# TECHNIQUES FOR CONDUCTING TERRESTRIAL HABITAT SURVEY IN EAST-CENTRAL NEVADA

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ABSTRACT: A new method of conducting terrestrial habitat survey on rangeland and woodland in East-Central Nevada was developed in 1976. Habitat types were first classified for data collection and retrieval needs. Habitat condition was then evaluated based upon five parameters: distance to nearest water, vegetative cover and composition, and utilization and reproduction of key plant species. Objective measurements were recorded and placed into appropriate condition classes. Each condition class was given a numerical rating, the sum of which represented the overall habitat condition. This survey was designed to provide the necessary data for input into land management decisions.

## INTRODUCTION

A complete wildlife inventory is composed of two components: an animal species survey and a habitat survey. This inventory must look at the quantitative and qualitative characteristic of each componet. In a species survey, quantity and quality are synonymous with population abundance and variety of species inhabiting a given area. In a habitat survey, quantity and quality are synonymous with the amount and productivity of water, protective cover and food of that given area. Although these two components compliment each other, they should be described separately.

Presently, very few systems are established for evaluating habitat quaility for all wildlife species. Biologists mostly use subjective judgment when describing habitat condition. Kerr and Brown (1977) described these judgments as transitory, losing their value for future analysis. The procedures described within are the results of our efforts to conduct terrestrial habitat surveys on rangeland and woodland in East-Central Nevada.

## METHODS

All terrestrial habitat was delineated into individual habitat types, which are equated as ecosystems. No limitation was placed upon the size of each type, which can range from a large sagebrush flat in a basin floor to a tiny mountain meadow.

Habitats were classified by ecological units for data collection and retrieval needs. These units included Standard Biomes, Ecoregions (Bailey 1976), Physiographic Regions (USDI, BLM 1978). Associations that correspond to "vegetation types" as described by A.W. Kuchler (1975) and displayed on the revised map "Potential Natural Vegetation of the Conterminous United States" and Habitat Types.

Habitat condition was evaluated based upon five parameters: distance to nearest water, vegetative cover and composition, and utilization and reproduction of key plant species. Objective measurements were recorded and placed into appropriate condition classes (Table 1). Each condition class was given a numerical rating, the sum of which represented the overall habitat condition.

TABLE 1. Wildlife habitat parameters and condition classes needed to evaluate terrestrial habitat in East-Central Nevada.

DISTANCE TO NEAREST WATER

| | | |
|---|---|---|
| 0.0 - 0.8 km | 0.0 - 9.5 mi | 5 |
| 0.9 - 1.6 km | 0.6 - 1.0 mi | 4 |
| 1.7 - 3.2 km | 1.1 - 2.0 mi | 3 |
| 3.3 - 6.4 km | 2.1 - 4.0 mi | 2 |
| 6.5 km | 4.1 mi | 1 |

VEGETATIVE COVER

| | |
|---|---|
| 36% - 40% | 5 |
| 41% - 45%. 31% - 35% | 4 |
| 46% - 55%, 21% - 30% | 3 |
| 56% - 65%, 11% - 20% | 2 |
| 66% - 100%, 0% - 10% | 1 |

VEGETATIVE COVER FOR MEADOWS

| | |
|---|---|
| 91% - 100% | 5 |
| 81% - 90% | 4 |
| 61% - 80% | 3 |
| 41% - 60% | 2 |
| 0% - 40% | 1 |

VEGETATIVE COMPOSTION

| | |
|---|---|
| 33% - 33% - 33% | 5 |
| 50% - 25% - 25% | 4 |
| 80% - 10% - 10% | 3 |
| 80% - 20% | 2 |
| 100% | 1 |

BROWSE FORM OF KEY BROWSE SPECIES

| Satis. | Unsatis. | Cond. Class |
|---|---|---|
| 90 | 10 | 5 |
| 75 | 25 | 4 |
| 50 | 50 | 3 |
| 25 | 75 | 2 |
| 10 | 90 | 1 |

UTILIZATION OF KEY GRASS SPECIES

| | |
|---|---|
| 0% - 20% | 5 |
| 21% - 30% | 4 |
| 31% - 40% | 3 |
| 41% - 50% | 2 |
| 51% - 100% | 1 |

REPRODUCTION OF KEY PLANT SPECIES

| | |
|---|---|
| 31% - 100% | 5 |
| 21% - 30% | 4 |
| 11% - 20% | 3 |
| 5% - 10% | 2 |
| 0% - 4% | 1 |

TOTAL

| | |
|---|---|
| Excellent | 21-25 |
| Good | 17-20 |
| Fair | 13-16 |
| Poor | 0-12 |

BROWSE FORM CLASSES

| AVAILABLE | HEDGING | | |
|---|---|---|---|
| | Little | Moderate | Severe |
| All | 1 | 2 | 3 |
| Part | 4 | 5 | 6 |
| None | 7 | 7 | 7 |
| Dead | 8 | 8 | 8 |

All waters, which included wells, reservoirs, pipelines, water troughs, springs and streams were located. The farthest distance from anywhere within the habitat type to the closest water reliable for wildlife use was measured. This water may be either inside or outside of the habitat type. It may be either year long or seasonal. Size, amount or discharge of the water source was also measured.

One or more representative step-point vegetative transects for each habitat type was conducted. Percent canopy cover provided by live trees and shrubs was computed. With the 100 step-point technique, this cover is the number of "hits" at the highest canopy level in the vertical column at the observation point. Meadow riparian types are the exeception where the percent of canopy cover provided by live herbaceous growth was computed.

Data from the step-point vegetative transect was used to calculate vegetative composition. Transects were stratigically located within each habitat type in order to get a fair representation of its composition, which was divided into three components: browse (all trees and shrubs), forbs and grasses. Habitat types having all three components were assigned either class 3, 4 or 5 depending on which was most representative. These percent limits are not absolutes and are to be considered as general guidelines for evaluating habitat condition. Any of the three components may be represented by any of the percent limits. For example, a habitat type with a Composition Class of 4 may either have 50 percent shrubs, 25 percent forbs and 25 percent grasses or 50 percent grasses, 25 percent forbs and 25 percent shrubs. The Composition Class of 3 is the lowest class that can be assigned to a type with all three components present. All types with only two of the three components was automatically assigned to Composition Class 2. All types with only one of the three components was automatically assigned to Composition Class 1. These same condition classes were used for evaluating riparian types.

Key plant species: one browse, one forb, and one grass present within the habitat type were identified. Criteria for plant selection include wildlife food value, wildlife cover value and plants which would increase native floral diversity. Wildlife considerations include a key wildlife species and its seasons of use.

Only one of the three key plant species was measured for utilization and reproduction. Browse was measured in habitats that are mostly fall and winter use areas. Grass was measured in habitats that are mostly fall and winter use areas. Grass was measured in habitats that are mostly spring and summer use areas. General comments about forbs were made.

The numerical value of each condition class was summed. This total represented the overall habitat condition.

Several map overlays were needed to display the survey data. The following are the minimum required:

| OVERLAY | DISPLAY PURPOSE |
|---|---|
| 1 | Base Map with Type Write-Up Numbers and Names |
| 1 | Wildlife Management Areas |
| 1 | Present Habitat Condition |
| 1 | Habitat Condition Improvement Potential |
| 1 | Habitat Condition Maintenance |
| 1 | Crucial Habitat |
| 1 | Habitat Conflicts |

## DISCUSSION

Habitat must first be classified for data collection and retrival needs. Equating habitat types with individual ecosystems is becoming popular as seen by the efforts of the Colorado Division of Wildlife's species-ecosystem approach for nongame programs and the Bureau of Land Management's Integrated Habitat Inventory and Classification System (Graul, W.D., et al. 1976, USDI, BLM 1978). This new approach coincides with agency policy which encourages the use of ecosystem concepts in maintaining diversity (USDI, BLM 1973, Smith, ed. 1975 in Graul et al. 1976).

Five parameters were identified to evaluate the quality of each habitat type. Their set values suggest that closeness to water and increased plant diversity supports increased animal diversity, breeding densities, and biomass. The influence of plant diversity on avian communities have been documented (Balda 1975, Hamilton and Noble 1975, Meslow and Wight 1975, Myers and Morris 1975, Shugart et al. 1975, Thomas et al. 1975, and Wiens and Dyer 1975). Such diverse habitats are also considered more stable (Pimlott 1969, Grieb and Graul 1975, and Hamilton and Noble 1975). Thus, our goal is to achieve the most diverse, stable condition.

A primary purpose of this habitat survey method is to provide the resource manager with basic data needed for land-use planning. In addition to providing basic survey and analysis data, remeasurement may provide trend information over a period of years. Moreover, these surveys may show the need for, as well as means of, providing the following (Duff and Cooper 1976).

1. Cooperation among various agencies concerned with management of terrestrial species and their habitat.
2. Coordination of terrestrial wildlife habitat resources with other resource and land-use activities.
3. Direct habitat improvement projects.
4. Administrative or research studies.
5. Special habitat management plans.

Regarding of the field examiner's education and training, the use of this method will establish consistent evaluation of habitat condition.

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## LITERATURE CITED

Bailey, R.G. 1976. Ecoregions of the United States (map and text). USDA, U.S. Forest Service. Map scale 1:7,500,000. Ogden, Utah.

Balda. R.P. 1975. Vegetation structure and breeding bird diversity. pp 59-80. In Proceedings: A symposium on management of forest and range habitats for nongame birds. May 5-9, Tucson, Arizona. 343 pp.

Duff, D.A. and J.L. Cooper. 1976. Techniques for conducting stream habitat survey on national resource land. Technical Note 283. Bureau of Land Management, Denver, Colorado. 72 pp.

Graul, W.D., J. Torres and R. Denney. 1976. A species-ecosystem approach for nongame programs. Widl. Soc. Bull. 4(2): 79-80.

LITERATURE CITED

(Continued)


Grieb, J.R. and W.D. Graul. 1975. The current status of state nongame bird programs. pp 328-333. In Proceedings: A symposium on management of forest and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.

Hamilton, R.B. and R.E. Noble. 1975. pp 96-114. In Proceedings: A symposium on management of forests and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.

Kerr, R. and K. Brown. 1977. Data requirements for terrestrial wildlife habitat inventory. In Proceedings: National symposium on classification, inventory and analysis of fish and wildlife habitat. Phoenix, Arizona.

Kuchler, A.W. 1975. Potential natural vegetation of the conterminous United States (revised map). Geog. Soc. Spec. Pub. 36. Map scale 1:3,168,000. NY, NY.

Meslow, E.C. and H.M. Wight. 1975. Avifauna and succession in Douglas-fir forests of the Pacific northwest. pp 266-271. In Proceedings: A symposium on management of forests and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.

Myers, C.A. and M.J. Morris. 1975. Watershed management practices and habitat values on coniferous forests. pp 288-295. In Proceedings: A symposium on management of forests and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.

Pimlott, D.H. 1969. The value of diversity. pp 31-43. In J.A. Bailey, W. Elder and T.D. McKinney (eds.), Readings in wildlife conservation. The Wildl. Soc. Wash., D.C. 1974. 722 pp.

Shugart, H.H., S.H. Anderson, and R.A. Strand. 1975. Dominant patterns in bird populations of the eastern deciduous forest biome. pp 90-95. In Proceedings: A symposium on management of forest and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.

Thomas, J.W., G.L. Crouch and R.S. Bumstead. 1975. Silvicultural options and habitat values in coniferous forests. pp 172-287. In Proceedings: A symposium on management of forest and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.

USDI, BLM. 1973. Supplemental guidance, Manual 1603. Bureau of Land Management, Wash., D.C.

________. 1978. Integrated habitat inventory and classification system, Manual 6602. Bureau of Land Management, Wash., D.C.

Wiens, J.A. and M.I. Dyer. 1975. Rangeland avifaunas: their composition, energetics, and role in the ecosystem. pp 146-182. In Proceedings: A symposium on management of forest and range habitats for nongame birds. May 5-9, 1975, Tucson, Arizona. 343 pp.