark pine in Mount Rainier National Park, Washington, using aerial photography**

**Nicholas Cottone** and **Gregory J. Ettl**, Biology Department, St. Joseph's University, Philadelphia, Pennsylvania 19131

### **Abstract**

Whitebark pine abundance is declining in western North America due to white pine blister rust, fire exclusion, and mountain pine beetle. In this study, natural color aerial photograph (23 x 23 cm) negatives, scales between 1:2,000 and 1:6,000) were used to estimate whitebark pine abundance in Mount Rainier National Park. Ground truth field plots were similar to counts from aerial photographs (80.2% accuracy). Correlation analysis between subpopulation area and abundance was used to supplement incomplete aerial coverage and determine the final whitebark pine abundance in the Park. Whitebark pine density, and vegetation cover type, influenced counts from the aerial photographs. Highly clustered whitebark pine sites demonstrated 7% greater accuracy when compared to sites that exhibited little clustering. Count accuracy was 4-5% more accurate on whitebark pine dominant habitats compared to subalpine fir dominant and subalpine parkland habitat. The total number of living adult whitebark pine within park boundaries was ~22,000, with 3,160 adult trees found in the Sunrise region. Aerial photography holds promise as a way to inventory and monitor whitebark pine.

## **Forest floor nutrient properties in single- and mixed-species, second growth stands of western hemlock and western redcedar**

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### **Abstract**

Forest floors in single- and mixed-species stands of western hemlock and western redcedar in the coastal forest of southern British Columbia were examined with respect to acidity (pH), and concentrations of total C, total N, mineralizable-N, and total Ca, Mg, K, P, and S. Using four properties (pH and total C, N, and Ca), canonical discriminant analysis separated forest floors of hemlock and redcedar stands, with mixed-species stands overlapping those of each single-species stand. Despite interactions between stand type and location, several properties were significantly different or showed clear trends between stand types. Forest floor pH, and concentrations of mineralizable-N, total Ca, and total K increased, while concentrations of total C and S decreased in the order from hemlock to hemlock-redcedar to redcedar stands. These results are consistent with other studies and suggest that forest floor decomposition and nutrient availability increase with increasing presence of redcedar.

## **Clutch Sizes and Nests of Tailed Frogs from the Olympic Peninsula, Washington**

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### **Abstract**

In the summers 1995-1998, we sampled 168 streams (1,714 m of randomly selected 1-m bands) to determine distribution and abundance of stream amphibians in Olympic National Park, Washington. We found six nests (two in one stream) of the tailed frog, compared to only two nests with clutch sizes reported earlier for coastal regions. This represents only one nest per 286 m searched and one nest per 34 streams sampled. Tailed frogs occurred only in 94 (60%) of the streams and, for these waters, we found one nest per 171 m searched or one nest per 20 streams sampled. The numbers of eggs for four masses (0 = 48.3, range 40–55) were low but one single strand in a fifth nest had 96 eggs. One nest with 185 eggs likely represented communal egg deposition. Current evidence indicates a geographic trend with yearly clutches of relatively few eggs in coastal tailed frogs compared to biennial nesting with larger clutches for inland populations in the Rocky Mountains.

## **Successful Bald Eagle Nesting and Fledging on Lower Yakima River, Washington**

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On 13 June 2000, during an aerial survey for mergansers (*Mergus* sp.), we observed two adult bald eagles on the Yakima River southeast of Granger, Washington. We located a nest during a ground visit on 15 June 2000, on property under restoration by the Yakama Nation (T9N R21E); two adult eagles were calling and flying around the nest. Simultaneous calling was coming from the nest while the two adults were visible. We assumed the vocalization from the nest was coming from a nestling. We visually confirmed that one eaglet was in the nest 27 June 2000. On 31 July 2000, we confirmed the eaglet had successfully fledged. It was perched in a snag approximately 100 m from the nest. We believe the return of nesting bald eagles reflects improved nesting and foraging opportunities. Large cottonwoods, abundant in the LYV on the Yakama Reservation, provide ample nesting substrates. American coot (*Fulica americana*) and carp (*Carpio* sp.) were the preferred forage species along the middle Columbia River (Stalmaster 1993). American coots and carp are plentiful in the LYV, and nesting bald eagles are likely exploiting these food resources.