

# Chapter 5

## Summary Findings

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This background paper describes the extensive activity undertaken by the Federal Government, mostly as a result of legislative mandates to collect biological data. The paper points out that very little of the Federal data can be easily applied to the maintenance of biological diversity, because the data are scattered throughout many agencies, maintained in various forms, and stored in different, and frequently incompatible, systems. These factors make it very difficult, if not impossible, to retrieve, compare, and consolidate the data for use in designing strategies for on-site maintenance of biological diversity in the United States. Many of the problems, however, could be easily solved or avoided in the future with strong institutional commitments to coordination and cooperation in collecting and applying biological data.

The following is a brief discussion of this paper's three major findings concerning biological data,

#### FINDING 1:

Few of the numerous mandates for Federal agencies to collect biological data or to maintain biological databases are directly applicable to the maintenance of biological diversity in the United States.

A body of Federal legislation authorizes various Federal agencies to collect and compile selected information on plant and animal life in the United States. (See ch. 2.) As a result, numerous Federal agencies conduct biological inventories, creating enormous quantities of biological data that address various aspects of biological diversity. Because few of these laws explicitly cite the maintenance of biological diversity as an objective, biological diversity is not considered in a comprehensive or coherent manner. The legislation usually directs or authorizes an agency to conduct inventories, but the mandates can be interpreted differently by different individuals within and among agencies. Due in part to the differences in agency objectives and in the interpretations of

agency objectives and directives, the information collected on individual organisms and on taxa varies considerably. Data gaps exist geographically and taxonomically. Some taxonomic groups generally are ignored in field inventories. Others, particularly plants and animals with economic or recreational value, are inventoried extensively by more than one Federal agency. As a result of all these factors, existing biological data cannot be easily applied to decisions regarding the maintenance of biological diversity.

*One solution to this problem would be an explicit mandate to the appropriate Federal agencies to compile existing data on the status of biological diversity in the United States and to conduct periodic reviews of this diversity.* The result could be agency cooperation similar to that undertaken by the U.S. Forest Service and the Soil Conservation Service in their joint assessment of wildlife and its habitat under the Soil and Water Resources Conservation Act (RCA) and the Rangeland Renewable Resources Planning Act (RPA) (see ch. 3), although appraising biological diversity would involve more than two Federal agencies. In addition, Federal agencies could be required to consult with appropriate State agencies (e. g., Natural History Surveys) or private organizations (e.g., The Nature Conservancy) to locate sources of biological data that are not available within the Federal system. The compilation of existing biological data for the maintenance of biological diversity could take a number of forms. (See ch. 3.)

The process of identifying and compiling existing biological data relevant to the maintenance of biological diversity would help to pinpoint areas where data overlap or are lacking. At the least, such a process would initiate activities to coordinate the collection and entry of data and, thus, would facilitate the retrieval of data. As with the RCA-RPA process, one benefit of coordination might be the establishment of standards for data collection and data entry.

**In addition, existing Federal laws authorizing biological inventories would** need to be reviewed to eliminate potential conflicts or inconsistencies with a new mandate for coordinating biological data. Under such a mandate, the responsibilities of Federal agencies would need to be clearly defined. Otherwise, the mandate could increase the quantity of biological information and perpetuate the inconsistencies and incompatibilities of the data maintained by different agencies. The extent of consistency that is necessary would determine how much funding would be needed.

**FINDING 2:**

Rapid technological advances, especially in the computer field, could have both positive and negative effects on the collection, storage, and retrieval of biological data.

Recent advances in technologies have increased, and should continue to increase, the quality and quantity of biological data collected, and the accessibility and usability of such data. Technological advances are likely to decrease the cost of data collection, maintenance, and retrieval. (See ch. 4.) These advances include microcomputers for field data collection, new and more flexible database-management packages, and sophisticated telecommunication technologies to increase data access and retrieval.

Although new technologies provide greater opportunities for data managers and data users, the variety of computer hardware and software could exacerbate the current problems of incompatibility and inaccessibility. Technologies appear to be selected on an ad hoc basis, frequently reflecting the preference, knowledge, or expertise of individual data collectors and administrators.

Various Federal agencies have begun to coordinate database-management activities, especially in the case of geographic information systems. However, coordination among agencies in the purchase and development of information technology is extremely difficult, because different agencies have different missions, needs, and uses. Obviously, no one database-management system could meet all the needs of one agency, let alone the needs of all agencies.

*A solution to these technology-based problems may be to establish an external review process that would assist agencies in setting up data networks and provide consultation on hardware and software systems.* The review process could be coordinated through an agency like the National Academy of Sciences or the congressional General Accounting Office. Professional societies of both resource professionals and computer specialists could play a role in designing office systems that would meet the needs of most users and would allow compatibility in hardware and software among users within an agency. Formal consultation with computer specialists could provide independent review of the utility of existing computer systems and could help agencies set priorities for purchasing additional hardware and software to meet agency needs. Because outside consultants would need to work closely with automated-data-processing personnel and database administrators within each agency, a mechanism to establish dialog between agencies would have to be developed. Once such a mechanism were established, standardized data mechanisms for data exchange could be developed.

The cost of establishing database hardware and software compatibility among and within agencies would depend on the extent of communication desired. An overall system plan that linked all potential users of the data, providing links between offices and between geographical regions, would be costly in the short term because it could require the purchase of new data systems or the reprogramming of existing systems to fit a standard framework. Careful planning and institutional coordination would substantially reduce the need to make hardware or software changes. In some cases, however, building communication between database-management systems might be as simple as purchasing telephone modems or exchanging diskettes containing data through the mail.

**FINDING 3:**

Lack of overall institutional coordination of databases reduces the value of existing biological data, especially those housed in Federal agencies.

Although a large amount of biological information is being collected, the data tend to be site-specific, project-related, and generally inaccessible to most potential users. Individual Federal agencies frequently do not know what biological data they themselves have collected, much less what other agencies have collected. Consequently, many efforts are duplicated, and the coordination of data is limited both among and within agencies.

Inventories of Federal biological databases, such as the inventories conducted by the Fish and Wildlife Service and the Environmental Protection Agency (see app. A), help secondary users identify existing data files that might be of use. Such activities should be encouraged. Even with these inventories, however, the efforts of data collectors and database administrators need to be coordinated in order to avoid duplication within and among agencies, and to provide broad use of the data collected.

*The establishment of certain standards, such as common data dictionaries, would be an important first step to data-sharing between agencies, thereby reducing the need for different agencies to collect similar data. It would, in addition, greatly aid efforts to address the technological difficulties discussed earlier. Establishing data standards, however, is a formidable task. The difficulty is exemplified by the inability of agencies to agree on even a common definition of wildlife.*

Existing cooperative efforts, such as the Interagency Assessment and Appraisal Liaison Committee (IAALC) and the Interagency Agreement Relating to Classification and Inventory of Natural Resources (5 WAY), have been working to standardize the data collection processes and classification systems of different agen-

cies.<sup>1</sup> [See ch. 3.] These interagency committees also exchange information about data collection and consolidation activities within the member agencies. For example, a working group under the 5 WAY recently completed an inventory of natural resource databases available within the member agencies.

Coordination could be formalized within the Federal agencies through the establishment of a national biological database, or each agency could ensure that one centralized office would remain aware of database activities within that agency. (For discussion of a national database see ch. 3.) In a few cases, individual Federal agencies have designated offices or personnel to serve such a function, but most agencies have no agencywide coordination of biological data. Centralized offices could serve as clearinghouses of data, improving the access managers and researchers within the agency have to data, as well as providing a source of public information for State and private institutions. Personnel within the centralized offices could assist the agencies in reviewing data compatibility (of technology and of the kind of data collected and maintained), which could reduce the agencies' costs for maintaining data. Although centralized offices for data coordination would not eliminate the need for interagency cooperation under agreements like the 5 WAY and the IAALC, centralized offices should greatly facilitate interagency cooperation.

<sup>1</sup> Although these interagency groups have led to agreements on data nomenclature standards and land-cover terminology standards, these agreements are not incorporated into the policy and practices of each agency represented in the interagency cooperative effort. If agency policies do not reflect the interagency agreement, these committees do little to standardize activities beyond merely providing a forum for communication.