

**Birds and Burns Network
Prescribed Fire Vegetation Analysis 2002
Overstory Cover**

**Final Report
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INTRODUCTION

In 2002 we collected information on overstory cover following the Birds and Burns Network vegetation protocol in eight western states: Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, South Dakota, and Washington. See our web site for details on vegetation sampling: (<http://www.rmrs.nau.edu/lab/4251/birdsnburns/>). In this report we provide mean estimates of overstory cover plus their confidence intervals (90 percent), sample sizes, and standard errors. All these data represent estimates in both control and treatment units before prescribed burning has taken place.

METHODS

At each random and nest tree point, we measured overstory cover at each of three vegetation subplots. Using a densiometer, we recorded the number of quarters within each square that were covered by tree canopy as we faced each of the cardinal directions. Total possible coverage for each direction was 96. For these measurements we only considered the upper canopy; no mid-canopy was included.

We calculated overstory cover 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 at the canopy cover 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).

We calculated overstory cover within each of these four levels in three categories: 1) all points combined; 2) only nest points; and 3) only random points. We used t-tests within each level of inquiry to determine whether any differences existed for values of overstory cover 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.

RESULTS

Regional Level

The percentage of overstory cover ranged from a low of 38.1 (\pm 2.7) percent in the southern region compared to a high of 66.4 (\pm 3.2) in Colorado (Table 1). South Dakota ranked second highest with 51.2 (\pm 6.4) percent cover, followed by the northern region with 46.7 percent (\pm 2.2). All regions had significantly different values from each other (based on non-overlapping

confidence intervals) for overstory cover with the exception of South Dakota. Values in South Dakota were not different compared to the northern region, although they did differ from the southern region and Colorado.

In the northern region, we estimated higher percentage values of overstory cover at random points (53.1 ± 2.9) compared to nest tree points (39.1 ± 2.8)(Table 1). We observed the opposite pattern in the southern region where nest trees had $44.8 (\pm 4.6)$ overstory cover compared to only 36.7 percent (± 3.1) at random points. We observed no difference between point types in Colorado or South Dakota.

State Level

The state of Montana had the highest overstory cover of any of the eight states at $75 (\pm 2.6)$ percent (Table 2). Colorado ranked second with $66.4 (\pm 3.2)$ percent. Arizona had the lowest overstory cover (32.1 ± 3). Idaho had the second lowest with only $35.8 (\pm 2.8)$ percent. The remaining four states had values ranging from 45.5 to 51.2.

Overstory cover in Oregon was about 14 percent higher at random points (53.6 ± 5.5) compared to around nest trees (39.2 ± 5.6)(Table 2). In Idaho random points (38.7 ± 3.6) also had higher overstory cover compared to nest trees (30.2 ± 4). In Arizona we observed the opposite pattern. That is, overstory cover surrounding nest trees (40 ± 7.2) was higher than at random points (30.7 ± 3.2). We observed no other differences between point types in the other states.

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 3). 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 overstory cover (36.5 ± 8.4) of the three units located in Arizona (Table 3). This was heavily influenced, however, by the high estimates of overstory cover around the four nest trees (53.5 ± 16.4) located on this unit. At random points we obtained an estimate of only $29.7 (\pm 8.4)$ on the BE unit. These values between nest and random points were significantly different.

The KE unit had a mean overstory cover value of $34.3 (\pm 4.9)$ and the MO unit had a mean of $28.1 (\pm 3.9)$. There was no difference between random points and nest points on either of these units.

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 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 (Table 4).

Overstory cover on the four Colorado units ranged from a high of 72.5 (± 3.6) percent on the SCS unit to a low of 59.7 (± 8) percent on the PB unit (Table 4). We detected no differences between point types on any of the four 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 5 shows how points were distributed among units.

Percent cover of the overstory ranged from a high of 47.1 (± 10) on the DM unit to a low of 27.4 (± 3.8) on the DO unit (Table 5). The PC unit ranked second highest with 42 (± 8) percent overstory cover.

On the BH unit, overstory cover was higher at random points (37.8 ± 5.6) compared to nest trees (18 ± 4.8) (Table 5). Random points (38.5 ± 6.6) on the FC unit also had a higher percentage of overstory cover compared to nest trees (24.3 ± 6.1). We did not detect any differences on any of the other units.

Montana (Unit)

Only two units were sampled in Montana in 2002: Strawberry and Maupin. Twenty random points were sampled on each (Table 6). Only random point results are available because nest searching and monitoring did not begin until 2003.

The ST unit in Montana had the highest overstory cover of any units in all eight states at 77.4 (± 3.6) percent (Table 6). The value on the MT unit in Montana was only slightly lower at 72.6 (± 3.9) percent cover.

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 7).

Percent cover of the overstory on the CP unit (48.4 ± 5.9) in New Mexico was the same as on the LJ unit (47.4 ± 7.2). Overstory estimates at nest and random points were also remarkably similar on both units (Table 7).

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 8 shows how nests and points were distributed.

Overstory cover ranged from 37.7 (± 7.8) on the CS unit to 51.4 (± 6) on the TN unit (Table 8). On the TN unit, we observed higher overstory cover at random points (57 ± 7) compared to nest trees (41.2 ± 10.7). Similarly, random points (53.8 ± 9.5) on the TS unit had a higher percentage of overstory cover compared to nest trees (34 ± 12.9). No differences were detected on either of the other units.

South Dakota (Unit)

South Dakota had four units in 2002 (Table 9). 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.

Overstory percentages in South Dakota ranged from a low of 43.6 (± 26.8) on the KH unit to a high of 57.9 (± 17) on the RR unit (Table 9). The FC unit had 53.6 (± 14.5) percent and the RC unit had 48.2 (± 12.2) percent overstory cover.

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 10 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.

Overstory cover ranged from a low of 40.4 (± 11.7) on the LK unit to a high of 52.5 (± 10.6) on the ZR unit (Table 10). The only difference we observed between points types in Washington was found on the FY unit where random points (55.6 ± 23) had a significantly higher percentage of overstory cover compared to nest trees (34.2 ± 11.7).

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 (Stratum)

Arizona had 48 points in the open stratum and 58 within the closed stratum (Table 11). Within the open stratum, only two points were nest trees and 46 were random points. Within the closed stratum 14 points were nests and 44 were random.

Points located in the closed stratum (42 ± 3.6) within Arizona had a higher percentage of overstory cover than in the open stratum (20.2 ± 3)(Table 11). Within each of the strata, we observed no differences in cover between point types.

Colorado (Stratum)

All points within Colorado were in the closed stratum (Table 11). We observed no difference in overstory estimates between random (65.9 ± 3.8) and nest points (68.4 ± 6.1) in Colorado.

Idaho (Stratum)

Idaho had 56 points in the open stratum and 37 in the closed stratum (Table 11). Overstory cover in the closed stratum (43.8 ± 4.7) was about 13 percent higher than cover in the open stratum (30.5 ± 2.9). Within the open stratum, overstory cover was higher at random points (31.7 ± 4.1) compared to nest trees (28.7 ± 4.4). Overstory cover within the closed stratum was about 13 percent higher at random points (46.9 ± 5.2) compared to nest trees (34.1 ± 10.1).

Montana (Stratum)

All random points within Montana were in the closed stratum (Table 11).

New Mexico (Stratum)

Overstory cover was dramatically less in the open stratum (7.3 ± 4.1) of New Mexico compared to the closed stratum (53 ± 3.7) (Table 11). Only seven points were located in the open stratum in New Mexico, all of which were random points. The closed stratum contained 57 points. We observed no difference in overstory cover between random (53.8 ± 4.7) and nest points (50.4 ± 5.1) within the closed stratum.

Oregon (Stratum)

Oregon had 38 points in the open stratum and 32 in the closed stratum (Table 11). The open stratum (39 ± 5.7) in Oregon had significantly less overstory cover compared to the closed stratum (53.6 ± 5.6). Within the open stratum, random points (48.3 ± 7) had about 20 percent more cover compared to nest trees (28.6 ± 7.7). Random points (63.3 ± 7.6) within the closed stratum also had higher cover values compared to nest trees (48.5 ± 7.3).

South Dakota (Stratum)

South Dakota had 3 points in the open stratum and 18 in the closed stratum (Table 11). Percent cover of the overstory was about 25 percent higher in the closed stratum (54.8 ± 5.9) compared to the open stratum (29.5 ± 27.1). There were no nests with the open stratum of South Dakota and only two in the closed stratum. Nevertheless, tests detected higher cover at random points (55.9 ± 6.6) in the closed stratum compared to nest trees (45.4 ± 7.6).

Washington (Stratum)

Washington had 18 points in the open stratum and 44 in the closed stratum (Table 11). Overstory cover within the closed stratum (54.2 ± 3.4) was about twice as high as within the open stratum (26.6 ± 3.4). Within the open stratum we observed higher overstory cover values at random points (30.4 ± 4.7) compared to nest trees (26.1 ± 3.8). There was no difference in cover between nest (53.4 ± 4.1) and random points (56.8 ± 6.3) within the closed stratum of Washington.

Table 1. Mean percentage values of overstory cover \pm 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in four geographic regions: southern, northern, South Dakota, and Colorado¹. Values given for all points combined, and separated by nest and random points. Data collected in 2002.

Region	Percent overstory cover \pm 90% confidence interval (SE)[n]		
	Combined	Nest	Random
Southern	38.1 \pm 2.7 (1.6) [170]	44.8 \pm 4.6 ^a (2.7) [30]	36.7 \pm 3.1 ^a (1.9) [140]
Northern	46.7 \pm 2.2 (1.3) [266]	39.1 \pm 2.8 ^a (1.7) [122]	53.1 \pm 2.9 ^a (1.8) [144]
Colorado	66.4 \pm 3.2 (1.9) [n = 60]	68.4 \pm 6.1 (3.4) [n = 13]	65.9 \pm 3.8 (2.3) [n = 47]
South Dakota	51.2 \pm 6.4 (3.7) [n = 21]	45.4 \pm 7.6 (1.2) [n = 2]	51.8 \pm 7.1 (4.1) [n = 19]

¹ South Dakota and Colorado were considered their own independent regions. The southern region includes Arizona and New Mexico. The northern region includes Idaho, Montana, Oregon, and Washington.

^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 percentage values of overstory cover \pm 90% confidence interval (SE) and sample size for Birds and Burns study sites located in the eight states. 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.

Location	Percent overstory cover \pm 90% confidence interval (SE)[n]		
	Combined	Nest	Random
Arizona	32.1 \pm 3 (1.8) [n = 106]	40 \pm 7.2 ^b (4.1) [n = 16]	30.7 \pm 3.2 ^b (1.9) [n = 90]
Colorado	66.4 \pm 3.2 (1.9) [n = 60]	68.4 \pm 6.1 (3.4) [n = 13]	65.9 \pm 3.8 (2.3) [n = 47]
Idaho	35.8 \pm 2.8 (1.7) [n = 93]	30.2 \pm 4 ^a (2.4) [n = 32]	38.7 \pm 3.6 ^a (2.1) [n = 61]
Montana	75 \pm 2.6 (1.6) [n = 40]	N/A	75 \pm 2.6 (1.6) [n = 40]
New Mexico	48 \pm 4.5 (2.7) [n = 64]	50.4 \pm 5.1 (2.9) [n = 14]	47.3 \pm 5.6 (3.4) [n = 50]
Oregon	45.5 \pm 4.1 (2.5) [n = 71]	39.2 \pm 5.6 ^a (3.3) [n = 40]	53.6 \pm 5.5 ^a (3.3) [n = 31]
South Dakota	51.2 \pm 6.4 (3.7) [n = 21]	45.4 \pm 7.6 (1.2) [n = 2]	51.8 \pm 7.1 (4.1) [n = 19]
Washington	46.2 \pm 3.7 (2.2) [n = 62]	44.7 \pm 4.3 (2.5) [n = 50]	52.4 \pm 7.4 (4.1) [n = 12]

^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 3. Mean overstory cover \pm 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in Arizona. 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.

Percent overstory cover \pm 90% confidence interval (SE)[n]			
Unit	Combined	Nest	Random
BE	36.5 \pm 8.4 (4.7) [14]	53.5 \pm 16.4 ^a (7) [4]	29.7 \pm 8.4 ^a (4.6) [10]
KE	34.3 \pm 4.9 (2.9) [50]	35 \pm 8.5 (4.6) [10]	34.1 \pm 5.9 (3.5) [40]
MO	28.1 \pm 3.9 (2.3) [42]	37.9 \pm 107 (17) [2]	27.6 \pm 4 (2.4) [40]

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

Table 4. Mean overstory cover \pm 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 only for woodpecker and bluebird species. Data collected in 2002.

Unit	Percent overstory cover \pm 90% confidence interval (SE)[n]		
	Combined	Nest	Random
DC	62.8 \pm 14.8 (8) [9]	72.4 \pm 14.3 (4.9) [3]	58.1 \pm 23.3 (11.5) [6]
PB	59.7 \pm 8 (4.1) [7]	60.4 \pm 29.4 (10.1) [3]	59.1 \pm 6.5 (2.8) [4]
SCN	64 \pm 5.3 (3.1) [22]	66.5 \pm 30 (10.3) [3]	63.6 \pm 5.8 (3.3) [19]
SCS	72.5 \pm 3.6 (2.1) [22]	72.8 \pm 6.4 (2.7) [4]	72.4 \pm 4.4 (2.5) [18]

Table 5. Mean overstory cover \pm 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 only for woodpecker and bluebird species. Data collected in 2002.

Unit	Percent overstory cover \pm 90% confidence interval (SE)[n]		
	Combined	Nest	Random
BH	34 \pm 5.3 (3.1) [26]	18 \pm 4.8 ^a (2.2) [5]	37.8 \pm 5.6 ^a (3.3) [21]
DM	47.1 \pm 10 (5.4) [10]	42.7 \pm 13 (5.5) [4]	50.1 \pm 17.1 (8.5) [6]
DO	27.4 \pm 3.8 (2.2) [13]	27.7 \pm 5 (2.6) [7]	26.9 \pm 7.8 (3.9) [6]
FC	34.6 \pm 5.3 (3.1) [29]	24.3 \pm 6.1 ^a (3.2) [8]	38.5 \pm 6.6 ^a (3.9) [21]
PC	42 \pm 8 (4.4) [11]	38.2 \pm 13.8 (6.5) [5]	45.1 \pm 12.7 (6.3) [6]
WM	37.7 \pm 24.1 (10.2) [4]	42.2 \pm 37.9 (13) [3]	24.2 [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 6. Mean overstory cover \pm 90 % confidence interval (SE) and sample size [n] for Birds and Burns study sites located in Montana. 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.

Percent overstory cover \pm 90% confidence interval (SE)[n]			
Unit	Combined	Nest	Random
MT	72.6 \pm 3.9 (2.3) [20]	N/A	72.6 \pm 3.9 (2.3) [20]
ST	77.4 \pm 3.6 (2.1) [20]	N/A	77.4 \pm 3.6 (2.1) [20]

Table 7. Mean overstory cover \pm 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 only for woodpecker and bluebird species. Data collected in 2002.

Percent overstory cover \pm 90% confidence interval (SE)[n]			
Unit	Combined	Nest	Random
CP	48.4 \pm 5.9 (3.5) [35]	51 \pm 7 (3.8) [10]	47.4 \pm 8 (4.7) [25]
LJ	47.4 \pm 7.2 (4.2) [29]	48.8 \pm 9 (3.8) [4]	47.2 \pm 8.4 (4.9) [25]

Table 8. Mean overstory cover \pm 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 only for woodpecker and bluebird species. Data collected in 2002.

Unit	Percent overstory cover \pm 90% confidence interval (SE)[n]		
	Combined	Nest	Random
CN	41 \pm 11.3 (6.3) [13]	43.1 \pm 11.6 (6.5) [12]	16 [1]
TN	51.4 \pm 6 (3.6) [31]	41.2 \pm 10.7 ^a (5.9) [11]	57 \pm 7 ^a (4) [20]
CS	37.7 \pm 7.8 (4) [7]	37.8 \pm 11.7 (5.5) [5]	37.7 \pm 40.1 (6.4) [2]
TS	41.9 \pm 8.9 (5.2) [20]	34 \pm 12.9 ^a (7.2) [12]	53.8 \pm 9.5 ^a (5) [8]

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

Table 9. Mean overstory cover \pm 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 only for woodpecker and bluebird species. Data collected in 2002.

Percent overstory cover \pm 90% confidence interval (SE)[n]			
Unit	Combined	Nest	Random
FC	53.6 \pm 14.5 (7.2) [6]	46.6 [1]	55 \pm 18.4 (8.6) [5]
KH	43.6 \pm 26.8 (4.3) [2]	N/A	43.6 \pm 26.8 (4.3) [2]
RC	48.2 \pm 12.2 (6.6) [9]	44.2 [1]	48.7 \pm 14.1 (7.4) [8]
RR	57.9 \pm 17 (7.2) [4]	N/A	57.9 \pm 17 (7.2) [4]

Table 10. Mean overstory cover \pm 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 only for woodpecker and bluebird species. Data collected in 2002.

Unit	Percent overstory cover \pm 90% confidence interval (SE)[n]		
	Combined	Nest	Random
FY	41.4 \pm 10.5 (5.7) [9]	34.2 \pm 11.7 ^b (5.8) [6]	55.6 \pm 23 ^b (7.9) [3]
HR	48.6 \pm 15.2 (7.8) [7]	40.9 \pm 17.6 (8.2) [5]	67.7 \pm 60.9 (9.7) [2]
LK	40.4 \pm 11.7 (6.4) [10]	37.8 \pm 16.6 (8.6) [7]	46.3 \pm 25.1 (8.6) [3]
MT	50.8 \pm 13.7 (7.2) [8]	50.8 \pm 13.7 (7.2) [8]	N/A
RY	46.7 \pm 8 (4.4) [10]	47.8 \pm 9.5 (5) [8]	42 \pm 68.5 (10.9) [2]
TD	43.5 \pm 8.9 (4.7) [8]	41 \pm 8.9 (4.6) [7]	61.3 [1]
ZR	52.5 \pm 10.6 (5.8) [10]	53.6 \pm 11.8 (6.4) [9]	42.5 [1]

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

Table 11. Mean overstory cover \pm 90% confidence interval (SE) and sample size [n] for Birds and Burns study sites located in the eight states. Values given for each stratum and separated by nest tree and random points within each stratum. Nest tree information is only for woodpecker and bluebird species. Data collected in 2002.

Location	Percent overstory cover \pm 90% confidence interval (SE)[n]					
	All points combined		Open		Closed	
	Open	Closed	Nest	Random	Nest	Random
Arizona	20.2 \pm 3 ^a (1.8) [n = 48]	42 \pm 3.6 ^a (2.2) [n = 58]	22.4 \pm 72.6 (11.5) [n = 2]	20.1 \pm 3.1 (1.8) [n = 46]	42.5 \pm 7.3 (4.1) [n = 14]	41.9 \pm 4.3 (2.6) [n = 44]
Colorado	N/A	66.4 \pm 3.2 (1.9) [n = 60]	N/A	N/A	68.4 \pm 6.1 (3.4) [n = 13]	65.9 \pm 3.8 (2.3) [n = 47]
Idaho	30.5 \pm 2.9 ^a (1.8) [n = 56]	43.8 \pm 4.7 ^a (2.8) [n = 37]	28.7 \pm 4.4 ^b (2.6) [n = 23]	31.7 \pm 4.1 ^b (2.4) [n = 33]	34.1 \pm 10.1 ^b (5.4) [n = 9]	46.9 \pm 5.2 ^b (3) [n = 28]
Montana	N/A	75 \pm 2.6 (1.6) [n = 40]	N/A	N/A	N/A	75 \pm 2.6 (1.6) [n = 40]
New Mexico	7.3 \pm 4.1 ^a (2.1) [n = 7]	53 \pm 3.7 ^a (2.2) [n = 57]	N/A	7.3 \pm 4.1 (2.1) [n = 7]	50.4 \pm 5.1 (2.9) [n = 14]	53.8 \pm 4.7 (2.8) [n = 43]
Oregon	39 \pm 5.7 ^a (3.4) [n = 38]	53.6 \pm 5.6 ^a (3.3) [n = 32]	28.6 \pm 7.7 ^a (4.4) [n = 18]	48.3 \pm 7 ^a (4.1) [n = 20]	48.5 \pm 7.3 ^a (4.2) [n = 21]	63.3 \pm 7.6 ^a (4.2) [n = 11]
South Dakota	29.5 \pm 27.1 ^b (9.3) [n = 3]	54.8 \pm 5.9 ^b (3.4) [n = 18]	N/A	29.5 \pm 27.1 (9.3) [n = 3]	45.4 \pm 7.6 ^a (1.2) [n = 2]	55.9 \pm 6.6 ^a (3.8) [n = 16]
Washington	26.6 \pm 3.4 ^a (2) [n = 18]	54.2 \pm 3.4 ^a (2) [n = 44]	26.1 \pm 3.8 ^b (2.2) [n = 16]	30.4 \pm 4.7 ^b (0.8) [n = 2]	53.4 \pm 4.1 (2.4) [n = 34]	56.8 \pm 6.3 (3.5) [n = 10]

^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 $P < 0.10$.