Using the Publication

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Application of Data

If used properly, the information in this publication can effectively assist the land manager in assessing potential effects on animals of proposed habitat management activities, and in identifying management opportunities for wildlife species. In addition, it would allow the man ager to formulate and evaluate with greater confidence alternatives for land and resource management planning, with reference to wildlife species. The information gathered puts wildlife habitat needs into practicable terms, so management objectives can be set, measured, cost assessed, and programmed over time.

The information reported is useful in forming judgments about potential responses of amphibians, rep tiles, birds, and mammals to identifiable habitat changes in the western Sierra Nevada. It can all but eliminate the possibility of approving projects that might adversely affect Threatened, Endangered, or Rare species, or any other species worthy of special consideration. *But the application of this process is not a .substitute for field work and sound biological and management judgment.*

The biologist still will need to conduct thorough field investigations, using the data as a framework for the field work. Once the basic habitats and broad wildlife effects have been determined, the biologist will need to refine the analysis based on such things as interspersion of habitat types, the presence or absence of special habitats, specific requirements of species for water, space, and cover, and a host of other factors beyond broad habitat needs that enter into determining habitat suitability for a particular species.

The data are especially applicable in land management planning, compartment planning[1], and most pro ject planning. It is important, however, to understand the *limits of resolution* of the data base. Larger areas tend to include more of the special habitat requirements of species, to have a greater variety and interspersion of habitat types and seral stages, and to include larger blocks of the various habitats. Consequently, the larger the area analyzed the more accurate will be the predictions of project impacts on habitats, while the smaller (or more site specific) the area is, the less accurate will be the predictions. Thus, the smaller the project site, the greater is the need for biological expertise in refining the wildlife predictions based on information in this publica tion.

Application of the data reported in making project assessments can be done at different levels, some simple and easily done by hand. More complex assessments, however, are beyond reach of the paper-and-pencil approach. An example is the assessment of probable effects of a large timber sale, involving vegetation changes in several habitat stages, on all vertebrate species within the sale area. For this reason, all of the basic information contained in this publication has been computerized for greater accessibility.

Even without access to a computer, however, it is still possible to use the information for simple analyses, by following these steps:

First, tailor the information to your particular area of interest-for example, for forest biologists, it could be a National Forest or Ranger District-by identifying all the animal species that do not occur in your management area. Use the distribution maps to determine the species not found in your area, and shade over, with a coloring pen, for example, the full species/habitat matrix entry for each species. You can then ignore shaded entries in future use of the species/habitat matrix. If local observations show that a species regularly occurs in your management area, even though the distribution map does not, consider the distribution map to be in error.

Second, use the information for reference on any species you have a particular question about. If the information supplied is not adequate, consult the references listed for that species.

Third, use the information to compile a list of species, likely to be found in any given habitat stage by scanning down the species/habitat matrix under the habitat stage of interest. Each time you find an entry for a species, *check across to the special habitat requirements for that species.* If it has special habitat requirements that are not provided on the project site, do not add it to your list of species. You will see from this step that compiling the species list is *a two-step process of eliminating species not likely to use an area.* Note in the species/habitat matrix, for example, that mallards may be found in any stage of any habitat, but only if a suitable aquatic site is available. Because of the importance of the special habitat requirements in screening out species not likely to utilize a project site, it is important that you visit the project area before compiling the species list. During the visit you should record the occurrence and extent of such features as riparian zones, lakes, ponds, marshes, rock outcrops, cliffs, litter, snags, and other special habitat require ments.

Fourth, and perhaps most important, use the information to get an idea of the species whose populations

likely will be affected, either positively or negatively, by a project. If you know the nature of the change in vegetation to be expected in a given habitat stage, as a result of a project, you may compile "before" and "after" lists of species. At least a simple level of assessment is possible by comparing the two lists.

Any Threatened, Endangered, Rare, or Sensitive animal species likely to be affected by the project should be brought to your attention. This no doubt will require thorough inventory of the project site to learn whether or not the species is actually present. If it is, take steps to learn more about its use of that site, to start (for Threatened or Endangered species) the required consultation process with the Fish and Wildlife Service, U.S. Department of Interior, and to explore possible ways to avoid all negative effects.

Many other ways exist in which animal species lists generated from the species/habitat matrix can be developed to serve the management function. The only constraint is that conclusions should not be drawn that exceed the limits of accuracy of the original data.

Accuracy of Data

This publication should be considered just the beginning in the task of assembling the needed wildlife information to enable comprehensive management of western Sierra Nevada habitats. It is, however, the best single source available for permitting forest managers to assess the effects of habitat modification on wildlife species. Nonetheless, the data base still can be expanded, improved, and made more accurate. For this reason, the California Wildlife Habitat Relationships Program will be involved in the future with testing the data in this and other documents in the series, and in evaluating predictions based on those documents.

Comments and suggestions from users and other readers are welcomed. Address correspondence to:

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Periodically, as more information accumulates, this publication will be updated or supplemented, and new methods will be developed to evaluate management proposals.

The recognized limitations in the information assembled here call for some caution by users in applying it to management decisions:

- It is not a substitute for professional field work and experience. In particular, it is not a substitute for ground checking each site proposed for a management project.

The very nature of the way the information is organized-especially its method of dealing with special habitat requirements-calls for field time of a person informed about how to apply this information.

- The scoring system for designating habitat suitability uses ordinal numbers (1, 2, and 3) for ranking purposes only. These numbers are not intended to indicate that optimum habitat is twice as good as suitable or three times as good as marginal habitat. Therefore, any application of these suitability classes to management problems should be done in a manner consistent with the intended ranking system.

- Only habitat *potentially* suitable for any given species is identified. A list of species potentially using any given habitat stage, for example, a block of mature mixed-conifer forest 100 acres (40 ha) in size, with 80 percent canopy cover, no doubt would include more species than actually could be found on the site. This condition reflects the fact that factors other than just features of a habitat stage have an important influence on a species' occurrence in any given area. This *effect diminishes with increasing size of the sample area.* For example, Marcot[2] found that "potential" lists developed from the North Coastal Zone were three to four times longer than "actual" lists produced by field verification of species occurrence. Marcot's plots, on the Six Rivers National Forest in northern California, were only about 5 acres (2 ha) in size. An analysis at the compartment level, however, should produce a potential list much more closely matching the actual list. In any case, if any analysis using the species/habitat matrix information indicates that the manager should be concerned for a certain species' welfare, *it will be necessary to inventory the area five or more times to determine whether or not that species actually* occurs there.

- The species/habitat matrix does not account for patch size of any given habitat stage, in terms of whether or not it is likely to be used by a species. Obviously small patches of habitat are more likely to be suitable for small animal species, or for species with small territory or home range requirements, than they are for large species with large territories and home ranges. The wildlife biologist will need to study the home range or territory size requirements, or both, or emphasis species guidelines when available, to determine whether patch sizes likely would accommodate a species in question.

- The related question of how many animals of a given species can occupy a patch of known size is also not answered here. A very crude guess might be made by dividing patch size by average territory or home range size, but we do not recommend this procedure. Typically, not all parts of a given patch will be equally suitable for use by the animal species, so not all the patch will be

occupied. As a result, dividing patch size by territory or home range size will overestimate animal density by an unknown amount. Until much more is known about these relationships, so that specific guidelines may be established for relating home range size to estimates of population numbers, the safest procedure for estimating population size is to undertake an accepted field counting procedure. In practice, it is likely that for most projects a

knowledge of actual population size will be necessary only for a limited number of species.

[1] A land area delineated by the Forest Service, U.S. Department of Agriculture, for resource record-keeping. Compartments in the Pacific Southwest Region generally range in size from 3,000 to 12,000 acres.

[2] Personal communication from Bruce Marcot, Six Rivers National Forest, Eureka, Calif, March 1979.