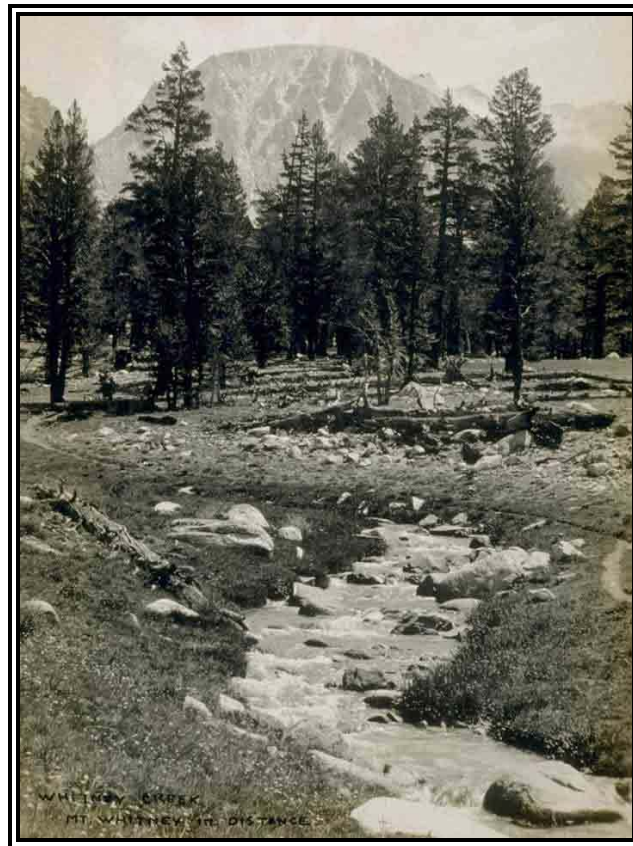


ADVANCING RESOURCE ASSESSMENT FOR CALIFORNIA'S WILDLIFE

**RESOURCE ASSESSMENT PROGRAM WORKSHOP SUMMARY
CALIFORNIA DEPARTMENT OF FISH AND GAME
UC DAVIS WILDLIFE HEALTH CENTER
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OVERVIEW OF WORKSHOP

Management of California's vast natural resources requires balancing the demands of an ever-increasing human population and protecting the integrity of a landscape that is unique in its geographic diversity and species richness. Management efforts are guided by the best available data at the smallest geographic scale whenever possible. While assessment and monitoring of California's wildlife, habitats and natural communities are a top priority for the California Department of Fish and Game (DFG), personnel and fiscal resources are limited, and a prioritization strategy must be established to ensure the most needed information is obtained. California Department of Fish and Game's Resource Assessment Program was established in order to develop a comprehensive monitoring strategy for California.

A major goal for the UC Davis Wildlife Health Center's role within the Resource Assessment Program is to coordinate efforts with other resource monitoring programs and include input from the scientific community in the development of a monitoring strategy. On the 28th of January 2004, a workshop was jointly hosted by the UC Davis Wildlife Health Center and DFG's Resource Assessment Program in an effort to gather outside scientific expertise on future resource assessment priorities. Nearly 60 scientists and administrators from universities, government agencies and non-governmental organizations with a broad range of expertise in ecology, conservation biology, and policy participated in round-table discussions. During the morning session, representatives from agencies that play a role in coordinating monitoring programs in California provided a transparent view of the strategy and criteria used by their agencies to develop resource monitoring priorities. For the afternoon session, participants' areas of expertise were carefully matched with geographic areas, and priorities for monitoring were identified by facilitated break-out groups on a regional basis.

Group findings and recommendations were discussed in a closing plenary session where regional priorities were evaluated for their fit within the DFG statewide resource assessment and monitoring program. In addition to the specific monitoring priorities identified for each geographic region, there was consensus among participants that the Resource Assessment Program should continue: 1) collaborative efforts with other agencies and universities, 2) development and dissemination of standardized data collection protocols, and 3) focusing monitoring efforts that evaluate land and water use practices that affect most geographic regions within California.

WORKSHOP PURPOSE

The goals for the workshop were to:

- Identify key resource assessment and monitoring priorities in California.
- Identify top biological issues to address through monitoring.
- Develop strategies for establishing and collaboratively implementing resource assessment priorities.
- Inform participants of current resource assessment program efforts and increase opportunities for collaboration on future endeavors.

GOALS OF DFG RESOURCE ASSESSMENT AND MONITORING

In order to meet the public trust responsibilities, the Resource Assessment Program strives to gather the information needed for species and habitat conservation planning and management of public or DFG lands for sustainable use. This information is most needed by policy makers, land managers, and program managers with regulatory responsibility, who represent the main “clients” for this program.

Background

DFG’s Resource Assessment Program was established in 2001 to enhance consistency and coordination among biological disciplines, and ensure that specific monitoring programs and activities throughout the state are focused on obtaining important and useful information for resource agencies, stakeholders, and the public. Several main objectives for the Resource Assessment Program were identified:

(<http://www.dfg.ca.gov/habitats/RAP/default.html>)

- Establish a mechanism to prioritize resource assessment for species, natural communities, and habitat elements with the help of the expert scientific community.
- Develop or acquire systematic data collection and assessment reporting protocols that have been peer-reviewed by scientists.
- Acquire baseline information for strategic species, natural communities, and habitat elements currently not addressed through other monitoring efforts.
- Integrate monitoring efforts across the various biological disciplines to the maximum extent possible.
- Compile inventory and monitoring data for use in regional and statewide assessments and identify important biological data gaps.
- Investigate the impact of natural and human-caused factors on abundance and distribution of species.
- Develop and implement data management procedures for the program.

- Provide information in an accessible format to help researchers, managers and planners conserve our resources in California.
- Increase public awareness and confidence in wildlife management decisions, particularly for private landowners.

Periodic program review and incorporation of feedback from the program's clients is important for long term sustainability of these efforts. In an effort to meet these goals, the Resource Assessment Program has become the state's main entity for collection of baseline data on wildlife species and habitats.

PRIORITIZATION STRATEGIES USED BY OTHER AGENCIES

Four representatives of other agency programs involved in development and implementation of monitoring programs were invited to give brief presentations of their respective efforts. The California Department of Fish and Game's portion of the Interagency Ecological Program, the California Department of Parks and Recreation, the California Legacy Project, and the US Forest Service all coordinate or have monitoring programs of their own. The following is a summary of the process used by these agencies to establish monitoring strategies.

- The Interagency Ecological Program, which focuses on the Sacramento-San Joaquin estuary, identifies priorities with input from regional scientists, engineers, and stakeholders (or clients). Management priorities for the Bay-Delta Authority, as well as project cost and feasibility play an important role in shaping priorities. Proposals for projects and contracts go through both internal and external scientific peer review. Use of an adaptive and transparent strategy that emphasizes collaboration has been key to the program's success.
- California Department of Parks and Recreation's Inventory, Monitoring and Assessment Program (IMAP) was created in 2000 to evaluate the trend of natural resources within parks and assess the affects of park management on these resources in order to ensure adaptive management and prudent use of funds. Each park develops an IMAP plan that identifies key indicators, or "vital signs", for assessment of park management strategies. A formal 15 step planning process is applied that utilizes input from park rangers, maintenance staff, interpretive staff, cultural staff, volunteer/cooperative associations, and resource specialists. Scientific specialists provide necessary input from plan initiation through project implementation and analysis of data. Final IMAP plans are reviewed through a series of workshops, and coordination/collaboration with federal and state monitoring efforts is emphasized.

- The California Legacy Project, based at the State Resources Agency is a statewide partnership between the private and public sectors to assemble resource conservation data to assist decision-makers. Major project goals are to ensure that information on the state's most valuable resources is available in a useable format for decision-making and that efforts are coordinated through public-private partnerships. Priorities for the project were identified through advisory committees and a series of regional workshops that incorporated local interests and expertise. This project did not receive agency funding for the 2004 -2005 budget period, but project managers are looking for public-private partnerships to continue decision-tool development and data analysis priorities.
- The US Forest Service's Pacific Southwest Research Station is committed to long term research that evaluates cause and effect relationships in forest ecosystems. Scientific peer-review and applicability to management decision-making are the main criteria used for establishing the research focus. Formal, large-scale collaborative entities with universities, such as the California Cooperative Ecosystems Studies Unit, play a major role in developing the research program and providing technical assistance. Implementation of long term projects has been hindered by revolving personnel and budgetary constraints. Projects that are implemented are expected to meet the best practices of scientific work and are subject to peer review.

REGIONAL PRIORITIES FOR RESOURCE ASSESSMENT AND MONITORING

Multi-agency priorities for resource assessment and monitoring were identified on a regional basis for the geographic areas shown in Figure 1 by participants in breakout groups. Participants in each group were asked to first list the major issues facing their assigned region and then select the three top issues to evaluate monitoring strategies in more detail. Participants identified the impacts for each top issue and determined the research data needed to monitor these issues and their impacts.

The priorities identified for each region are summarized in Figures 2 – 6. Clearly, each region faces problems related to land use, water use, invasive species, and climate change. Land and water use, and their associated impacts (actual or potential future impacts), were identified as the major stressors driving habitat and species population-level changes in each region. There was consensus that emphasis should be placed on monitoring the impacts of land and water use on wildlife populations and plants because land and water use practices may most easily be influenced by changes in policy resulting from monitoring efforts. In general, monitoring efforts were

recommended that would provide the most powerful information for management and policy decisions.

Experts for most regions stressed monitoring changes in habitat structure and composition and identifying key wildlife species (bioindicators) to assess the impacts of the problems facing the region. Often, changes in wildlife species distribution and abundance will be in response to habitat changes, so monitoring the underlying alterations in habitat structure and community composition is critical. In regions where water management issues featured heavily, recommendations were made to also evaluate water quality parameters. Monitoring disease in wildlife populations was also emphasized particularly in those regions where biological and chemical pollution was a concern. Wildlife disease may be a much bigger issue facing wildlife than it has in the past as wildlife and zoonotic pathogens become more widely distributed via global trade and the exchange of biological materials across continents. To meet the basic standards of scientific rigor, a monitoring program should take all practical measures to evaluate any factors that may influence the manifestation of an impact in an ecosystem. Measures such as water quality and disease should be evaluated not only as markers of certain impacts within a region but also because these problems may exert their own influence on wildlife species abundance and therefore act to confound analyses in general.

STRATEGIES FOR COLLABORATIVELY IMPLEMENTING MONITORING PRIORITIES

DFG's Resource Assessment Program is ideally positioned to develop a widespread monitoring network with a systematic process for identifying priorities that can be applied statewide. The system should be adaptive so that plans can be modified to focus on important areas that need immediate attention to solve emergent problems. The monitoring network must establish standardized and widely accepted guidelines and protocols that can be broadly applied to different projects to make data as comparable as possible. Ideally, sampling regimes would be developed and reviewed by scientific experts in advance of project planning so that they could be applied most effectively to new projects across the landscape. Similarly, a conceptual model framework that can be applied to various projects with some modification would help ensure that the basic tenets of a good monitoring program and scientific rigor are incorporated into every project. The Resource Assessment Program is currently developing standardized protocols and a conceptual model framework that could be widely distributed. Extensive coordination with field investigators, review by the expert scientific community and cooperation among various agencies must be emphasized in the development and implementation of these tools to ensure their

broad acceptance. An approach similar to that developed by CALFED to establish priorities and prioritize research efforts was recommended.

The need for increased collaboration in management of research activities in order to improve monitoring efforts and keep costs at a minimum was repeatedly emphasized. At the very least, resource assessment efforts should be integrated within and between CDFG, the US Forest Service, CA Parks and Recreation, and the US Geological Survey-Western Ecological Research Center (WERC). In a variety of recent initiatives by other programs, a great deal of emphasis has been placed on collaboration and integration of efforts, yet a clear strategy to accomplish this has not emerged. In the past, research collaborations have most often resulted from efforts made by mid-level scientists. Large scale collaborations at the programmatic/upper management level are much rarer. Currently, most state management agencies can not reward collaborative efforts, which usually involve work, funds and time being put towards another agency's project. Furthermore, most researchers are chronically overextended and, given the investment of time and advanced planning needed to initiate and maintain collaborations, many may be reluctant to broaden efforts if collaborations have not "paid off" adequately in the past. Barriers to inter-agency and intra-agency collaboration must be identified and resolved if statewide monitoring programs are to reach their full potential.

Consistent with the needs identified, the Resource Assessment Program had already taken the initiative to develop what are hoped to be long-term collaborations, particularly with the UC system (UC Davis Wildlife Health Center, UC Riverside Center for Conservation Biology, and UC San Diego White Mountain Research Station) and with the US Geological Survey-WERC.

SUMMARY OF RECOMMENDATIONS FROM WORKSHOP

Recurring recommendations from geographic region groups

- Land and water use contributing to habitat loss and degradation, invasive species, and climate change were identified as critical issues affecting most geographic regions of California.
- Monitoring efforts should focus on sensitive bioindicators that will best reflect these anthropogenic changes in critically altered ecosystems.
- Whenever possible, monitoring efforts should try to elucidate cause and effect relationships within critically altered ecosystems.

- Water quality and disease should be evaluated because they can serve as markers of certain impacts and also exert their own influence on wildlife and plant populations.
- Predictive models should be developed that can be used for management decisions.
- Research activities should evaluate ecosystem function and processes, and elucidate the effects of human activities vs “natural” sources of change over time.

Program Recommendations

- The Resource Assessment Program should spearhead a collaborative effort to establish standardized peer-reviewed data collection protocols and develop a system for distribution of protocols.
- Increased collaboration in management of research activities will improve monitoring and keep costs at a minimum.
- Periodic program reviews and incorporation of feedback from the program’s “clients” will help ensure long term sustainability.
- For monitoring data to be most useable by the targeted “clients”, the data must be interpreted and translated into an easily understandable format, preferably by the projects investigators.

Figure 2: Monitoring priorities for the Sierra Nevada, Sierra Foothills and Modoc Plateau region.

Major Issues Facing Sierra Nevada Region

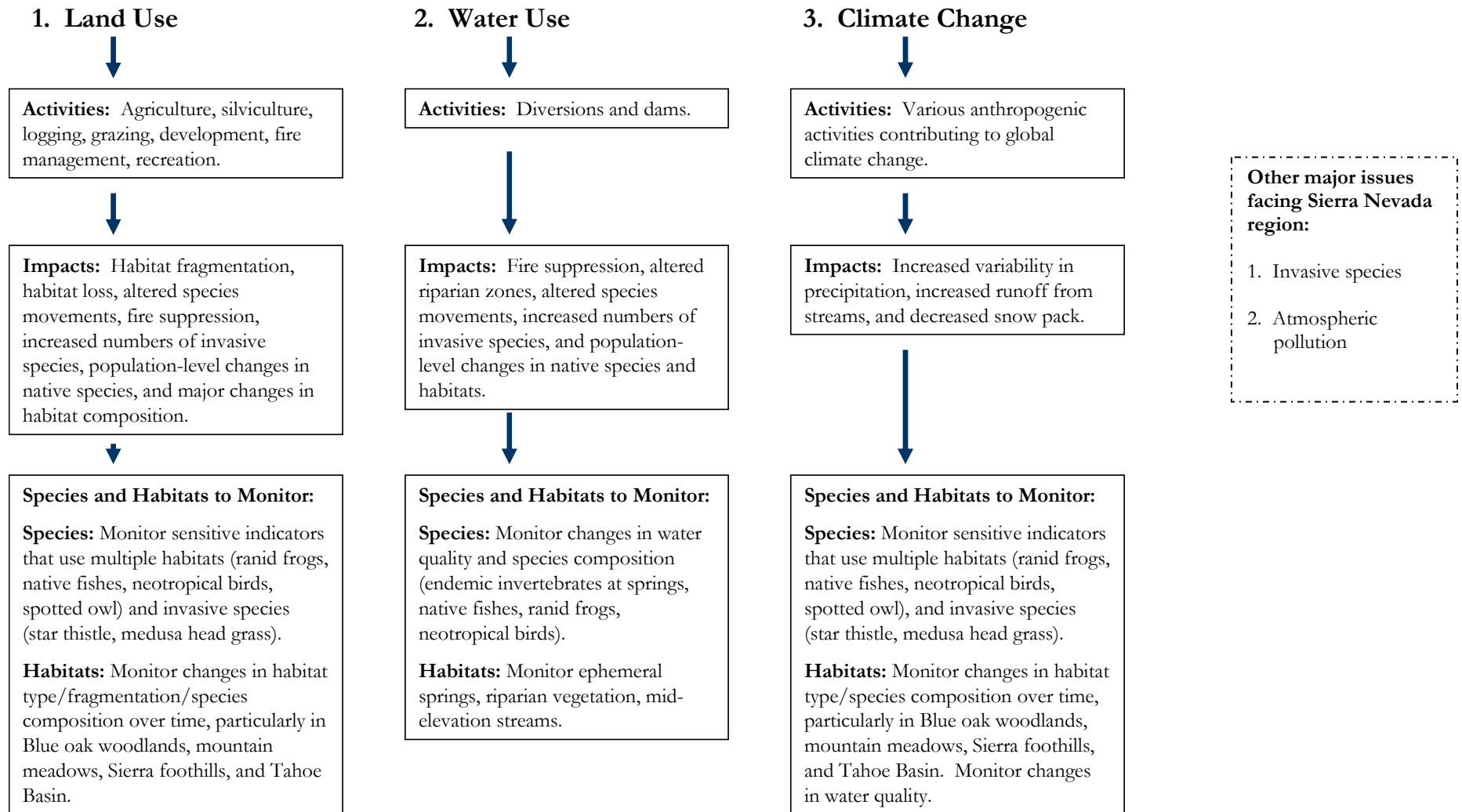


Figure 3: Monitoring priorities for the Central Coast and Central Valley region.

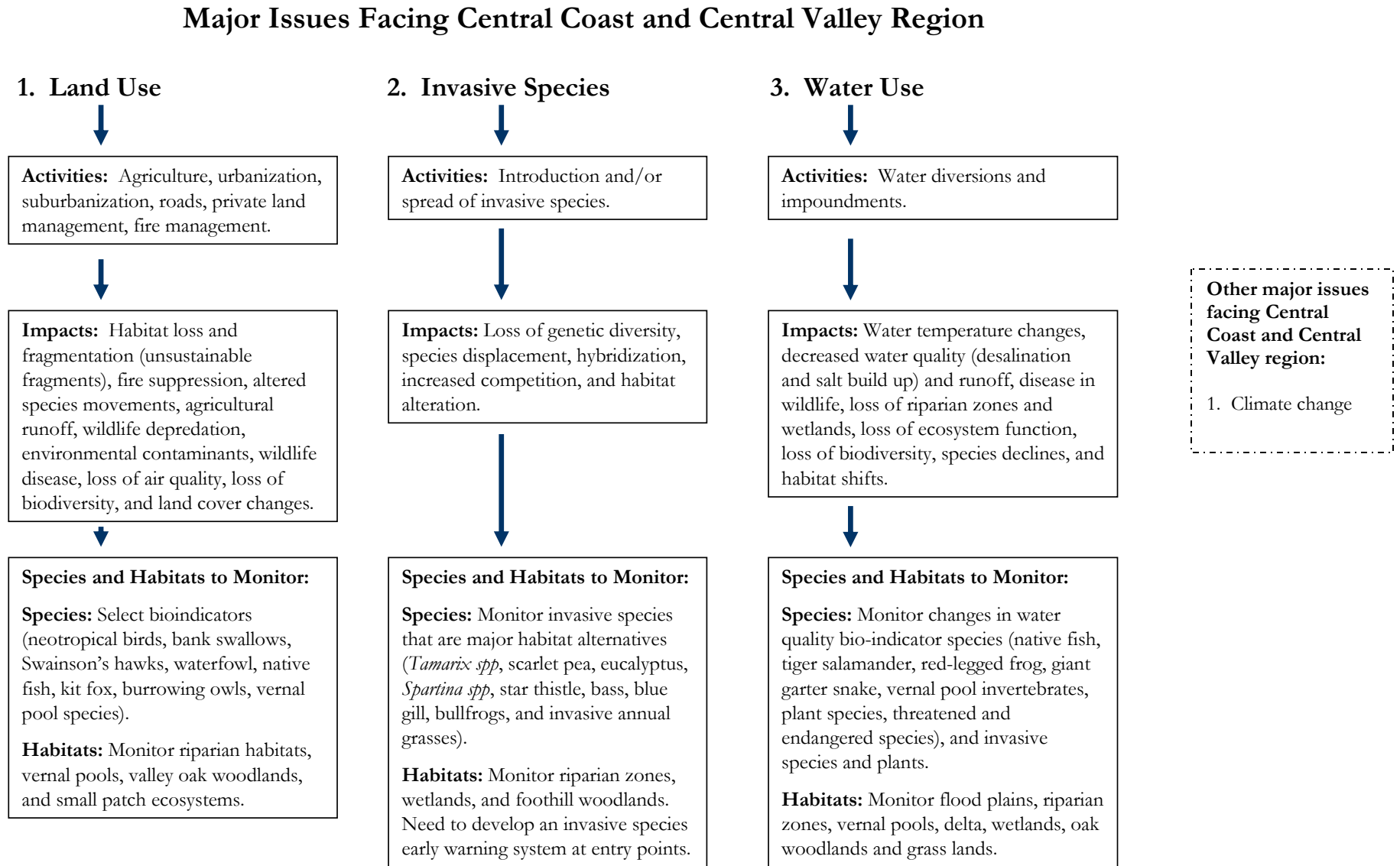


Figure 4: Monitoring priorities for the South Coast and Desert region.

Major Issues Facing South Coast and Desert Region

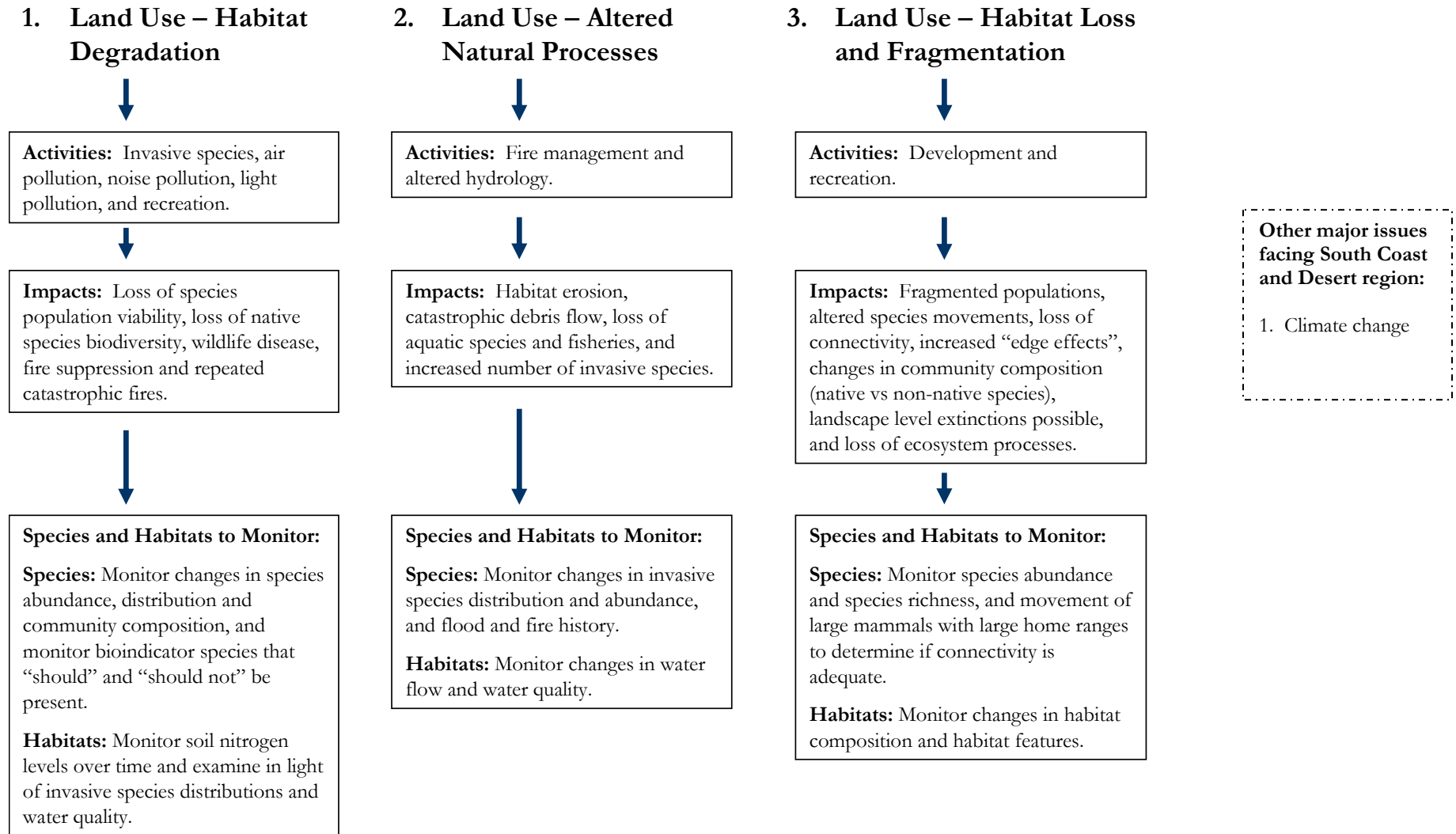


Figure 5: Monitoring priorities for the North Coast region.

Major Issues Facing North Coast Region

1. Land Use – Alterations in Water Flow



Activities: Development, industrial, and agriculture activities that alter water flow.



Impacts: Decreased water quality, changes in water table stability, loss of estuarine system function, fish mortality, and riparian habitat loss.



Species and Habitats to Monitor:
Species: Couple monitoring of aquatic systems (water flow, temperature, quality, chemistry) with monitoring of species changes (macro-invertebrate species composition, fish species composition, owl abundance, and murrelet abundance).
Habitats: Monitor soil nutrient levels over time/nutrient leaching.

2. Land Use – Vegetation Alteration/Timber Harvest



Activities: Vegetation alteration through agriculture/development and timber harvesting.



Impacts: Major changes in community and habitat composition, and fragmented landscapes and populations (subdivisions with large land holdings).



Species and Habitats to Monitor:
Species: Monitor species associations with seral changes in forest ecosystems resulting from timber harvest (deer abundance/distribution, spotted owl abundance/distribution).
Habitats: Monitor changes in edge habitat diversity and landslide activity.

3. Land Use – Soil Erosion



Activities: Development, agricultural, industrial and recreation activities contributing to soil erosion.



Impacts: Shallow soils and altered streambed habitat and aquatic ecosystems.



Species and Habitats to Monitor:
 Monitor water quality stations, stream channels, gravel transport, landslides and extraction activities.

Other major issues facing North Coast region:

1. Invasive species
2. Climate change

Figure 6: Monitoring priorities for the near-shore marine region.

Major Issues Facing Near-shore Marine Region

