ANALYZING WILDLIFE HABITATS AT THE PROJECT LEVEL: AN EVALUATION METHOD

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ABSTRACT.

Two important steps in wildlife management are: 1) gaining an understanding of existing and potential wildlife habitats and 2) developing a management scheme that places wildlife in an active position prior to interdisciplinary involvement. To attain these ends, concepts from the California Fish and Wildlife Habitat Relationships Program were combined with a management indicator species approach to develop an evaluation method for wildlife habitats in Wet Timber Compartment, Inyo National Forest.

Survey routes were delineated and habitat data collected to identify existing habitats and to predict potential habitats for nine management indicator species. These species were used as a barometer for assessing habitats of other species in Wet Timber Compartment.

Three management strategies were developed for managing wildlife habitats. These were evaluated in terms of impacts on the management indicator species. The level which best managed all species collectively was recommended for implementation. Habitat improvement projects and resource coordination opportunities were identified to attain the recommended management level.

INTRODUCTION

Biologists often assess wildlife habitats for both improvement potential and coordinating wildlife habitat requirements with other resources. Time and budget constraints require assessment methods that are rapid, yet insure quality classification of fish and wildlife habitats. Habitat improvement projects and coordination efforts done haphazardly will result in a poor understanding of gains or losses of wildlife habitats.

Several excellent habitat analysis methods (USDI, Fish and Wildlife Service 1980, Sheffield 1981, Salwasser and Tappeiner 1981, Chapel et al. 1983 and others) have been developed in recent years. These methods tend to emphasize impacts on wildlife habitats resulting from implementation of other resource activities, such as timber harvest. Two important steps in wildlife habitat analyses are gaining an understanding of existing and potential wildlife habitats, and developing a management scheme that places wildlife in an active position prior to interdisciplinary involvement.

California Fish and Wildlife Habitat Relationship concepts (Salwasser 1982, Grenfell et al. 1982 and Laudenslayer 1982) were used to develop a project level habitat assessment method for fish and wildlife habitat evaluation.

The objectives of this assessment are to: (1) describe existing and potential habitats using a management indicator species approach; (2) establish goals for managing indicator species habitats over time; (3) provide recommendations for coordinating wildlife habitats with other resource uses; (4) propose habitat improvement projects that manage indicator species habitats to meet goals; and (5) monitor habitats over time.

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STUDY AREA

This habitat assessment method uses discrete land entities as basic planning units. These can be grazing allotments, timber compartments or watersheds. Wet Timber Compartment was chosen to illustrate this assessment methodology.

Wet Timber Compartment (37°50'N, 118°50'W) lies 280 km south of Reno, Nevada and 100 km north of Bishop, California in the Glass Mountains of the Inyo National Forest, and encompasses 1474 ha. Aspects are east to northeast and elevations vary from 2440 m to 2865 m. Major vegetation types include Jeffrey pine (*Pinus jeffreyi*), lodgepole pine (*Pinus contorta*), quaking aspen (*Populus tremuloides*), big sagebrush (*Artemisia tridentata* ssp. *vaseyana* and mountain meadows.

METHODS

A field reconnaissance of Wet Timber Compartment was conducted during August of 1981 by running survey routes through different vegetation types. A standard survey sheet was used to obtain data on the structure and composition of overstory and understory vegetation, the availability of snags and logs, and pertinent topographical features of each vegetation community. These parameters were measured using four to six randomly placed 0.04 ha plots along each survey route. Survey routes were delineated on a 7.5 minute USGS orthophoto quad map.

In riparian areas, streams were divided into reaches. Aquatic data were collected using a channel stability survey method developed by the USDA, Forest Service (1975). Fisheries inventory data (Stefferud, unpub. data) were also incorporated in the evaluation. Terrestrial riparian data were collected for each reach using the same standards as for the remainder of the compartment.

Habitats of selected management indicator species were used as a barometer for assessing other wildlife habitats in Wet Timber Compartment. If habitat requirements were met for these species, then it was assumed that habitat needs for species requiring similar habitats were met. These were selected on the basis of (1) being designated as sensitive by the Forest Service, or (2) being identified as an indicator or emphasis species for habitats on the Inyo National Forest.

Nine management indicator species were selected to represent major habitats in Wet Timber Compartment. These were:

brook trout (*Salvelinus fontinalis*): aquatic habitats

northern goshawk (*Accipter gentilis*): mature forests

sage grouse (*Centrocercus urophasianus*): all seral stages, sagebrush

Williamson's sapsucker (*Sphyrapicus thyroideus*): primary excavator, mature aspen

red-breasted sapsucker (*Sphyrapicus ruber*): primary excavator, mature aspen

pygmy nuthatch (*Sitta pygmaea*): cavity dependent, Jeffrey pine

hairy woodpecker (*Picoides villosus*): primary excavator, coniferous forests

yellow warbler (*Dendroica petechia*): riparian shrub

mule deer (*Odocoileus hemionus*): all seral stages, forest and brushland

Vegetation types (Figure 1) and habitat structure were used to delineate habitat units. Each habitat unit was evaluated for its capability to support one or more of the indicator species. Information on the habitat needs of each species was taken from habitat capability models developed for species in Oregon (Thomas et al. 1979), northeastern California (Shimamoto and Airola 1981) and the western Sierra Nevada (Hurley et al. 1981). These models were modified to reflect environmental conditions unique to the eastern Sierra Nevada.

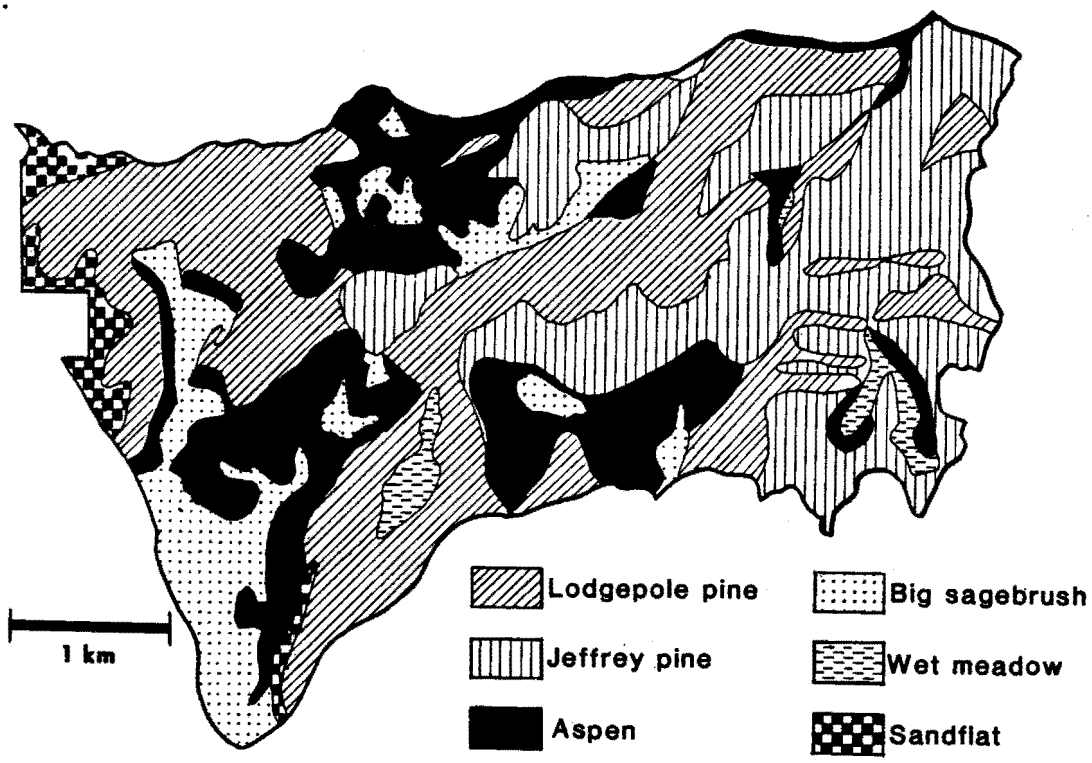

Figure 1. Major vegetation types in Wet Timber Compartment, Inyo National Forest.

Habitat units were rated primary habitat, secondary habitat, or non-habitat in accordance with the capability models. Primary habitat refers to areas contributing to an increase in population levels of a species or contributing to an increase in population size over time. Secondary habitat refers to areas which can support a stable, viable population at moderate levels. Non-habitat refers to areas which may be used by a species, but lack key habitat elements for maintaining a viable population over time (Hurley et al. 1981).

Habitats were evaluated in terms of current habitat suitability and the ability to function as habitat in the future. The term "existing habitat" is used for areas which have current

habitat suitability. The term "potential habitat" is used for areas where the vegetative type or successional stage is currently unsuitable for an indicator species, but desired habitat conditions are anticipated as a result of natural succession.

RESULTS AND DISCUSSION

Snag dependent species, including Williamson's sapsucker, red-breasted sapsucker, hairy woodpecker and pygmy nuthatch, are used as an example of how habitats were delineated for management indicator species.

Existing and potential habitat for the four snag dependent species were determined on the basis of vegetation type, basal area (m^2/ha), tree diameter (DBH in cm) and percent canopy cover (Table 1). Species were then combined into management groups based on similarity of habitat requirements. Existing and potential habitats for these management groups were delineated on Wet Timber Compartment map overlays (Figures 2 and 3).

Table 1. Optimum habitat criteria used for four snag dependent species in Wet Timber Compartment, Inyo National Forest[1/]

Species	Vegetation Type	Stand Basal Area (m^2/ha)	Mean Canopy Cover (Percent)	Mean Tree Diameter in Stand (cm DBH)	Snags ≥ 30 cm DBH per Hectare
Williamsons' Sapsucker	Lodgepole Pine	38	22	28	3.7
Red-breasted Sapsucker	Quaking Aspen	18	40	30	3.7
Pygmy Nuthatch	Jeffrey Pine	9	10	46	3.7
Hairy Woodpecker	All Conifer & Hardwood types	9	10	30	3.7

[1/]Based on data from McClelland (1977), Thomas et al. (1979), Raphael (1980) and Raphael and White (1984) modified for East Side Sierra Nevada.

Habitats of the remaining management indicator species were similarly identified on the basis of vegetation type and habitat structure. Following identification of existing and potential habitats for indicator species, recommendations for management of these species were made.

Management strategies were developed at three different levels. The first was a high management level which would develop habitats of all indicator species to full potential. The second was a low management level which would result in habitats of all indicator species being managed at 40 percent of potential. Timber compartment map overlays were developed which identified wildlife habitat coordination opportunities and improvement projects required to meet each of these objectives.

Since management of all indicator species habitats at full potential is unrealistic, and management at 40 percent of potential is undesirable, a third management level was recommended. Management was directed towards enhancing habitats of indicator species to the highest percent of potential which could feasibly be attained using coordination and improvement projects. An additional timber compartment map overlay was developed which identified areas to be maintained or improved for indicator species. Table 2 displays existing and potential habitat, percent of potential habitat currently suitable, recommended hectares of habitat improvement or maintenance required and the resulting percent

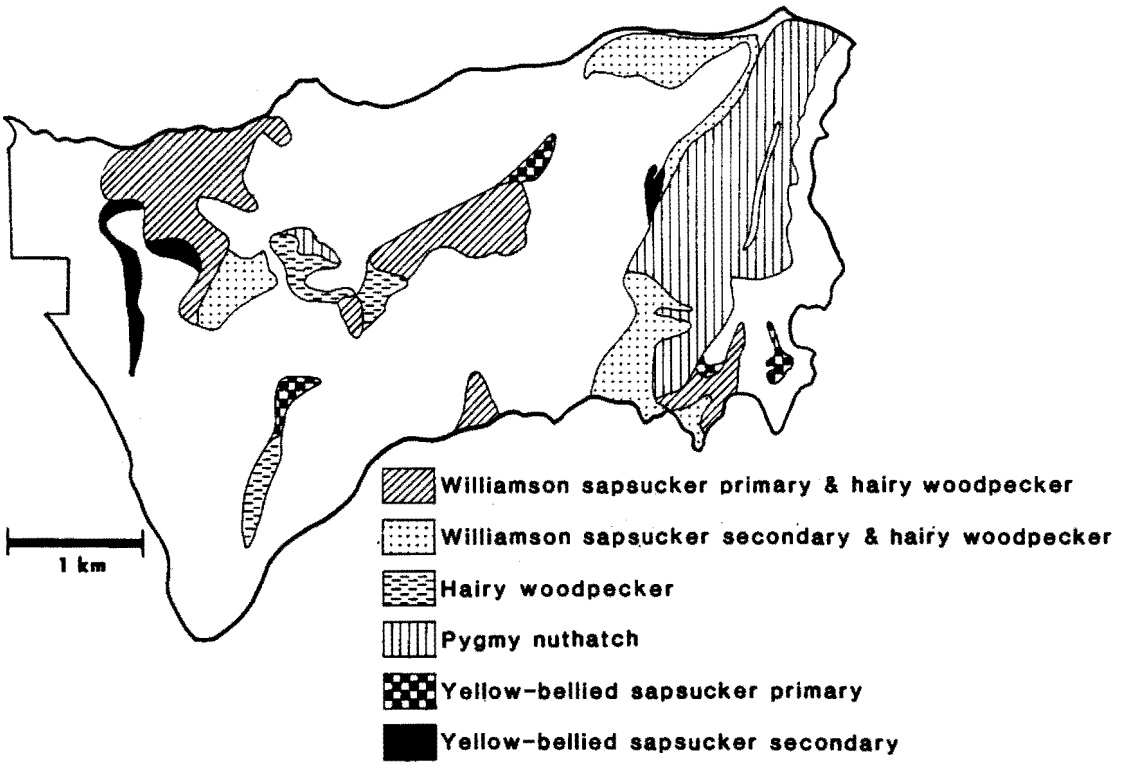

Figure 2. Existing habitat for cavity dependent species in Wet Timber Compartment, Inyo National Forest

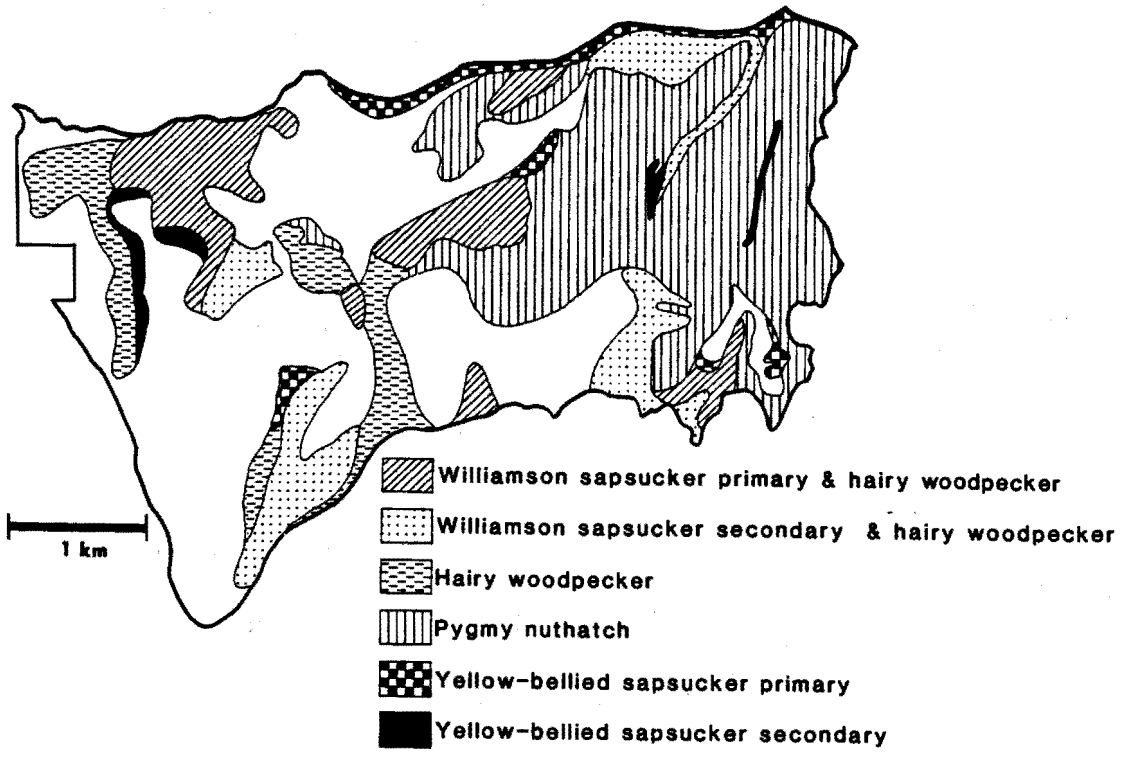

Figure 3. Potential habitat for cavity dependent species in Wet Timber Compartment, Inyo National Forest.

of potential attained for each indicator species. Figure 4 identifies locations and types of improvement projects which are required to attain management recommendations.

Table 2. Existing and potential habitat and recommendations for management of indicator species in Wet Timber Compartment, Inyo National Forest

Species	Existing (Hectares) Primary	Secondary	Total Potential (Hectares)	% of Potential Currently Suitable	Recommended for Treatment (Hectares)	Recommended Management (% Potential)
Williamson Sapsucker	130	85	272	79	57	100
Pygmy Nuthatch	154	-	423	36	20	41
Hairy Woodpecker	402	-	818	49	76	58
Red-Breasted Sapsucker	11	14	38	66	13	100
Sage Grouse	64	-	86	74	22	100
Goshawk Nesting	41	251	293	100	maintain 155	53
Mule Deer Cover	247	-	468	53	221	83

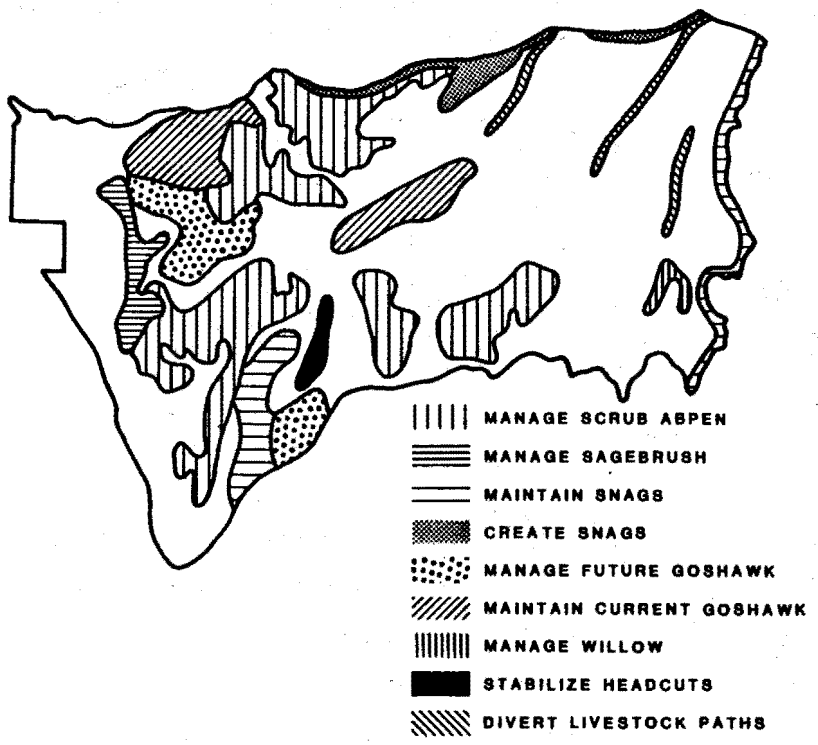

Figure 4. Areas recommended for habitat maintenance and habitat improvement in Wet Timber Compartment, Inyo National Forest.

Habitats of Williamson's sapsucker and red-breasted sapsucker could be improved to full potential. Habitats of pygmy nuthatch and hairy woodpecker could only be improved by 5 percent and 9 percent, respectively. Unsuitability of the Jeffrey pine habitats precluded further improvement for these two species. In general, habitats of snag dependent species can be maintained by armoring snags in road corridors, and improved by creating snags in otherwise suitable habitats where this component is lacking.

Mule deer habitat was addressed using cover/forage ratios. Cover is thought to be the main limiting factor for mule deer in this area and could be increased from 20 percent to 33 percent within the compartment. Forty percent of the compartment should be in cover for optimum mule deer summer habitat (Thomas et al. 1979). Thus, 83 percent of the desired cover would be achieved. Mule deer cover can be improved by opening stands of scrub-form Aspen using mechanical or fire prescriptions. These stands are currently unusable due to high stem density. Forage production would also be improved in treated areas.

Northern goshawk habitat shows a 47 percent decrease in the recommended management level. In this case, four stands were selected which would maintain two nesting pairs of goshawks over time. These areas were given high priority for management. The remainder of existing habitat could be used to meet timber harvest objectives without decreasing the number of potential nesting pairs. Goshawk habitat can be maintained by retaining the integrity of existing habitats, and improved by prescribing silvicultural treatments in selected stands to derive suitable nesting habitats.

Sage grouse summer habitat can be improved to full potential by converting 25 percent of decadent sagebrush habitat to an earlier succesional stage.

Yellow warbler habitat can be improved by fencing areas where willow is overgrazed. Willow will be planted in these areas to supplement existing habitat.

Brook trout habitat can be improved by stabilizing headcuts and diverting livestock paths in areas which have poor channel stability.

CONCLUSIONS

Assessing wildlife habitats prior to vegetation manipulation is an important step in understanding the value of habitats for various species. This approach allows the identification of existing and potential habitats, habitats that should be emphasized for improvement projects, and a prioritization of habitats when trade-offs with other resources are required. The biologist can also prescribe a wildlife oriented level of management which considers these factors. As habitats are maintained, improved or degraded, the results can be quantified using management indicator species. This ensures a level of accountability for land managers.

Two changes are anticipated in this method to improve its usability. The first is to develop polygons in a project area which combine vegetation community and stand structure into identifiable units. Habitats of indicator species would be identified using these polygons as the basic unit. The second change is to use wildlife guild groups to analyze habitats. Guilds (Chapel et al. 1983) would be selected so that a group of species represents a specific vegetation type, successional stage and set of habitat components.

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