A Strategy to Inventory the Biological Resources of the National Park System of the USA

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We would like to report our progress on a program that the United States National Park Service (USNPS) has begun to (1) assess and document its extant biological resources, (2) standardize and synthesize that information, and (3) provide a foundation and direction for future biological inventory efforts.

The U.S. national park system contains 357 units, 250 of which have significant natural resources. Each national park unit was created by its own federal act of Congress or presidential proclamation to recognize outstanding examples of the nation's heritage, to be preserved forever. The 1916 Organic Act that established the USNPS did so to "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the man-

agement of the same, in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The national park system represents most of the major ecosystem types of the United States. Thirty national parks have also been designated International Biosphere Reserves by Unesco because of their representation of the world's major ecosystems.

Because of a national commitment to preserve these special places and their ecological significance, the director the USNPS, James Ridenour, stated in a 1991 interview in *Life* magazine: "The parks can and should be our national 'canaries in the coal mine,' telling us about our work and our environment. They can tell us what is happening in the areas of global warming, clean air, clean water, acid rain. We're set to take the temperature of the country. The parks are great reservoirs of science." Nonetheless, despite the fact that the USNPS is over 75 years old and Yellowstone, the first national park, is 120 years old, we still know very little about the actual biological structure of our parks.

Indeed, this problem is not new. In 1933, George Wright and others recommended in the first volume of the series *Fauna of the National Parks of the United States* that "a complete faunal investigation, including the four steps of determining the primitive fauna picture, tracing the history of human influences, making a thorough zoological survey and formulating a wildlife administrative plan, [should] be made at the earliest possible date."

In 1990, we began an intensive effort to address the widespread problem of the lack of biological information. Our goal is to have a basic inventory of vascular plants and vertebrate animals of the national park system by 2000. The product will be a complete listing of vascular plant and vertebrate species for the 250 national park units that have significant natural resources. Each species entry on the list will also contain information on presence, documentation, special status, origin, availability of distribution data, resident status, and abundance with appropriate bibliographic references.

Before proceeding with data collection on a grand scale, though, we have first begun to organize what we already know. That is, we are assembling five databases, in the dBASE software format, to create an "inventory of inventories." The five databases are: the biological inventory status, national park flora, national park fauna, remotely senses information, and thematically mapped information. We report here on only the first of these, the biological inventory status database. It is now complete, with the others still being compiled.

The biological inventory status database describes the current status of biological inventories for vascular plants, mammals, birds, reptiles, amphibians, and fishes for each park. Each of these groups was given a score of one to six or one to seven in each of four categories of completeness: taxonomic, geographic, ecological, and seasonal.

A score of one in a category indicates greater than 95% completeness; a score of six or seven indicates poor or no data. Taxonomic completeness refers to coverage of major taxa, such as families, of a group; geographic completeness refers to area coverage; ecological completeness assures that all major habitat types have been surveyed; and seasonal completeness indicates that the group has been surveyed in all appropriate seasons. The first three scores were then combined to give a composite score for each group at each park.

In looking at completeness information for 250 national park units, we found that:

- 33% of the parks have 80% or better inventories of vascular plants;
- 18% of the parks have 80% or better inventories of mammals;
- 27% of the parks have 80% or better inventories of birds (the best-represented of the vertebrate groups);
- 13% of the parks have 80% or better inventories of reptiles and amphibians (the worst-represented of the vertebrate groups); and
- 18% of the parks have 80% or better inventories of fishes.

By October 1992, we plan to produce:

- An inventory of "candidate" flora and fauna of the national park system in both printed and database format, specific for individual parks and aggregated for regional and national levels;
- A "user-friendly" computer program and associated database for each park that can be consolidated at the regional and national levels;
- A system-wide analysis of the biological similarity among parks based upon flora and fauna information; and
- A strategy for acquiring and managing new flora and fauna data.

By 2000 we hope to have:

- A complete inventory of the vascular flora and vertebrate fauna of the national park system;
- A determination of the contribution of the national park system to conserving the nation's biological diversity, relative to that of other public and private land management agencies or organizations; and
- An updated archive of collections representing national park flora and fauna.

We do not believe that the existing low level of biological inventory completeness is desirable. We do believe, though, that we have taken a necessary first step to assess our current situation on a systematic basis. We believe that the national park system biological inventory can be a valuable prototype for other agencies and organizations and perhaps a pilot program for a larger and much-needed national biological inventory, or even a systematic inventory of the flora and fauna of the world's international biosphere reserves.