Effects of Forest Management Practices on Habitat of Pileated Woodpeckers

Experimental Forest:
University of Idaho
Moscow, Idaho, USA

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The purpose of this study was to examine the effects of timber harvesting on habitat that is used by pileated woodpeckers (*Dryocopus pileatus)* on the University of Idaho Experimental Forest. There was concern that the population may be declining due to the required habitat being reduced by forestry activities (Appelgren, pres.comm.). The main objective of this study was to compare the presence of woodpecker sign in an area of "typical" timber harvest to the presence of sign in an area of mature forest.

Current guidelines set by the Northwest Pacific region of the U. S. Forest Service indicate that a ~1000ac (400ha) area with at least 300ac (120ha) of >80 year old forest is required for pileated woodpeckers to successfully nest (Mellen et al. 1992). Pileated woodpeckers are primary cavity excavators (Dudley and Saab, 2003) and require large trees for nesting and roosting. The pileated woodpecker is considered to be a forest management indicator species and is included in the planning process as part of the National Forest Management Act (Bull et al. 1992). The pileated woodpecker also plays an important role in the ecology of a forest by creating cavities for other birds and mammals (Bull, 1987).

Pileated woodpeckers are primarily associated with old growth forests (>70yrs), although pileated woodpeckers will use forests of younger age classes. Mellen et al. (1992) showed that pileated woodpeckers will use forests habitats younger than old growth (>70) for nesting, roosting, and foraging. In areas where the woodpeckers have old growth available, areas of younger age class (cut-over areas 0-40yrs, treated) were used considerably less if at all (Mannan, 1984).

This study was to determine if pileated woodpeckers are making use of cut-over areas (0-40yr) on the experimental forest. I have also included a list of birds that were

observed during this study and my time spent in the forest (Table 1). Not being a part of this study, this list is intended as supplemental source of information and could also be used as an indicator of overall forest health.

STUDY AREA

The study was conducted on the University of Idaho Experimental Forest. The Experimental Forest is northeast of Moscow (Figure 1) and located in north central Idaho. The study units were located in the West Hatter Creek (WHC) unit of the forest. West Hatter Creek unit is the most northwest unit of the experimental forest and is located on the northern slope of Moscow Mountain (Figure 2). Two study units were assigned; one in the northern portion and one in the southern portion of WHC (Figure 2).

Unit 1 was located in the southern portion of WHC and was the study unit which contain the untreated forest (>40yrs). Unit 1 was dominated by steep slopes draining into Hatter Creek (Figure 3) and areas of thick forest interspersed with small openings of brush. This unit was dominated by a mixed forest containing in no particular order; western red cedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), ponderosa pine (*Pinus ponderosa*), and western larch (*Larix occidentalis*). There are riparian areas along the creeks that contain some of the largest trees in the unit. Elevations in unit 1 ranged from ~2,600 to ~3,800ft (800-1,159m) with high ridges with steep slopes.

Unit 2 was the most northern of the study units and was the unit that contained the treated (harvested) area of forest (<40yrs). Being the treated unit, it still contained some riparian areas along creeks that had older age class trees. The unit also contained a variety of

of stand age classes and most of them were in the 0-40yr age class. Tree species in unit 2 were the same as in unit 1. There were two areas of slightly older age stands; one along

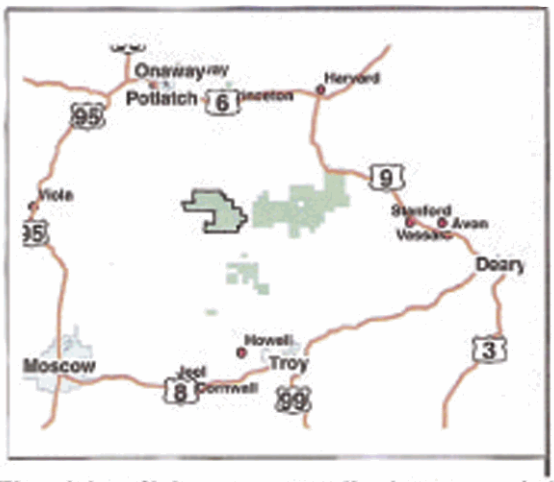

Fig 1. Map of Moscow area, outlined green area indicates the West Hatter Creek Unit of the University of Idaho Experimental Forest.

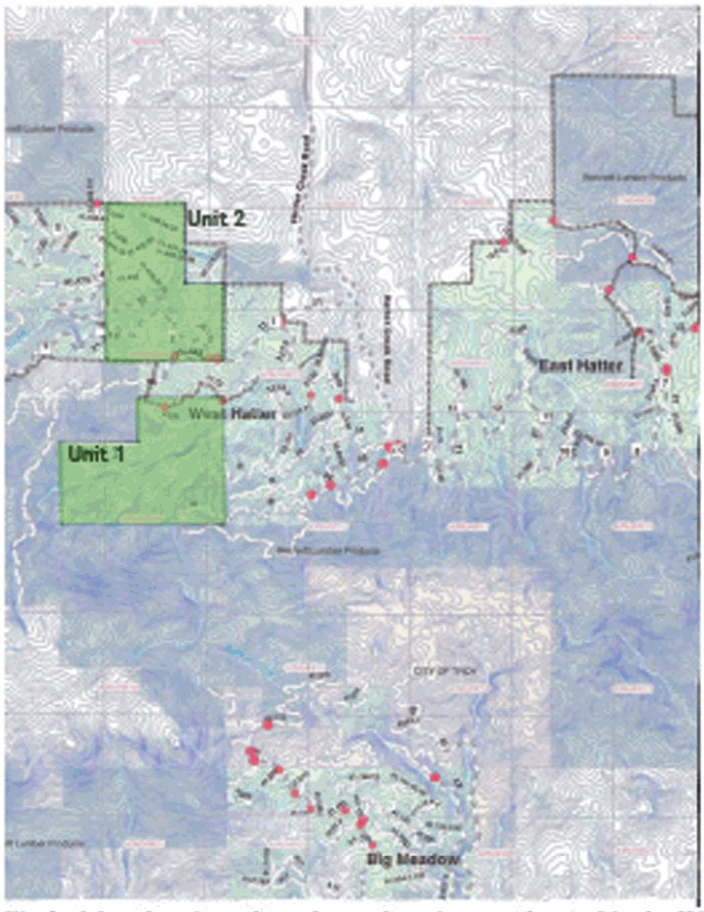

Fig 2. Map showing where the study units were located in the West Hatter Creek Unit (units 1 and 2 are **filled in with** green).

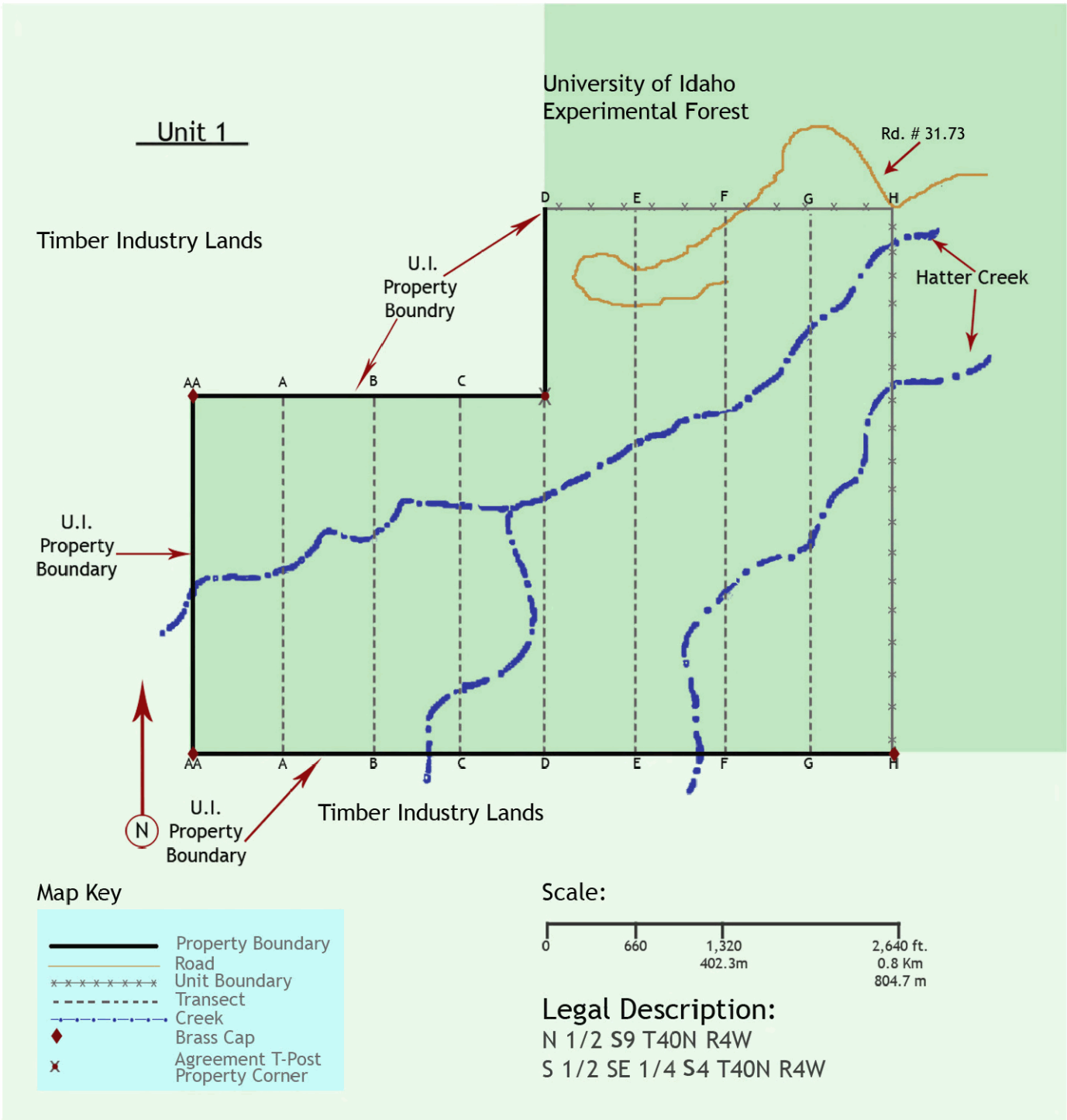

Fig. 3 Map of Unit 1, showing the layout of the transect lines.

There were two areas of slightly older age stands; one along the southern border and another in the northern half of the eastern extension (Figure 4). Most of this unit was in the 0-10yr age class with large cut-over areas interspersed with snags and live trees. Unit 2 had some steep slopes and high ridges with elevations ranging from ~2,700ft (829m) in the drainages to ~3,660ft (1,116m) on the highest ridges.

METHODS

Both study units were ~400ac (161ha) and contained 4 transects that were 2,640ft (805m) long and 5 transects that were 3,780ft (1,152m) (figures 3 and 4). All transects were spaced 660ft (201m) from the next and were marked at each end with a "transect tree" (Dudley and Saab, 2003). Transect trees were marked with 3 bands of flagging (yellow, blue, green) around the trunk at breast height; nearby branches were flagged with blue and yellow streamers to help locate the transect trees (Dudley and Saab, 2003). Each transect has an area 328ft (100m) from the transect line on both sides that make up the "belt transect" (Fig 4). Each belt transect was surveyed by starting at one of the transect trees located at the center of each end of the belt transects (shown as letters on Figs 3 and 4). Starting at the transect tree; the belts were surveyed by meandering at a 45 degree angle from the transect line from one end of the transect to the other. Pacing, a compass, and maps were used to stay within the belt transect (Dudley and Saab, 2003).

Due to the time of year the survey (mid-June to mid-August) was conducted (after nesting and fledging); observing the woodpeckers would have been unrealistic, so I surveyed for woodpecker signs of occupancy (either nest cavities or foraging patterns (*gov.bc.ca). Sign that was recorded was excavations (nesting or foraging) that were made within the last year. This was determined by level of decay and coloration of

excavations and chips (*gov.bc.ca). Once a tree was determined to have recordable sign the following characteristics were also recorded: species, DBH, height, decay class, and type of sign (nest or forage) (Bull 1987, Dudley and Saab 2003, *gov.bc.ca). Decay class was determined by using scale of 1 thru 9; 1 and 2 being live trees and 3 thru 9 being dead. A tree with a decay class of 9 would almost be totally decayed (*gov.bc.ca). Surveys were started at ~6:00am and usually concluded by 12:00pm (Dudley and Saab, 2003). The survey was conducted from mid-June to mid-August. To survey unit 1, other student employees were used to collect data. This was done to try to make more efficient use of limited time to collect data in the unit that contained very thick vegetation and steep slopes (unit 1). Since most of unit 2 was open habitat and the survey could be done without meandering, I conducted the survey in that unit myself. In place of meandering, I used binoculars to survey cut-over areas where sightability was high. Finally, a comparison was made between the two units as well as to the available literature on Pileated Woodpecker habitat use.

RESULTS & DISCUSSION

Unit 1(untreated). Data was collected on 21 trees in unit 1 (Fig 5), but only 17 had species ID included (Table 2). Pileated activity was recorded on ponderosa pine (29%), western red cedar (29%), grand fir (24%), Douglas-fir (6%), and western larch (6%). This is consistent with a study by Bull (1987); where ponderosa pine and grand fir were preferred for foraging over 50% of the time. Bull (1987) also indicated a preference for foraging in/on trees at least >20" (50cm). Dead and downed trees also play a very important role in pileated habitat by providing good carpenter ant habitat. Carpenter ants are one of the primary sources of food for pileated woodpeckers (Bull, 1987) and form

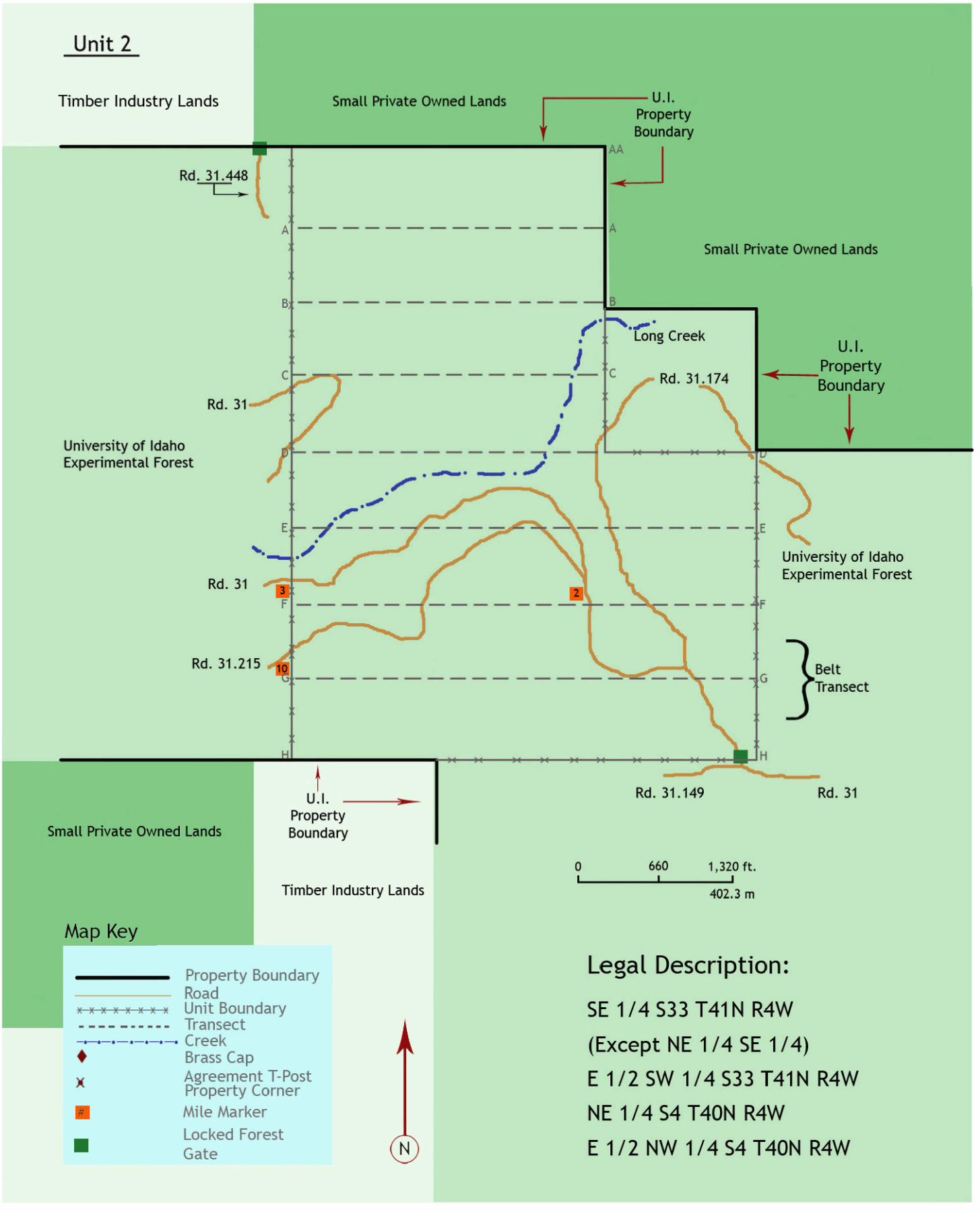

Fig 4. Map of Unit 2; shows transect lines and belt transect.

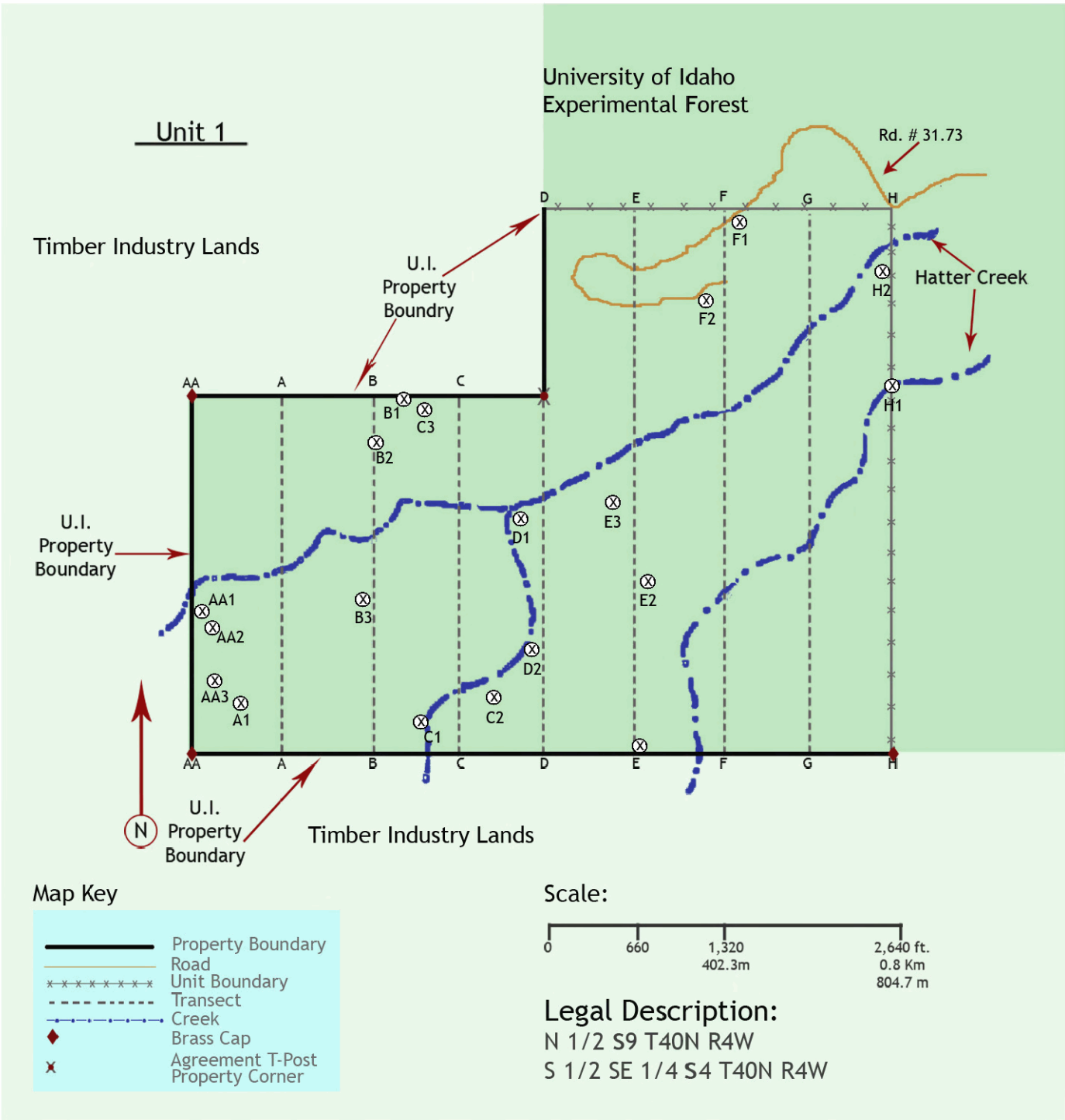

Fig. 5 Map of unit showing sites where data was collected.

colonies in dead trees. Carpenter ants will also form colonies in red cedar with heartrot. In a study by Mannan (1984) pileated woodpeckers foraged in dead wood 96% of the time (snags (45%) and logs (36%)). Decay class use for this survey were, 53% dead wood (snag or log) and 18% living trees. All of the live trees used were western red cedar.

Out of the 21 sample trees recorded, only 4 were cavities and these were not aged or determined to be nest or roost cavities. Three of the 4 cavities were in trees that were above the >50cm minimum for nesting and roosting (Bull, 1987). Birds were sighted twice; once on June 24, 2005 (1 bird, A1) and on July 7, 2005 (2 birds, D). One of the transect lines (transect G) had no data recorded so was not part of the data. This was one of the transect lines that was surveyed by one of the student employees and no data was recorded.

Unit 2(treated). Unit 2 was surveyed from mid-July to mid-August and I was the only observer for all the transect lines. This unit contained no recent sign of pileated woodpecker activity. I did observe very old excavations in snags left in cut-over areas, forest area along the southern boundary, and riparian areas. All of these were uncommon and sign that was detected was very old. No pileated woodpeckers were seen or heard calling in Unit 2.

MANAGEMENT IMPLICATION

This survey does indicate that pileated woodpeckers are present and have the habitat required to sustain at least a small population on the experimental forest and surrounding lands. From an observational stand point, foraging habitat within the forest is adequate, but a more in depth and intensive study would need to be conducted to examine nest and

roost tree availability. In one study in northeastern Oregon, where grand fir with DBH >50cm was the preferred nest tree type, it was recommended that a significant number (>100) of large diameter dead and live grand fir with conks and damaged tops in management area of at least 243ha for nesting and roosting (Bull et al. 1992).

Most even-aged forest practices remove large trees that are large enough for pileated woodpeckers to build nests and roosts. Since no sign was observed in the treated unit, it is apparent that the woodpeckers do not use habitat in areas following that type of timber harvest practiced by the UI Exp. Forest in that unit. Leaving areas with forest interior and less edge can help retain large areas of closed canopy. Square and circular forest patches have more interior (Rodewald, 2001). Also, since mixed forests provide the optimal foraging habitat retaining some of all species would be beneficial (Bull, 1987). While I have observed evidence of woodpecker use in all units of the forest, it is unclear that the necessary nesting habitat is available and not declining. Also, a vegetation cover map depicting over-story, under-story, age classes, and just an inventory of available habitat of the forest would be of great value to any future ecological research.

ACKNOWLEDGEMENTS

This study was done under the University of Idaho Experimental Forest and most equipment used during the study was made available through the Experimental Forest. I would also like to thank members of the experimental forest tech crew; Jeff Kingsbury, Helen Rector, and Andrew Gorbett. This crew taught me a very valuable lesson in using research assistants. This lesson was to only use interested & experienced assistants. I thank Dr. Kerri Vierling of the Univ. of Idaho Fish and Wildlife department for some helpful guidance and getting me started. Finally, I thank forest managers Ross Appelgren

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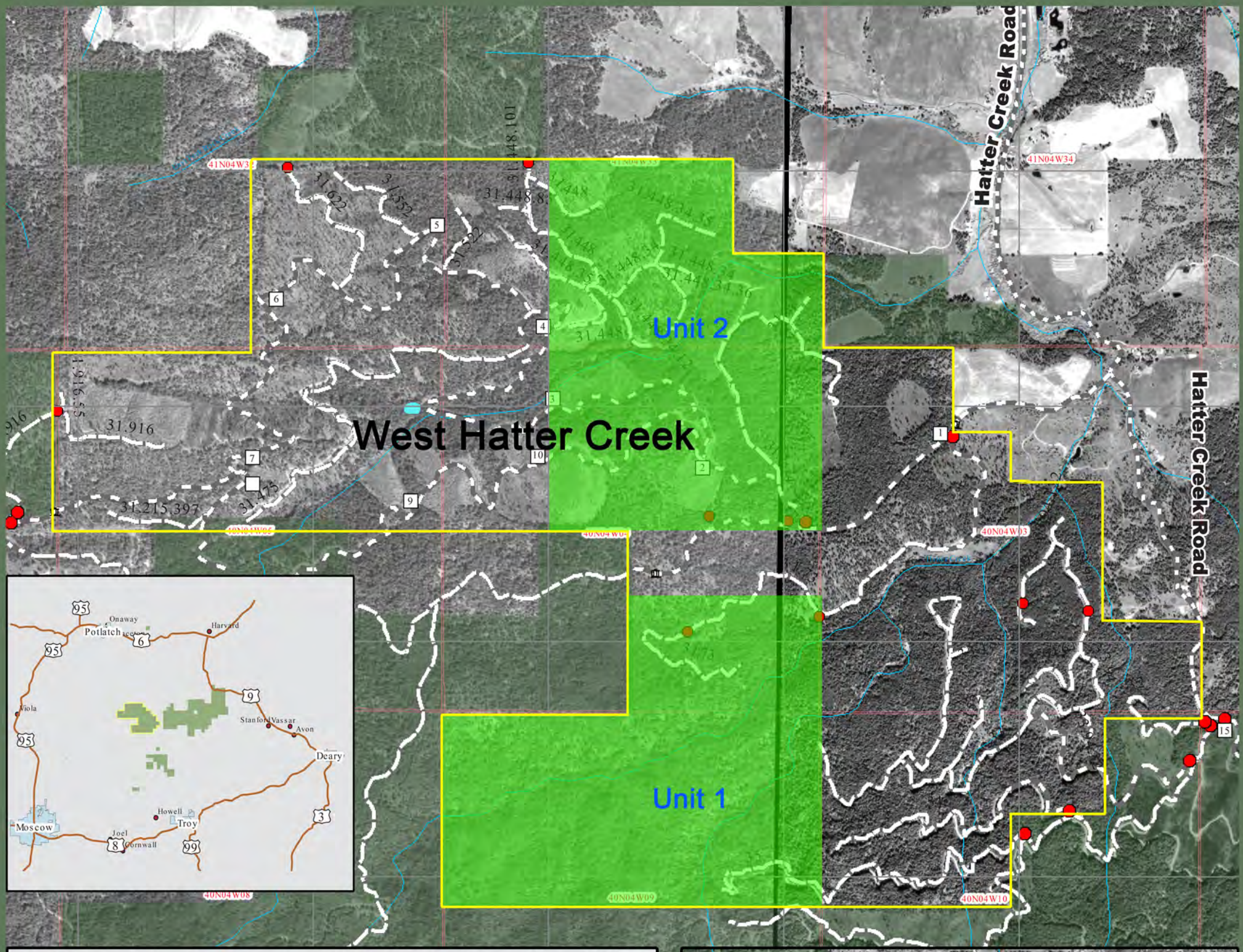
Table 1. This is a supplemental bird list and not specific to any particular unit or time. Data was from May 2005 to January 2006.

Bald Eagle	*Haliaeetus leucocephalus*
Red-tailed Hawk	*Buteo jamaicensis*
Turkey Vulture	*Cathartes aura*
N. Goshawk	*Accipiter gentilis*
Wild Turkey	*Meleagris gallopavo meriami*
Ruffed Grouse	*Bonasa umbellus*
California Quail	*Callipepla californica*
N. Pigmy Owl	*Glaucidium gnoma*
N. Flicker	*Colaptes auratus*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Pileated Woodpecker	*Dryocopus pileatus*
American Crow	*Corvus brachyrynchos*
Raven	*Corvus corax*
Stellar's Jay	*Cyanocitta stelleri*
Gray Jay	*Perisoreus canadensis*
Clark's Nutcracker	*Nucifraga columbiana*
Chestnut-backed Chickadee	*Poecile rufescens*
Black-capped Chickadee	*Poecile atricapillus*
White-breasted Nuthatch	*Sitta carolinensis*
Red-breasted Nuthatch	*Sitta canadensis*
Winter Wren	*Troglodytes troglodytes*
W. Bluebird	*Sialia mexicana*
Mountain Bluebird	*Sialia currucoides*
Red-winged Blackbird	*Agelaius phoeniceus*
American Robin	*Turdus migratorius*
W. Tanager	*Piranga ludoviciana*
Spotted Towhee	*Pipilo maculatus*
Dark-eyed Junco	*Junco hyemalis*

Table 2. Sample trees from unit 1 with pileated woodpecker sign (forage & cavity) on the U of I Experimental Forest.

Species	***Decay Class***	***Height***	***DBH***	***Excavation Type***
PP	7	10'	22"	**forage**
WRC	1	80'	14	**forage**
WL	5	100	15	**forage**
GF	4	90	12	**forage**
WRC	5	100	20	**forage**
	8	15	8	**forage**
PP	6	18		**forage**
WRC	4	100		**forage**
PP	4	100		**forage**
WRC	1			**forage**
GF	6	50		**forage**
GF	6	80	30	**cavity**
PP	7	60	20	**cavity**
PP	7	20	33	**forage**
WRC	2	95	25	**forage & cavity**
GF	7	55	18	**forage**
DF	6	80	20	**forage**
		33	17	**cavity**
				forage
				forage



UI Experimental Forest Administrative Map 2004

- Running Surface Water
- Railroad Grade
- Forest Gravel Road
- County Paved Road
- County Gravel Road
- County Dirt Road
- State Road
- Public Land Survey System
- Forest Gates
- CB Mile Markers
- Cattleguards
- Fire Ponds
- Bennett Lumber Products
- Potlatch Corporation
- City of Troy Forest

Feet

0 850 1,700 3,400 5,100 6,800

1 inch equals 0.25 miles

520 260 0 520 1,040 1,560

Meters

N

West Hatter Creek

Location of Complete Research:

Author & Title: Lewis, Erik (2006)
Effects of Forest Management Practices on Habitat Use of Pileated Woodpeckers

University of Idaho Library:

Call Number- none

College of Natural Resources:

Department- Wildlife

Note: Was a directed study for
Dr. Kerri Vierling