

State and Tribal Perspectives

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This session was devoted to databases that cover a particular state, tribal area, or smaller region. Databases of this type may have a vital role to play in addressing invasive species issues because the actual prevention and management of many invasive species is likely to be undertaken at the state, tribal, or site scales. Ironically, less than one-fifth of the 34 databases for which detailed information was submitted at the workshop were focused on a state, tribal area, or more local scale. To date, the invasive species databases that are most widely known and accessible tend to be regional or national in scope.

The panel for this session included three state agency representatives, a tribal agency representative, a representative from a federal agency that is encouraging the development of state-level databases, and a representative from one of the state Natural Heritage programs knowledgeable about how the different Natural Heritage databases are coordinated and are able to interact.

North Carolina Department of Agriculture and Consumer Services

The North Carolina Department of Agriculture and Consumer Services (NCDA&CS) maintains a database on the distribution of the federally designated noxious *Striga asiatica* (witchweed) as part of a project to eradicate this nonnative species. Witchweed was first detected in North Carolina in the late 1950s and at its greatest extent it infested 400,000 acres in North Carolina and South Carolina. Witchweed causes severe crop losses and is extremely difficult to control so the USDA set out to contain and then eradicate it from the United States. Several years ago, NCDA&CS assumed the lead responsibility for the effort. As part of the eradication effort infested land is quarantined to prevent the species from spreading, so accurate field data are essential. The project also determines when quarantines of these farmlands are lifted, so accuracy and up-to-date information are very important.

NCDA&CS staff members conduct on-the-ground surveys and collect location data for witchweed. They record field data on scantron-type sheets which are quickly shipped back to the office, error checked and uploaded to the database. Monitoring continues at sites even after they have been released from quarantine to ensure that new outbreaks are quickly detected. The witchweed database is used to track the history of infested acreage and to pinpoint areas that require inspection. Mapping classifications for the database will be refined in the future. The database is an integral part of the eradication program which has thus far reduced the witchweed infestation to approximately 6,600 acres. A distinguishing feature of this database is its narrow and clearly defined purpose, and its integration into a highly responsive witchweed eradication program. See the database abstract in these proceedings.

Illinois Natural History Survey

The Illinois Natural History Survey (INHS) collection of databases are dedicated to the understanding of Illinois' biotic resources. They contain information on more than 8 million plant and animal specimens housed in the state's herbaria and museum collections. Because they contain information on when and where each specimen was collected, they allow species to be tracked through time and space across the state. The location data on each specimen is also assigned a spatial accuracy code, which allows the accuracy of species distribution maps generated from the databases to be assessed. Of the total number of specimens in the databases, about 75 percent are arthropods, 9 percent fish, 3 percent plants, 2 percent mollusks and crustaceans, and 11 percent other taxa. Most of the information in the databases is on a website, although insects and various other arthropods are underrepresented. The INHS also maintains ecological databases on insect pathogens and viral diseases. INHS is the largest state natural history survey in the nation and has maintained this status and a relatively high level of staffing, mainly because of its long-standing university relationships.

See the database abstract in these proceedings and the website given there for additional information.

Hawaiian Ecosystems At Risk Program

The Hawaiian islands are faced with tremendous threats to their biological diversity that differ in kind and degree from that seen on the mainland. The Hawaiian biota has a higher rate of endemism than any other state or region in the U.S.; in fact, it is one of the highest in the world. The biota developed in isolation had no native land mammals, reptiles or amphibians, ants, and species from many of the families that dominate continental tropical and subtropical areas. These factors appear to have made the islands especially susceptible to disruption by invaders from these and other taxa. In addition, the islands have been a shipping and trade center for the entire Pacific Basin for the past 200 years and they contain almost all of the worlds' climatic zones or biomes, and the islands provide appropriate climatic conditions for a vast number of species. Today, nearly 50 percent of the flowering plant species growing wild in the islands are nonnative species introduced directly or indirectly by humans.

The databases that the Hawaiian Ecosystems at Risk (HEAR) Project maintain are designed to disseminate information to land managers, policy makers, the Maui Invasive Species Committee, and the general public. This is done through websites, e-mail lists, technical support, etc. HEAR uses its normalized relational databases to provide range maps, species information sheets, and species-island matrices. Most recently, work is being done with landscapers to provide horticultural alternatives to invasive species. See the database abstract in these proceedings and the website given there for additional information.

A View of Databases from the Bureau of Land Management

The Bureau of Land Management (BLM) has the responsibility for managing millions of acres of public lands and is concerned primarily about invasive weeds. BLM is working primarily at the state level to encourage the development of databases that will be useful in managing noxious weeds. At the present time, there is a need to move towards some standardization of record keeping and of database design, but the methodology needs to be practical and

user friendly. In this regard, BLM is encouraging the development of state-level databases modeled after one in Idaho using MS Access software. BLM is also encouraging further development of a similar database in Montana. In Colorado, state-level efforts to deal with noxious weeds are fairly recent since the first state weed law was passed in 1991. A more recent initiative by the Governor of Colorado has resulted in the employment of a full-time state noxious weeds coordinator, the development of a memorandum of understanding involving about 14 state and federal agencies, and the establishment of a noxious weed management team. The team meets regularly and sponsors an annual "Weeds Awareness Week." As efforts in Colorado continue to increase, databases are certain to receive more attention.

Experiences by personnel in the Colorado BLM Office indicate that the development of state-level databases is likely to be the most effective approach, at least in the short term, for BLM to use computerized databases in managing invasive plants.

The Tulalip Tribe

The Tulalip Tribe has retained its rights to harvest 50 percent of the finfish and shellfish in certain waters of Washington state under treaties signed in the 1800s. These treaties have been upheld by recent court rulings. The tribe's natural resources program co-manages finfish and shellfish populations with Washington state agencies. It has developed, through the Bureau of Indian Affairs, Geographical Information Systems (GIS) projects that map shellfish distributions, especially for application in litigation proceedings. The U.S. Environmental Protection Agency is also supporting a related GIS project. Data from these projects have application for Endangered Species Act issues, cultural and ethnobotanical databases, finfish/shellfish databases, and exotic species monitoring. The tribe is monitoring the status of such invasive species as purple loosestrife, eurasian milfoil, spartina, zebra mussels, green crabs, and mitten crabs in waters it harvests. Plans are being made to design a database to accommodate the monitoring data being collected and to use it for management purposes.

The Nature Conservancy and Colorado Natural Heritage Program

There are Natural Heritage programs with conservation databases in each of the 50 United States as well as similar programs in several Canadian provinces, Mexican states, and Latin American nations. There are a total of 135 programs worldwide. Each of these programs has a distinct history and operates as a separate unit, but they share a common methodology that allows for exchange of information. The first Natural Heritage programs were initiated by or with assistance from The Nature Conservancy (TNC), a private, nonprofit conservation organization. Natural Heritage programs are now administered and funded by state agencies in most states but in a few states these programs are still fully or partially funded and administered by TNC. TNC also continues to fund and administer staff who help maintain and update national, indeed international, database platforms and who assist with data collection and database methodology. TNC's role at this level is undergoing a rapid change, however, and a separate nonprofit organization, Association for Biodiversity Information, will assume many of these functions for the Natural Heritage network over the next few years.

Originally, TNC was one of the main users of the detailed information on the location and status of plants and animals provided by the Natural Heritage programs. As time has passed more and more federal, state, and local agencies, private organizations, and corporations have become "customers" of the

Heritage programs. All the Heritage programs operate with a uniform methodology, and track the same sort of data; i.e., what are the "elements" (species and biological communities) in the state and where are they located, how rare are they at the state and global level (rated with numerical state/global indices known as S-ranks and G-ranks), and how healthy or viable is each population or occurrence. Together the Heritage networks house the largest, most comprehensive set of location and condition data on native flora and fauna in the world. To date, however, only a few of the individual programs have collected data on nonnative species although some have recently accelerated their compilation.

Common Issues

Common issues arose frequently. The need to ensure data quality, and not just data quantity, is important and often under managed. There is a common interest to make data available on the Internet, although usually only subsets of the information contained in each database are appropriate to post. In some cases combining databases would be useful, but it was unanimously agreed that specific benefits of combining information from two or more databases should be identified before the time-consuming and expensive work to make this possible is undertaken. Fusing different data sets is usually nontrivial, and should only be done if real benefits will result. Often the best results come from smaller databases—bigger is not always better.