

THE CALIFORNIA WILDLIFE HABITAT RELATIONSHIPS PROGRAM: AN OVERVIEW

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ABSTRACT

The California Wildlife Habitat Relationships (WHR) Program is developing new tools to assist field biologists assess habitat conditions for forest and rangeland wildlife. The systematic organization of existing knowledge on the life histories and habitat relationships of these animals is the core of the Program. WHR is needed to meet the requirements of many laws, policies, and regulations as well as to foster a land ethic in wildland resource management. Major land and wildlife management agencies in California and Nevada, many universities, and one public utility company are cooperating in the Program. WHR is based on the premises that wildlife are products of the environmental features that they use as habitat; that wildland resource management affects those habitats and is subsequently an indirect form of wildlife management; that wildlife habitat requirements must be an integral part of wildland resource planning and management; and that a comprehensive information system covering all species habitat relationships is necessary to facilitate multi-species wildlife planning and management. The Program is consequently structured to develop such an information system, apply it to management processes, and provide for continual improvement in both the system and its application. WHR is administered by a statewide coordinator and

leaders from each of four working zones in the state.

KEYWORDS: habitat, wildlife, land use planning, ecosystem, management, California.

INTRODUCTION

Program Goal

The California Wildlife Habitat Relationships Program is being developed to provide natural resource managers with a system for obtaining information on the responses of wildlife species and their habitats to land management alternatives. The Program emphasizes the practical application of knowledge and experience about wildlife and their habitat requisites to the tasks of identifying wildlife habitat improvement opportunities and of predicting the wildlife consequences of habitat change. The change can be either natural or man induced.

The core of WHR is the systematic organization of information on the life history characteristics of each species, and on the relative capability of different environments to support them. All species of amphibians, reptiles, birds, and mammals inhabiting California's wildland forests and ranges are included (some sub-species are also covered). Environments are classified as wildlife habitats, and described in terms of the habitat elements that provide different arrangements of food, cover, space, and water for wildlife.

The Program of itself will not make nor constrain land management decisions. It will eventually provide an ecologically sound and practical method for integrating wildlife habitat resource data with data on other natural resources for the purpose of assisting decision making administrators understand the wildlife opportunities and consequences of their decisions. We are developing tools to improve the wildlife aspects of the environmental assessment process. Application of these tools hopefully will lead to improved wildlife conservation.

Program Need

The WHR Program is needed to effectively meet the requirements of numerous laws, regulations, and public demands, and to facilitate the evolution of a "land ethic" in natural resources management. The principal national laws affecting public land management agencies are the National Environmental Policy Act of 1969 (NEPA), the Endangered Species Act of 1973 (ESA), the Forest and Rangelands Renewable Resources Planning Act of 1974 (RPA), the Sikes Act of 1974, the National Forest Management Act of 1976 (NFMA), and the Federal Land Policy Management Act of 1976 (FLPMA). Various state laws also affect management decisions.

The central features of these national laws for wildlife resources are indicated by Section 6 of NFMA, "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives...", and by Section 2 of ESA, "...provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved...". By law, we must prevent the man-caused extinction of any species, and we must maintain animal community diversity on Federal lands.

Federal agencies prepare regulations to implement these laws. Regulations provide direction for the preparation of Environmental Impact Statements, Environmental Assessments, and various other reports and plans. The regulations for National Forest System Land and Resources Management Planning (36 CFR 219) require that on each

National Forest, "Fish and wildlife habitats will be managed to maintain viable populations of all existing native vertebrate species..." and the "population trends of management indicator species will be monitored and relationships to habitat changes determined." In addition to the legal mandates previously mentioned, we must deal quantitatively with habitats for all species, and with populations of species selected for management attention. This is very difficult to do, and the WHR Program is providing a "first step" on these tasks.

Public demands for wildlife resources range from local to national in scope. They come from individuals, ad hoc coalitions, sportsmen's groups, national conservation organizations and their regional and state affiliates, and from educational institutions. Public interests vary from population levels of single species, such as deer for harvest, to populations and habitats of several species as indicators of ecosystem vitality. These concerns can result in litigation over land and resource management decisions. Often the litigation arises because resource tradeoffs and the consequences of management alternatives are not adequately displayed. The WHR Program will not halt legal action against resource administrators, but it will provide a credible mechanism for portraying the wildlife consequences of their decisions.

Finally, as society's land stewards we have an obligation to promote conservation as "...a state of harmony between man and the land" (Leopold 1966). This can be done only through an ecosystem, or holistic, philosophy about natural resources management. "Living organisms and their nonliving (abiotic) environment are inseparably interrelated and interact upon each other" (Odum 1971), or as Commoner (1971) puts it, "everything is connected to everything else." Our land management actions have multiple effects, many of which cannot be clearly identified. In timber harvest, we affect not only a stand of trees, but also the wildlife depending on that stand as habitat, and the wildlife dependent on those animals as foods. The action causes "ripples" through the entire ecosystem. That is not inherently bad. It merely indicates that we need to better understand the nature of the linkages in our natural resource ecosystems in order to minimize the probability of unintentional ecological catastrophes, such as species extinction, wildlife starvation die-offs, and disease epidemics, and the extent to which we constrain future resource production options.

In summary of why a Wildlife Habitat Relationships Program is needed we have only to look at society's increased concern and sensitivity about environmental quality. It is expressed through laws, regulations, and political pressures, and is founded in a conservation land ethic. Our natural resource ecosystems will be managed to produce high levels of goods and amenities, while maintaining their ecological integrity and vitality. The WHR Program will evolve to provide us with increasingly better mechanisms to meet wildlife resource objectives for all species by utilizing an ecosystem approach to organizing, refining, and applying wildlife knowledge to resource management decisions.

Interagency Involvement

The USDA Forest Service, Pacific Southwest Region, is the lead agency in the Program. Other Federal, State, and private agencies and organizations with responsibilities for wildland resources are involved in providing Program direction and in sharing developmental work. Our mutual concern is for the development of a common philosophy and methodology for organizing wildlife life history and habitat information. The continued evolution and success of the Program is a result of the combined commitments, insights, and hard work of individual line officers, biologists, and others in the USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, California Department of Fish and Game, Southern California Edison Company, USDI Bureau of Land Management, USDI Fish and Wildlife Service, California Department of Forestry, California Universities, and Nevada Department of Fish and Game.

BASIC PRINCIPLES

The Program's underlying principles are adapted from Thomas (1979).

Wildlife as a Product of Habitat

The distribution and abundance of each wildlife species are greatly influenced by the nature, amounts, shapes, location, and juxtaposition of the food, cover, space, and water resources upon which it depends--its habitat. Many other factors as well affect wildlife abundance, such as predation, competition (both resource exploitation and interference types), parasitism, disease, and weather. These latter factors, singly and in combination, act to suppress a species' numbers below the support capability of its habitat. Thus habitat sets the ultimate capability of an area to support any species, and other environmental factors often function to hold populations below that capacity. The WHR Program deals with the basic habitat capability.

Habitat as a Set of Environmental Elements

In a conceptual sense, habitat is a function of the species' needs for food, cover, space, and water throughout its life history. In reality, food, cover, space, and water are the result of stands of vegetation, bodies of water, physical features such as soils, cliffs, slopes, and aspects, and items like snags, rotting logs, and rock outcrops. The different characteristics and arrangements of these factors are what make one area a habitat for deer and another a habitat for goshawks. Of course, the presence of deer is an important element of mountain lion habitat. Our ability to identify wildlife habitat improvement opportunities or to predict wildlife responses to management activities depends upon our understanding of how each species is related to the environmental elements that comprise its habitats, the current conditions of those elements, and how they will change as a result of our activity or inactivity.

In order to define and distinguish the different kinds of wildlife habitat we use a classification system. In the WHR Program, the vegetation elements of habitat are described by broad scale identifiers of vegetation type (e.g., Chaparral, Mixed Conifer Forest, Wet Meadow), by stand classes of size and age of dominant plants (e.g., grass/forb stand, seedling tree/shrub stand, large tree stand), and by canopy cover classes of dominant plants (e.g., less than 40% canopy cover, 40-70% cover, and 70% or more cover). Other habitat elements are also included in the system; e.g., snags, decaying downed logs, seeps, perches, rimrocks.

Wildland Resource Management is Wildlife Management

All land and resource management activities affect at least some of the environmental elements that constitute habitat for some wildlife. It may be timber harvest as a negative effect on spotted owl habitat in dense forest, but a positive effect on shrub dependent deer. Or, it could be livestock grazing as a negative effect on mallard nesting cover around ponds, yet beneficial to forb dependent pronghorn. Every activity alters habitat elements to the extent that some wildlife are benefitted while others suffer. In this regard, wildland resource management is wildlife management.

Wildlife Needs in Land Use Planning

In many areas of the West, wildland management activities other than those directly considered to be wildlife management have a much greater impact on wildlife than do wildlife projects. Timber management, livestock grazing and fire management are prime examples. These activities are in effect the wildlife manager's primary and most feasible habitat management tools. To get desired wildlife habitat benefits from these activities wildlife managers must be involved in the planning and assessment processes; they must know how each species of concern is related to its key habitat

elements; and they must have a mechanism for applying that knowledge to the decision process. Wildlife habitat needs must be an important consideration in wildland resource planning and management.

A Wildlife Habitat Relationships Information System

A systematic approach to information organization and application is needed to deal with all wildlife in all habitats in the increasingly complex and intensive field of resource management. The system must incorporate the best of existing information, and provide for continual refinement as new data are acquired. In developing such a system for the WHR Program we are concerned with the following criteria:

1. The system should be based on well accepted ecological principles.
2. The system should be practical and comprehensible by professional field biologists and other resource professionals.
3. The system should eventually incorporate all important aspects of species' life histories and habitat relationships relevant to resource management.
4. The system should be structured to be compatible with resource classifications used by other disciplines; e.g., timber typing, vegetation classification.
5. The system should facilitate integration of wildlife habitat assessments with on going management processes; e.g., land use planning, project planning and assessment.
6. The system should be dynamic in the sense that refinements and improvements of the information base are a planned feature of the system.
7. The system should provide a common terminology for all professionals working in wildlife habitat management.

In brief, the WHR Information System is being designed to be an integral part of the total resource management process, not to be a separate, single resource system.

PROGRAM STRUCTURE

There are three basic parts to the California WHR Program; Information System, Applications, and Program Improvement. They are highly interdependent.

The Information System

The Information System is a synthesis of existing knowledge. It therefore mirrors the present strengths and weaknesses in that knowledge. Two things have come to light in this regard; we know something about the habitat needs of every species, and most of what we know is very difficult to express as a quantitative relationship between population dynamics and habitat conditions. In developing the Information System we have constructed an organizational framework for making what is known easily accessible to field biologists.

We fully recognize that precision is the weakest aspect of our model. At this time, we are more concerned with generality and realism; precision will come as our understanding of wildlife habitat relationships becomes relevant to actual sites. The model is designed to encompass the best understood life history attributes of each species and their habitat needs. What we have now is a general model of wildlife habitat relationships for use in broad scale assessments of wildlife habitat resources.

The Information System is currently composed of three products; Species Notes, Species Habitat Relationships Information File, and Specific Management Documents. Each Species Note is typically a one page description of key life history information, the habitat element requirements of the species, selected references, and a geographic distribution map. The notes are synthesized from literature and personal experience by specialists working on contract for the Program. The notes are designed to bridge the gap between the scant information in a typical field guide, and the detail of an exhaustive literature review.

The Species Habitat Relationships Information File is currently both operational and undergoing rapid development. It was initially designed as a matrix of species relationships with vegetation types, stand classes, and cover classes, and with special habitat elements. The relationships are indicated by an index of relative capability to support breeding, feeding, and resting activities of each species over a many year period. Capabilities are currently classed as optimum - the vegetation conditions are capable of supporting relatively high densities of the species; suitable - capable of supporting intermediate densities; marginal - not capable of supporting a self-sustaining population; and not a habitat for the species. Recent evaluation of this capability classification has lead us to propose future improvement by rating capability in relation to the role of specific vegetation conditions in population dynamics. Under the new system (Table 1) high capability vegetation conditions would potentially support positive recruitment (an increasing population or a stable population that produces a dispersal excess); moderate would support neutral recruitment (a stable population with no dispersal excess), and low capability would not support a self-sustaining population (inhabited primarily by colonizing individuals).

Table 1. Proposed system for rating the habitat capability of vegetation types in the California Wildlife Habitat Relationships Program.

Relative Habitat Capability	<u>Recruitment*</u> Mortality		<u>Emigration</u> Immigration
High	G.T. 1	or	G.T. 1
Moderate	~ 1		~ 1
Low	L.T. 1		L.T. 1

* Recruitment is here considered to be the addition of reproductive age individuals from within the population.

The original habitat relationships matrix is currently being augmented by placing life history and niche information into each species' information file. While the exact details of the information file are still evolving, it is intended that future versions will contain information on the following for each species:

1. Species identifiers (codes, numbers, names).
2. Geographic distribution.
3. Life history attributes.
4. Niche parameters.

5. Habitat capability of vegetation stand conditions.
6. Relationships to other environmental elements as habitat.
7. Relative abundance.
8. Legal and management status.

Information files for portions of the state are currently accessible through two computer programs; QWICK QUERY (CACI 1973) ^{1/} for batch mode at the USDA Fort Collins Computer Center, and WHIMP (Marcot pers. comm.) for interactive processing on mini-computers.

Specific Management Documents are still in the developmental phase. They will be patterned after the chapters in Thomas (1979), and will likely be localized modifications of that seminal work. These documents will be designed to provide additional detail on habitat management alternatives for selected species such as mule deer, goshawks, pronghorn, and others, and for special habitat elements such as snags, riparian areas, and old-growth forest. Current efforts concern the development of habitat models for mule deer as a corollary to California's deer management planning effort.

Applications

The development and implementation of procedures for using the information System in wildlife habitat assessments are now underway in many areas of California. A key point in this work is the recognition that the Information System is not a planning or assessment process. Planning and assessment should follow the logical process of: 1) identifying issues, questions, or goals, 2) establishing rules or criteria for gathering information to evaluate conditions relative to those issues, 3) gathering the data and information needed, 4) performing the evaluation, and 5) establishing the management prescriptions needed to meet stated objectives. Wildlife biologists should function at each of these steps as members of the management team.

The Information System is intended to greatly strengthen the biologist's ability to deal with all wildlife at steps 3 and 4. The System is thus both a potential information source and a tool for evaluating habitat capabilities. It does not replace a professionally competent biologist who is capable of integrating site specific wildlife habitat conditions with the general information contained in the system, and who is able to write management prescriptions to meet wildlife objectives.

The WHR Information System is being used both manually and through computer access on projects such as timber sales and in land and resource management planning. As this work proceeds, new methods of making wildlife habitat assessments and habitat capability predictions will be tested and refined. It is our intent to publish these as WHR Applications Notes and to make these new techniques available through periodic training sessions.

^{1/}"The use of a trade, firm, or corporation name does not constitute an official endorsement of or approval by the U.S. Department of Agriculture of any product of service to the exclusion of others which may be suitable."

Program Improvement

Program Improvement is currently focused on the Information System. The initial information in the System includes many subjective evaluations; best guesses of wildlife specialists. Many, if not all, of these evaluations still need to be field verified, and modified when appropriate.

We are currently supporting investigations of bird community relationships with forest seral stages (Verner 1980), wildlife relationships to hardwoods, wildlife community characteristics of old-growth forest ecosystems, and single species studies on bighorn sheep, pine marten, and other wildlife. The results of these studies will in part be used to improve the resolution of the Information System. It is hoped that improved models for assessing wildlife habitat capability will also result from the studies.

Program Improvement will be a continuing part of the WHR Program. Feedback from field biologists using Program products will be crucial. Field application and evaluation is the most important aspect of Program Improvement.

PROGRAM ADMINISTRATION

Working Zones

The WHR Program was initially guided by a Steering Committee chaired by a Forest Supervisor. In order to complete an initial Information System for a large portion of the state in a short time the committee assigned responsibilities to four working zones; Western Sierra, Southern California, North Coast Cascades, and Northeast Interior (Figure 1). Each zone includes 3-6 National Forests, and is mandated to produce a Zone Specific Information System. Eventually, these four Systems will be incorporated into a standardized statewide system. Progress in each zone is listed in Table 2.

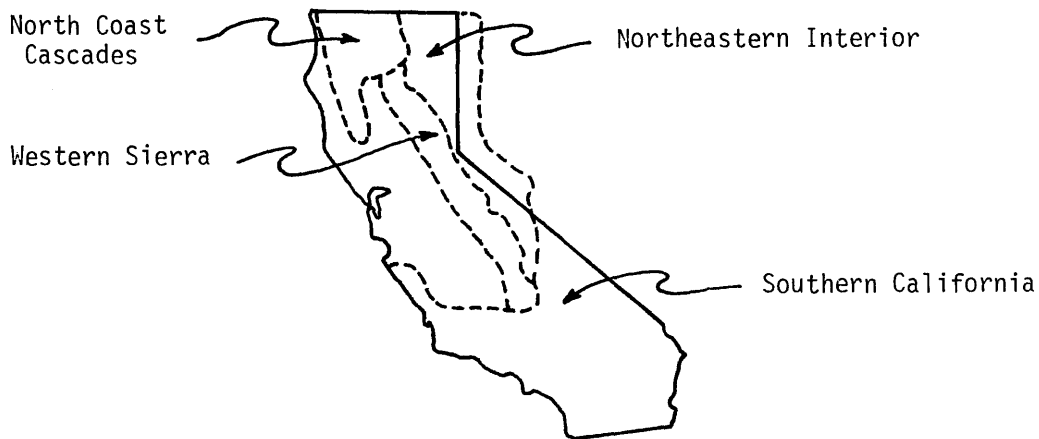


Figure 1. Working Zones of the California Wildlife Habitat Relationships Program.

Table 2. Progress of the working zones of the California Wildlife Habitat Relationships Program. An "x" denotes completion. A year denotes anticipated completion.

Working Zone	Species Notes	Habitat Relationships Matrix	Expanded Information File	Computer Access	Training Program
Western Sierra	x	x	'81	x	x
Southern California	'80	'80	'81	'80	'80
North Coast Cascades	x	x	x	x	x
Northeast Interior	'81	'81	'81	'81	'81

Statewide Coordination

Coordination and direction for developing the Program in each zone and for the state as a whole is lead by the Program Coordinator, a Zone Leader from each zone, and cooperating agency representatives (Table 3). Technical aspects of the Program are handled by the Technical Group, which is composed of individuals working on all aspects of the Program in each zone. The Steering Committee now composed of the Program Coordinator, the USDA Forest Service, Pacific Southwest Region, Fish and Wildlife Staff Director, and one Forest Supervisor from each zone, provides policy direction and administrative support. As the Program expands to cover other portions of the state, appropriate agency line officers will be added to the Steering Committee. We hope to eventually have a Wildlife Habitat Relationships Program that covers all species in all environments of California, and that provides wildlife biologists with an improved ability to insure that California's wildlife habitat resources are prudently managed.

Table 3. Administrative structure of the California Wildlife Habitat Relationships Program.

Working Group	Composition
Steering Committee	Program Coordinator-currently PSW Regional Wildlife Ecologist PSW Region F&WL Staff Director Zone Forest Supervisors-currently 4
Zone Leaders Group	Program Coordinator Zone Leaders-currently 6; 2 are co-leaders Agency Representatives-currently 3 non-FS representatives
Technical Group	Program Coordinator Technical Assistant Zone Technicians Research Cooperators

ACKNOWLEDGMENTS

We have been ably assisted in the development of this paper by Robert Nelson, Jared Verner, Tom Keeney, Jack Kawashima, Ed Toth, Dan Airola, Mike McCollum, Steve Loe, Phil Schempf, Debi Negri and Tom Newman. Judy Wright prepared the manuscript.

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The 4-H Wildlife Habitat Evaluation Program (WHEP) is a 4-H youth natural resource program dedicated to teaching wildlife management to Cloverbud, Junior and Senior level (ages 5 - 19) youth in Arkansas. Nationally, WHEP has earned a solid reputation for being a 4-H program that fosters relationships between youth, professional wildlife and fisheries biologists, agents, volunteers, parents, teachers, and farmers. Participants learn essential life skills such as oral and written communication and decision-making.