Birds and Burns Network
Prescribed Fire Vegetation Analysis 2002
Wildlife Logs and Downed Woody Fuels

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INTRODUCTION

In 2002 we collected information on wildlife logs and downed woody fuels following the Birds and Burns Network vegetation protocol http://www.rmrs.nau.edu/lab/4251/birdsnburns/ in eight western states: Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, South Dakota, and Washington. In this report we provide log density (logs per hectare) and percent cover (percent are covered by logs) estimates of all wildlife logs plus their confidence intervals (90 percent), sample sizes, and standard errors. We also report volume (meters^3 per hectare) estimates of all downed woody fuels in eight different categories along with mean litter depth (cm). All these data represent estimates in both control and treatment units before prescribed burning has taken place.

METHODS

In our study we defined a wildlife log as any log with a large-end diameter (LED) $\geq$ 23 cm and $\geq$ 1 m long. We used the strip-plot method (SPM) to sample percent cover and density of wildlife logs out to 2 m either side of the transect line. We used the line-intersect method (LIM), also known as the planar intersect method following Brown's (1974) protocol, to assess the volume of fuels. Fine fuels were defined as any woody material with an intersect diameter < 7.6 cm. Fine fuels were broken down into three size classes based on their diameter at the point of intersection: 1) < 0.64; 2) 0.64 to < 2.5; and 3) 2.5 to < 7.6 cm. In addition we measured the depth of the litter layer down to the mineral soil in three places and averaged these values (cm). Coarse fuels were defined as downed woody materials $\geq$ 7.6 cm intersect diameter. For each coarse fuel intersected we recorded its diameter at the point of intersection and placed it into one of three categories depending on the size of the LED: 1) 7.6 to < 15; 2) 15 to < 23; and 3) $\geq$ 23 cm. In our analysis we also present a coarse volume fuel (> 7.6 cm LED) total and an overall volume total for all fuels > 0.01 cm intersect diameter. This yielded a total of eight fuel class categories plus litter.

We calculated estimates of log densities, percent cover, and volume at four levels. The first level was the regional level. We had four regions: southern, northern, Colorado and South Dakota. Data from the states of Arizona and New Mexico represent the southern region. Data from Idaho, Montana, Oregon, and Washington make up the northern region. We treated Colorado and South Dakota as their own regions.

Our second level of analysis was at the state level. Our third level of analysis was at the unit level. Among the eight states, we collected information from 34 individual units. A unit was defined as a landscape approximately 250 to 400 hectares. Units within each state were paired as a treatment and control unit. That is one would undergo a mechanical and/or burning treatment, whereas the other would not. Our fourth level was based on the crown closure stratum level. For this analysis we combined all data from each state into one of two strata: 1) open (< 40 percent canopy cover); and 2) closed ($\geq$ 40 percent canopy cover).

For each size class within each of these four levels, we then calculated variable estimates using the nest tree and random point data combined. In addition, we separated nest tree data from random

point data. We used t-tests within each level of inquiry to determine whether any differences existed for values of density, percent cover, and volume between nest tree and random points. All states collected both nest tree and random point data with the exception of Montana, which only collected random point data in 2002. Only trees that contained woodpeckers or bluebirds were included in these analyses.

We considered wildlife logs $\geq$ 23 cm dbh and $\geq$ 1 m long as the most important habitat component for cavity-nesting birds in this portion of our study. Therefore, we were interested in obtaining the most precise estimates possible of logs in this size class. Maintaining the cross design with four 50-m arms, we then investigated the precision and independence of the smaller sampling units within each cross pattern. We did this for both nest tree and random points for each individual state. Using the cross pattern we calculated the means, standard deviations, sample sizes required using one of four patterns: 1) entire cross with 50 m arms (n = number of nest trees, 2) entire cross using each 50 m arm as the sampling unit (n = number of nest trees times four), 3) entire cross using the mean of each of four subsegments in concentric circles (n = number of nest trees times four), and 4) entire cross using the mean of each of two 25 m segments in concentric circles from the nest tree (n = number of nest trees times two). Figure 1 illustrates how sampling units were defined.

To test for the independence of adjacent sampling units we ran serial correlation tests. To do this we paired the first sampling unit at each point with the second sampling unit based on the mean value of log density or percent cover found with each unit. We then obtained a Pearson correlation coefficient between the first and second sampling units to see how much influence the first sampling unit had on the second. We assumed that sampling units with a Pearson correlation coefficient < 0.45 ($R^2 < 0.20$) were independent.

Finally, within each state we calculated the number of wildlife logs available, the number that had been foraged on by woodpeckers, and the percentage used. We did this for all nest and random points, and all points combined.

RESULTS

Regional Level

Wildlife Log Percent Cover

Percent cover of wildlife logs ($\geq$ 23 cm dbh; > 1 m long) ranged from a low of 0.25 $\pm$ 0.05 ($\pm$ 90 C.I.) in the southern region (Arizona and New Mexico) to a high of 0.99 $\pm$ 0.18 in Colorado (Table 1). There was no difference in percent cover estimates between Colorado and the northern region (Idaho, Montana, Oregon, and Washington), where it was estimated there was 0.97 $\pm$ 0.18 percent cover of wildlife logs. South Dakota had estimates of 0.41 $\pm$ 0.15 percent cover.

The southern region reported vegetation data for 30 nest trees and 115 random points. Nest tree points (0.44 $\pm$ 0.13) had more than twice as much percent cover of wildlife logs compared to random points (0.2 $\pm$ 0.07) (Table 1). We observed a similar pattern in the northern region, where nest trees (1.18 $\pm$ 0.15) supported higher values of percent cover compared to random points (0.8 $\pm$ 0.1). In this region wildlife logs were sampled around 120 nest trees and at 142 random points. Colorado had 14 nest points and 46 random points; South Dakota had 2 nest points and 19 random

points. We observed no statistical differences between point types for percent cover in either of these regions although the trend was similar in Colorado with higher values of percent cover of logs surrounding nest trees.

Wildlife Log Densities (Regional)

The ranking of log densities among regions showed the same pattern as with the percent cover of logs. Densities of wildlife logs ranged from a low of 19.8 logs per hectare (± 3.8) in the southern region to a high of 49 logs per hectare (± 9.8) in Colorado (Table 1). The northern region was again second with 42.1 logs per hectare (± 3.9). South Dakota ranked third with a mean of 28 logs per hectare (± 11.5).

Wildlife log densities were higher at nest trees compared to random points in three regions: southern, northern, and Colorado. In the southern region nest points supported 30 logs per hectare (± 8.2), whereas we estimated only 17.2 (± 4.2) at random points. In the northern region log densities surrounding nest trees were higher at 54 per hectare (± 6.7) compared to random points which had a mean 32 per hectare (± 4.2). Densities surrounding Colorado nest trees were also higher (67 per hectare ± 23.4) compared to random points (43.5 per hectare ± 10.7). We could not test for differences between point types in South Dakota.

Downed Woody Fuels (Regional)

Total fuel volume ranged from a high of 63.1 m^3 per hectare (± 7) in the northern region to a low of 22 m^3 per hectare (± 6.2) in the southern region (Table 2). Colorado ranked second with a total fuel volume of 53.7 m^3 per hectare (± 7.7). The estimate of the total volume of fuels in South Dakota ranked third at 28.6 m^3 per hectare (± 6.9).

Regions varied in what size classes of fuels made up the total volume (Table 2). For example, in Colorado, 82 percent of the total fuel volume was comprised of coarse (≥ 7.6 cm LED) woody fuels (43.9 m^3 per hectare (± 7.1), which were mainly in the largest (≥ 23 cm LED) log size class (62 percent of total volume). This contrasted sharply with the southern region where only 44 percent of the total volume was comprised of coarse fuels (9.7 m^3 per hectare ± 1.6) and logs in the largest (≥ 23 cm LED) only contributed 16 percent to the total volume (3.6 m^3 per hectare ± 1). The fuels contributing the most (47 percent) to total volume in the southern region were those in the 2.5 to < 7.6 cm size class (10.3 m^3 per hectare ± 5.4).

As in Colorado, coarse fuels (42.7 m^3 per hectare ± 3.7) in the northern region contributed a major amount (68 percent) to the total fuel volume (63.1 m^3 per hectare ± 7). Of the total fuel amount, 50 percent were large logs (≥ 23 cm LED; 31.6 m^3 per hectare ± 3.2). Coarse fuels (18.9 m^3 per hectare ± 6) in South Dakota comprised 66 percent of the total volume (28.6 m^3 per hectare ± 6.9). In South Dakota, fine fuels (7.8 m^3 per hectare ± 2.8) in the size class 2.5 to < 7.6 contributed about the same amount (27 percent) as large (≥ 23 cm LED) fuels (7.6 m^3 per hectare ± 4.4).

Litter amounts were highest in the northern region (7.5 cm deep ± 0.8), followed by Colorado (6.2 cm deep ± 0.8), then South Dakota (5.2 cm deep ± 0.8). The southern region had the lowest mean litter depth (2.8 cm deep ± 0.5).

In South Dakota we could not test for differences between nest and random points in any of the fuel categories (Table 2). In Colorado, we observed significant differences in three size classes. The first was in the fine fuel category of 2.5 to < 7.6 where nest trees had higher volumes of fuels (10.8 m^3 per hectare $\pm$ 4) than random points (6 m^3 per hectare $\pm$ 1.4). Large (> 23 cm LED) fuel volume was also higher around nest trees (42.4 m^3 per hectare $\pm$ 13.6) compared to random points (30.3 m^3 per hectare $\pm$ 7.4). Although we observed the same trend of higher volumes around nest trees compared to random points in the northern region, again, none of these relationships were significant. By contrast, in the southern region, nest trees had about twice the volume of fuels compared to that of random points in all but two volume categories: 1) 2.5 to < 7.6; and 2) > 23 cm LED.

State Level

Wildlife Log Percent Cover

Estimates of percent cover of wildlife logs among the eight states varied from a high of 1.1 $\pm$ 0.19 in Oregon to a low of 0.21 $\pm$ 0.06 in Arizona (Table 3). The four states that ranked highest in their percent cover values - Colorado, Idaho, Oregon, and Washington - all were within 0.1 percent of each other. Montana ranked fifth with 0.58 $\pm$ 0.06 percent cover. This was followed by South Dakota with 0.41 $\pm$ 0.15, then New Mexico with 0.35 $\pm$ 0.13.

Nest sites (0.55 $\pm$ 0.18) in Arizona had nearly four times the percent cover of wildlife logs compared to random points (0.15 $\pm$ 0.05). Oregon and Washington were the only other two states that had differences. Oregon had 1.3 ($\pm$ 0.28) percent cover at nest sites compared to 0.84 ($\pm$ 0.24) random sites, and Washington had 1.05 ($\pm$ 0.17) at nest sites compared to 0.78 ($\pm$ 0.21) at random sites. Although not significant, trends in Colorado and Idaho were similar.

Wildlife Log Densities (State)

Densities of wildlife logs among states ranged from a high of 53 logs per hectare ($\pm$ 7.9) in Washington to a low of 16.2 logs per hectare ($\pm$ 7.9) in Arizona (Table 3). The four states with the highest wildlife log densities also had the highest values for percent cover. Colorado ranked second highest with 49 logs per hectare ($\pm$ 9.8), followed by Oregon (47.3 logs per hectare $\pm$ 8.3), then Idaho with 35 logs per hectare ($\pm$ 6.8). Montana, New Mexico, and South Dakota all had similar log densities ranging from 28 to 31.9 logs per hectare.

Oregon had about twice as many logs surrounding nest trees (59 logs per hectare $\pm$ 12.4) compared to random points (32.7 logs per hectare $\pm$ 9.1). We observed a similar pattern in Idaho where densities at nest trees were 50.8 logs per hectare ($\pm$ 15.6) compared to only 26.7 logs per hectare $\pm$ (5.9) at random points. Arizona, the only other state with significant differences between point types, had 32.8 logs per hectare ($\pm$ 12.1) around nest trees and only 13.2 logs per hectare $\pm$ (4.3) at random points.

Downed Woody Fuels (State)

Total fuel volumes among states ranged from a high in Oregon of 102.5 m^3 per hectare ($\pm$ 22.1) to a low of 18.4 m^3 per hectare ($\pm$ 4.4) in New Mexico (Table 4). Two size classes of fuels in particular contributed to the high level of Oregon's total fuel volume. These were pieces 2.5 to < 7.6 cm (32.6 m^3 per hectare $\pm$ 13.4) and large logs $\geq$ 23 cm LED (38.2 m^3 per hectare $\pm$ 6.5). Volume amounts in

each of these categories for Oregon exceeded the total fuel volume in two states: Arizona and New Mexico. Colorado ranked second (53.7 m^3 per hectare $\pm$ 7.7). Idaho ranked third for total volume (52.5 m^3 per hectare $\pm$ 7.6). This volume, however, was only about half the fuel volume we observed in Oregon. Logs in the largest (> 23 cm LED) size class contributed the most (35.8 m^3 per hectare $\pm$ 6.3) to the total volume in Idaho. Washington ranked fourth in total fuel volume with an estimated 48.4 m^3 per hectare $\pm$ 5.5).

Ranking fifth, total fuel volumes in Montana were estimated to be 40.7 m^3 per hectare ($\pm$ 6.4) (Table 4). South Dakota had a total fuel volume of 28.6 m^3 per hectare ($\pm$ 6.94) with fuels relatively evenly distributed among the four largest size classes (> 2.5 cm). Arizona ranked seventh for total fuel volumes (23.4 m^3 per hectare $\pm$ 8.4). Most of this volume was found in the 2.5 to < 7.6 cm category (12.6 m^3 per hectare $\pm$ 7.4).

Mean litter depths among the eight states ranged from a high 12.8 cm ($\pm$ 2.3) cm in Oregon to a low of 2.6 cm ($\pm$ 0.6) in Arizona (Table 4). Montana ranked second with 8.9 cm ($\pm$ 0.8), followed by Colorado with 6.2 cm ($\pm$ 0.8), Washington (5.3 cm $\pm$ 0.7), South Dakota (5.2 cm $\pm$ 0.8), and then Idaho 4.2 cm ($\pm$ 0.7). New Mexico litter depths were closest to depths in Arizona at 3.2 cm ($\pm$ 0.7).

In our comparisons of fuel volumes in each of the nine categories between nest and random points, we observed no differences in either South Dakota or Washington (Table 4). In Arizona we observed that nest trees had higher litter depths and fuel volumes in nearly every category. Nest trees in New Mexico had higher fuel volumes compared to random points in three categories: 1) 2.5 to < 7.6; 2) 7.6 to < 15; and 3) 15 to < 23 cm.

In Colorado fuel volumes in the size class 2.5 to < 7.6 cm were higher around nest trees (10.8 m^3 per hectare $\pm$ 4) compared to random points (6 m^3 per hectare $\pm$ 1.4). In Idaho it was the next smaller size class (0.64 to < 2.5) where we detected the only difference in fuel volumes between point types. Here nest trees had 5.2 m^3 per hectare ($\pm$ 1.2) and random points had 3.7 m^3 per hectare ($\pm$ 0.7). Finally, in Oregon we observed that coarse (> 15 cm LED) fuel volumes surrounding nest trees were greater than at random points. This led to a total volume difference of 46.7 m^3 per hectare with 123 m^3 per hectare ($\pm$ 35.1) around nest trees compared to 76.3 m^3 per hectare ($\pm$ 23.1) at random points.

Unit Level

Sample sizes by individual units were quite small the majority of the time and many results are inconclusive. Nevertheless, some differences were detected between point types within a unit. These are listed below.

Arizona

In 2002 Arizona had one treatment unit (KE) and two control units (MO and BE). Two nest trees were sampled on the MO unit, four on the BE unit, and 10 on the treatment unit identified as KE (Table 5). Forty random points were sampled on each of the KE and MO units. Ten random points were sampled on the BE unit. Ninety random points in all were sampled.

The BE unit had the highest cover of wildlife logs with 0.54 $\pm$ 0.29 percent, compared to 0.24 $\pm$ 0.06 on the KE unit, and only 0.07 $\pm$ 0.06 on the MO unit (Table 5). Although the BE unit appeared

to have the same trend, only the KE and MO units showed significantly higher percent cover at nest trees compared to random points. Percent cover surrounding nest trees on the KE unit was estimated to be 0.48 ± 0.16, compared to only 0.18 ± 0.06 at random points. On the MO unit nest trees had 0.53 ± 0.56 percent cover compared to 0.05 ± 0.06 at random points.

Log densities among Arizona units ranged from a high of 42 logs per hectare (± 18.9) on the BE unit to only 3.6 logs per hectare (± 2.7) on the MO unit (Table 5). The KE unit had 19.5 logs per hectare (± 5.7). The only difference in wildlife log densities between point types was on the KE unit where nest sites had about twice as many logs (31.3 per hectare ± 14.1) as random points (16.6 per hectare (± 6.1).

The BE unit also had the highest estimates of total fuel volumes (44 m^3 per hectare ± 18.6), followed by KE (31.9 m^3 per hectare ± 16.5). As with log densities and percent cover, our estimates of log volume on the MO unit were extremely low (6.3 m^3 per hectare ± 3.4). On all three units, fuels in the 2.5 to < 7.6 cm size class contributed the most to the overall volume.

The only difference we observed between nest and random points on the BE unit was with litter. Here litter depth at nest sites was 7.7 cm (± 2.2), whereas random points had litter depths of only 1.9 cm (± 1.1)(Table 6a). Nest sites had (11.2 m^3 per hectare ± 8.3) compared to random points which only had 2.4 m^3 per hectare (± 1.1). On the MO unit litter depths were more than twice as high at nest sites (3.9 cm ± 0.9) compared to random points (1.7 cm ± 0.6). In addition fuels in the 0.64 to < 2.5 were higher around nest trees (2.4 m^3 per hectare ± 1.9) compared to random points (0.56 m^3 per hectare ± 0.2).

Each of the three units within Arizona had distinctly different estimates for total weight of fuels (Table 6b). The BE unit had the highest total weight of fuels with an estimated 2.8 tons per acre (± 0.9). The KE unit had the next highest with 1.8 tons per acre (± 0.4). The MO unit had the lowest total fuel weight (0.4 tons per acre [+ 0.2]). The majority of the weight at each of the units was contributed by fuels in each of the size classes ≥ 3 inches. Very small amounts of fuels were recorded in size classes < 3 inches.

Colorado (Unit)

Colorado had four units in 2002. It is undecided at this point which units will be paired with each other (G. Vos; pers. commun.) because of logistical concerns. Three nest trees each were sampled on the DC, PB, and SCN units and four on the SCS unit for a total of 13 nest trees. Five random points were sampled on each of the DC and PB units, 19 on the SCN unit and 18 on the SCS unit for a total of 47 random points.

In Colorado, the SCN and SCS units appeared most similar to each other in regards to wildlife logs (Table 7). The SCN unit had estimated values of 1.26 percent cover (± 0.37) and the SCS unit was at 1.13 percent cover (± 0.27). Percent cover values at the DC and PB units were about one-third as much. The DC had 0.46 percent cover (± 0.22) and the PB unit had 0.4 percent cover (± 0.32).

Wildlife log density patterns had a similar pattern to that of percent cover (Table 7). That is log densities were highest on the SCN unit (68.2 logs per hectare ± 0.27) and the SCS unit (49.4 logs per hectare ± 11.4). The DC unit had the lowest wildlife log density (18.8 logs per hectare ± 14.2).

The PB unit had 25 logs per hectare (± 11). The only difference we observed between nest and random points within units was on the SCN unit where nest trees had 128 logs per hectare (± 47.1) compared to 54.9 logs per hectare (± 23) at random points.

The total fuel volume on the DC and PB units was almost half (mean = 28 m^3 per hectare) the mean volume we observed on the SCN and SCS units (52 m^3 per hectare)(Table 8a). It was the large (≥ 23 cm LED) fuel class that contributed the most to the total volume on the SCN (30.6 m^3 per hectare ± 8.4) and SCS (28.2 m^3 per hectare ± 7.2) units. Volumes in this size were two to three times more on the SCN and SCS units compared to the PB (9.9 m^3 per hectare ± 8.1) and DC units (14.7 m^3 per hectare ± 9.4).

In our comparisons between nest and random points we only observed differences on the SCN unit (Table 8a). Here fuel volumes in the 15 to < 23 cm LED class were twice as high at nest trees (7.9 m^3 per hectare ± 3) compared to random points (3.5 m^3 per hectare ± 1.5). Similarly, large (≥ 23 cm LED) fuel volumes were twice as high around nest trees (54.4 m^3 per hectare ± 28.4) compared to random points (25.4 m^3 per hectare ± 8.1). Subsequently, this led to higher volumes in the coarse (> 7.6 cm LED) and total fuel volumes around nest trees.

The SCS (8.5 tons per acre [± 2]) and SCN units (7.7 tons per acre [± 1.8]) had the highest and similar estimates for total weight of fuels in Colorado (Table 8b). The PB unit had the lowest estimate of total weight with an estimated 3.1 tons per acre (± 1.6). The DC unit had the second lowest estimate of weight with 3.8 tons per acre (± 1.6). Logs ≥ 9 inch LED contributed the most to the total weight at each of the units.

Idaho (Unit)

There were six units in Idaho in 2002. BH is the control unit for FC. DM is the control unit for PC and WM is the control unit for DO. Idaho had a total of 31 nests and 59 random points sampled. Table 9 shows how points were distributed among units.

The percent cover of wildlife logs was highest on the PC unit (1.7 ± 0.66) and lowest on the WM unit (0.66 ± 0.49)(Table 9). The BH unit was second highest (1.17 ± 0.39). The DM and DO unit were similar (mean = 0.94). The FC unit was on the low end for percent cover with an estimated value of (0.76 ± 0.23). In our comparisons between nest and random points we observed no differences.

As with percent cover, the PC unit had the highest wildlife log densities (71.6 logs per hectare ± 18.1). All other units appeared similar with densities ranging from 27.2 to 34.4 logs per hectare (Table 9). We observed no differences between point types in regard to wildlife log densities within any of the Idaho units.

The PC unit also had the highest total fuel volume (71.9 m^3 per hectare ± 21.9) of any of the Idaho units (Table 10a). Seventy-seven percent of this total was in the form of large (> 23 cm LED) fuel logs (55.3 m^3 per hectare ± 20.1). The DM unit had the lowest total fuel volume with an estimated 41.7 m^3 per hectare (± 19). As with the PC unit, large (> 23 cm LED) fuel logs contributed the most to the total fuel volume on the DM unit. This was also true on all other units, whereas fuels in the

2.5 to < 7.6 cm size class generally ranked second. Mean litter depth was also highest on the PC unit (7 cm ± 3.6). The FC had the least amount with only 2.8 cm (± 0.8).

We observed no differences in volume between point types on either the DM or WM units (Table 10a). On the FC unit random points (0.95 m^3 per hectare ± 0.5) had higher volumes of small fuels (< 0.64 cm) compared to nest points (0.33 m^3 per hectare ± 0.2). This was in contrast to the previous pattern of higher volumes around nest trees. The BH unit also had a higher volume of small (< 0.64 cm) fuels and litter depth at random points compared to nest trees.

On the PC unit, large (> 23 cm LED) fuels were more than twice as abundant around nest trees (77.2 m^3 per hectare ± 32.7) compared to random points (37 m^3 per hectare ± 24.2). On the DO unit, we estimate that fuels in the size class 2.5 to < 7.6 cm, were more abundant around nest trees (10.5 m^3 per hectare ± 5.9) compared to random points (3.5 m^3 per hectare ± 4).

As expected, the PC unit (11.1 tons per acre [3.4]) also had the highest estimates for total weight of fuels (Table 10b). Eighty-one percent of this weight was in the form of large (> 9 inch LED) logs (9 tons per acre). The DO unit had the second highest estimate of weight at 9.2 tons per acre (± 4.3); followed by the BH unit (8.5 tons per acre [± 2.6]. The DM had the lowest estimates for total weight (7 tons per acre [± 3.3]). As we observed in Colorado, the majority of the weight of fuels in the Idaho units was comprised of logs ≥ 9 inch LED.

Montana (Unit)

Only two units were sampled in Montana in 2002: Strawberry and Maupin. Twenty random points were sampled on each (Table 11). Only random point results are available because nest searching and monitoring did not begin until 2003.

The MT unit (0.4 ± 0.16) had lower wildlife percent cover values compared to the ST unit (0.77 ± 0.22). Similarly, the MT unit had lower wildlife log densities (25.6 logs per hectare ± 11.5) compared to the ST unit (38.1 logs per hectare ± 12.1).

Total fuel volumes were higher on ST unit (48.2 m^3 per hectare ± 10.8) compared to the MT unit (33.3 m^3 per hectare ± 6.7)(Table 12a). This was mainly influenced by higher fuel volumes in the 15 to < 23 and the > 23 cm LED classes. Litter depths were also higher on ST units (9.5 cm ± 1.3) compared to MT units (8.2 ± 1).

Total weight of fuels was also higher on the ST unit (5 tons per acre [± 1.3]) compared to the MT unit (3.1 tons per acre [± 0.8])(Table 12b). Nearly all the fuels were in the form of coarse woody debris ≥ 3 inches.

New Mexico (Unit)

There were only two units in New Mexico in 2002. The CP unit had ten nests and the LJ unit had four for a total of 14 nests. No random points were sampled on the CP unit, but 25 were sampled on the LJ unit (Table 13).

Percent cover values appeared similar on the CP (0.32 ± 0.28) and LJ units (0.36 ± 0.15)(Table 13). We observed no difference in cover between point types on the LJ unit. Wildlife log densities,

however, were higher on the LJ unit (33.6 logs per hectare ± 10.4) compared to the CP unit (18.8 logs per hectare ± 9.8).

Total fuel volumes on both the CP (18.6 m^3 per hectare ± 5.1) and LJ units (18.3 m^3 per hectare ± 5.7) in New Mexico were relatively low (Table 14a). The only difference we observed between point types on the LJ unit was in the 15 to < 23 cm LED category where nest trees (6.1 m^3 per hectare ± 3.9) had higher volumes than random points (1.9 m^3 per hectare ± 0.9).

Total weight of fuels in New Mexico were highest on the CP (2.4 tons per acre [± 0.6]) unit followed by the LJ unit (1.8 tons per acre [± 0.6])(Table 14b). Similar to what we observed in Arizona, the majority of the fuel weight was contributed by logs ≥ 3 in LED, with very low estimates of fine fuels (< 3 in).

Oregon (Unit)

Oregon had a total of 40 nests and 31 random points sampled on four units in 2002. CS is the control unit for TS, and CN is the control unit for TN. Table 15 shows how nests and points were distributed.

The CN (1.34 ± 0.66) and TS units (1.46 ± 0.32) in Oregon had the highest percent cover values (Table 15). This compared with (0.91 ± 0.27) on the TN unit and only (0.43 ± 0.3) on the CS unit. We saw similar patterns with wildlife log densities in Oregon in regards to units. The TS unit had the highest density (72.5 logs per hectare ± 18.6) along with the CN unit (52.9 ± 19.4). The CS unit only had 21.4 logs per hectare (± 18.9). We observed no differences in either percent cover or density values between point types within any of the units.

Three of Oregon's units, CN, TN, and TS, each had total fuel volumes that surpassed 100 m^3 per hectare (Table 16a). These were the highest fuel volumes we observed throughout the eight states. On the CN unit most of the total fuel volume (100 m^3 per hectare ± 53.9) was made up by large (> 23 cm LED) logs (58.1 m^3 per hectare ± 5.1). This was also true on the TS unit where large (> 23 cm LED) fuels made up the majority (43.7 m^3 per hectare ± 9.6) of the total fuel volume (113 m^3 per hectare ± 22.7). By contrast on the TN unit, fuels in the 2.5 to < 7.6 cm size class made up the majority (45.9 m^3 per hectare ± 29.5) of the total fuel volume (107 m^3 per hectare ± 45.2) which was influenced by the highly imprecise estimate around nest trees (85.2 m^3 per hectare ± 84.6). Litter depths on three of the Oregon units, CN, TN, and TS, were greater than 11.4 cm. These were also some of the highest values we observed throughout the eight states.

On the CS unit numbers suggested higher large (> 23 cm LED) fuels at random points (38 m^3 per hectare ± 12.3) compared to nest trees (24.1 m^3 per hectare ± 4.5) on the CS unit (Table 16a). This was an unusual result because we usually observed the opposite pattern in this size class. Fuels in the 15 to < 23 cm class on this same unit, however, appeared higher around nest trees (6.3 m^3 per hectare ± 4.6) compared to random points (0.4 m^3 per hectare ± 2.5). On the TS unit we observed twice the depth of litter around nest trees (18.5 cm ± 4.5) compared to random points (9.2 cm ± 4.8). Fuel volumes in the < 0.64 and the 15 to < 23 cm class were also higher around nest trees.

The TS unit in Oregon had the highest estimates of fuel weight (13 tons per acre [± 2.5]) of any of the eight locations (Table 16b) in the Birds and Burns study. The CN unit had the second highest

amount with an estimated 12.2 tons per acre (± 4.9). The TN unit had an estimated 7 tons per acre (± 2) and the CS unit had 6.4 ton per acre (± 1.2). Similar to Idaho and Colorado, the majority of the total fuel weight was comprised of logs ≥ 9 in LED.

South Dakota (Unit)

South Dakota had four units in 2002 (Table 17). The FC and RC units accounted for the two nests in 2002 where vegetation was sampled. The KH and RR units did not have any nest trees. The RC unit had the highest number (n = 8) of random points sampled. The FC unit had five random points, the KH had two, and the RR had four, for a total of 19 random points. Only the FC and RC units had both nest and random points.

The percent cover of wildlife logs was highest on the FC unit (0.63 ± 0.45) followed by the RC unit (0.42 ± 0.2)(Table 17). Both the KH and RR units had estimates of 0.19 percent cover. Density estimates were also highest on the FC unit (52.1 logs per hectare ± 37) followed by the RC unit (23.6 logs per hectare ± 9.8).

Total fuel volumes were highest on the FC unit (42.2 m^3 per hectare ± 13.5)(Table 18a). The next highest was the RC unit with 24.4 m^3 per hectare (± 13.1). Both the KH and RR units were about 18.5 m^3 per hectare. Large (> 23 cm LED) and medium (15 to < 23 cm) fuels contributed the most to the total fuel volume on the FC unit.

Total weight of fuels in South Dakota was highest on the FC unit (5.3 tons per acre [± 2.4]) followed by the RC unit (3 tons per acre [± 1.1])(Table 18b). The KH unit with only 2 random points, had an estimated 2.7 tons per acre (± 13.2) and the RR unit had 1.9 tons per acre (± 0.94).

Washington (Unit)

Washington had the highest number of nest trees sampled (n = 50). These were distributed among seven units with a low of five nest trees on the HR unit and a high of nine on the ZR unit. Table 19 shows how the nests were distributed. Only 12 random points were sampled for vegetation. All units except for the MT unit had at least one random point sampled. The highest number was three.

Estimates of percent cover of logs ranged from a high of 1.32 (± 0.65) on the TD unit to a low of 0.69 (± 0.38) on the RY unit. Log densities ranged from a high of 69.4 logs per hectare (± 34.2) on the FY unit to a low of 36.3 per hectare (± 12.1) on the RY unit. We observed no differences between point types for either percent cover or density.

Total volume estimates of downed wood varied from a high of 65.3 m^3 per hectare (± 23.4) on the TD unit to a low of 36.8 m^3 per hectare (± 10.5) on the ZR unit (Table 20a). These estimates used the strip-plot method to calculate the volume of the large logs (> 23 cm LED).

We estimated that the total weight of downed fuels in Washington ranged from a high of 8 tons per acre (± 3.2) on the TD unit to a low of 4.6 tons per acre (± 1.6) on the ZR unit (Table 20b). Similar to Colorado, Idaho, and Oregon, most of the total fuel weight was comprised of logs ≥ 9 inches LED.

Stratum Level

Sample sizes for strata based on canopy cover within each unit were extremely low or even non-existent in some cases. Therefore, all data within each state were used in this analysis. Estimates are for all points combined within each stratum and then separated by nest and random point within both the open and closed strata.

Arizona

Arizona had 49 points in the open stratum and 57 within the closed stratum (Table 21). Within the open stratum, only two points were nest trees and 47 were random points. Within the closed stratum 14 points were nests and 43 were random.

We observed no difference in percent cover of wildlife logs between strata in Arizona (Table 21). Within the open stratum, however, percent cover values were higher around nest trees (0.4 $\pm$ 0.03) compared to random points (0.16 $\pm$ 0.08). Within the closed stratum we also observed higher percent cover values at nest trees (0.57 $\pm$ 0.2) compared to random points (0.14 $\pm$ 0.07). Percent cover values at random points within both strata were surprisingly similar.

There were no differences in wildlife log densities between strata in Arizona (Table 22). The only difference we observed between point types was in the closed stratum where nest trees (30.4 logs per hectare $\pm$ 12.9) had higher densities than random points (11.6 logs per hectare $\pm$ 5.7).

In our examination of fuel volumes between strata in Arizona we observed that litter, fine fuels in the < 0.64 cm and 0.64 to < 2.5 cm classes, were all higher in the closed stratum (Table 23). In addition the coarse fuel class 7.6 to < 15 cm LED, and all coarse fuels (> 7.6 cm LED) combined classes, were higher in the closed stratum.

Colorado (Stratum)

All nests and random points within Colorado were in the closed stratum (Tables 3 and 4).

Idaho (Stratum)

Idaho had 54 points in the open stratum and 36 in the closed stratum (Table 21). The percent cover of wildlife logs in the closed stratum (1.29 $\pm$ 0.36) was higher than in the open stratum (0.86 $\pm$ 0.16). The only difference between point types was within the closed stratum where random points (0.14 $\pm$ 0.07) had lower values of cover compared to nests (0.57 $\pm$ 0.2).

Wildlife log densities in the closed (38 logs per hectare $\pm$ 13) and open strata (33 logs per hectare $\pm$ 8) were similar (Table 22). Within the closed stratum, we observed higher densities around nest trees (72 logs per hectare $\pm$ 38) compared to random points (26 logs per hectare $\pm$ 10).

The only difference we observed in estimates of fuel volumes in Idaho, were in the 15 to < 23 cm LED class (Table 23). Within this class fuels were higher in the closed stratum (3.1 m^3 per hectare $\pm$ 0.9) than in the open stratum (2 m^3 per hectare $\pm$ 0.6).

Montana (Stratum)

All random points within Montana were in the closed stratum (Tables 3 and 4).

New Mexico (Stratum)

Only four points were located in the open stratum in New Mexico, all of which were random points (Table 21). The closed stratum contained 35 points. Points located within the closed stratum (0.38 ± 0.14) of New Mexico had higher estimates of percent cover than in the open stratum (0.06 ± 0.13). Log densities were also higher in the closed stratum (32.1 logs per hectare ± 8.8) compared to the open stratum (9.4 logs per hectare ± 14.1)(Table 22).

Fuel volumes in the closed stratum of New Mexico were higher in five categories: 1) litter; 2) < 0.64 cm; 3) 7.6 to < 15 cm LED; 4) > 7.6 cm LED; and 5) total fuel volume (Table 23). The total fuel volume estimate in the open stratum of New Mexico was miniscule at 0.33 m^3 per hectare (± 0.4). By contrast, it was estimated that total fuel volume in the closed stratum was 62 times greater at 20.5 m^3 per hectare (± 4.5).

Oregon (Stratum)

Oregon had 41 points in the open stratum and 28 in the closed stratum (Table 21). There was no difference in percent cover of wildlife logs between the open (1.05 ± 0.24) and closed strata (1.16 ± 0.35) of Oregon. Within the open stratum, we estimated nest trees (1.34 ± 0.36) had a higher percent cover compared to random points (0.8 ± 0.3).

We observed no difference in wildlife log densities between strata in Oregon (Table 22). Within both strata, however, nest trees had higher log densities than random points. In the open stratum, nest tree densities (58.6 logs per hectare ± 20) were about twice as high as random point densities (30.7 logs per hectare ± 12.6). In the closed stratum, nest tree densities (55.9 logs per hectare ± 16.3) were also higher compared to random point densities (37.5 logs per hectare ± 7.7).

The only difference between strata we observed among fuel categories in Oregon was for litter (Table 23), where estimates of depth in the closed stratum were 16 cm (± 3.6) compared to 10.5 cm (± 3) in the open stratum.

South Dakota (Stratum)

South Dakota had 3 points in the open stratum and 18 in the closed stratum (Table 21) Percent cover of wildlife logs was three times higher in the closed stratum (0.46 ± 0.17) compared to the open stratum (0.15 ± 0.22). We did not, however, observe a difference in log densities between strata (Table 22).

Fuel volumes between strata in South Dakota were higher in all categories except for litter depth in the closed stratum compared to the open stratum (Table 23). Total fuel volumes were about five times higher in the closed stratum (32.3 m^3 per hectare ± 7) compared to the open stratum (6.4 m^3 per hectare ± 4.5).

Washington (Stratum)

Washington had 17 points in the open stratum and 45 in the closed stratum (Table 21). Compared to other states, Washington had an unusual pattern in regards to the percent cover of logs. In this state the open stratum (1.27 ± 0.35) had higher estimates of percent cover compared to the closed stratum (0.89 ± 0.15). We observed no difference in log densities between strata (Table 22).

The only difference we observed between strata in fuel volumes was in the > 23 cm LED class (Table 23). Here the closed stratum (26 m^3 per hectare $\pm$ 5.1) had lower volumes than the open stratum (40.8 m^3 per hectare $\pm$ 11.8).

Optimal Plot Size for Wildlife Logs (> 23 cm dbh)

Figure 1 illustrates the different nested sampling units we evaluated for precision and independence in our analysis of wildlife logs. All nested sampling units were part of the entire cross plot design. In this section we define the optimal plot as that which maximizes precision and sampling units are considered independent.

Arizona (Optimal plot size)

In Arizona at nest trees, using four 12.5 m subsegments averaged together as our sampling unit we saw a very small increase in precision from 31 (n = 16) to 26 percent (n = 64)(Table 24A) for estimates of percent cover of wildlife logs (> 23 cm LED and > 1 m long). At random points the 12.5 m subsegments were also the best plot size. This increased our precision from 35 (n = 90) to 23 percent (n = 360).

Precision of wildlife log densities was lower than for percent cover in Arizona (Table 24B). For nest points the 12.5 m subsegments gave us an estimate within 32 percent (n = 64) of the true mean. This was only five percent better than the entire cross (n = 16). For random points we observed that the 50 m sections were chosen as the optimal plot size (23 % precision; n = 360). This was nine percent more precise than the entire cross (n = 64; 32 %).

Colorado (Optimal plot size)

The optimal plot size in Colorado around nest trees for estimates of percent cover of wildlife logs (>23 cm LED and > 1m long) were again the 12.5 m subsegments (Table 25A). This increased our precision from 38 to 24 percent (n = 56) using this design rather than the entire cross (n = 14). For random points the 12.5 (n = 184) and 25 m (n = 92) increments tied at 17 percent precision. This was only slightly better than the entire cross (n = 46; 20 %).

For estimates of density around nest trees, the 50 m plots increased our precision from 35 (n = 56) to 23 percent compared to the entire cross (n = 14)(Table 25 B). At random points the 12.5 m subsegments (n = 184) were considered optimal (16 %). This was an eight percent increase from using the entire cross as the sampling unit (n = 46).

Idaho (Optimal plot size)

Using 12.5 m subsegments for the sampling unit around nest trees in Idaho increased our precision level from 28 (n = 31) to 20 percent (n = 124) for estimates of percent cover (Table 26A). Our estimate for percent cover at random points was even better at 15 percent using the 50 m sections (n = 236). The entire cross had a precision level of 21 percent (n = 59).

Fifty meter sections were also shown to be the optimal plot size (22 % precision; n = 124) for estimates of wildlife log densities around nest trees (Table 26B). At random points the 12.5 m subsegments were best with a precision level of 18 percent (n = 236).

Montana (Optimal plot size)

For random points in Montana we observed a slight increase in precision for estimates of percent cover from 25 (n = 40) to 20 percent (n = 160) with the selection of the 12.5 m subsegments (Table 27A). For density estimates, again, the 12.5 m subsegments were most precise (n = 160; 20 %). This was an increase of six percent from the entire cross pattern (n = 40) (Table 27B).

New Mexico (Optimal plot size)

Precision levels for the percent cover of wildlife logs in New Mexico around nest trees were quite low (52 to 62 %)(Table 28A). The 25 m segments, however, were selected as the optimal plot size with a precision level of 52 percent (n = 28), up from 62 percent for the entire cross (n = 14). At random points the 12.5 m subsegments (n = 100) were optimal with a precision level of 27 percent.

For density estimates at nest sites the 12.5 m subsegments were again selected as the optimal plot size (Table 28B) with a precision level of 38 percent (n = 14). For random points we obtained a precision level of 25 percent using 12.5 m subsegments (n = 100). This increased the precision level up from 36 percent (n = 25).

Oregon (Optimal plot size)

Precision levels for percent cover of wildlife logs in Oregon were quite high ranging from 14 to 22 percent (Table 29A). The 12.5 subsegments were selected as the optimal plot size at nest trees with a precision level of 14 percent (n = 39). For random points the 12.5 m were also the best sampling unit increasing precision from 28 percent (n = 31) to 19 percent (n = 124).

For density estimates at nest points the 12.5 and 50 m plots (n = 156) tied in their precision level at 16 percent (Table 29B). At random points the 12.5 m provided a 21 percent precision level (n = 124) up from 28 percent with the entire cross pattern (n = 31).

South Dakota (Optimal plot size)

South Dakota only had two nest trees so it was not possible to run a serial correlation tests on independence for alternative plot sizes (Table 30A). With only two nests available, precision levels were quite poor at 248 percent using the entire cross pattern. By contrast, the precision level for estimates of percent cover at random points was high at 25 percent (n = 76) using the 12.5 m subsegments.

Precision levels for density estimates were again poor (292 %) using the entire cross (Table 30B). Using the 12.5 m subsegments, however, for random points we obtained a precision level of 27 percent (n = 76).

Washington (Optimal plot size)

We observed in Washington, where the vegetation at 50 nests was sampled, that we had a high level of precision in our estimates (13 to 17 %) of percent cover of wildlife logs (Table 31A). As with the majority of the other states, the 12.5 m subsegments (n = 200) were the optimal plot size giving us

an estimate within 13 percent of the true mean. At random sites the 25 m segments (n = 100) were the optimal plots size producing a 23 percent level of precision.

Precision levels for wildlife log densities were similar to what we observed with percent cover (Table 31B). Using the 25 m segments as our sampling unit, we obtained a 14 percent level (n = 100) of precision in our estimates of log density at nest trees. At random points we also obtained a 14 percent level of precision using the same plot size (n = 24).

Foraging Use

The percentage of logs exhibiting new foraging signs by woodpeckers at nest trees was highest in Arizona at 35.2 percent (Table 32). This was followed by Oregon at 22.8 percent, then Idaho with 22 percent. Logs (n = 38) surrounding nest trees in New Mexico showed no signs of new foraging. South Dakota also had zero use around nest trees, but only three logs were encountered. Arizona also had the highest percent use of logs by foraging woodpeckers at random points (45.3 %)(Table 32). This was the highest percent use value we observed throughout the eight states.

New Mexico was intriguing in that no wildlife logs showed any new foraging signs by woodpeckers. Montana also had a very low percent use of logs by woodpeckers (2.4 %). Colorado was the next lowest with only 2.5 percent of all wildlife logs encountered showing new foraging signs. Washington, at 12.4 percent use for all logs combined, was the only other state that was below average (16.7 %) in the percentage of logs showing signs of new foraging. When all points were considered, the percent use in South Dakota jumped to 34.5 percent.

Table 1. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in four geographic regions: southern, northern, South Dakota, and Colorado[1]. Values given for all points combined, and separated by nest and random points. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)[n]					
	Percent cover			Density (logs/ha)		
Region	Combined	Nest	Random	Combined	Nest	Random
Southern	0.25 ± 0.05 (0.03) [145]	0.44 ± 0.13 [b] (0.08) [30]	0.2 ± 0.07 [b] (0.03) [115]	19.8 ± 3.8 (2.3) [145]	30 ± 8.2 [b] (4.8) [30]	17.2 ± 4.2 [b] (2.6) [115]
Northern	0.97 ± 0.09 (0.05) [262]	1.18 ± 0.15 [b] (0.09) [120]	0.8 ± 0.1 [b] (0.06) [142]	42.1 ± 3.9 (2.39) [262]	54 ± 6.7 [b] (4.04) [120]	32 ± 4.2 [b] (2.5) [142]
Colorado	0.99 ± 0.18 (0.11) [n = 60]	1.36 ± 0.52 (0.3) [n = 14]	0.88 ± 0.18 (0.11) [n = 46]	49 ± 9.8 (5.8) [n = 60]	67 ± 23.4 [a] (13.2) [n = 14]	43.5 ± 10.7 [a] (6.3) [n = 46]
South Dakota	0.41 ± 0.15 (0.09) [21]	0.2 ± 1.1 (0.17) [2]	0.44 ± 0.16 (0.09) [19]	28 ± 11.5 (6.7) [21]	6.3 ± 39.5 (6.3) [2]	30.3 ± 12.4 (7.2) [19]

[1] South Dakota and Colorado were considered their own independent regions.
[a] Mean values within a region differed between nest and random values $P < 0.05$.
[b] Mean values within a region differed between nest and random values $P < 0.10$.

Table 2. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in four geographic regions: southern, northern, South Dakota, and Colorado[1]. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha) plus 90 % confidence interval (SE)					
		Southern region			Northern region		
	Fuel size class (cm)	Combined (n = 145)	Nest (n = 30)	Random (n = 115)	Combined (n = 262)	Nest (n = 142)	Random (n = 120)
	Litter depth (cm)	2.8 ± 0.5 (0.28)	5 ± 0.9[a] (0.56)	2.2 ± 0.5[a] (0.3)	7.5 ± 0.8 (0.46)	8.3 ± 1.3 (0.8)	6.7 ± 0.9 (0.52)
Fine fuels by intersect	< 0.64	0.44 ± 0.1 (0.06)	0.87 ± 0.3[a] (0.15)	0.33 ± 0.1[a] (0.07)	1.1 ± 0.3 (0.16)	1.4 ± 0.5 (0.31)	0.83 ± 0.2 (0.13)
	0.64 to < 2.5	1.7 ± 0.3 (0.19)	3 ± 1[a] (0.56)	1.3 ± 0.3[a] (0.17)	5.4 ± 1.1 (0.69)	6.3 ± 1.7 (1)	4.7 ± 1.5 (0.91)
	2.5 to < 7.6	10.3 ± 5.4 (3.3)	15.9 ± 6.9 (4)	8.8 ± 6.7 (4)	13.9 ± 3.8 (2.3)	17.6 ± 7.5 (4.5)	10.7 ± 3 (1.8)
Coarse fuels by large-end	7.6 to < 15	3.3 ± 0.6 (0.34)	5.3 ± 1[a] (0.6)	2.8 ± 0.6[a] (0.39)	4.7 ± 0.6 (0.35)	5 ± 1.1 (0.65)	4.3 ± 0.6 (0.36)
	15 to < 23	2.8 ± 0.5 (0.33)	5.1 ± 1.3[a] (0.77)	2.2 ± 0[a] (0.34)	6.2 ± 0.9 (0.55)	7.1 ± 1.8 (1.1)	5.4 ± 0.7 (0.42)
	> 23	3.6 ± 1 (0.6)	5.9 ± 3.1 (1.8)	3 ± 1 (0.58)	31.6 ± 3.2 (1.9)	39.6 ± 4.6 (2.8)	24.9 ± 4.2 (2.6)
Coarse fuel total	≥ 7.6 cm	9.7 ± 1.6 (0.98)	16.2 ± 3.9[a] (2.3)	8 ± 1.7[a] (1)	42.7 ± 3.7 (2.2)	51.7 ± 5.9 (3.6)	35.1 ± 4.4 (2.7)
Total volume		22 ± 6.2 (3.8)	36.1 ± 9.2[a] (5.4)	18.4 ± 7.4[a] (4.5)	63.1 ± 7 (4.2)	76.9 ± 12.8 (7.7)	51.4 ± 6.8 (4.1)

[a] Mean values within a region differ between nest and random values $P < 0.05$.
[b] Mean values within a region differ between nest and random values $P < 0.10$.

Table 2 (cont). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in four geographic regions: southern, northern, South Dakota, and Colorado[1]. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha) plus 90 % confidence interval (SE)					
		Colorado			South Dakota		
	Fuel size class (cm)	Combined (n = 60)	Nest (n = 14)	Random (n = 46)	Combined (n = 21)	Nest (n = 2)	Random (n = 19)
	Litter depth (cm)	6.2 ± 0.8 (0.46)	5.7 ± 2.1 (1.2)	6.4 ± 0.8 (0.48)	5.2 ± 0.8 (0.47)	3.5 ± 3.2 (0.5)	5.4 ± 0.9 (0.5)
Fine fuels by intersect diameter	< 0.64	0.6 ± 0.1 (0.07)	0.66 ± 0.4 (0.21)	0.55 ± 0.1 (0.07)	N/A	N/A	N/A
	0.64 to < 2.5	2.1 ± 0.3 (0.2)	2.9 ± 1.1 (0.63)	1.9 ± 0.3 (0.16)	1.9 ± 0.6 (0.37)	1.8 ± 5.4 (0.85)	1.9 ± 0.7 (0.41)
	2.5 to < 7.6	7.1 ± 1.4 (0.86)	10.8 ± 4 [b] (2.3)	6 ± 1.4 [b] (0.83)	7.8 ± 2.8 (1.6)	13 ± 56.5 (9)	7.3 ± 2.8 (1.6)
Coarse fuels by large-end diameter	7.6 to < 15	6.4 ± 1.3 (0.77)	6.5 ± 1.9 (1.1)	6.4 ± 1.6 (1)	4.5 ± 1.8 (1)	6.3 ± 8.8 (1.4)	4.4 ± 1.9 (1.1)
	15 to < 23	4.4 ± 0.9 (0.53)	5.3 ± 1.3 (0.76)	4.1 ± 1.1 (0.65)	6.8 ± 3.1 (1.8)	10.6 ± 7.3 (1.2)	6.4 ± 3.4 (2)
	> 23	33.1 ± 6.4 (3.9)	42.4 ± 13.6 [b] (7.7)	30.3 ± 7.4 [b] (4.4)	7.6 ± 4.4 (2.5)	0.5 ± 3.2 (0.5)	8.3 ± 4.8 (2.8)
Coarse fuel total	≥ 7.6 cm	43.9 ± 7.1 (4.3)	54.2 ± 14.5 (8.2)	40.7 ± 8.3 (4.9)	18.9 ± 6 (3.5)	17.4 ± 4.7 (0.75)	19.1 ± 6.7 (3.8)
Total volume		53.7 ± 7.7 (4.6)	54.2 ± 14.5 (8.2)	49.1 ± 8.7 (5.2)	28.6 ± 6.9 (4)	32 ± 56.2 (8.9)	28.3 ± 7.5 (4.3)

[a] Mean values within a region differ between nest and random values $P < 0.05$.
[b] Mean values within a region differ between nest and random values $P < 0.10$.

Table 3. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in eight states. Values given for all points combined, and separated by nest and random points. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)[n]					
	Percent cover			Density (logs/ha)		
State	Combined	Nest	Random	Combined	Nest	Random
Arizona	0.21 ± 0.06 (0.03) [106]	0.55 ± 0.18[a] (0.1) [16]	0.15 ± 0.05[a] (0.03) [90]	16.2 ± 4.2 (2.5) [106]	32.8 ± 12.1[a] (6.9) [16]	13.2 ± 4.3[a] (2.6) [90]
Colorado	1 ± 0.18 (0.11) [60]	1.36 ± 0.52 (0.3) [14]	0.88 ± 0.18 (0.11) [46]	49 ± 9.8 (5.8) [60]	67 ± 23.4 (13.2) [14]	43.5 ± 10.7 (6.3) [46]
Idaho	1.03 ± 0.17 (0.1) [90]	1.2 ± 0.35 (0.21) [31]	0.92 ± 0.19 (0.12) [59]	35 ± 6.8 (4.1) [90]	50.8 ± 15.6[a] (9.2) [31]	26.7 ± 5.9[a] (3.5) [59]
Montana	0.58 ± 0.14 (0.08) [40]	N/A	0.58 ± 0.14 (0.08) [40]	31.9 ± 8.2 (4.9) [40]	N/A	31.9 ± 8.2 (4.9) [40]
New Mexico	0.35 ± 0.13 (0.08) [39]	0.32 ± 0.20 (0.11) [14]	0.36 ± 0.17 (0.1) [25]	29.8 ± 8.1 (4.8) [39]	26.8 ± 12 (6.8) [14]	31.5 ± 11.3 (6.6) [25]
Oregon	1.1 ± 0.19 (0.12) [70]	1.3 ± 0.28[a] (0.17) [39]	0.84 ± 0.24[a] (0.14) [31]	47.3 ± 8.3 (5) [70]	59 ± 12.4[a] (7.3) [39]	32.7 ± 9.1[a] (5.3) [31]
South Dakota	0.41 ± 0.15 (0.09) [21]	0.2 ± 1.1 (0.17) [2]	0.44 ± 0.16 (0.09) [19]	28 ± 11.5 (6.7) [21]	6.3 ± 39.5 (6.3) [2]	30.3 ± 12.4 (7.2) [19]
Washington	1 ± 0.15 (0.09) [62]	1.05 ± 0.17[b] (0.1) [50]	0.78 ± 0.21[b] (0.12) [12]	53 ± 7.9 (4.7) [62]	52 ± 9.1 (5.4) [50]	57.3 ± 17.6 (9.8) [12]

[a] Mean densities within a state differ between nest and random values $P < 0.05$.
[b] Mean densities within a state differ between nest and random values $P < 0.10$.

Table 4. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) ± 90% confidence interval (SE) and sample size (n) for study sites located in each of the eight states participating in the Birds and Burns study. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha) plus 90 % confidence interval (SE)								
		Arizona			Colorado			New Mexico		
	Fuel size class (cm)	Combined (n = 106)	Nest (n = 16)	Random (n = 90)	Combined (n = 60)	Nest (n = 14)	Random (n = 46)	Combined (n = 39)	Nest (n = 14)	Random (n = 25)
	Litter depth (cm)	2.6 ± 0.6 (0.35)	5.2 ± 1.2 [a] (0.7)	2.13 ± 0.6 [a] (0.37)	6.2 ± 0.8 (0.46)	5.7 ± 2.1 (1.2)	6.4 ± 0.8 (0.48)	3.2 ± 0.7 (0.42)	4.7 ± 1.6 (0.91)	2.44 ± 0.6 (0.33)
Fine fuels by intersect	< 0.64	0.29 ± 0.1 (0.04)	0.54 ± 0.2 [b] (0.14)	0.24 ± 0.1 [b] (0.03)	0.6 ± 0.1 (0.07)	0.66 ± 0.4 (0.21)	0.55 ± 0.1 (0.07)	0.9 ± 0.3 (0.21)	1.24 ± 0.4 (0.24)	0.65 ± 0.5 (0.29)
	0.64 to < 2.5	1.5 ± 0.4 (0.22)	3.5 ± 1.7 [a] (1)	1.1 ± 0.3 [a] (0.17)	2.1 ± 0.3 (0.2)	2.9 ± 1.1 (0.63)	1.9 ± 0.3 (0.16)	2.2 ± 0.6 (0.33)	2.5 ± 0.8 (0.43)	2 ± 0.8 (0.46)
	2.5 to < 7.6	12.6 ± 7.4 (4.5)	23.7 ± 12.2 (7)	10.6 ± 8.5 (5.11)	7.1 ± 1.4 (0.86)	10.8 ± 4 [b] (2.3)	6 ± 1.4 [b] (0.83)	4 ± 1.3 (0.75)	7 ± 2.8 [a] (1.6)	2.3 ± 0.9 [a] (0.53)
Coarse fuels by large-end	7.6 to < 15	3.3 ± 0.7 (0.42)	5.3 ± 1 [a] (0.56)	2.9 ± 0.8 [a] (0.47)	6.4 ± 1.3 (0.77)	6.5 ± 1.9 (1.1)	6.4 ± 1.6 (1)	3.4 ± 1 (0.58)	5.3 ± 2 [a] (1.15)	2.28 ± 0.9 [a] (0.54)
	15 to < 23	2.7 ± 0.7 (0.4)	5.4 ± 2.1 [a] (1.19)	2.22 ± 0.7 [a] (0.4)	4.4 ± 0.9 (0.53)	5.3 ± 1.3 (0.76)	4.1 ± 1.1 (0.65)	2.9 ± 0.9 (0.54)	4.8 ± 1.8 [a] (1)	1.9 ± 0.9 [a] (0.54)
	> 23	3.1 ± 1 (0.63)	8.5 ± 5.4 [b] (3.1)	2.1 ± 0.7 [b] (0.45)	33.1 ± 6.4 (3.9)	42.4 ± 13.6 (7.7)	30.3 ± 7.4 (4.4)	5.1 ± 2.4 (1.4)	2.9 ± 2.4 (1.37)	6.3 ± 3.5 (2.1)
Coarse fuel total	≥ 7.6 cm	9.04 ± 1.9 (1.14)	19.1 ± 6.3 [b] (3.6)	7.3 ± 1.8 [b] (1.1)	43.9 ± 7.1 (4.3)	54.2 ± 14.5 (8.2)	40.7 ± 8.3 (4.9)	11.4 ± 3.2 (1.9)	13 ± 4.4 (2.5)	10.5 ± 4.5 (2.6)
Total volume		23.4 ± 8.4 (5.1)	46.9 ± 15.4 [b] (8.8)	19.2 ± 9.4 [b] (5.7)	53.7 ± 7.7 (4.6)	54.2 ± 14.5 (8.2)	49.1 ± 8.7 (5.2)	18.4 ± 4.4 (2.6)	23.7 ± 6.8 (3.8)	15.4 ± 5.7 (3.3)

[a] Mean values within a state differ between nest and random values $P < 0.05$.
[b] Mean values within a state differ between nest and random values $P < 0.10$.

Table 4 (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for study sites located in each of the eight states participating in the Birds and Burns study. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha) plus 90 % confidence interval (SE)									
		Montana[1]	Idaho			Oregon			Washington		
	Fuel size class (cm)	Random (n = 40)	Combined (n = 90)	Nest (n = 31)	Random (n = 59)	Combined (n = 71)	Nest (n = 40)	Random (n = 31)	Combined (n = 62)	Nest (n = 50)	Random (n = 12)
	Litter depth (cm)	8.9 ± 0.8 (0.47)	4.2 ± 0.7 (0.41)	3.6 ± 0.8 (0.47)	4.5 ± 1 (0.57)	12.8 ± 2.3 (1.4)	15.5 ± 3.2 (1.9)	9.3 ± 3.1 (1.8)	5.3 ± 0.7 (0.4)	5.5 ± 0.8 (0.47)	4 ± 1.2 (0.67)
Fine fuels by intersect	< 0.64	0.52 ± 0.1 (0.04)	1.1 ± 0.4 (0.24)	1.3 ± 1 (0.59)	1 ± 0.3 (0.2)	1.6 ± 0.8 (0.48)	2 ± 1.3 (0.79)	1.15 ± 0.7 (0.43)	0.8 ± 0.2 (0.14)	0.89 ± 0.3 (0.17)	0.43 ± 0.2 (0.13)
	0.64 to < 2.5	2.2 ± 0.5 (0.27)	4.2 ± 0.6 (0.37)	5.2 ± 1.2 [b] (0.7)	3.7 ± 0.7 [b] (0.41)	10.9 ± 4 (2.4)	10.9 ± 5.1 (3.03)	10.8 ± 6.6 (3.9)	3.1 ± 0.4 (0.25)	3.3 ± 0.5 (0.29)	1.9 ± 0.6 (0.32)
	2.5 to < 7.6	11.5 ± 2.2 (1.3)	6.4 ± 1.5 (0.91)	8.4 ± 2.9 (1.68)	5.3 ± 1.8 (1.05)	32.6 ± 13.4 (8)	40.9 ± 22.1 (13.1)	22.2 ± 12.6 (7.4)	5.1 ± 0.9 (0.57)	5.1 ± 1 (0.61)	5.4 ± 2.7 (1.5)
Coarse fuels by large-end	7.6 to < 15	5.3 ± 0.8 (0.48)	1.8 ± 0.3 (0.2)	1.8 ± 0.5 (0.28)	1.9 ± 0.5 (0.27)	8.3 ± 1.5 (0.89)	8.9 ± 2.3 (1.35)	7.5 ± 1.9 (1.1)	4.3 ± 1.3 (0.78)	4.1 ± 1.6 (0.95)	5.1 ± 1.6 (0.87)
	15 to < 23	8.4 ± 1.3 (0.8)	2.4 ± 0.5 (0.3)	2.3 ± 0.7 (0.44)	2.5 ± 0.7 (0.4)	10.9 ± 3 (1.8)	14.3 ± 5.1 [a] (3.02)	6.6 ± 1.6 [a] (1)	4.9 ± 0.8 (0.46)	4.5 ± 0.8 (0.48)	6.6 ± 2.1 (1.2)
	> 23	12.8 ± 4.6 (2.7)	35.8 ± 6.3 (3.8)	43.3 ± 10.7 (6.3)	31.8 ± 7.9 (4.7)	38.2 ± 6.5 (3.9)	46.2 ± 8.5 [a] (5.05)	28.1 ± 9.6 [a] (5.7)	30.3 ± 5 (3)	32.1 ± 5.8 (3.5)	22.9 ± 9.8 (5.4)
Coarse fuel total	≥ 7.6 cm	26.5 ± 5.3 (3.2)	40.7 ± 6.6 (4)	47.3 ± 11.3 (6.6)	37.2 ± 8.3 (5)	57.4 ± 8.8 (5.3)	69.4 ± 13 [a] (7.7)	42.2 ± 10.4 [a] (6.1)	39.4 ± 5.2 (3.1)	40.6 ± 6.2 (3.7)	34.5 ± 8.9 (5)
Total volume	Total	40.7 ± 6.4 (3.8)	52.5 ± 7.6 (4.5)	62.2 ± 12.6 (7.4)	47.4 ± 9.5 (5.7)	102.5 ± 22.1 (13.3)	123 ± 35.1 [b] (20.8)	76.3 ± 23.1 [b] (13.6)	48.4 ± 5.5 (3.3)	49.9 ± 6.5 (3.9)	42.3 ± 9.7 (5.4)

[a] Mean values within a state differ between nest and random values $P < 0.05$.

[b] Mean values within a state differ between nest and random values $P < 0.10$.

[1] Nest data not available for 2002.

Table 4 (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for study sites located in each of the eight states participating in the Birds and Burns study. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		South Dakota		
	Fuel size class (cm)	Combined (n = 21)	Nest (n = 2)	Random (n = 19)
	Litter depth (cm)	5.2 ± 0.8 (0.47)	3.5 ± 3.2 (0.5)	5.4 ± 0.9 (0.5)
Fine fuels by intersect	< 0.64	N/A	N/A	N/A
	0.64 to < 2.5	1.9 ± 0.6 (0.37)	1.8 ± 5.4 (0.85)	1.9 ± 0.7 (0.41)
	2.5 to < 7.6	7.8 ± 2.8 (1.6)	13 ± 56.5 (9)	7.3 ± 2.8 (1.6)
Coarse fuels by large-end	7.6 to < 15	4.5 ± 1.8 (1)	6.3 ± 8.8 (1.4)	4.4 ± 1.9 (1.1)
	15 to < 23	6.8 ± 3.1 (1.8)	10.6 ± 7.3 (1.2)	6.4 ± 3.4 (2)
	> 23	7.6 ± 4.4 (2.5)	0.5 ± 3.2 (0.5)	8.3 ± 4.8 (2.8)
Coarse fuel total	≥ 7.6 cm	18.9 ± 6 (3.5)	17.4 ± 4.7 (0.75)	19.1 ± 6.7 (3.8)
Total volume	Total	28.6 ± 6.9 (4)	32 ± 56.2 (8.9)	28.3 ± 7.5 (4.3)

Table 5. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size for Birds and Burns study sites located in Arizona. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED). Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)[n]					
	Percent cover			Density (logs/ha)		
Unit	Combined	Nest	Random	Combined	Nest	Random
BE	0.54 ± 0.29 (0.16) [14]	0.74 ± 0.84 (0.36) [4]	0.46 ± 0.34 (0.19) [10]	42 ± 18.9 (10.7) [14]	37.5 ± 49.5 (21) [4]	43.8 ± 24 (13.1) [10]
KE	0.24 ± 0.06 (0.04) [50]	0.48 ± 0.16 [a] (0.09) [10]	0.18 ± 0.06 [a] (0.04) [40]	19.5 ± 5.7 (3.4) [50]	31.3 ± 14.1 [b] (7.7) [10]	16.6 ± 6.1 [b] (3.6) [40]
MO	0.07 ± 0.06 (0.04) [42]	0.53 ± 0.56 [b] (0.09) [2]	0.05 ± 0.06 [b] (0.03) [40]	3.6 ± 2.7 (1.6) [42]	31.3 ± 118 (18.8) [2]	2.2 ± 2 (1.2) [40]

[a] Mean densities within a unit differ between nest and random values $P < 0.05$.
[b] Mean densities within a unit differ between nest and random values $P < 0.10$.

Table 6a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study units located in Arizona. Densities given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha) plus 90 % confidence interval (SE)								
		BE			KE			MO		
	Fuel size class (cm)	Combined (n = 14)	Nest (n = 4)	Random (n = 10)	Combined (n = 50)	Nest (n = 10)	Random (n =40)	Combined (n = 42)	Nest (n = 2)	Random (n = 40)
	Litter depth (cm)	3.5 ± 1.5 (0.87)	7.7 ± 2.2 [a] (0.9)	1.9 ± 1.1 [a] (0.61)	3 ± 1.1 (0.6)	4.5 ± 1.7 (0.9)	2.6 ± 1.3 (0.76)	1.8 ± 0.6 (0.33)	3.9 ± 0.9 [a] (0.15)	1.7 ± 0.6 [a] (0.34)
Fine fuels by intersect	< 0.64	0.64 ± 0.2 (0.11)	0.48 ± 0.3 (0.11)	0.71 ± 0.3 (0.15)	0.3 ± 0.1 (0.06)	0.6 ± 0.4 (0.22)	0.22 ± 0.1 (0.03)	0.16 ± 0.05 (0.03)	0.3	0.15 ± 0.05 (0.03)
	0.64 to < 2.5	1.9 ± 0.7 (0.4)	2.8 ± 2.3 (1)	1.5 ± 0.7 (0.4)	2 ± 0.7 (0.43)	4 ± 2.8 (1.5)	1.5 ± 0.6 (0.35)	0.65 ± 0.2 (0.12)	2.4 ± 1.9 [a] (0.3)	0.56 ± 0.2 [a] (0.11)
	2.5 to < 7.6	22.7 ± 14.4 (8.1)	52.4 ± 52.5 (22.3)	10.8 ± 6.5 (3.5)	17.7 ± 15.3 (9.1)	14.4 ± 6.9 (3.8)	18.5 ± 19.1 (11.4)	3.1 ± 1.8 (1.1)	12.9	2.6 ± 1.8 (1.1)
Coarse fuels by large-end	7.6 to < 15	7.1 ± 2 (1.1)	7.2 ± 1.8 (0.8)	7.1 ± 2.8 (1.6)	4.4 ± 1.1 (0.6)	4.7 ± 1.1 (0.6)	4.3 ± 1.3 (0.78)	0.7 ± 0.6 (0.33)	4.3 ± 14.8 (2.4)	0.56 ± 0.5 (0.31)
	15 to < 23	6.5 ± 2.5 (1.4)	7.2 ± 6.6 (2.8)	6.3 ± 3.2 (1.7)	3.4 ± 1 (0.59)	4.7 ± 2.6 (1.4)	3 ± 1.1 (0.64)	0.6 ± 0.5 (0.3)	4.9 ± 30.6 (4.9)	0.41 ± 0.4 (0.21)
	> 23	5.1 ± 2.7 (1.5)	6.1 ± 8.5 (3.6)	4.7 ± 3.2 (1.7)	4.2 ± 1.9 (1.1)	11.2 ± 8.3 [b] (4.6)	2.4 ± 1.1 [b] (0.63)	1.1 ± 1 (0.58)	0	1.1 ± 1 (0.61)
Coarse fuel total	≥ 7.6 cm	18.7 ± 5.7 (3.2)	20.4 ± 12 (5.1)	18.1 ± 7.7 (4.2)	11.9 ± 2.9 (1.7)	20.6 ± 9.5 [b] (5.2)	9.7 ± 2.7 [b] (1.6)	2.4 ± 1.6 (1)	9.1 ± 45.5 (7.2)	2.1 ± 1.6 (1)
Total volume		44 ± 18.6 (10.5)	76.1 ± 63.9 (27.1)	31.1 ± 14.1 (7.7)	31.9 ± 16.5 (9.8)	39.6 ± 13.3 (7.3)	30 ± 20.6 (12.2)	6.3 ± 3.4 (2)	24.8 ± 47.7 (7.6)	5.4 ± 3.4 (2)

[a] Mean densities within a unit differ between nest and random values $P < 0.05$

[b] Mean densities within a unit differ between nest and random values $P < 0.10$

Table 6b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study units located in Arizona. Densities given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)								
		BE			KE			MO		
	Fuel size class (in)	Combined (n = 14)	Nest (n = 4)	Random (n = 10)	Combined (n = 50)	Nest (n = 10)	Random (n =40)	Combined (n = 42)	Nest (n = 2)	Random (n = 40
	Litter depth (in)	1.4 ± 0.6 (0.34)	3 ± 0.9[a] (0.37)	0.73 ± 0.4[a] (0.24)	1.2 ± 0.4 (0.6)	1.8 ± 0.7 (0.4)	1 ± 0.5 (0.3)	0.7 ± 0.2 (0.13)	1.5 ± 0.4[a] (0.07)	0.7 ± 0.2 (0.13)
Fine fuels by intersect	< 0.25	0.005 ± 0.002 (0.001)	0.004 ± 0.003 (0.001)	0.006 ± 0.002 (0.001)	0.003 ± 0.001 (0.001)	0.006 ± 0.004 (0.002)	0.002 ± 0.001 (0.001)	0.002 ± 0.001 (0.001)	0.003 ± 0.001 (0.001)	0.002 ± 0. (0.001)
	0.25 to < 1	0.02 ± 0.007 (0.003)	0.024 ± 0.2 (0.009)	0.012 ± 0.006 (0.003)	0.02 ± 0.006 (0.004)	0.04 ± 0.03 (0.01)	0.15 ± 0.004 (0.003)	0.008 ± 0.002 (0.001)	0.03 ± 0.001[a] (0.001)	0.007 ± 0.0 (0.001)
	1 to < 3	0.15 ± 0.09 (0.05)	0.37 ± 0.32 (0.14)	0.07 ± 0.03 (0.02)	0.1 ± 0.09 (0.05)	0.1 ± 0.05 (0.03)	0.1 ± 0.11 (0.1)	0.03 ± 0.14 (0.008)	0.1 ± 0.09 (0.01)	0.02 ± 0.0 (0.008)
Coarse fuels by large-end	3 to < 6	1 ± 0.28 (0.16)	1 ± 0.3 (0.1)	1 ± 0.4 (0.22)	0.6 ± 0.2 (0.09)	0.7 ± 0.2 (0.09)	0.6 ± 0.2 (0.11)	0.1 ± 0.08 (0.05)	0.6 ± 2.1 (0.3)	0.0.08 ± 0 (0.04)
	6 to < 9	0.9 ± 0.4 (0.2)	1 ± 0.9 (0.4)	0.9 ± 0.5 (0.25)	0.5 ± 0.14 (0.08)	0.7 ± 0.4 (0.2)	0.4 ± 0.15 (0.1)	0.09 ± 0.07 (0.04)	0.7 ± 4.3 (0.7)	0.06 ± 0.0 (0.03)
	> 9	0.7 ± 0.4 (0.22)	0.9 ± 1.2 (0.51)	0.7 ± 0.5 (0.25)	0.6 ± 0.3 (0.2)	1.6 ± 1.2[b] (0.6)	0.3 ± 0.15[b] (0.09)	0.15 ± 0.14 (0.08)	0	0.16 ± 0. (0.09)
Coarse fuel total	≥ 3 in	2.6 ± 0.8 (0.46)	2.9 ± 1.7 (0.72)	2.5 ± 1.1 (0.6)	1.7 ± 0.4 (0.2)	2.9 ± 1.3[b] (0.7)	1.4 ± 0.4[b] (0.2)	0.3 ± 0.2 (0.1)	1.3 ± 6.4 (1)	0.3 ± 0.2 (0.1)
Total weight		2.8 ± 0.9 (0.48)	3.3 ± 1.9 (0.81)	2.6 ± 1.1 (0.6)	1.8 ± 0.4 (0.3)	3.1 ± 1.3 (0.7)	1.5 ± 0.4 (0.3)	0.4 ± 0.2 (0.1)	1.4 ± 6.4 (1)	0.3 ± 0.2 (0.1)

[a] Mean densities within a unit differ between nest and random values $P < 0.05$

[b] Mean densities within a unit differ between nest and random values $P < 0.10$

Table 7. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in Colorado. Estimated values given are for wildlife logs ≥ 23 cm large-end diameter (LED). Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)					
	Percent cover			Density (logs/ha)		
	Combined	Nest	Random	Combined	Nest	Random
DC	0.46 ± 0.22 (0.12) [8]	0.47 ± 0.63 (0.21) [3]	0.45 ± 0.33 (0.15) [5]	18.8 ± 14.2 (7.5) [8]	25 ± 55.8 (19.1) [3]	15 ± 13.1 (6.1) [5]
PB	0.4 ± 0.32 (0.17) [8]	0.7 ± 1.23 (0.42) [3]	0.22 ± 0.16 (0.08) [5]	25 ± 11 (5.8) [8]	33.3 ± 12.2 (4.2) [3]	20 ± 18.1 (8.5) [5]
SCN	1.26 ± 0.37 (0.22) [22]	2.4 ± 1.53 (0.65) [4]	1.01 ± 0.32 (0.19) [18]	68.2 ± 22 (12.8) [22]	128 ± 47.1[a] (20) [4]	54.9 ± 23[a] (13.2) [18]
SCS	1.13 ± 0.27 (0.16) [22]	1.48 ± 0.83 (0.35) [4]	1.06 ± 0.31 (0.18) [18]	49.4 ± 11.4 (6.6) [22]	62.5 ± 20.8 (8.8) [4]	46.5 ± 13.5 (7.7) [18]

[a] Mean densities within a unit differ between nest and random values $P < 0.05$.

Table 8a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Colorado. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)					
		DC			PB		
	Fuel size class (cm)	Combined (n = 8)	Nest (n = 3)	Random (n = 5)	Combined (n = 8)	Nest (n = 3)	Random (n = 5)
	Litter depth (cm)	5.2 ± 1.9 (1)	2.9 ± 4.8 (1.7)	6.5 ± 1.8 (0.86)	4.9 ± 1.3 (0.69)	5.9 ± 3.8 (1.3)	4.3 ± 1.6 (0.76)
Fine fuels by intersect	< 0.64	0.45 ± 0.37 (0.2)	0.4 ± 0.64 (0.22)	0.5 ± 0.64 (0.3)	0.29 ± 0.16 (0.09)	0.2 ± 0.45 (0.15)	0.34 ± 0.23 (0.11)
	0.64 to < 2.5	2 ± 0.92 (0.49)	1.7 ± 1.7 (0.58)	2.2 ± 1.6 (0.7)	2 ± 0.81 (0.4)	2.8 ± 1.97 (0.67)	1.5 ± 0.97 (0.46)
	2.5 to < 7.6	6.4 ± 3.9 (2.1)	4.7 ± 2.6 (0.88)	7.4 ± 7 (3.3)	5.5 ± 1.7 (0.9)	6 ± 3.3 (1.13)	5.2 ± 2.9 (1.3)
Coarse fuels by large-end	7.6 to < 15	3.4 ± 1.5 (0.8)	4.7 ± 4.8 (1.6)	2.5 ± 1.6 (0.76)	4.8 ± 3.6 (1.9)	8 ± 13.3 (4.6)	2.9 ± 2.3 (1.1)
	15 to < 23	1.9 ± 1.5 (0.8)	2.6 ± 4.6 (1.6)	1.5 ± 2 (1)	4.8 ± 2.4 (1.3)	5.5 ± 3.4 (1.2)	4.3 ± 4.3 (2)
	> 23	18.9 ± 10.9 (5.7)	24.7 ± 37.6 (12.9)	15.4 ± 12.1 (5.7)	9.8 ± 9.7 (5.1)	18.4 ± 38.4 (13.1)	4.6 ± 4.3 (2)
Coarse fuel total	≥ 7.6 cm	24.2 ± 10.7 (5.7)	32 ± 38 (13)	19.4 ± 10.4 4.9	19.3 ± 10.5 (5.6)	32 ± 34.5 (11.8)	11.7 ± 5.4 (2.5)
Total volume		33 ± 10.2 (5.4)	38.7 ± 35.6 (12.2)	29.5 ± 11.3 (5.3)	27.1 ± 11.6 (6.1)	41 ± 38.2 (13.1)	18.7 ± 5.8 (2.7)

Table 8a (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Colorado. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)					
		SCN			SCS		
	Fuel size class (cm)	Combined (n = 22)	Nest (n = 4)	Random (n = 18)	Combined (n = 22)	Nest (n = 4)	Random (n = 18)
	Litter depth (cm)	7.6 ± 1.5 (0.89)	8 ± 9 (3.8)	7.5 ± 1.4 (0.79)	5.7 ± 1.2 (0.71)	5.3 ± 2.5 (1.1)	5.8 ± 1.5 (0.84)
Fine fuels by intersect	< 0.64	0.5 ± 0.21 (0.12)	1.03 ± 1.14 (0.48)	0.38 ± 0.16 (0.09)	0.82 ± 0.2 (0.12)	0.88 ± 1.1 (0.49)	0.8 ± 0.19 (0.11)
	0.64 to < 2.5	2 ± 0.52 (0.3)	2.9 ± 3.1 (1.3)	1.8 ± 0.41 (0.24)	2.3 ± 0.69 (0.4)	3.9 ± 4.3 (1.8)	2 ± 0.46 (0.26)
	2.5 to < 7.6	6.7 ± 2.2 (1.3)	12.9 ± 11.5 (4.9)	5.4 ± 1.7 (1)	8.4 ± 3.1 (1.8)	16.9 ± 11.5 (4.9)	6.5 ± 2.9 (1.64)
Coarse fuels by large-end	7.6 to < 15	6.4 ± 1.7 (1)	7.5 ± 2.6 (1.1)	6.1 ± 2 (1.16)	8.1 ± 2.9 (1.7)	5.6 ± 3.7 (1.6)	8.7 ± 3.5 (2)
	15 to < 23	4.3 ± 1.4 (0.8)	7.9 ± 3[a] (1.3)	3.5 ± 1.5 [a] (0.83)	5.3 ± 1.8 (1.04)	4.7 ± 2.4 (1.03)	5.4 ± 2.2 (1.3)
	> 23	38.5 ± 11 (6.4)	62.9 ± 16.2[a] (6.9)	33.1 ± 12.4 [a] (7.1)	41.3 ± 11.9 (6.9)	53.2 ± 39.1 (16.6)	38.7 ± 13.4 (7.7)
Coarse fuel total	≥ 7.6 cm	49.2 ± 12 (7)	78.3 ± 16.2 [a] (6.9)	42.7 ± 13.3[a] 7.6	54.7 ± 13.2 (7.7)	63.5 ± 43.4 (18.4)	52.8 ± 15 (8.6)
Total volume		58.3 ± 12.4 (7.2)	95.1 + 8.2 [a] (3.5)	50.1 + 13.1 [a] (7.5)	66.2 + 15 (8.7)	85.1 ± 50.1 (21.3)	62 ± 16.6 (9.5)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

Table 8b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Colorado. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)					
		DC			PB		
	Fuel size class (in)	Combined (n = 8)	Nest (n = 3)	Random (n = 5)	Combined (n = 8)	Nest (n = 3)	Random (n = 5)
	Litter depth (in)	2 ± 0.7 (0.4)	1.1 ± 1.9 (0.6)	2.6 ± 0.7 (0.3)	1.9 ± 0.5 (0.3)	2.3 ± 1.5 (0.5)	1.7 ± 0.6 (0.3)
Fine fuels by intersect	< 0.25	0.004 ± 0.005 (0.003)	0.003 ± 0.01 (0.003)	0.004 ± 0.009 (0.004)	0.003 ± 0.003 (0.002)	0.	0.004 ± 0.005 (0.002)
	0.25 to < 1	0.02 ± 0.01 (0.005)	0.02 ± 0.02 (0.006)	0.03 ± 0.02 (0.008)	0.02 ± 0.008 (0.004)	0.03 ± 0.02 (0.007)	0.01 ± 0.01 (0.005)
	1 to < 3	0.06 ± 0.04 (0.02)	0.04 ± 0.02 (0.007)	0.07 ± 0.07 (0.03)	0.05 ± 0.02 (0.008)	0.04 ± 0.01 (0.003)	0.05 ± 0.03 (0.01)
Coarse fuels by large-end	3 to < 6	0.5 ± 0.2 (0.1)	0.7 ± 0.7 (0.3)	0.4 ± 0.2 (0.1)	0.7 ± 0.6 (0.3)	1.2 ± 2.1 (0.7)	0.4 ± 0.35 (0.2)
	6 to < 9	0.3 ± 0.2 (0.1)	0.4 ± 0.7 (0.2)	0.2 ± 0.3 (0.1)	0.7 ± 0.4 (0.2)	0.8 ± 0.5 (0.2)	0.7 ± 0.7 (0.3)
	> 9	2.9 ± 1.7 (0.9)	3.8 ± 5.8 (2)	2.4 ± 1.9 (0.9)	1.5 ± 1.5 (0.8)	2.8 ± 5.9 (2)	0.7 ± 0.7 (0.3)
Coarse fuel total	≥ 3 in	3.7 ± 1.7 (0.9)	4.9 ± 5.9 (2)	3 ± 1.6 0.8	3 ± 1.6 (0.9)	4.9 ± 5.3 (1.8)	1.8 ± 0.8 (0.4)
Total weight		3.8 ± 1.6 (0.9)	5 ± 5.8 (2)	3.1 ± 1.6 (0.7)	3.1 ± 1.6 (0.9)	5 ± 5.4[b] (1.8)	1.9 ± 0.8[b] (0.4)

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 8b (con't). Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Colorado. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)					
		SCN			SCS		
	Fuel size class (in) Litter depth (in)	Combined (n = 22) 3 ± 0.6 (0.35)	Nest (n = 4) 3.1 ± 3.5 (1.5)	Random (n = 18) 2.9 ± 0.5 (0.3)	Combined (n = 22) 2.2 ± 0.5 (0.3)	Nest (n = 4) 2.1 ± 1 (0.4)	Random (n = 18) 2.3 ± 0.6 (0.0.3)
Fine fuels by intersect	< 0.25	0.004 ± 0.002 (0.002)	0.01 ± 0.01 (0.006)	0.002 ± 0.002 (0.001)	0.007 ± 0.003 (0.001)	0.008 ± 0.01 (0.005)	0.007 ± 0.0 (0.002)
	0.25 to < 1	0.02 ± 0.005 (0.003)	0.03 ± 0.03 (0.01)	0.02 ± 0.004 (0.002)	0.02 ± 0.007 (0.004)	0.04 ± 0.04 (0.02)	0.02 ± 0.0 (0.003)
	1 to < 3	0.06 ± 0.02 (0.01)	0.1 ± 0.1 (0.04	0.05 ± 0.02 (0.009)	0.06 ± 0.02 (0.01)	0.1 ± 0.09 (0.04)	0.04 ± 0.0 (0.008)
Coarse fuels by large-end	3 to < 6	1 ± 0.3 (0.15)	1.2 ± 0.4 (0.2)	0.9 ± 0.3 (0.2)	1.3 ± 0.4 (0.3)	0.9 ± 0.6 (0.2)	1.3 ± 0.3 (0.3)
	6 to < 9	0.7 ± 0.2 (0.1)	1.2 ± 0.5[a] (0.2)	0.5 ± 0.2 [a] (0.1)	0.8 ± 0.3 (0.2)	0.7 ± 0.4 (0.2)	0.8 ± 0.3 (0.2)
	> 9	5.9 ± 1.7 (1)	9.7 ± 2.5 (1.1)	5.1 ± 1.9 (1.1)	6.4 ± 1.8 (1.1)	8.2 ± 6 (2.6)	6 ± 2.1 (1.2)
Coarse fuel total	≥ 3 in	7.6 ± 1.9 (1.1)	12.1 ± 2.5 (1.1)	6.6 ± 2 1.2	8.4 ± 2 (1.2)	9.8 ± 6.7 (2.8)	8.1 ± 2.3 (1.3)
Total weight		7.7 ± 1.8 (1.1)	12.2 + 2.4 (1)	6.7 + 2 (1.2)	8.5 + 2 (1.2)	10 ± 6.7 (2.9)	8.2 ± 2.3 (1.3)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

Table 9. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in Idaho. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED). Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)[n]					
	Percent cover			Density (logs/ha)		
	Combined	Nest	Random	Combined	Nest	Random
BH	1.17 ± 0.39 (0.22) [25]	0.99 ± 0.85 (0.4) [5]	1.21 ± 0.46 (0.27) [20]	31 ± 12.2 (7.15) [25]	52.5 ± 44.1 (20.7) [5]	25.6 ± 12.3 (7.1) [20]
DM	0.96 ± 0.39 (0.21) [9]	0.85 ± 1.21 (0.4) [3]	1.02 ± 0.53 (0.26) [6]	31.9 ± 16 (8.6) [9]	37.5 ± 55.8 (19.1) [3]	29.2 ± 20.2 (10) [6]
DO	0.92 ± 0.57 (0.32) [13]	1.29 ± 1.07 (0.55) [7]	0.5 ± 0.37 (0.18) [6]	30.8 ± 30.6 (17.2) [13]	42.9 ± 59.7 (30.7) [7]	16.7 ± 24 (11.9) [6]
FC	0.76 ± 0.23 (0.14) [28]	1.1 ± 0.69 (0.36) [8]	0.63 ± 0.2 (0.12) [20]	27.2 ± 5.4 (5.5) [28]	43.8 ± 30.3 (16) [8]	20.6 ± 6.4 (3.5) [20]
PC	1.7 ± 0.66 (0.37) [11]	2.13 ± 1.51 (0.71) [5]	1.37 ± 0.64 (0.32) [6]	71.6 ± 18.1 (10) [11]	87.5 ± 34.7 (16.3) [5]	58.3 ± 21.2 (10.5) [6]
WM	0.66 ± 0.49 (0.21) [4]	0.81 ± 0.58 (0.2) [3]	0.19 [1]	34.4 ± 14.1 (6) [4]	37.5 ± 21.1 (7.2) [3]	25 [1]

Table 10a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Idaho. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)								
		BH			DM			DO		
	Fuel size class (cm)	Combined (n = 25)	Nest (n = 5)	Random (n = 20)	Combined (n = 9)	Nest (n = 3)	Random (n = 6)	Combined (n = 13)	Nest (n = 7)	Random (n = 6)
	Litter depth (cm)	4.5 ± 1.5 (0.85)	1.7 ± 1.1[a] (0.53)	5.2 ± 1.7[a] (1)	4.9 ± 1.9 (1)	3.9 ± 2.8 (1)	5.4 ± 2.9 (1.4)	3.5 ± 1.2 (0.66)	4.1 ± 1.7 (0.88)	2.8 ± 2 (1)
Fine fuels by intersect	< 0.64	0.89 ± 0.6 (0.33)	0.18 ± 0.2[a] (0.07)	1.1 ± 0.7[a] (0.4)	1.5 ± 1.4 (0.77)	0.5 ± 1.3 (0.45)	2 ± 2.2 (1.1)	2.2 ± 2.3 (1.3)	3.6 ± 4.6 (2.4)	0.55 ± 0.3 (0.15)
	0.64 to < 2.5	3.8 ± 1.1 (0.62)	5.4 ± 4 (1.9)	3.4 ± 1.1 (0.62)	3.4 ± 2.8 (1.5)	1.6 ± 2.1 (0.72)	4.2 ± 4.5 (2.2)	5.3 ± 1.7 (1)	5.4 ± 2.5 (1.3)	5.1 ± 3.3 (1.6)
	2.5 to < 7.6	6.7 ± 3.5 (2.1)	4.6 ± 5.1 (2.4)	7.3 ± 4.3 (2.5)	5.4 ± 4.8 (2.6)	2.6 ± 7.7 (2.6)	6.8 ± 7.4 (3.7)	7.3 ± 3.7 (2.1)	10.5 ± 5.9[b] (3)	3.5 ± 4[b] (2)
Coarse fuels by large-end	7.6 to < 15	1.6 ± 0.5 (0.28)	0.9 ± 1.2 (0.56)	1.7 ± 0.6 (0.32)	2.4 ± 1.6 (0.86)	2.4 ± 3.1 (1.1)	2.4 ± 2.5 (1.2)	1.8 ± 1.1 (0.63)	2.1 ± 1.7 (0.85)	1.5 ± 2 (1)
	15 to < 23	2.6 ± 0.8 (0.49)	2.1 ± 2.4 (1.1)	2.8 ± 1 (0.56)	1.7 ± 1.5 (0.83)	1.6 ± 3.3 (1.1)	1.8 ± 2.4 (1.2)	1.3 ± 1 (0.54)	1.1 ± 1.1 (0.58)	1.5 ± 2 (1)
	> 23	37.1 ± 13.4 (7.8)	29.9 ± 26.4 (12.4)	38.9 ± 16.2 (9.3)	27.3 ± 14.5 (7.8)	32 ± 58.6 (20.1)	25 ± 15.8 (7.9)	35.6 ± 19.1 (10.7)	48.5 ± 33.3 (17.1)	20.5 ± 20.3 (10.1)
Coarse fuel total	≥ 7.6 cm	43.7 ± 14 (8.2)	32.8 ± 27.3 (12.8)	46.4 ± 16.9 (9.8)	31.4 ± 15.1 (8.1)	35.9 ± 59.4 (20.4)	29.2 ± 17.1 (8.5)	38.7 ± 19.7 (11.1)	51.7 ± 34.9 (18)	23.5 ± 20.1 (10)
Total volume		55.4 ± 17.3 (10.1)	43 ± 30.9 (14.5)	58.5 ± 21 (12.1)	41.7 ± 19 (10.2)	40.7 ± 67 (23)	42.2 ± 24.2 (12)	53.5 ± 22.4 (12.6)	71.3 ± 38 (19.6)	32.7 ± 22.6 (11.2)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 10a (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Idaho. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)								
		FC			PC			WM		
	Fuel size class (cm)	Combined (n = 28)	Nest (n = 8)	Random (n = 20)	Combined (n = 11)	Nest (n = 5)	Random (n = 6)	Combined (n = 4)	Nest (n = 3)	Random (n = 1)
	Litter depth (cm)	2.8 ± 0.8 (0.49)	2.3 ± 1.9 (1)	3 ± 1 (0.56)	7 ± 3.6 (2)	5.2 ± 2.9 (1.4)	8.5 ± 7 (3.5)	5.2 ± 1.8 (0.78)	5.9 ± 1.6 (0.56)	3.2
Fine fuels by intersect	< 0.64	0.77 ± 0.3 (2)	0.33 ± 0.2[a] (0.09)	0.95 ± 0.5[a] (0.27)	0.26 ± 0.1 (0.07)	0.36 ± 0.3 (0.12)	0.18 ± 0.1 (0.05)	1.9 ± 3.9 (1.7)	2.5 ± 6.4 (2.2)	0.1
	0.64 to < 2.5	4.4 ± 1.2 (0.72)	6.6 ± 3.6 (1.9)	3.6 ± 1.1 (0.61)	3.9 ± 1.2 (0.67)	3.8 ± 1.9 (0.89)	3.9 ± 2.1 (1.1)	5.8 ± 4.5 (1.9)	6.8 ± 6.7 (2.3)	2.7
	2.5 to < 7.6	5.6 ± 2.4 (1.4)	9.2 ± 7 (3.7)	4.13 ± 2.3 (1.3)	4.4 ± 1.7 (1)	5.8 ± 2.4 (1.1)	3.3 ± 2.8 (1.4)	14.4 ± 20.7 (8.8)	17.5 ± 34 (11.6)	5
Coarse fuels by large-end	7.6 to < 15	1.6 ± 0.6 (0.33)	1.8 ± 0.9 (0.46)	1.5 ± 0.7 (0.43)	2.8 ± 1.4 (0.75)	1.8 ± 1 (0.48)	3.7 ± 2.5 (1.3)	1.5 ± 2 (0.87)	1.7 ± 3.5 (1.2)	1
	15 to < 23	1.9 ± 0.8 (0.44)	2.7 ± 1.8 (1)	1.5 ± 0.8 (0.48)	5.3 ± 2.3 (1.3)	4.3 ± 2.8 (1.3)	6.1 ± 4.3 (2.2)	2.8 ± 2.9 (1.2)	1.8 ± 3.3 (1.1)	5.6
	> 23	31.4 ± 11.9 (7)	35.9 ± 18.7 (9.9)	29.6 ± 15.6 (9)	55.3 ± 20.1 (11.1)	77.2 ± 32.7[b] (15.4)	37 ± 24.2[b] (12)	23.6 ± 19 (8.1)	27.8 ± 28.5 (9.7)	11.1
Coarse fuel total	≥ 7.6 cm	34.9 ± 12.3 (7.2)	40.4 ± 20.3 (10.7)	32.7 ± 16 9.3	63.4 ± 20.9 (11.5)	83.4 ± 34.9 (16.4)	46.8 ± 27.5 (13.7)	27.9 ± 18.2 (7.7)	31.3 ± 28.7 (9.8)	17.7
Total volume		45.6 ± 13.5 (7.9)	56.4 ± 26.8 (14.1)	41.3 ± 16.5 (9.6)	71.9 ± 21.9 (12.1)	93.3 ± 37.8 (17.7)	54.1 ± 27.7 (13.7)	50 ± 31.3 (13.3)	58.2 ± 43.2 (14.8)	25.5

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 10b. Mean weight (tons per acre) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (inches) per acre ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Idaho. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons/acre)								
		BH			DM			DO		
	Fuel size class (in) Litter depth (in)	Combined (n = 25)	Nest (n = 5)	Random (n = 20)	Combined (n = 9)	Nest (n = 3)	Random (n = 6)	Combined (n = 13)	Nest (n = 7)	Random (n = 6)
Fine fuels by intersect	< 0.25	1.9 ± 2.1 (0.1.2)	0.18 ± 0.16 (0.07)	2.3 ± 2.6 (1.5)	1.5 ± 1.4 (0.77)	0.5 ± 1.3 (0.45)	1.9 ± 2.2 (1.1)	2.1 ± 2.3 (1.3)	3.6 ± 4.6 (2.3)	0.5 ± 0.3 (0.15)
	0.25 to < 1	0.6 ± 0.2 (0.1)	0.8 ± 0.6 (0.26)	0.6 ± 0.24 (0.14)	0.47 ± 0.39 (0.21)	0.22 ± 0.3 (0.1)	0.59 ± 0.62 (0.31)	0.74 ± 0.24 (0.14)	0.75 ± 0.34 (0.18)	0.7 ± 0.46 (0.23)
	1 to < 3	0.09 ± 0.06 (0.04)	0.04 ± 0.04 (0.02)	0.1 ± 0.07 (0.04)	0.05 ± 0.04 (0.02)	0.02 ± 0.07 (0.02)	0.06 ± 0.07 (0.03)	0.07 ± 0.03 (0.02)	0.09 ± 0.05 (0.03)	0.03 ± 0.03 (0.02)
Coarse fuels by large-end	3 to < 6	0.24 ± 0.8 (0.05)	0.14 ± 0.19 (0.09)	0.3 ± 0.1 (0.05)	0.39 ± 0.26 (0.14)	0.39 ± 0.51 (0.18)	0.39 ± 0.41 (0.2)	0.3 ± 0.18 (0.1)	0.34 ± 0.27 (0.14)	0.24 ± 0.32 (0.16)
	6 to < 9	0.43 ± 0.14 (0.08)	0.33 ± 0.38 (0.18)	0.45 ± 0.16 (0.09)	0.28 ± 0.25 (0.13)	0.25 ± 0.55 (0.19)	0.29 ± 0.38 (0.19)	0.21 ± 0.16 (0.09)	0.17 ± 0.18 (0.09)	0.24 ± 0.33 (0.17)
	> 9	6 ± 2.2 (1.3)	4.8 ± 4.3 (2)	6.3 ± 2.6 (1.5)	4.4 ± 2.3 (1.3)	5.2 ± 9.5 (3.3)	4.1 ± 2.6 (1.3)	5.8 ± 3.1 (1.7)	7.9 ± 5.4 (2.8)	3.3 ± 3.3 (1.6)
Coarse fuel total	≥ 3 in	7.1 ± 2.3 (1.3)	5.3 ± 4.4 (2.1)	7.5 ± 2.7 (1.6)	5.1 ± 2.4 (1.3)	5.8 ± 9.6 (3.3)	4.7 ± 2.8 (1.4)	6.3 ± 3.2 (1.8)	8.4 ± 5.7 (2.9)	3.8 ± 3.2 (1.6)
Total weight		8.5 ± 2.6 (1.5)	6.3 ± 4.6 (2.2)	9 ± 3.1 (1.8)	7 ± 3.3 (1.8)	6.5 ± 10.7 (3.7)	7.3 ± 4.5 (2.2)	9.2 ± 4.3 (2.4)	12.8 ± 7.6 (3.9)	5.1 ± 3.5 (1.7)

Table 10b (con't). Mean weight (tons per acre) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (inches) per acre ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Idaho. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons/acre)								
		FC			PC			WM		
	Fuel size class (in) Litter depth (in)	Combined (n = 28)	Nest (n = 8)	Random (n = 20)	Combined (n = 11)	Nest (n = 5)	Random (n = 6)	Combined (n = 4)	Nest (n = 3)	Random (n = 1)
Fine fuels by intersect	< 0.25	0.74 ± 0.33 (0.19)	0.3 ± 0.2[a] (0.09)	0.91 ± 0.5 (0.26)	0.27 ± 0.12 (0.06)	0.36 ± 0.24 (0.11)	0.19 ± 0.1 (0.06)	1.9 ± 3.9 (1.7)	2.5 ± 6.3 (2.2)	0.08
	0.25 to < 1	0.62 ± 0.17 (0.1)	0.9 ± 0.5 (0.3)	0.5 ± 0.15 (0.09)	0.53 ± 0.17 (0.09)	0.5 ± 0.3 (0.12)	0.5 ± 0.3 (0.15)	0.81 ± 0.63 (0.27)	1 ± 0.9 (0.32)	0.38
	1 to < 3	0.05 ± 0.02 (0.01)	0.08 ± 0.06 (0.03)	0.04 ± 0.02 (0.01)	0.04 ± 0.02 (0.008)	0.05 ± 0.02 (0.01)	0.03 ± 0.03 (0.01)	0.13 ± 0.18 (0.08)	0.16 ± 0.3 (0.1)	0.04
Coarse fuels by large-end	3 to < 6	0.26 ± 0.09 (0.05)	0.3 ± 0.14 (0.07)	0.25 ± 0.12 (0.07)	0.46 ± 0.22 (0.12)	0.3 ± 0.2 (0.08)	0.6 ± 0.4 (0.2)	0.25 ± 0.33 (0.14)	0.3 ± 0.6 (0.2)	0.16
	6 to < 9	0.3 ± 0.12 (0.07)	0.44 ± 0.29 (0.16)	0.25 ± 0.13 (0.08)	0.86 ± 0.38 (0.21)	0.7 ± 0.5 (0.22)	1 ± 0.7 (0.35)	0.45 ± 0.47 (0.2)	0.3 ± 0.5 (0.2)	0.91
	> 9	5.1 ± 1.9 (1.1)	5.8 ± 3 (1.6)	4.8 ± 2.5 (1.5)	9 ± 3.2 (1.8)	12.5 ± 5.3 (2.5)	6 ± 3.9 (2)	3.8 ± 3.1 (1.3)	4.5 ± 4.6 (1.6)	1.8
Coarse fuel total	≥ 3 in	5.7 ± 2 (1.2)	6.5 ± 3.3 (1.7)	5.3 ± 2.6 1.5	10.3 ± 3.4 (1.9)	13.5 ± 5.6 (2.6)	7.6 ± 4.5 (2.2)	4.5 ± 2.9 (1.3)	5.1 ± 4.6 (1.6)	2.9
Total weight		7.1 ± 2 (1.2)	7.8 ± 3.5 (1.9)	6.7 ± 2.6 (1.5)	11.1 ± 3.4 (1.9)	14.4 ± 5.7 (2.7)	8.3 ± 4.5 (2.2)	7.3 ± 5.3 (2.2)	8.6 ± 7.5 (2.6)	3.4

Table 11. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in Montana. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED). Data collected in 2002.

	Estimated value + 90% confidence interval (SE)	
Unit	Percent cover	Density
MT	0.4 ± 0.16 (0.09) [20]	25.6 ± 11.5 (6.6) [20]
ST	0.77 ± 0.22 (0.13) [20]	38.1 ± 12.1 (7) [20]

Table 12a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Montana. Data collected in 2002.

		Volume (m^3/ha)	
		Strawberry	Maupin
	Fuel size class (cm)	Random[1] (n = 20)	Random[1] (n = 20)
	Litter depth (cm)	9.5 ± 1.3 (0.73)	8.2 ± 1 (0.56)
Fine fuels by intersect	< 0.64	0.44 ± 0.1 (0.07)	0.61 ± 0.1 (0.05)
	0.64 to < 2.5	2.3 ± 0.7 (0.42)	2.1 ± 0.6 (0.36)
	2.5 to < 7.6	12.5 ± 4.1 (2.3)	10.5 ± 2.2 (1.3)
Coarse fuels by large-end	7.6 to < 15	4.2 ± 1.1 (0.64)	6.4 ± 1.1 (0.64)
	15 to < 23	10.5 ± 1.6 (0.92)	6.3 ± 2 (1.1)
	> 23	18.3 ± 8.3 (4.8)	7.3 ± 3.4 (2)
Coarse fuel total	≥ 7.6 cm	33 ± 9 (5.2)	20.1 ± 5.3 (3)
Total volume		48.2 ± 10.8 (6.2)	33.3 ± 6.7 (3.9)

[1] Only random point data available for Strawberry and Maupin units.

Table 12b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Montana. Data collected in 2002.

		Weight (tons per acre)	
		Strawberry	Maupin
	Fuel size class (in)	Random[1] (n = 20)	Random[1] (n = 20)
	Litter depth (in)	3.7 ± 0.5 (0.3)	3.2 ± 0.4 (0.2)
Fine fuels by intersect	< 0.25	0.004 ± 0.001 (0.001)	0.006 ± 0.001 (0.001)
	0.25 to < 1	0.02 ± 0.006 (0.004)	0.02 ± 0.007 (0.004)
	1 to < 3	0.09 ± 0.03 (0.02)	0.08 ± 0.02 (0.009)
Coarse fuels by large-end	3 to < 6	0.6 ± 0.2 (0.1)	0.9 ± 0.2 (0.09)
	6 to < 9	1.5 ± 0.2 (0.14)	0.9 ± 0.3 (0.2)
	> 9	2.7 ± 1.2 (0.7)	1.1 ± 0.5 (0.3)
Coarse fuel total	≥ 3 in	4.9 ± 1.3 (0.8)	3 ± 0.8 (0.5)
Total weight		5 ± 1.3 (0.8)	3.1 ± 0.8 (0.5)

[1] Only random point data available for Strawberry and Maupin units.

Table 13. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size for Birds and Burns study sites located in New Mexico. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED). Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)					
	Percent cover			Density (logs/ha)		
	Combined	Nest	Random	Combined	Nest	Random
CP	0.32 ± 0.28 (0.15) [10]	0.32 ± 0.28 (0.15) [10]	N/A	18.8 ± 9.8 (5.4) [10]	18.8 ± 9.8 (21) [10]	N/A
LJ	0.36 ± 0.15 (0.09) [29]	0.31 ± 0.24 (0.1) [4]	0.36 ± 0.17 (0.1) [25]	33.6 ± 10.4 (6.1) [29]	46.9 ± 40.5 (17.2) [4]	31.5 ± 11.3 (6.6) [25]

Table 14a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in New Mexico. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)			
		CP	LJ		
	Fuel size class (cm)	Combined (n = 10)	Combined (n = 29)	Nest (n = 4)	Random (n = 25)
	Litter depth (cm)	3.7 ± 1 (0.55)	3.1 ± 0.9 (0.53)	7.1 ± 6.4 (2.7)	2.4 ± 0.6 (0.3)
Fine fuels by intersect	< 0.64	1.1 ± 0.4 (0.21)	0.79 ± 0.5 (0.27)	1.7 ± 1.6 (0.67)	0.65 ± 0.5 (0.29)
	0.64 to < 2.5	2.2 ± 0.5 (0.25)	2.2 ± 0.7 (0.44)	3.4 ± 3.3 (1.4)	2 ± 0.8 (0.46)
	2.5 to < 7.6	5.4 ± 2 (1.1)	3.5 ± 1.6 (0.92)	11.2 ± 10.8 (4.6)	2.3 ± 0.9 (0.53)
Coarse fuels by large-end	7.6 to < 15	5.1 ± 2.7 (1.4)	2.8 ± 1 (0.57)	5.8 ± 4.8 (2.03)	2.3 ± 0.9 (0.54)
	15 to < 23	4.3 ± 2.3 (1.2)	2.5 ± 1 (0.57)	6.1 ± 3.9[b] (1.7)	1.9 ± 0.9 [b] (0.54)
	> 23	0.6 ± 0.9 (0.49)	6.6 ± 3.1 (1.8)	8.4 ± 8.3 (3.5)	6.3 ± 3.5 (2.1)
Coarse fuel total	≥ 7.6 cm	10 ± 4.4 (2.4)	11.9 ± 4.1 (2.4)	20.4 ± 12 (5.1)	10.5 ± 4.5 (2.6)
Total volume		18.6 ± 5.1 (2.8)	18.3 ± 5.7 (3.4)	36.6 ± 22.1 (9.4)	15.4 ± 5.7 (3.3)

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 14b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in New Mexico. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)					
		CP			LJ		
	Fuel size class (in)	Combined (n = 35)	Nest (n = 10)	Random (n = 25)	Combined (n = 29)	Nest (n = 4)	Random (n = 25)
	Litter depth (in)	1.4 ± 0.2 (0.1)	1.4 ± 0.4 (0.2)	1.4 ± 0.3 (0.2)	1.2 ± 0.4 (0.2)	2.8 ± 2.5 (1.1)	1 ± 0.2 (0.13)
Fine fuels by intersect	< 0.25	0.007 ± 0.002 (0.001)	0.01 ± 0.004 [a] (0.002)	0.006 ± 0.002 [a] (0.001)	0.007 ± 0.003 (0.002)	0.01 ± 0.01 (0.005)	0.006 ± 0.003 (0.002)
	0.25 to < 1	0.02 ± 0.003 (0.002)	0.02 ± 0.006 (0.003)	0.02 ± 0.004 (0.002)	0.02 ± 0.008 (0.004)	0.03 ± 0.3 (0.01)	0.02 ± 0.009 (0.005)
	1 to < 3	0.04 ± 0.009 (0.005)	0.05 ± 0.02 (0.009)	0.04 ± 0.01 (0.006)	0.03 ± 0.01 (0.007)	0.08 ± 0.08 (0.03)	0.02 ± 0.007 (0.004)
Coarse fuels by large-end	3 to < 6	1.1 ± 0.3 (0.2)	0.7 ± 0.4 (0.2)	1.2 ± 0.4 (0.2)	0.4 ± 0.14 (0.08)	0.8 ± 0.7 (0.3)	0.3 ± 0.13 (0.08)
	6 to < 9	0.6 ± 0.2 (0.1)	0.6 ± 0.3 (0.2)	0.7 ± 0.2 (0.1)	0.4 ± 0.14 (0.08)	0.9 ± 0.6 [b] (0.2)	0.3 ± 0.13 [b] (0.08)
	> 9	0.6 ± 0.3 (0.2)	0.09 ± 0.13 [a] (0.07)	0.9 ± 0.4 [a] (0.3)	1 ± 0.4. (0.3)	1.2 ± 1.2 (0.5)	0.9 ± 0.5 (0.3)
Coarse fuel total	≥ 3 in	2.4 ± 0.6 (0.4)	1.4 ± 0.6 [a] (0.3)	2.7 ± 0.8 [a] (0.5)	1.7 ± 0.6 (0.3)	2.9 ± 1.7 (0.7)	1.5 ± 0.6 (0.4)
Total weight		2.4 ± 0.6 (0.4)	1.5 ± 0.6 [a] (0.3)	2.8 ± 0.8 [a] (0.5)	1.8 ± 0.6 (0.4)	3 ± 1.7 (0.7)	1.6 ± 0.6 (0.4)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.
[b] Mean densities within a unit differ between nest and random values $P < 0.10$

Table 15. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size for Birds and Burns study sites located in Oregon. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED). Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)					
	Percent cover			Density (logs/ha)		
	Combined	Nest	Random	Combined	Nest	Random
CN	1.34 ± 0.66 (0.37) [13]	1.38 ± 0.72 (0.4) [12]	0.83 [1]	52.9 ± 19.4 (10.9) [13]	55.2 ± 20.8 (11.6) [12]	25 [1]
CS	0.43 ± 0.3 (0.15) [7]	0.48 ± 0.46 (0.22) [5]	0.3 ± 0.64 (0.1) [2]	21.4 ± 18.9 (9.7) [7]	27.5 ± 27.2 (12.7) [5]	6.3 ± 39.5 (6.3) [2]
TN	0.91 ± 0.27 (0.16) [30]	1.23 ± 0.55 (0.3) [10]	0.75 ± 0.31 (0.18) [20]	34.2 ± 9.8 (5.8) [30]	47.5 ± 22.3 (12.2) [10]	27.5 ± 5.8 (10.1) [20]
TS	1.46 ± 0.32 (0.18) [20]	1.62 ± 0.42 (0.24) [12]	1.22 ± 0.55 (0.29) [8]	72.5 ± 18.6 (10.8) [20]	85.4 ± 27.5 (15.3) [12]	53.1 ± 22.7 (12) [8]

Table 16a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Oregon. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)					
		CN			TN		
	Fuel size class (cm)	Combined (n = 13)	Nest (n = 12)	Random (n = 1)	Combined (n = 30)	Nest (n = 10)	Random (n = 20)
	Litter depth (cm)	11.4 ± 4.7 (2.6)	11.9 ± 5 (2.8)	4.3	13.8 ± 4.3 (2.5)	20.4 ± 9.3 (5.1)	10.5 ± 4.5 (2.6)
Fine fuels by intersect	< 0.64	0.82 ± 0.52 (0.29)	0.78 ± 0.57 (0.32)	1.2	2.4 ± 1.7 (1)	4.1 ± 4.9 (2.7)	1.6 ± 1.1 (0.66)
	0.64 to < 2.5	5.5 ± 3.5 (2)	5.6 ± 3.8 (2.1)	4.6	18.2 ± 8.7 (5.1)	25.2 ± 18.4 (10)	14.6 ± 10.2 (5.9)
	2.5 to < 7.6	20 ± 22.5 (12.6)	21.2 ± 24.5 (13.7)	6	45.9 ± 29.5 (17.4)	85.2 ± 84.6 (46.1)	26.3 ± 19.4 (11.2)
Coarse fuels by large-end	7.6 to < 15	4.4 ± 1.7 (0.97)	4.2 ± 1.9 (1.04)	6.3	6.2 ± 1.7 (1)	7.7 ± 3.5 (1.9)	5.5 ± 2 (1.2)
	15 to < 23	11.1 ± 10.9 (6.1)	11.5 ± 11.9 (6.6)	6.3	6.1 ± 1.9 (1.1)	6.2 ± 4.1 (2.2)	6 ± 2.2 (1.3)
	> 23	58.1 ± 20 (11.2)	61.7 ± 20.7 (11.5)	15.7	28.3 ± 10.4 (6.1)	42.5 ± 20.3 (11.1)	21.2 ± 12 (6.9)
Coarse fuel total	≥ 7.6 cm	73.7 ± 29.5 (16.5)	77.5 ± 31.4 (17.5)	28.4	40.6 ± 11.6 (6.8)	56.3 ± 25.5 (13.9)	32.7 ± 12.4 (7.2)
Total volume		100 ± 53.9 (30.2)	105 ± 58.2 (32.4)	40.1	107 ± 45.2 (26.6)	171 + 123 (67)	75.1 + 34.5 (20)

Table 16b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Oregon. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)					
		CN			TN		
	Fuel size class (in)	Combined (n = 13)	Nest (n = 12)	Random (n = 1)	Combined (n = 30)	Nest (n = 10)	Random (n = 20)
	Litter depth (in)	4.5 ± 1.9 (1)	4.7 ± 2 (1.1)	1.7	5.4 ± 1.7 (1)	8 ± 3.7 (2)	4.1 ± 1.8 (1)
Fine fuels by intersect	< 0.25	0.005 ± 0.003 (0.002)	0.004 ± 0.004 (0.002)	0.01	0.01 ± 0.007 (0.004)	0.02 ± 0.01 (0.007)	0.01 ± 0.009 (0.005)
	0.25 to < 1	0.04 ± 0.006 (0.004)	0.03 ± 0.007 (0.004)	0.04	0.1 ± 0.06 (0.04)	0.2 ± 0.1 (0.06)	0.1 ± 0.08 (0.04)
	1 to < 3	0.07 ± 0.03 (0.02)	0.07 ± 0.04 (0.02)	0.04	0.2 ± 0.1 (0.06)	0.4 ± 0.2 (0.1)	0.2 ± 0.1 (0.07)
Coarse fuels by large-end	3 to < 6	0.7 ± 0.3 (0.16)	0.7 ± 0.3 (0.2)	1.04	1 ± 0.3 (0.2)	1.3 ± 0.6 (0.3)	0.9 ± 0.3 (0.2)
	6 to < 9	1.8 ± 1.8 (1)	1.9 ± 1.9 (1.1)	1.03	1 ± 0.3 (0.2)	1 ± 0.7 (0.4)	1 ± 0.4 (0.2)
	> 9	9.5 ± 3.3 (1.8)	10.1 ± 3.4 (1.9)	2.6	4.6 ± 1.7 (1)	7 ± 3.3 (1.8)	3.5 ± 2 (1.1)
Coarse fuel total	≥ 3 in	12.1 ± 4.8 (2.7)	12.7 ± 5.2 (2.9)	4.7	6.7 ± 1.9 (1.1)	9.2 ± 4.2 (2.3)	5.4 ± 2 (1.2)
Total weight		12..2 ± 4.9 (2.7)	12.8 ± 5.2 (2.9)	4.8	7 ± 2 (1.2)	9.8 + 4.3 (2.3)	5.6 + 2.1 (1.2)

Table 16b (cont). Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Oregon. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)					
		CS			TS		
	Fuel size class (in)	Combined (n = 7)	Nest (n = 5)	Random (n = 2)	Combined (n = 20)	Nest (n = 12)	Random (n = 8)
	Litter depth (in)	2.1 ± 1.8 (0.9)	2.9 ± 2.4 (1.1)	0	5.8 ± 1.4 (0.8)	7.3 ± 1.8 [a] (1)	3.6 ± 1.9 [a] (1)
Fine fuels by intersect	< 0.25	0.009 ± 0.02 (0.009)	0.01 ± 0.03 (0.01)	0	0.003 ± 0.002 (0.001)	0.004 ± 0.004 (0.002)	0.001 ± 0.003 (0.001)
	0.25 to < 1	0.03 ± 0.03 (0.02)	0.04 ± 0.05 (0.02)	0.005 ± 0.03 (0.005)	0.03 ± 0.01 (0.006)	0.03 ± 0.02 (0.008)	0.03 ± 0.02 (0.01)
	1 to < 3	0.06 ± 0.05 (0.03)	0.08 ± 0.07 (0.03)	0	0.1 ± 0.03 (0.02)	0.1 ± 0.04 (0.02)	0.1 ± 0.06 (0.03)
Coarse fuels by large-end	3 to < 6	1 ± 0.7 (0.4)	1.1 ± 1.1 (0.5)	0.7 ± 0.5 (0.09)	2.4 ± 0.6 (0.3)	2.6 ± 0.9 (0.5)	2.2 ± 0.6 (0.3)
	6 to < 9	0.8 ± 0.6 (0.3)	1 ± 0.8 (0.4)	0.07 ± 0.4 (0.07)	3.3 ± 1.1 (0.6)	4.5 ± 1.6 [a] (0.9)	1.6 ± 0.4 [a] (0.2)
	> 9	4.6 ± 0.9 (0.5)	4 ± 0.7 (0.3)	6.2 ± 2 (0.3)	7.2 ± 1.6 (0.9)	7.1 ± 1.5 (0.8)	7.3 ± 3.8 (2)
Coarse fuel total	≥ 3 in	6.3 ± 1.1 (0.6)	6.1 ± 1.7 (0.8)	7 ± 1 (0.2)	12.9 ± 2.5 (1.4)	14.1 ± 3.5 (2)	11.1 ± 3.7 (2)
Total weight		6.4 ± 1.2 (0.6)	6.2 ± 1.8 (0.8)	7 ± 1 (0.2)	13 ± 2.5 (1.4)	14.2 ± 3.5 (2)	11.2 ± 3.8 (2)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 16b (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Oregon. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)					
		CS			TS		
	Fuel size class (cm)	Combined (n = 7)	Nest (n = 5)	Random (n = 2)	Combined (n = 20)	Nest (n = 12)	Random (n = 8)
	Litter depth (cm)	5.3 ± 4.7 (2.4)	7.4 ± 6.1 (2.9)	0	14.8 ± 3.6 (2.1)	18.5 ± 4.5 [a] (2.5)	9.2 ± 4.8 [a] (2.5)
Fine fuels by intersect	< 0.64	2.2 ± 4.1 (2.1)	3.1 ± 6.3 (3)	0	0.86 ± 0.42 (0.25)	1.2 ± 0.69 [a] (0.38)	0.4 ± 0.24 [a] (0.13)
	0.64 to < 2.5	5.6 ± 8.2 (4.2)	7.6 ± 12.3 (5.8)	0.4 ± 1.3 (0.2)	5.3 ± 2.4 (1.4)	5.7 ± 3.6 (2)	4.7 ± 3.3 (1.8)
	2.5 to < 7.6	12.1 ± 14 (7.2)	16.9 ± 20.1 (9.5)	0	27.9 ± 9.9 (5.7)	33.5 ± 15.3 (8.5)	19.5 ± 10.9 (5.8)
Coarse fuels by large-end	7.6 to < 15	5.9 ± 4.2 (2.2)	6.6 ± 6.5 (3.1)	4.2 ± 3.5 (0.55)	14.8 ± 3.3 (1.9)	15.6 ± 5.4 (3)	13.5 ± 3.5 (1.9)
	15 to < 23	4.6 ± 3.6 (1.8)	6.3 ± 4.6 [b] (2.2)	0.4 ± 2.5 [b] (0.4)	20.1 ± 6.7 (3.9)	27.2 ± 10 [a] (5.6)	9.5 ± 2.3 [a] (1.2)
	> 23	28.1 ± 5.8 (3)	24.1 ± 4.5 [a] (2.1)	38 ± 12.3 [a] (2)	43.7 ± 9.6 (5.6)	43.1 ± 9.2 (5.1)	44.5 ± 23 (12.2)
Coarse fuel total	≥ 7.6 cm	38.5 ± 6.8 (3.5)	37 ± 10.3 (4.8)	42.5 ± 6.3 (1)	78.6 ± 15.1 (8.7)	85.9 ± 21.6 (12)	67.6 ± 22.8 (12.1)
Total volume		58.4 ± 30.2 (15.5)	64.6 ± 46.6 (21.8)	42.9 ± 4.7 (0.75)	113 + 22.7 (13.1)	126 ± 33.3 (18.5)	92.3 ± 30.6 (16.1)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 17. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size for Birds and Burns study sites located in South Dakota. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED) and ≥ 1 m long. Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Mean values + 90 % confidence interval (SE)					
	Percent cover			Density (logs/ha)		
Unit	Combined	Nest	Random	Combined	Nest	Random
FC	0.63 ± 0.45 (0.23) [n = 6]	0.03 [n = 1]	0.75 ± 0.5 (0.23) [n = 5]	52.1 ± 37 (18.4) [n = 6]	0 [n = 1]	62.5 ± 39.5 (18.5) [n = 5]
KH	0.19 ± 1.2 (0.19) [n = 2]	N/A	0.19 ± 1.2 (0.19) [n = 2]	18.8 ± 118 (18.8) [n = 2]	N/A	18.8 ± 118 (18.8) [n = 2]
RC	0.42 ± 0.2 (0.11) [n = 9]	0.37) [n = 1]	0.43 ± 0.23 (0.12) [n = 8]	23.6 ± 9.8 (5.3) [n = 9]	12.5 [n = 1]	25 ± 11 (5.8) [n = 8]
RR	0.19 ± 0.15 (0.063) [n = 4]	N/A	0.19 ± 0.15 (0.063) [n = 4]	6.3 ± 8.5 (3.6) [n = 4]	N/A	6.3 ± 8.5 3.6) [n = 4]

Table 18a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in South Dakota. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)					
		FC			KH[1]	RC[1]	RR[1]
	Fuel size class (cm)	Combined (n = 6)	Nest (n = 1)	Random (n = 5)	Random (n = 2)	Random (n = 8)	Random (n = 4)
	Litter depth (cm)	4.9 ± 1.6 (0.78)	4	5.1 ± 2 (0.93)	5.1 ± 3.2 (0.5)	5 ± 1.5 (0.79)	6.6 ± 3.5 (1.5)
Fine fuels by intersect	< 0.64	N/A	N/A	N/A	N/A	N/A	N/A
	0.64 to < 2.5	2.1 ± 1.4 (0.68)	2.6	2 ± 1.8 (0.83)	0.35 ± 0.9 (0.15)	1.4 ± 0.9 (0.47)	3.7 ± 2.2 (0.93)
	2.5 to < 7.6	8.8 ± 8 (4)	4	9.7 ± 10 (4.7)	3.5 ± 3.2 (0.5)	7.1 ± 4.6 (2.4)	6.5 ± 4.3 (1.8)
Coarse fuels by large-end	7.6 to < 15	5.5 ± 4.3 (2.1)	4.9	5.6 ± 5.6 (2.6)	1.6 ± 4.4 (0.7)	4.8 ± 3.9 (2.1)	3.4 ± 2.9 (1.2)
	15 to < 23	11.5 ± 10.8 (5.3)	11.7	11.5 ± 13.9 (6.5)	2.6 ± 16.4 (2.6)	5.4 ± 4.3 (2.3)	3.9 ± 1.1 (0.47)
	> 23	14.4 ± 15.3 (7.6)	0	17.3 ± 18.3 (8.6)	10.3 ± 64.7 (10.3)	5.8 ± 3.9 (2)	1.2 ± 2.8 (1.2)
Coarse fuel total	≥ 7.6 cm	31.3 ± 16.7 (8.3)	16.6	34.3 ± 20.2 (9.5)	14.5 ± 85.6 (13.6)	16 ± 8.3 (4.4)	8.5 ± 6.4 (2.7)
Total volume		42.2 ± 13.5 (6.7)	23.1	46 ± 14.4 (6.8)	18.3 ± 88.1 (14)	24.4 ± 13.1 (6.9)	18.7 ± 10 (4.2)

[1] Only random point data available for the KH and RC sites; only nest data for the RR site.

Table 18b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in South Dakota. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)							
		FC			KH[1]	RC			
	Fuel size class (in)	Combined (n = 6)	Nest (n = 1)	Random (n = 5)	Random (n = 2)	Combined (n = 9)	Nest (n = 1)	Random (n = 8)	Ra (n
	Litter depth (in)	1.9 ± 0.6 (0.0.3)	1.6	2 ± 0.78 (0.36)	2 ± 1.2 (0.19)	1.9 ± 0.54 (0.29)	1.2	1.9 ± 0.59 (0.31)	2.6 (
Fine fuels by intersect	< 0.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	0.25 to < 1	0.2 ± 0.2 (0.008)	0.03	0.2 ± 0.02 (0.01)	0.004 ± 0.015 (0.002)	0.01 ± 0.004 (0.002)	0.007	0.01 ± 0.004 (0.002)	0.0 (
	1 to < 3	0.08 ± 0.09 (0.04)	0.04	0.08 ± 0.11 (0.05)	0.03 ± 0.008 (0.001)	0.06 ± 0.03 (0.02)	0.14	0.05 ± 0.03 (0.02)	0.06 (
Coarse fuels by large-end	3 to < 6	0.85 ± 0.67 (0.33)	0.76	0.87 ± 0.87 (0.41)	0.25 ± 0.69 (0.11)	0.8 ± 0.5 (0.29)	1.2	0.8 ± 0.6 (0.32)	0.53 (
	6 to < 9	1.8 ± 1.7 (0.8)	1.8	1.8 ± 2.2 (1.03)	0.4 ± 2.6 (0.4)	0.92 ± 0.58 (0.32)	1.5	0.85 ± 0.68 (0.36)	0.6 (
	> 9	2.3 ± 2.4 (1.2)	0	2.7 ± 2.9 (1.3)	1.6 ± 10.1 (1.6)	0.83 ± 0.54 (0.29)	0.16	0.91 ± 0.6 (0.32)	0.19 (
Coarse fuel total	≥ 3 in	4.9 ± 2.6 (1.3)	2.6	5.4 ± 3.2 (1.5)	2.3 ± 13.4 (2.1)	2.5 ± 1.13 (0.61)	2.8	2.5 ± 1.3 (0.69)	1.3 (
Total weight		5.3 ± 2.4 (1.2)	3	5.8 ± 2.9 (1.4)	2.7 ± 13.2 (2.1)	3 ± 1.1 (0.57)	3.3	2.9 ± 1.2 (0.65)	1.9 (

[1] Only random point data available for the KH and RC sites.

Table 19. Mean percent cover and wildlife log densities per hectare ± 90 % confidence interval (SE) and sample size for Birds and Burns study sites located in Washington. Estimated values for wildlife logs ≥ 23 cm large-end diameter (LED). Values given for all points combined, and separated by nest tree and random points. Nest tree information only for woodpecker and bluebird species. Data collected in 2002.

	Estimated value ± 90% confidence interval (SE)					
	Percent cover			Density (logs/ha)		
	Combined	Nest	Random	Combined	Nest	Random
FY	0.91 ± 0.47 (0.25) [9]	0.98 ± 0.71 (0.35) [6]	0.77 ± 1.06 (0.36) [3]	69.4 ± 34.2 (18.4) [9]	66.7 ± 49 (24.3) [6]	75 ± 96.6 (33.1) [3]
HR	1.26 ± 0.49 (0.25) [7]	1.4 ± 0.7 (0.33) [5]	0.88 ± 1.74 (0.28) [2]	62.5 ± 29 (14.9) [7]	70 ± 43.5 (20.4) [5]	43.8 ± 39.5 (6.3) [2]
LK	1.05 ± 0.34 (0.18) [10]	1.06 ± 0.48 (0.25) [7]	1.02 ± 0.78 (0.27) [3]	62.5 ± 13.2 (7.2) [10]	58.9 ± 14.7 (7.6) [7]	70.8 ± 53 (18.2) [3]
MT	0.89 ± 0.37 (0.2) [8]	0.89 ± 0.37 (0.2) [8]	N/A	42.2 ± 17.3 (9.1) [8]	42.2 ± 17.3 (9.1) [8]	N/A
RY	0.69 ± 0.38 (0.21) [10]	0.71 ± 0.5 (0.26) [8]	0.65 ± 0.36 (0.06) [2]	36.3 ± 12.1 (6.6) [10]	32.8 ± 14.8 (7.8) [8]	50 [2]
TD	1.32 ± 0.65 (0.34) [8]	1.46 ± 0.71 (0.36) [7]	0.39 [1]	60.9 ± 31.5 (16.6) [8]	67.9 ± 33.9 (17.4) [7]	12.5 [1]
ZR	0.95 ± 0.36 (0.2) [10]	0.95 ± 0.36 (0.2) [9]	0.48 [1]	41.3 ± 21.9 (11.9) [10]	40.3 ± 24.7 (13.3) [9]	50 [1]

Table 20a. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Washington. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)								
		FY			HR			LK		
	Fuel size class (cm)	Combined (n = 9)	Nest (n = 6)	Random (n = 3)	Combined (n = 7)	Nest (n = 5)	Random (n = 2)	Combined (n = 10)	Nest (n = 7)	Random (n =3)
	Litter depth (cm)	2.8 ± 1.1 (0.58)	3.4 ± 1.5 (0.76)	1.8 ± 1.5 (0.52)	6.7 ± 2.5 (1.3)	8.1 ± 2.6[a] (1.2)	3.1 ± 4.1 [a] (0.65)	4.4 ± 1.3 (0.71)	4.6 ± 1.8 (0.92)	3.8 ± 3.5 (1.2)
Fine fuels by intersect	< 0.64	0.58 ± 0.5 (0.25)	0.83 ± 0.7[b] (0.32)	0.07 ± 0.1[b] (0.03)	0.73 ± 1 (0.5)	0.82 ± 1.5 (0.7)	0.5 ± 3.2 (0.5)	1 ± 1 (0.54)	1.2 ± 1.5 (0.78)	0.53 ± 0.4 (0.13)
	0.64 to < 2.5	2.7 ± 1.5 (0.79)	3.4 ± 2.2 (1.1)	1.4 ± 1.1 (0.37)	3.1 ± 1.9 (1)	3.5 ± 2.9 (1.3)	2 ± 4.7 (0.75)	3 ± 0.6 (0.35)	3.1 ± 0.7 (0.36)	2.9 ± 2.7 (0.9)
	2.5 to < 7.6	7 ± 3.3 (1.8)	4.8 ± 3.7 (1.8)	11.2 ± 8.3 (2.8)	2.4 ± 1.5 (0.8)	3 ± 1.9 (0.9)	1 ± 6.3 (1)	4.3 ± 2.3 (1.2)	5.6 ± 3[a] (1.5)	1.3 ± 1[a] (0.33)
Coarse fuels by large-end	7.6 to < 15	6 ± 1.6 (0.85)	5.2 ± 2 (1)	7.4 ± 4.2 (1.4)	2.8 ± 1.2 (0.64)	2.4 ± 1.8 (0.9)	3.7 ± 2.2 (0.35)	4.2 ± 1.7 (0.91)	4.3 ± 1.8 (0.95)	4.1 ± 7.2 (2.5)
	15 to < 23	7.5 ± 2.5 (1.4)	7.1 ± 4.1 (2)	8.4 ± 2.8 (1)	4.2 ± 2.6 (1.4)	4.1 ± 2.7 (1.3)	4.7 ± 29.7 (4.7)	4.7 ± 0.9 (0.5)	4.8 ± 1 (0.54)	4.4 ± 3.7 (1.3)
	> 23	23.9 ± 12.9 (6.9)	26.6 ± 20.3 (10.1)	18.4 ± 20.3 (7)	36.5 ± 14.5 (7.5)	42.2 ± 20 (9.4)	22.4 ± 24.3 (3.9)	37.2 ± 15.5 (8.4)	36.7 ± 19 (9.8)	38.4 ± 58.2 (19.9)
Coarse fuel total	≥ 7.6 cm	37.3 ± 12.7 (6.8)	38.9 ± 19.6 (9.8)	34.2 ± 25 (8.6)	43.5 ± 14.9 (7.6)	48.6 ± 21.3 (10)	30.6 ± 3.2 (0.5)	46.2 ± 15.3 (8.3)	45.9 ± 19.5 (10)	46.9 ± 53.6 (18.4)
Total volume		47.6 ± 11.8 (6.4)	47.9 ± 17.1 (8.5)	46.9 ± 32.6 (11.2)	49.7 ± 13.7 (7.1)	56 ± 17.8 (8.3)	34.1 ± 17.7 (2.8)	54.5 ± 16.3 (8.9)	55.6 ± 21 (10.8)	51.7 ± 55.4 (19)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 20a (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Washington. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Volume (m^3/ha)									
		MT	RY			TD			ZR		
	Fuel size class (cm)	Nest[1] (n = 8)	Combined (n = 10)	Nest (n = 8)	Random (n = 2)	Combined (n = 8)	Nest (n = 7)	Random (n = 1)	Combined (n = 10)	Nest (n = 9)	Random (n = 1)
	Litter depth (cm)	4.9 ± 2.5 (1.3)	6.3 ± 2.3 (1.3)	6 ± 3 (1.6)	7.7 ± 0.9 (0.15)	5.9 ± 2.4 (1.3)	6.3 ± 2.7 (1.4)	3.7	6 ± 1.3 (0.72)	5.9 ± 1.5 (0.8)	6.3
Fine fuels by intersect	< 0.64	1 ± 0.5 (0.27)	0.77 ± 0.4 (0.24)	0.75 ± 0.5 (0.27)	0.85 ± 4.1 (0.65)	1.2 ± 1.1 (0.57)	1.3 ± 1.3 (0.65)	0.5	0.39 ± 0.2 (0.1)	0.41 ± 0.2 (0.12)	0.2
	0.64 to < 2.5	4.3 ± 1.8 (0.9)	2.6 ± 0.8 (0.43)	2.8 ± 1 (0.5)	1.9 ± 3.2 (0.5)	3.1 ± 1 (0.55)	3.3 ± 1.1 (0.57)	1.4	2.9 ± 1.2 (0.64)	3.1 ± 1.2 (0.67)	0.8
	2.5 to < 7.6	4 ± 2.5 (1.3)	7.1 ± 2.7 (1.5)	6.5 ± 3.4 (1.8)	9.4 ± 3.2 (0.5)	7.8 ± 3.7 (1.9)	8.1 ± 4.3 (2.2)	6	3.1 ± 1.7 (1)	3.4 ± 1.8 (1)	0
Coarse fuels by large-end	7.6 to < 15	2.7 ± 1.8 (0.96)	7.5 ± 7.9 (4.3)	8.3 ± 10.2 (5.4)	4.1 ± 7.9 (1.3)	5 ± 3.5 (1.8)	4.5 ± 3.9 (2)	8.6	1.2 ± 0.8 (0.41)	1.1 ± 0.8 (0.45)	2
	15 to < 23	3.8 ± 1.9 (0.98)	4.3 ± 1.3 (0.68)	4.1 ± 1.5 (0.79)	5.4 ± 8.8 (1.4)	7.7 ± 3.7 (2)	6.5 ± 3.6 (1.9)	15.6	2.3 ± 1.1 (0.58)	2 ± 1.1 (0.59)	4.4
	> 23	28.2 ± 14 (7.3)	21.9 ± 15.6 (8.5)	22.9 ± 20.2 (10.7)	18.2 ± 46.4 (7.4)	40.4 ± 20.7 (10.9)	45 ± 22.3 (11.5)	8.3	27 ± 11.1 (6.1)	28.2 ± 12.3 (6.6)	15.6
Coarse fuel total	≥ 7.6 cm	34.7 ± 15 (8)	33.7 ± 17.2 (9.4)	35.2 ± 22.3 (11.8)	27.7 ± 29.4 (4.7)	53.1 ± 21.1 (11.2)	56 ± 24.2 (12.4)	32.5	30.4 ± 10.9 (5.9)	31.3 ± 12.2 (6.5)	22
Total volume		43.9 ± 15 (8.1)	44.2 ± 18.8 (10.3)	45.3 ± 24.6 (13)	39.8 ± 24.9 (4)	65.3 ± 23.4 (12.4)	68.8 ± 26.6 (13.7)	40.4	36.8 ± 10.5 (5.7)	38.3 ± 11.5 (6.2)	22.9

[1] Only nest tree data available for the MT site.

Table 20b. Mean weight (tons per acre) of fine (< 3 in) and coarse (≥ 3 in) woody fuels and litter depth (in) per hectare ± 90% confidence interval (SE) and sample size (n) for Birds and Burns study sites located in Washington. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

		Weight (tons per acre)								
		FY			HR			LK		
	Fuel size class (in)	Combined (n = 9)	Nest (n = 6)	Random (n = 3)	Combined (n = 7)	Nest (n = 5)	Random (n = 2)	Combined (n = 10)	Nest (n = 7)	Random (n =3)
	Litter depth (in)	1.1 ± 0.4 (0.2)	1.3 ± 0.6 (0.3)	0.7 ± 0.6 (0.2)	2.6 ± 1 (0.5)	3.2 ± 1 (0.5)	1.2 ± 1.6 (0.3)	1.7 ± 0.5 (0.3)	1.8 ± 0.7 (0.4)	1.5 ± 1.4 (0.5)
Fine fuels by intersect	< 0.25	0.006 ± 0.005 (0.003)	0.008 ± 0.008 (0.004)	0	0.006 ± 0.008 (0.004)	0.006 ± 0.01 (0.006)	0.005 ± 0.03 (0.005)	0.009 ± 0.01 (0.007)	0.01 ± 0.02 (0.01)	0.003 ± 0.01 (0.003)
	0.25 to < 1	0.02 ± 0.01 (0.007)	0.03 ± 0.02 (0.009)	0.01	0.03 ± 0.02 (0.01)	0.03 ± 0.03 (0.01)	0.02 ± 0.06 (0.01)	0.03 ± 0.007 (0.004)	0.03 ± 0.008 (0.004)	0.03 ± 0.03 (0.009)
	1 to < 3	0.05 ± 0.02 (0.01)	0.03 ± 0.03 (0.01)	0..08 ± 0.05 (0.02)	0.02 ± 0.01 (0.007)	0.03 ± 0.02 (0.009)	0.01 ± 0.06 (0.01)	0.04 ± 0.02 (0.01)	0.05 ± 0.03 (0.02)	0.01 ± 0.01 (0.003)
Coarse fuels by large-end	3 to < 6	0.9 ± 0.2 (0.13)	0.8 ± 0.3 (0.1)	1.1 ± 0.6 (0.2)	0.4 ± 0.2 (0.09)	0.4 ± 0.3 (0.1)	0.5 ± 0.3 (0.05)	0.6 ± 0.2 (0.1)	0.6 ± 0.3 (0.14)	0.6 ± 1.1 (0.4)
	6 to < 9	1.1 ± 0.4 (0.2)	1.1 ± 0.6 (0.3)	1.2 ± 0.4 (0.1)	0.6 ± 0.4 (0.2)	0.6 ± 0.4 (0.2)	0.7 ± 4.4 (0.7)	0.7 ± 0.1 (0.08)	0.7 ± 0.2 (0.08)	0.7 ± 0.6 (0.2)
	> 9	3.6 ± 1.9 (1)	4 ± 3 (1.5)	2.7 ± 3 (1)	5.4 ± 2.2 (1.1)	6.3 ± 3 (1.4)	3.3 ± 3.6 (0.6)	5.5 ± 2.3 (1.3)	5.5 ± 2.8 (1.5)	5.7 ± 8.7 (3)
Coarse fuel total	≥ 3 in	5.6 ± 1.9 (1)	5.8 ± 2.9 (1.5)	5.1 ± 3.7 (1.3)	6.5 ± 2.2 (1.1)	7.2 ± 3.2 (1.5)	4.6 ± 0.5 (0.08)	6.9 ± 2.3 (1.2)	6.8 ± 2.9 (1.5)	7 ± 8 (2.7)
Total weight		5.6 ± 1.9 (1)	5.9 ± 2.9 (1.4)	5.2 ± 3.7 (1.3)	6.5 ± 2.2 (1.1)	7.3 ± 3.1 (1.5)	4.6 ± 0.6 (0.1)	7 ± 2.3 (1.2)	6.9 ± 2.9 (1.5)	7 ± 8 (2.7)

[a] Mean values within a unit differ between nest and random values $P < 0.05$.

[b] Mean values within a unit differ between nest and random values $P < 0.10$.

Table 20b (cont)

		Weight (tons per acre)									
		MT	RY			TD			ZR		
	Fuel size class (in)	Nest[1] (n = 8)	Combined (n = 10)	Nest (n = 8)	Random (n = 2)	Combined (n = 8)	Nest (n = 7)	Random (n = 1)	Combined (n = 10)	Nest (n = 9)	Random (n = 1)
	Litter depth (in)	1.9 ± 1 (0.5)	2.5 ± 0.9 (0.5)	2.3 ± 1.2 (0.6)	3 ± 0.4 (0.06)	2.3 ± 1 (0.5)	2.4 ± 1.1 (0.6)	1.5	2.3 ± 0.5 (0.3)	2.3 ± 0.6 (0.3)	2.5
Fine fuels by intersect	< 0.25	0.01 ± 0.01 (0.003)	0.01 ± 0.01 (0.003)	0.01 ± 0.01 (0.003)	0.01 ± 0.03 (0.01)	0.01 ± 0.01 (0.006)	0.01 ± 0.01 (0.007)	0	0.01 ± 0.01 (0.01)	0.01 ± 0.01 (0.002)	0
	0.25 to < 1	0.04 ± 0.02 (0.009)	0.03 ± 0.01 (0.01)	0.03 ± 0.01 (0.005)	0.02 ± 0.01 (0.003)	0.03 ± 0.01 (0.003)	0.03 ± 0.01 (0.01)	0.01	0.04 ± 0.02 (0.009)	0.04 ± 0.02 (0.009)	0.01
	1 to < 3	0.03 ± 0.02 (0.01)	0.06 ± 0.02 (0.01)	0.06 ± 0.03 (0.01)	0.05 ± 0.02 (0.01)	0.05 ± 0.02 (0.01)	0.05 ± 0.02 (0.01)	0.04	0.03 ± 0.02 (0.01)	0.04 ± 0.02 (0.01)	0
Coarse fuels by large-end	3 to < 6	0.4 ± 0.3 (0.14)	1.1 ± 1.2 (0.6)	1.2 ± 1.5 (0.8)	0.7 ± 0.5 (0.3)	0.7 ± 0.5 (0.3)	0.7 ± 0.6 (0.3)	1.3	0.2 ± 0.1 (0.06)	0.16 ± 0.1 (0.07)	0.3
	6 to < 9	0.6 ± 0.3 (0.15)	0.6 ± 0.19 (0.1)	0.6 ± 0.2 (0.1)	0.8 ± 1.3 (0.2)	1.1 ± 0.6 (0.3)	1 ± 0.5 (0.3)	2.3	0.3 ± 0.2 (0.09)	0.3 ± 0.2 (0.09)	0.7
	> 9	4.2 ± 2.1 (1.1)	3.3 ± 2.3 (1.3)	3.4 ± 3 (1.6)	2.7 ± 6.9 (1.1)	6 ± 3.1 (1..6)	6.7 ± 3.3 (1.7)	1.2	4 ± 1.7 (0.9)	4.2 ± 1.8 (1)	2.3
Coarse fuel total	≥ 3 in	5.2 ± 2.3 (1.2)	5 ± 2.6 (1.4)	5.2 ± 3.3 (1.8)	4.1 ± 4.4 (0.7)	7.9 ± 3.1 (1.7)	8.3 ± 3.6 (1.9)	4.9	4.5 ± 1.6 (0.9)	4.7 ± 1.8 (1)	3.3
Total weight		5.3 ± 2.2 (1.2)	5.1 ± 2.6 (1.4)	5.3 ± 3.3 (1.8)	4.2 ± 4.3 (0.7)	8 ± 3.2 (1.7)	8.4 ± 3.6 (1.9)	4.9	4.6 ± 1.6 (0.9)	4.7 ± 1.8 (1)	3.3

[1] Only nest tree data available for the MT site.

Table 21. Percent cover of wildlife logs ± 90% confidence interval (SE) and sample size [n] by stratum for Birds and Burns study sites located in each of the eight states participating in the Birds and Burns study. Values given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

	Percent cover + 90 % confidence interval (SE)					
	All points combined		Open		Closed	
	Open	Closed	Nest	Random	Nest	Random
Arizona	0.17 ± 0.08 (0.05) [n = 49]	0.25 ± 0.08 (0.05) [n = 57]	0.4 ± 0.03[a] (0.005) [n = 2]	0.16 ± 0.08[a] (0.05) [n = 47]	0.57 ± 0.2[a] (0.11) [n = 14]	0.14 ± 0.07[a] (0.04) [n = 43]
Colorado	N/A	0.99 ± 0.18 (0.11) [n = 60]	N/A	N/A	1.36 ± 0.52 (0.3) [n = 14]	0.88 ± 0.18 (0.11) [n = 46]
Idaho	0.86 ± 0.16[a] (0.1) [n = 54]	1.29 ± 0.36[a] (0.2) [n = 36]	0.9 ± 0.3 (0.17) [n = 22]	0.82 ± 0.19 (0.1) [n = 32]	2.05 ± 0.92[b] (0.5) [n = 9]	1.03 ± 0.37[b] (0.21) [n = 27]
Montana	N/A	0.58 ± 0.14 (0.08) [n = 40]	N/A	N/A	N/A	0.58 ± 0.14 (0.08) [n = 40]
New Mexico	0.06 ± 0.13[a] (0.06) [n = 4]	0.38 ± 0.14[a] (0.08) [n = 35]	N/A	0.06 ± 0.13 (0.06) [n = 4]	0.32 ± 0.2 (0.11) [n = 14]	0.42 ± 0.2 (0.12) [n = 21]
Oregon	1.05 ± 0.24 (0.14) [n = 41]	1.16 ± 0.35 (0.21) [n = 28]	1.34 ± 0.36[b] (0.21) [n = 19]	0.8 ± 0.3[b] (0.18) [n = 22]	1.26 ± 0.49 (0.28) [n = 19]	0.95 ± 0.45 (0.24) [n = 9]
South Dakota	0.15 ± 0.22[a] (0.08) [n = 3]	0.46 ± 0.17[a] (0.1) [n = 18]	N/A	0.15 ± 0.22 (0.08) [n = 3]	0.2 ± 1.07 (0.17) [n = 2]	0.49 ± 0.18 (0.1) [n = 16]
Washington	1.27 ± 0.35[b] (0.2) [n = 17]	0.89 ± 0.15[b] (0.09) [n = 45]	1.33 ± 0.39 (0.22) [n = 15]	0.82 ± 1.4 (0.22) [n = 2]	0.92 ± 0.18 (0.11) [n = 35]	0.77 ± 0.25 (0.14) [n = 10]

[a] Mean densities within a state differ between strata or nest and random values $P < 0.05$.
[b] Mean densities within a state differ between strata or nest and random values $P < 0.10$.
[a] All forest canopies within these states were classified as closed.

Table 22. Mean densities of wildlife logs per hectare ± 90% confidence interval (SE) and sample size [n] by stratum for Birds and Burns study sites located in each of the eight states participating in the Birds and Burns study. Densities given for all points combined, and separated by nest tree and random points. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

	Log density + 90 % confidence interval (SE)					
	All points combined		Open		Closed	
	Open	Closed	Nest	Random	Nest	Random
Arizona	16.1 ± 6.5 (3.9) [n = 49]	16.2 ± 5.5 (3.3) [n = 57]	54.2 ± 43.8 (15.0) [n = 2]	14.6 ± 6.4 (3.8) [n = 47]	30.4 ± 12.9 [a] (7.3) [n = 14]	11.6 ± 5.7 [a] (3.4) [n = 43]
Colorado [1]	N/A	49 ± 9.8 [a] (5.8) [n = 60]	N/A	N/A	67 ± 23.4 [b] (13.2) [n = 14]	43.5 ± 10.7 [b] (6.3) [n = 46]
Idaho	33 ± 8 (4.6) [n = 54]	38 ± 13 (7.5) [n = 36]	42 ± 11 (6.1) [n = 22]	27 ± 7 (4.0) [n = 32]	72 ± 38 [a] (20.6) [n = 9]	26 ± 10 [a] (6.1) [n = 27]
Montana [1]	N/A	31.9 ± 8.2 [a] (4.9) [n = 40]	N/A	N/A	N/A	31.9 ± 8.2 (4.9) [n = 40]
New Mexico	9.4 ± 14.1 [a] (6) [n = 4]	32.1 ± 8.8 [a] (5.2) [n = 35]	N/A	9.4 ± 14.1 (6) [n = 4]	26.8 ± 12.0 (6.8) [n = 14]	35.7 ± 12.8 (7.4) [n = 21]
Oregon	43.6 ± 11.6 (6.9) [n = 41]	50 ± 11.3 (6.7) [n = 28]	58.6 ± 20 [a] (11.5) [n = 19]	30.7 ± 12.6 [a] (7.3) [n = 22]	55.9 ± 16.3 [b] (9.4) [n = 19]	37.5 ± 7.7 [b] (4.2) [n = 9]
South Dakota	12.5 ± 21.1 (7.2) [n = 3]	30.6 ± 13.2 [b] (7.6) [n = 18]	N/A	12.5 ± 21.1 (7.2) [n = 3]	6.3 ± 39.5 (6.3) [n = 2]	33.6 ± 14.4 (8.2) [n = 16]
Washington	61 ± 19.4 (11.1) [n = 17]	50 ± 8.4 (5) [n = 45]	59.2 ± 21.7 (12.3) [n = 15]	75 ± 158 (25) [n = 2]	48.9 ± 9.7 (5.7) [n = 35]	53.8 ± 19.9 (10.9) [n = 10]

[a] Mean densities within a stratum differ between strata or nest and random values $P < 0.05$.
[b] Mean densities within a stratum differ between strata or nest and random values $P < 0.10$.
[1] All forest canopies within these states were classified as closed.

Table 23. Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size [n] by stratum for study sites located in each of the eight states participating in the Birds and Burns study for open and closed forest canopy strata. Data collected in 2002.

		Volume (m^3/ha)						
		Arizona		Colorado[1]	New Mexico		South Dakota	
		Open (n = 49)	Closed (n = 57)	Closed (n = 60)	Open (n = 4)	Closed (n = 35)	Open (n = 3)	Closed (n = 18)
	Litter depth (cm)	1.84 ± 1 [a] (0.58)	3.24 ± 0.7 [a] (0.4)	6.2 ± 0.8 (0.46)	0.53 ± 0.4 [a] (0.19)	3.55 ± 0.7 [a] (0.44)	3.7 ± 4.1 (1.4)	5.4 ± 0.9 (0.49)
Fine fuels by intersect diameter	< 0.64	0.18 ± 0.1 [a] (0.04)	0.38 ± 0.1 [a] (0.05)	0.6 ± 0.1 (0.07)	0.18 ± 0.4 [a] (0.18)	0.94 ± 0.4 [a] (0.23)	N/A	N/A
	0.64 to < 2.5	0.93 ± 0.5 [a] (0.27)	1.93 ± 0.6 [a] (0.33)	2.1 ± 0.3 (0.2)	0	2.44 ± 0.6 (0.34)	0.4 ± 0.7 [a] (0.23)	2.2 ± 0.7 [a] (0.41)
	2.5 to < 7.6	15 ± 15.7 (9.33)	10.5 ± 4 (2.37)	7.1 ± 1.4 (0.86)	0	4.47 ± 1.3 (0.8)	2.3 ± 1.9 [a] (0.68)	8.7 ± 3.1 [a] (1.8)
Coarse fuels by large-end diameter	7.6 to < 15	2.51 ± 1 [a] (0.57)	4 ± 1 [a] (0.59)	6.4 ± 1.3 (0.77)	0.15 ± 0.4 [a] (0.15)	3.7 ± 1 [a] (0.61)	0.3 ± 0.9 [a] (0.3)	5.3 ± 1.9 [a] (1.1)
	15 to < 23	2.2 ± 0.9 (0.55)	3.14 ± 1 (0.57)	4.4 ± 0.9 (0.53)	0	3.3 ± 1 (0.57)	0.6 ± 1.9 [a] (0.63)	7.8 ± 3.5 [a] (2.02)
	> 23	2.18 ± 1 (0.61)	3.82 ± 1.7 (1.04)	33.1 ± 6.4 (3.9)	0	5.66 ± 2.6 (1.55)	2.8 ± 4.1 (1.4)	8.4 ± 5.1 (2.9)
Coarse fuel total	≥ 7.6 cm	6.96 ± 2.4 [a] (1.45)	10.9 ± 2.8 [a] (1.69)	43.9 ± 7.1 (4.3)	0.15 ± 0.4 [a] (0.15)	12.7 ± 3.4 [a] (2)	3.7 ± 4.3 [a] (1.5)	21.5 ± 6.5 [a] (3.7)
	Total	23 ± 17.1 (10.2)	23.7 ± 6.1 (3.67)	53.7 ± 7.7 (4.6)	0.33 ± 0.4 [a] (0.19)	20.5 ± 4.5 [a] (2.7)	6.4 ± 4.6 [a] (1.6)	32.3 ± 7 [a] (4)

[a] Mean densities within a stratum differ between strata or nest and random values $P < 0.05$.
[b] Mean densities within a stratum differ between strata or nest and random values $P < 0.10$.
[1] All forest canopies within these states were classified as closed.

Table 23 (con't). Mean volume (m^3 per hectare) of fine (< 7.6 cm) and coarse (≥ 7.6 cm) woody fuels and litter depth (cm) per hectare ± 90% confidence interval (SE) and sample size [n] for study sites located in each of the eight states participating in the Birds and Burns study for open and closed forest canopy strata. Data collected in 2002.

		Volume (m^3/ha)						
		Idaho		Montana[1]	Oregon		Washington	
		Open (n = 54)	Closed (n = 36)	Closed (n = 40)	Open (n = 41)	Closed (n = 28)	Open (n = 18)	Closed (n = 44)
	Litter depth (cm)	3.8 ± 1 (0.58)	4.8 ± 0.9 (0.53)	8.9 ± 0.8 (0.47)	10.5 ± 3 [b] (1.8)	16 ± 3.6 [b] (2.1)	5 ± 1 (0.6)	5.4 ± 0.9 (0.51)
Fine fuels by intersect diameter	< 0.64	0.9 ± 0.6 (0.35)	1.3 ± 0.5 (0.3)	0.52 ± 0.1 (0.04)	1.4 ± 1.2 (0.68)	2 ± 1.1 (0.67)	0.54 ± 0.3 (0.15)	0.91 ± 0.3 (0.19)
	0.64 to < 2.5	4 ± 0.8 (0.47)	4.7 ± 1 (0.6)	2.2 ± 0.5 (0.27)	8.6 ± 4.8 (2.9)	14.2 ± 7.3 (4.3)	3.1 ± 0.8 (0.46)	3.1 ± 0.5 (0.3)
	2.5 to < 7.6	5.3 ± 1.8 (1.1)	7.9 ± 2.6 (1.6)	11.5 ± 2.2 (1.3)	30.3 ± 21.1 (12.6)	35.7 ± 14.4 (8.4)	5 ± 1.6 (0.9)	5.2 ± 1.2 (0.7)
Coarse fuels by large-end diameter	7.6 to < 15	1.7 ± 0.4 (0.26)	2.1 ± 0.5 (0.32)	5.3 ± 0.8 (0.48)	8.5 ± 2.1 (1.3)	7.5 ± 2.1 (1.2)	3.9 ± 1.1 (0.6)	4.4 ± 1.8 (1.08)
	15 to < 23	2 ± 0.6 [b] (0.35)	3.1 ± 0.9 [b] (0.52)	8.4 ± 1.3 (0.8)	10.9 ± 3.6 (2.1)	10.1 ± 5.3 (3.1)	5.1 ± 1.4 (0.79)	4.8 ± 0.9 (0.56)
	> 23	32.8 ± 7.5 (4.5)	40.3 ± 11.4 (6.8)	12.8 ± 4.6 (2.7)	35.3 ± 8.4 (5)	43.1 ± 10.9 (6.4)	40.8 ± 11.8 [a] (6.8)	26 ± 5.1 [a] (3.1)
Coarse fuel total	≥ 7.6 cm	36.4 ± 7.8 (4.7)	47.1 ± 11.9 (7)	26.5 ± 5.3 (3.2)	54.7 ± 11.2 (6.7)	60.8 ± 15.4 (9.1)	49.8 ± 12.4 (7.1)	35.2 ± 5.3 (3.2)
	Total	46.7 ± 8.8 (5.3)	61.3 ± 13.6 (8.1)	40.7 ± 6.4 (3.8)	95 ± 32.1 (19.1)	113 ± 30.8 (18.1)	58.5 ± 12.5 (7.2)	44.3 ± 5.8 (3.5)

[a] Mean densities within a stratum differ between strata or nest and random values $P < 0.05$.
[b] Mean densities within a stratum differ between strata or nest and random values $P < 0.10$.
[1] All forest canopies within these states were classified as closed.

Table 24. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in Arizona. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 12.5	0.55	0.68	64	106	5296	0.14	26	0.01	< 0.01	1
	Nest	4 x 50	0.55	0.7	64	114	5707	0.15	27	-0.03	< 0.01	1
	Nest	4 x 25	0.55	0.49	32	55	5487	0.15	27	32	0.1	1
	Nest	200	0.55	0.4	16	37	7429	0.17	31	N/A	N/A	1
	Random	4 x 50	0.15	0.4	360	470	23510	0.03	23	0.49	0.24	0
	Random	4 x 12.5	0.15	0.42	360	518	25919	0.04	24	0.3	0.09	1
	Random	4 x 25	0.15	0.32	180	314	31388	0.04	26	0.75	0.86	0
	Random	200	0.15	0.3	90	274	54787	0.05	35	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 12.5	32.8	49.8	64	170	8480	10.4	32	0.07	< 0.01	1
	Nest	4 x 50	32.8	51.3	64	180	9024	10.7	33	0.04	< 0.01	1
	Nest	4 x 25	32.8	36.2	32	90	8954	10.8	33	0.15	0.02	1
	Nest	200	32.8	27.7	16	53	10518	12.1	37	N/A	N/A	1
	Random	4 x 50	13.2	34.2	360	495	24754	3	23	-0.02	< 0.01	1
	Random	4 x 12.5	13.2	35.4	360	530	26523	3.1	24	0.27	0.07	1
	Random	4 x 25	13.2	28.8	180	350	35012	3.6	27	0.09	0.01	1
	Random	200	13.2	24.4	90	252	50350	4.3	33	N/A	N/A	1

Table 25. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in Colorado. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 12.5	1.36	1.47	56	82	4117	0.33	24	0.33	0.11	1
	Nest	4 x 50	1.36	1.55	56	90	4484	0.34	25	0.37	0.14	1
	Nest	4 x 25	1.36	1.22	28	56	5596	0.39	29	0.61	0.37	0
	Nest	200	1.36	1.11	14	46	9275	0.52	38	N/A	N/A	1
	Random	4 x 25	0.88	0.88	92	70	6977	0.15	17	0.39	0.15	1
	Random	4 x 12.5	0.88	1.25	184	140	6989	0.15	17	0.22	0.05	1
	Random	4 x 50	0.89	1.36	184	66	8292	0.17	19	0.03	< .01	1
	Random	200	0.88	0.74	46	49	9801	0.18	20	N/A	N/A	1

B

	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Density	Nest	4 x 50	67	68.3	56	72	3624	15.2	23	0.26	0.07	1
	Nest	4 x 12.5	67	81.1	56	102	5108	18.1	27	0.14	0.02	1
	Nest	4 x 25	67	61.6	28	59	5906	19.8	30	0.36	0.13	1
	Nest	200	67	49.4	14	38	7595	23.2	35	N/A	N/A	1
	Random	4 x 12.5	43.5	57.6	184	122	6119	7.1	16	0.41	0.17	1
	Random	4 x 50	43.5	60.9	183	135	6768	7.5	17	0.32	0.11	1
	Random	4 x 25	43.5	47.4	92	83	8302	8.3	19	0.64	0.41	0
	Random	200	43.5	43	46	68	13664	10.6	24	N/A	N/A	1

Table 26. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in Idaho. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 12.5	1.24	1.64	124	213	6169	0.25	20	0.42	0.18	1
	Nest	4 x 25	1.24	1.4	62	89	8901	0.3	24	0.39	0.15	1
	Nest	4 x 50	1.24	2.14	124	209	10458	0.32	26	0.04	< 0.01	1
	Nest	200	1.24	1.16	31	61	12178	0.35	28	N/A	N/A	1
	Random	4 x 50	0.92	1.3	236	140	6981	0.14	15	0.22	0.05	1
	Random	4 x 12.5	0.92	1.32	236	145	7243	0.14	16	0.31	0.09	1
	Random	4 x 25	0.92	1.07	118	94	9447	0.16	18	0.35	0.12	1
	Random	200	0.92	0.88	59	64	12810	0.19	21	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 50	50.8	74.3	124	158	7892	11.1	22	0.29	0.09	1
	Nest	4 x 12.5	50.8	79.1	124	179	8936	11.9	23	0.46	0.21	0
	Nest	4 x 25	50.8	65.6	62	213	12285	13.9	27	0.33	0.11	1
	Nest	200	50.8	51.3	31	75	15046	15.4	30	N/A	N/A	1
	Random	4 x 12.5	26.7	45.3	236	201	10030	4.9	18	0.23	0.05	1
	Random	4 x 50	26.7	46.4	236	211	10551	5	19	0.01	< 0.01	1
	Random	4 x 25	26.7	35.9	118	126	12620	5.5	21	0.12	0.02	1
	Random	200	26.7	26.9	59	71	14176	5.8	22	N/A	N/A	1

Table 27. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in Montana. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	200	N/A[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nest	4 x 50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nest	4 x 25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nest	4 x 12.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Random	4 x 12.5	0.32	0.49	160	167	8361	0.07	20	0.17	0.03	1
	Random	4 x 50	0.32	0.51	160	178	8900	0.07	21	0.05	<.01	1
	Random	4 x 25	0.32	0.39	80	105	10530	0.07	23	0.22	0.05	1
	Random	200	0.32	0.31	40	65	12971	0.08	25	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 12.5	N/A[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nest	4 x 50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nest	4 x 25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nest	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Random	4 x 12.5	31.9	49.4	160	177	8838	6.5	20	0.14	0.02	1
	Random	4 x 50	31.9	50.9	160	188	9408	6.7	21	0.05	< 0.01	1
	Random	4 x 25	31.9	39.2	80	111	11131	7.3	23	0.17	0.03	1
	Random	200	31.9	30.7	40	69	13712	8.2	26	N/A	N/A	1

[1] No nest data available in Montana in 2002.

Table 28. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in New Mexico. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 25	0.32	0.51	28	182	18202	0.16	52	0.07	0.01	1
	Nest	4 x 12.5	0.32	0.75	56	397	19874	0.17	53	0.01	0.01	1
	Nest	4 x 50	0.32	0.83	56	481	24055	0.19	59	-0.16	0.03	1
	Nest	200	0.32	0.42	14	121	24172	0.2	62	N/A	N/A	1
	Random	4 x 12.5	0.36	0.59	100	186	9279	0.1	27	0.33	0.11	1
	Random	4 x 25	0.36	0.55	50	162	16235	0.1	28	0.21	0.05	1
	Random	4 x 50	0.36	0.62	100	201	10064	0.13	36	0.25	0.06	1
	Random	200	0.36	0.51	25	137	27440	0.17	48	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 12.5	25.9	43.7	56	210	10489	9.7	38	0.13	0.02	1
	Nest	4 x 50	25.9	49.5	56	270	13487	11.1	43	0.01	< 0.01	1
	Nest	4 x 25	25.9	34.3	28	130	12969	11	43	-0.04	< 0.01	1
	Nest	200	25.9	24.3	14	65	12930	11.4	44	N/A	N/A	1
	Random	4 x 12.5	31.5	48	100	171	8564	8	25	0.33	0.11	1
	Random	4 x 50	31.5	46.4	100	160	8001	7.8	26	0.12	0.02	1
	Random	4 x 25	31.5	41.9	50	130	13038	9.9	31	0.21	0.05	1
	Random	200	31.5	32.9	25	80	16078	11.2	36	N/A	N/A	1

Table 29. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in Oregon. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 12.5	1.3	1.41	156	82	4099	0.19	14	0.43	0.18	1
	Nest	4 x 50	1.3	1.47	156	89	4448	0.2	15	0.32	0.1	1
	Nest	4 x 25	1.3	1.17	78	57	5675	0.22	17	0.59	0.35	0
	Nest	200	1.3	1.05	39	46	9164	0.28	22	N/A	N/A	1
	Random	4 x 12.5	0.84	1.08	124	115	5736	0.16	19	0.4	0.16	1
	Random	4 x 25	0.84	0.91	62	82	8155	0.19	23	0.49	0.24	0
	Random	4 x 50	0.84	1.35	124	178	8910	0.2	24	0.1	0.01	1
	Random	200	0.84	0.79	31	61	12196	0.24	28	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 50	58.7	70.7	156	101	5072	9.5	16	0.17	0.03	1
	Nest	4 x 12.5	58.7	69.4	156	98	4876	9.3	16	0.32	0.1	1
	Nest	4 x 25	58.7	55.5	78	62	6245	10.5	18	0.37	0.14	1
	Nest	200	58.7	45.9	39	43	8538	12.4	21	N/A	N/A	1
	Random	4 x 12.5	32.7	46	124	138	6914	6.9	21	0.38	0.14	1
	Random	4 x 50	32.7	50.7	123	166	8280	7.7	23	0.11	0.01	1
	Random	4 x 25	32.7	39.1	62	100	9990	8.4	26	0.15	0.02	1
	Random	200	32.7	29.7	31	58	11530	9	28	N/A	N/A	1

Table 30. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in South Dakota. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 50	0.2	0.33	8	203	10153	0.22	110	N/A	N/A	0
	Nest	4 x 12.5	0.2	0.52	8	484	24212	0.34	171	N/A	N/A	0
	Nest	4 x 25	0.2	0.36	4	234	23448	0.38	192	N/A	N/A	0
	Nest	200	0.2	0.24	2	104	20773	0.49	248	N/A	N/A	1
	Random	4 x 12.5	0.44	0.57	76	124	6199	0.11	25	0.23	0.05	1
	Random	4 x 25	0.44	0.44	38	74	7398	0.12	28	0.18	0.03	1
	Random	4 x 50	0.44	0.67	76	169	8464	0.13	29	0.11	0.01	1
	Random	200	0.44	0.4	19	61	12187	0.16	36	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 50	6.3	17.7	8	590	29481	11.6	186	N/A	N/A	0
	Nest	4 x 12.5	6.3	17.7	8	590	29481	11.6	186	N/A	N/A	0
	Nest	4 x 25	6.3	12.5	4	295	29481	13.3	213	N/A	N/A	0
	Nest	200	6.3	8.8	2	147	29481	18.2	292	N/A	N/A	1
	Random	4 x 12.5	30.3	43.3	76	151	7532	8.3	27	0.32	0.1	1
	Random	4 x 50	30.3	44.8	76	161	8069	8.6	28	0.02	< 0.01	1
	Random	4 x 25	30.3	34	38	93	9286	9.3	31	0.7	0.49	0
	Random	200	30.3	31.3	19	79	15736	12.4	41	N/A	N/A	1

Table 31. Estimated means, standard deviations, sample sizes, and precision levels of the percent cover (A) and density (B) of wildlife logs (≥ 23 cm dbh) at nest trees and random points in Washington. Data are arranged in decreasing order of precision for both nest and random points using four nested plots designs within a cross pattern with arms 50 m long, 4 m wide. Pearson correlation coefficients obtained from serial correlation analysis testing for independence of adjacent sampling units. Independence values equal to one are assumed to be independent. Figure 1 illustrates the different plot designs. Data collected in 2002 following the Birds and Burn Prescribed Fire protocol.

A

Variable	Point type	Total plot length (m)	Percent cover	Standard deviation	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
Percent cover	Nest	4 x 12.5	1.05	1.16	200	86	4277	0.14	13	0.17	0.03	1
	Nest	4 x 50	1.05	1.25	200	100	5019	0.15	14	0.12	0.02	1
	Nest	4 x 25	1.05	0.87	100	48	4827	0.15	14	0.43	0.18	1
	Nest	200	1.05	0.73	50	34	6833	0.17	17	N/A	N/A	1
	Random	4 x 25	0.79	0.53	24	32	3153	0.18	23	0.3	0.09	1
	Random	4 x 50	0.79	0.79	48	71	3568	0.19	25	-0.07	0.01	1
	Random	4 x 12.5	0.79	0.82	48	76	3818	0.2	25	-0.03	< .01	1
	Random	200	0.79	0.4	12	18	3678	0.21	26	N/A	N/A	1

B

Density	Point type	Total plot length (m)	Mean (logs/ha)	Standard deviation (logs/ha)	Current number of samples (N)	Estimated sample size required (n)	Estimated transect length required (m)	Bound	Current level of precision (%)	Pearson correlation coefficient	R^2	Independence
	Nest	4 x 25	52	44.8	100	55	5461	7.5	14	0.46	0.21	0
	Nest	4 x 12.5	52	59.9	200	98	4891	7.1	14	0.12	0.01	1
	Nest	4 x 50	52	66.3	200	120	5987	7.8	15	0.05	< 0.01	1
	Nest	200	52	38.3	50	40	8009	9	17	N/A	N/A	1
	Random	4 x 25	52	44.8	100	55	5461	7.5	14	0.46	0.21	0
	Random	4 x 12.5	57.3	59.2	48	79	3940	14.3	25	0.27	0.07	1
	Random	4 x 25	57.3	45.1	24	46	4574	15.8	28	0.09	0.01	1
	Random	200	57.3	33.9	12	26	5162	17.4	30	N/A	N/A	1

Table 32. The number of wildlife logs (≥ 23 cm large-end diameter (LED) and ≥ 1 m long) available, the number exhibiting new woodpecker foraging signs, and their percent use for Birds and Burns study sites located in eight states. Values given for all points combined, and separated by nest and random points. Data collected in 2002.

Location	Point type (n)	Number of logs available	Number of logs with new foraging signs	Percent use
Arizona	Nest (16)	91	32	35.2
	Random (90)	161	73	45.3
	Combined (106)	252	105	41.7
Colorado	Nest (14)	133	5	3.8
	Random (46)	270	5	1.9
	Combined (60)	403	10	2.5
Idaho	Nest (31)	227	50	22.0
	Random (59)	347	55	15.9
	Combined (90)	574	105	18.3
Montana	Random (40)	212	5	2.4
New Mexico	Nest (14)	38	0	0.0
	Random (25)	96	0	0.0
	Combined (39)	134	0	0.0
Oregon	Nest (39)	351	80	22.8
	Random (31)	203	39	19.2
	Combined (70)	554	119	21.5
South Dakota	Nest (2)	3	0	0.0
	Random (19)	84	30	35.7
	Combined (21)	87	30	34.5
Washington	Nest (50)	371	51	13.7
	Random (12)	82	5	6.1
	Combined (62)	453	56	12.4

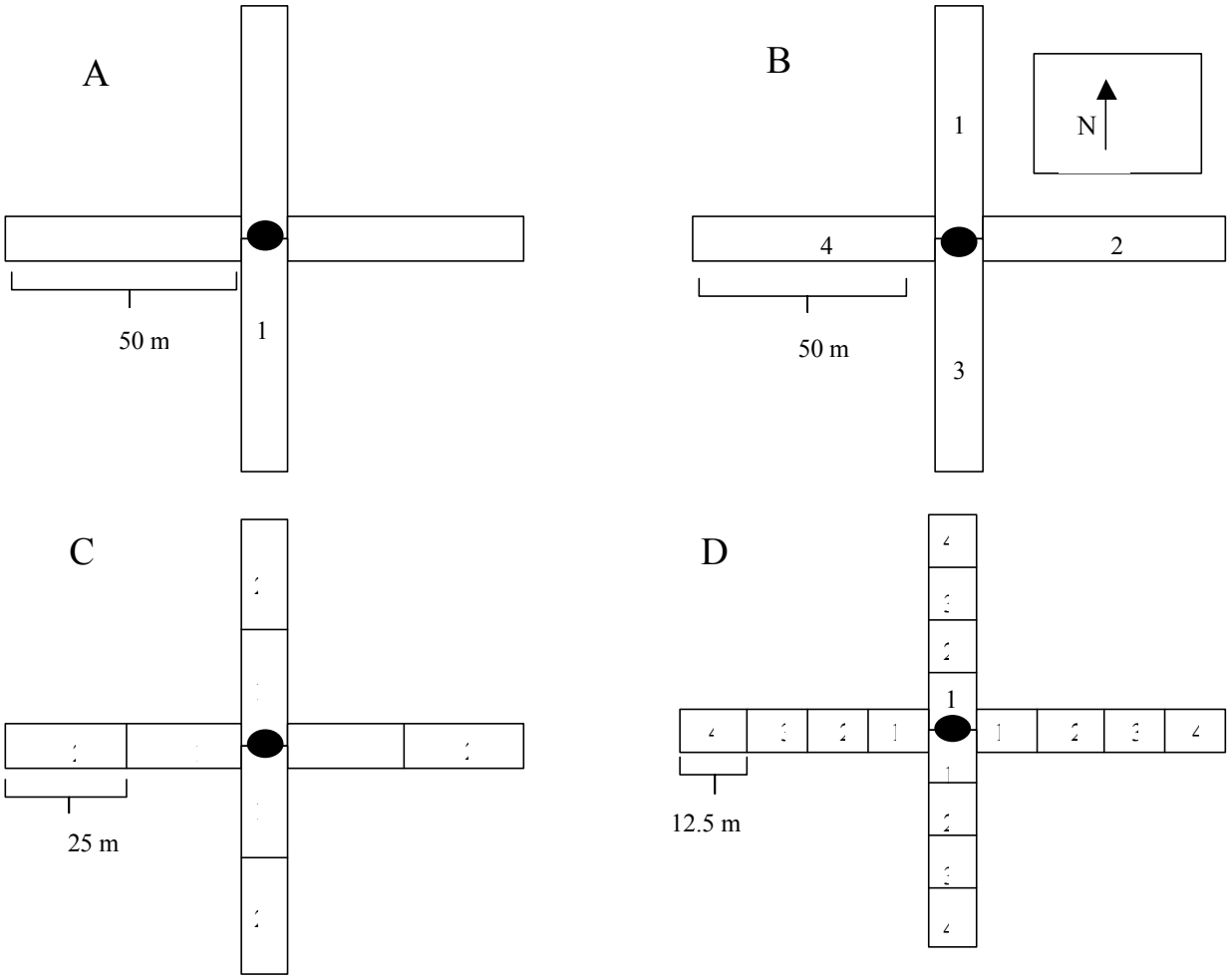

Figure 1. Four sample plot designs used to assess precision and independence of density and percent cover of wildlife logs (≥ 23 cm LED) nested within a 200-m cross design (A). Units containing a different number within each design were treated as individual sampling units. Units with the same number within each design were treated as one sampling unit with values averaged among the four azimuths. Plot designs used for data collected in 2002 from eight different states involved in the Birds and Burn Prescribed Fire Project.