MAPPING CALIFORNIA'S "AREAS OF SPECIAL BIOLOGICAL IMPORTANCE"

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ABSTRACT.

To provide a major component in the development of the wildlife emement of the "1980 California Fish and Wildlife Plan," the California Department of Fish and Game (DFG) mapped "Areas of Special Biological Importance" (ASBI) for each county in the state. Maps are intended to provide land managers, planners, and developers with an early warning so that potential adverse impacts on ASBI's from proposed land-use changes can be identified and subsequently reduced or avoided. ASBI's were described for terrestrial mammals, birds, reptiles, and amphibians in three categories: (1) key wildlife areas, (2) limited habitat, and (3) rare or endangered species habitat. DFG biologists indicated proposed ASBI's on 1:100,000 scale work maps and completed information sheets describing ASBI location, land ownership, other current designations (if any), species or habitat involved, and rationale for ASBI designation. Following screening of proposed ASBI's by DFG regional and state headquarters staff, ASBI's meeting designation criteria were transferred onto 1:250,000 maps for printing. Descriptive narrative of the resources of each ASBI was included on the face of the maps.

INTRODUCTION

During the summer of 1980, the California Department of Fish and Game (DFG) will publish the "California Fish and Wildlife Plan." The plan will be the product of over two years of efforts by DFG's planning branch (Speth 1980), and will update the first fish and wildlife plan published 15 years before (California Department of Fish and Game 1965). A major component in the wildlife element of the 1980 plan will be a set of maps of the entire state on which will be designated "Areas of Special Biological Importance" (ASBI). An individual 1:250,000 scale map will be published for each county, with the exception of San Francisco County, which will be included on the San Mateo county map.

Because these maps will show the areas considered by DFG to posses special natural resource qualities, they will likely receive more widespread use than any other set of documents published by DFG. Agency biologists (both state and federal), land managers, planning departments, developers, consultants, and other parties involved with natural resources will look to these maps to provide: (1) an inventory of special biological areas; (2) a "red flag" indication to anyone proposing land-use changes of DFG concern for designated areas; and (3) site information for use in preparing and reviewing environmental documents. This report discusses the rationale and criteria for selecting special areas, methodology of map preparation, and some of the future uses of the completed maps.

Production of the ASBI maps was a cooperative effort of DFG and private consultants: Environmental Systems Research Institute (ESRI) of Redlands, California; and Jones and Stokes Associates, Inc., (J&S) of Sacramento, California; Rod Goss, DFG Planning Branch, coordinated the project for DFG. Don Chambers (ESRI) was the project cartographer. Other individuals instrumental in completion of the project were John Speth (DFG), Mike Larrance (ESRI), and Robert L. Jones (J&S).

RATIONALE AND CRITERIA

Governmental agencies, such as DFG, whose charge is the conservation and wise management of wildlife resources, are confronted daily with proposals for subdivisions, waste-treatment plants, water diversions, transmission line corridors, and other land-use changes that will cause potentially significant impacts. To evaluate the magnitude of potential impacts,

responsible agencies must have information readily available on the type and sensitivity of resources in the project area. ASBI maps immediately identify areas of greatest concern to DFG. If a project is proposed within or adjacent to an ASBI, DFG will be alerted that careful project review is necessary and extensive mitigation measures may be required.

Individuals, corporations, agencies, and others proposing land-use changes will also be major users of the maps. Project proponents will know early in the project planning and design which areas DFG considers special; ASBI maps will be a "red flag." By avoiding these areas, wherever possible, the proponents can reduce or minimize what would otherwise have been substantial opposition by DFG. In addition, mitigation of project-caused losses to a less sensitive site will nearly always be less elaborate (i.e., less expensive) and easier to implement. Thus, proponents will benefit from these maps in three ways: (1) project designs can be drawn to minimize impacts to ASBIs from the outset; thereby avoiding costly redesigning or moving of a project from a highly sensitive site to a less sensitive site; (2) minimizing DFG opposition to the project means that the project may begin sooner, rather than encountering costly delays; and (3) as noted above, mitigation measures required for project approval will likely be less expensive. The project proponent will also avoid being the target of the bad publicity generated by the proposed destruction of an important biological area.

A major problem facing wildlife resources in California is the cumulative impact of small incremental losses of wildlife habitats and populations. The impact of one 10 hectare (ha) subdivision, for example, may be insignificant. However, the cumulative impact of several 10 ha subdivisions becomes highly significant. Major projects affecting sufficiently large areas to generate significant impacts will be required to mitigate those impacts as a condition of project approval. Yet when many independently proposed and evaluated projects cumulatively affect an equally large area over the course of several years, little or no mitigation is accomplished because the impact of each individual project is very small. The problem of cumulative impacts can only be solved by early participation in local and county planning. The overall impact of many small projects over a broad area can be identified for local planning agencies and governing bodies, who ultimately decide where development may or may not occur. ASBI maps are the first step toward early participation. Rather than the traditional role of merely reacting to project proposals, DFG has identified prior to any specific proposals those areas that should be protected. Planning departments can incorporate such information into local policies and general plans.

The concept of designating areas with special values is not new. The California Natural Areas Coordinating Council (Hood 1975-77) has identified several hundred "natural areas" in California based on biological, geological, or paleontological features. The California State Water Resources Control Board (1976) mapped 34 ASBI's along the coast; designated areas where those requiring protection of species or biological communities to the extent that alteration of normal water quality was undesirable. The California Office of Planning and Research (1972, 1974) published preliminary maps, guidelines, and criteria for designating areas of statewide critical concern for a variety of environmental resources. The ASBI mapping effort, however, concentrated on wildlife and wildlife habitat; and it is the only effort to print maps of special areas for each county in the state.

When the fish and wildlife plan update began in 1977, DFG anticipated inventorying and mapping the state's wildlife habitats. Such an effort would have been equivalent to preparing detailed vegetation maps. DFG lacked sufficient funding for statewide vegetation mapping, and the U.S. Forest Service was currently initiating such a study, entitled CALVEG (Parker and Matyas 1978). The wildlife habitat mapping approach was, therefore, abandoned; and the ASBI mapping effort evolved.

ASBI mapping began with the development of criteria for designation. ASBI's were described for terrestrial mammals, birds, reptiles, and amphibians in three categories: (1) key wildlife area, (2) limited habitat, and (3) rare or endangered species habitat. Designation criteria were:

GENERAL CRITERIA

- All ASBI's should be designated on the basis of faunal, floral, or ecological factors, whether natural or artificial.

- The ASBI must be an area that can be delineated or pinpointed on the basis of known biological information.
- The ASBI must be supported by sufficient factors to allow DFG to maintain a defensible position on its designation.

KEY WILDLIFE AREA CRITERIA
- Designations are for species not classified as rare or endangered by the California Fish and Game Commission.
- The area provides an essential habitat component within the general range of an animal species.
- The area is known habitat for an animal species of limited abundance or restricted distribution.

LIMITED HABITAT CRITERIA
- A habitat type that has been significantly reduced from its historic distribution, either locally or statewide.
- The area is of special importance in meeting the general life requirements of a diversity of dependent or associates species.

RARE OR ENDANGERED SPECIES HABITAT CRITERIA
- The general range of those species designated as rare or endangered by the California Fish and Game Commission.
- U.S. Fish and Wildlife Service officially designated critical habitat.
- Verified sightings or nesting sites of rare or endangered species having extended ranges.

Table 1 lists several examples of ASBI's that fulfill the designation crietria. DFG emphasizes that ASBI's are not only important wildlife areas in the state. Indeed, the entire state, even urban areas, provides habitat to several wildlife species. ASBI's however, represent those areas possessing natural resources qualities that require special consideration in the development of human use of the land.

TABLE 1. Sample of acceptable ASBI's

CATEGORY	ASBI NAME
Key Wildlife Area	Pronghorn antelope kidding grounds, Sage grouse strutting grounds, snowy plover breeding habitat, water-associated bird habitat, Fisher sightings and Yosemite toad habitat
Limited Habitat	Coastal wetlands, freshwater marsh, vernal pool, ironwood woodland, riparian habitat and mountain meadows
Rare or Engangered Species Habitat	California least tern habitat, American peregrine falcon habitat, blunt-nosed leopard lizard habitat, wolverine sightings, Mohave ground squirrel habitat, and limestone salamander habitat

METHODOLOGY OF MAP PREPARATION

Preparation of the ASBI maps followed four basic steps: (1) proposal by DFG biologists of areas for ASBI designation; (2) screening of proposed ASBI's using designation criteria; (3) writing descriptive narrative for each ASBI to be printed on the face of the map; and (4) transfer of designated ASBI's from work maps to camera-ready maps for printing.

During all of these steps, numerous unexpected problems were encountered. These problems caused a project intitially estimated to require 6 to 8 months for completion to take nearly two years. Although none of the problems was difficult to solve, solutions were time consuming because of the magnitude of the project. A total of 3,198 ASBI's were proposed for designation in California's 58 counties.

PROPOSAL FOR ASBI DESIGNATION

DFG divides California into five administrative regions, which in turn are divided into a total of 41 local units. Unit boundaries usually follow county lines. Several units encompass two entire counties; and few units contain parts of several counties. Each unit has a biologist in charge of the wildlife resources for that area. Workshops were held in all five regions to brief the unit biologists on the mapping project, designation criteria, and designation methods.

To propose an ASBI, the unit biologist drew the area boundaries on 1:100,000 scale working maps and completed an information sheet listing the necessary background data to justify designation. Data on the information sheet included a number assigned to the ASBI, unit biologist's name and phone, ASBI name, ASBI location, wildlife species or group involved, ASBI category (e.g., limited habitat), land ownership, known or potential land-use conflicts, threat time, impacts on ASBI's from conflicts, and rationale for designation. The most important data on the form were the rationale for designation. Wherever possible, quantitative data were reported, and supporting documents and information sources (e.g., field notes, administrative reports) were listed. The information sheet was the basis for the screening evaluation and provided the data to write the descriptive narrative.

On the working maps, the color of ink used to delineate an ASBI's boundaries corresponded to the appropriate ASBI category. When an ASBI was too small to designate by a polygon (e.g., wolverine sighting, guzzler), it was represented by a dot.

Several types of ASBI's were discussed in narrative form only; exact indication of location was shown on the map. Raptor nests were not mapped because of their high sensitivity to human disturbance. Potential ranges of highly mobile species, such as the San Joaquin kit fox (*Vulpes macrotis mutica*), would have included many thousands of hectares. Riparian habitat was not mapped because the California legislature allocated funds specifically for an in-depth riparian inventory and mapping study (Nelson, et al., 1980).

SCREENING

Following proposal of ASBI's by unit biologists, the maps and information sheets were reviewed by the regional offices and forwarded to DFG headquarters for further screening. The supervisors of DFG's wildlife management branches (i.e., big game, waterfowl, nongame, rare and endangered species, herpetofauna) reviewed the proposed ASBI's. Occasionally, some areas were deleted, and others were added. These reviews ensured that all known areas deserving designation were included. For example, a unit biologist who dealt primarily with big game may have had very limited knowledge of the status of nongame birds or amphibians in his unit.

DFG Planning Branch performed a final review of all proposed ASBI's. Those areas meeting all designation criteria were accepted. The working maps were sent to the cartographers as ESRI. The information sheets were sent to J&S to write the descriptive narrative.

WRITING DESCRIPTIVE NARRATIVE

A narrative discussion of the ASBI's in a county is presented on the face of the maps. A number indicates which narrative corresponds to mapped areas. For each type of ASBI (e.g., deer winter range, coastal wetland), a general statement is made describing such an area and documenting its importance. Immediately following is a brief statement on the individual ASBI's of the type in the county, incorporating the background data from the ASBI information sheet (Table 2).

TABLE 2. Sample ASBI narratives

Type	General Discussion	Site-Specific Discussion
Yellow-billed cuckoo habitat	Rare. The yellow-billed cuckoo is restricted to riparin habitat exceeding 300m in length and 100m in width. Because of extensive losses of riparian habitat, the species is absent from much of its original range. Only 141 individuals were observed in a statewide census in 1977.	Four were observed in the Owens Valley and two along the Amargosa River. (From Inyo County).
Heron and egret rookeries	Herons and egrets usually nest colonially in marsh or riparian habitats. Nests are typically stick platforms in trees, willow thickets, reeds, or cattails. Because of the concentrations of birds in a small area, disturbance could adversely affect many breeding pairs.	Groves of oaks, willows, and olives that are suitable for rookeries are uncommon in Fresno County. A large rookery near Oxalis supports 50 great egret, 500 snowy egret, and 100 black-crowned night heron nests.
Deer holding areas	Holding areas are concentration centers, usually along migration routes between winter and summer ranges, where deer remain temporarily because of climatic or forage conditions.	Approximately 75 percent of the deer that summer in eastern Sierra County utilize the upper Long Valley as a source of early spring grass.
Golden Eagle nest sites	The golden eagle is protected under the federal Bald Eagle Protection Act, and is fully protected by state law. Nests are usually in tall trees or on cliffs in mountainous areas. Because the species is highly sensitive to human disturbance and may desert a nesting territory if disturbed, nest locations are not mapped.	Twenty-nine aeries have been located in Lassen county, the highest number of any county in the state.

General narratives were written for 74, 15, and 26 different types of key wildlife areas, limited habitats and rare or endangered species habitat, respectively. Some areas were designated under two or all three categories. San Francisco Bay, for example, is a key wildlife area to thousands of waterfowl, shorebirds, and wading birds; provides large areas of otherwise highly limited wetland habitat; and supports populations of several rare or endangered species. Lake Skinner in Riverside County is both a waterfowl wintering habitat and a bald eagle (*Haliaeetus leucocephalus*) wintering area.

Once all narratives for a county were written and assembled, they were arranged by category and renumbered sequentially. Draft narratives were then submitted to the appropriate unit biologists, who reviewed them for accuracy of content. Changes in the narratives were incorporated where needed. Final narratives were forwarded to ESRI to be typeset and added to the maps.

PREPARATION OF CAMERA-READY COPY

Areas delineated on the 1:100,000 working maps were transferred onto transparent overlays. The areas were given numbers corresponding to the appropriate narrative discussion. The

overlays were photo-reduced to 1:250,000 scale and superimposed over U.S. Geological Survey basemaps. Polygons and dots representing key wildlife areas, limited habitats, and rare or endangered species habitat were printed in green, blue and red, respectively. Narrative titles were also printed in the colors representing the three ASBI categories.

The above procedure, although conceptually simple, took many months to complete. Major problems encountered included:

1. An ASBI in one county may extend into an adjoining county and a different DFG unit. Occasionally, there was no indication on the adjoining map of a continuation of the ASBI into the county. The remainder of the ASBI needed to be added to the adjoining map. Similarly, an ASBI may have been designated in both adjoining counties, but the boundaries did not match up.

2. During the extensive screening process, numerous ASBI's were added or deleted. Occasionally, changes were indicated only on the information sheets, not on the working maps, or vice-versa. Thus, in some instances narratives had no polygons and polygons had no narratives.

3. ASBI's were occasionally designated in the incorrect category.

4. Bodies of water delineated on the overlays did not always line up with the same bodies of water on the base maps.

The first three problems were the most time consuming. To rectify these problems, both the narratives and the overlays had to be changed; where such changes altered the narrative sequence, dozens of individual ASBI dots and polygons had to be renumbered. Even if the problems noted above occurred in only a small percentage of cases, thousands of ASBI's had to be carefully checked to ensure that the number next to an ASBI narrative referred to the correct polygon or dot on the map. Two sets of draft maps were needed to catch all potential errors. Photographs of the overlays were taken and reviewed for accuracy. Complete blue line maps were prepared from the corrected overlays. These blue lines were also checked, any additional corrections were made, and the camera-ready maps were prepared for printing.

FUTURE USES OF THE ASBI MAPS

The rationale section discussed in detail some of the major uses of the ASBI maps: resource inventory, "red flag" to developers and planners, and site-specific information for use in writing and reviewing environmental documents. The maps will be consulted repeatedly as a source of crucial biological information. However, the maps will also serve two additional, highly important uses.

First, the maps will readily indicate where gaps exist in DFG's knowledge of California's resources. For example, if the ASBI maps for a particular county reports five osprey (*Pandion haliaetus*) nests, yet a local ornithologist is aware of six, DFG will learn of an additional aerie. It also became apparent during this project that the exact migration routes of some of the state's big game herds are unknown. Thus, the maps will stimulate expansion of DFG's data base, and will help direct future research toward filling existing data gaps.

Second, the maps will provide baseline information for monitoring the future status and trends of California's sensitive biological resources. It is likely that in coming years many ASBI's will be lost to urban sprawl or some other land-use change. DFG, other governmental agencies, conservation groups, and concerned citizens will be able to measure the effectiveness of management plans, governing policies, and the environmental review process. If needed, changes can then be made in these activities to ensure that the remaining ASBI's continue to be of special importance.

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