

Databases

Because of the diverse coverage of some of the databases, any grouping of the databases is somewhat arbitrary. However, an attempt was made to arrange the abstracts in groups that reflect the interests of potential users. Within each group, closely related databases are placed together, and databases with the broadest taxonomic and geographic coverage are listed first. Also, added to some of the groupings is information on websites and/or contacts for over 25 other related databases for which abstracts were not submitted for consideration at the workshop. The databases are placed in the following groups: (1) plants, (2) terrestrial vertebrates, (3) arthropods, (4) microbial databases with broad coverage, (5) plant pests and disease agents, (6) animal diseases, (7) introduced beneficial organisms, (8) aquatic organisms, and (9) global and regional databases with broad taxonomic coverage.

Plants

The Federal Noxious Weeds (FNW) database contains taxonomic lists of plants listed as Federal Noxious Weeds under the Federal Noxious Weed Act of 1975. Listing is made by the U.S. Department of Agriculture (USDA) based on the recommendations of a technical committee of USDA scientists. Since 1976, 88 individual species have been listed, plus all species within the parasitic genera *Aeginetia*, *Alectra*, and *Striga* and nonindigenous species in the genera *Cuscuta* and *Orobanche*. The database is accessible by the Internet and is maintained by the Plant Protection and Quarantine Division of the USDA's Animal and Plant Health Inspection Service (APHIS) and the NSF Center for IPM at North Carolina State University. It is derived from the "Federal Noxious Weed Inspection Guide—Noxious Weed Inspection System," prepared in 1991 by Randy G. Westbrooks. Data fields include:

- Scientific name
- Common name
- Synonym
- Family
- Characteristics
- Reason(s) for listing as FNW
- Habitat
- Distribution

- Likely entry pathway
- References
- Photographs
- Plant
- Reproductive structures
- Distribution map
- Line drawing
- Life forms most likely to be intercepted at ports

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Alien Plant Invaders of Natural Areas: Weeds Gone Wild is a web-based, public education project aimed at informing the general public, natural resource managers and others about the serious threat and impact of invasive alien (exotic-nonnative) plants to the native flora, fauna, and ecosystems in the U.S. The site provides: (1) a comprehensive national listing of alien invasive species of natural areas in the U.S. (currently around 500 species); (2) a referenced invasive database "USA Weeds" (to be posted by the summer of 1999); (3) illustrated fact sheets; (4) background information on the problem, including terminology; (5) links to species management experts and other people and organizations in the U.S. and worldwide who can provide extra expertise and assistance; and (6) invasive species policy, press releases, and selected publications.

The national list of invasive trees, scrubs, woody vines, herbs, and aquatic plants includes species that have been identified as serious ecosystem invaders by The Nature Conservancy, the U.S. National Park Service, Exotic Pest Plant Councils (California, Florida, Tennessee, Pacific Northwest), native plant societies, universities, and other people and organizations. The list continues to grow as new plants are identified and it is updated as needed.

The USA weeds database includes the following information: genus, species, plant type (e.g., herb),

family, native range, U.S. distribution, and reference citations for each plant listed.

Illustrated fact sheets are written in a consistent format, take a national perspective, and provide information on: identification, native range, habitat and distribution in the U.S., ecological threat, biology and mechanism of spread, management options, links to management experts, and suggested alternative plants. Fact sheets are available for 40 plant invaders as of March, 1999, an additional 80 are in preparation, and 200 are planned.

Alien Plant Invaders of Natural Areas is a project of the Alien Plant Working Group (APWG) which is a subcommittee of the Native Plant Conservation Initiative. The project is supported by volunteers from government, nongovernment organizations, universities, private firms, and other affiliations. Participation is open to anyone interested in helping. Fact sheet authors are needed: please contact the chair through the website.

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Pacific Island Ecosystems at Risk (PIER). The project is compiling a database and synthesis of available information on plants that are known or potential threats to Pacific island ecosystems, particularly the present and former U.S. territories. Master files will be maintained on the websites of the United Nations Food and Agriculture Organization's Global Plant Pest Information System (FAO-GPPIS) and the World Conservation Union's Invasive Species Specialist Group (IUCN-ISSG). This will facilitate worldwide access via the Internet, continuous updating, cross-referencing, use of computer search functions, links to references on the Web, and interaction with Pacific Rim and island collaborators. A loose-leaf manual will be published using the information on the website for use by quarantine officers and other field personnel who may not have ready access to the Internet. Information being compiled for each plant species includes:

- Identity (scientific/common names, botanical description, and photographs sufficient to positively identify)
- Growth form
- Area of origin
- Known/likely methods of introduction and spread
- Other countries or regions in which the weed is a pest
- Community types affected or potentially affected
- Risk of introduction and potential for spread
- Control methods
- Methods of eradication (if feasible)
- References

Website: www.hear.org/pier
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Southwest Exotic Plant Mapping Database (SWEMP). The Colorado Plateau Field Station of the U.S. Geological Survey's Biological Resources Division is developing a database on invasive exotic plants of Arizona and New Mexico and adjacent areas of Colorado and Utah using data collected by collaborating land managers. The database provides federal, tribal, state, and private land managers an important tool for inventorying, monitoring, and sharing data on exotic species invasions in the region.

SWEMP utilizes standards for database development and documentation developed by the Federal Geographical Data Committee, and is distributed on the World Wide Web using conventional file transfer protocol (ftp). Using the new Internet map server, database users may generate and query maps of exotic species locations on the Internet in the fashion of a geographic information system.

Website: <http://www.usgs.nau.edu/swemp/>
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E-mail: kat@usgs.nau.edu

Connecticut Invasive Plant Database. The Education Subcommittee of the Connecticut Invasive Plant Working Group is compiling a database to document websites, videos, brochures, books, and magazine articles on invasive species that are directed at the general public. The database, in Microsoft Access format, includes information on both aquatic and terrestrial species in the New England region. The objective is to develop a clearinghouse for information on multimedia educational materials for use by local conservation organizations and other interested parties with interests in invasive plants. The Connecticut Invasive Plant Working Group includes specialists from academia, government agencies, garden clubs, the green industry, and nongovernmental organizations; environmental educators, and other individuals concerned with the impacts of invasive species on native biodiversity in Connecticut. The mission of the Connecticut Invasive Plant Working Group is: to gather and convey information on the presence, distribution, ecological impacts, and management of invasive plant species; to promote uses of native plants or non-invasive ornamental alternatives throughout Connecticut; and to work cooperatively with researchers, conservation organizations, government agencies, the green industry, and the general public to identify and manage invasive species proactively and effectively.

Website: N/A

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Witchweed Management Database. Witchweed, *Striga asiatica*, is an introduced parasitic weed capable of substantially reducing yields in corn and other grass crops. The species was detected in North Carolina and South Carolina in the late 1950s and is listed as a federal and state noxious weed. In cooperation with the affected states, the Animal and Plant Health Inspection Service initiated an effective eradication effort that has reduced the infested acreage to approximately 6,600 acres. In 1995, the USDA delegated responsibility for completion of the project in North Carolina to the North Carolina Department of Agriculture and Consumer Services

(NCDA&CS). Through a cooperative agreement, USDA provides funds to the state for survey, control, and regulatory activities. To manage the project, NCDA&CS developed a database to track the progress of the eradication effort on the infested fields. The database includes information on survey, treatment, field status, and regulatory components.

Website: N/A

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Plant Databases Reviewed in a Previous Workshop. The following additional databases were reviewed in a previous workshop in addition to some of those described in abstracts that appear elsewhere in these proceedings and also contain information on nonindigenous plants. Database descriptions may be found in Jacono, C. C., and C. P. Boydston. 1998. Proceedings of the workshop on databases for nonindigenous plants, Gainesville, FL, September 24–25, 1997, U.S. Geological Survey, Biological Resources Division, Gainesville, FL. 27 pp. The reference is available on the Internet at: http://nas.er.usgs.gov/publications/plant_workshop/npwrkshp/

Army Lands Inventory

Website: N/A. Data are available in hard copy.

Contact: Al Cofrancesco

Agency/Organization: U.S. Army Corps of Engineers, Waterways Experiment Station

Phone: 601-634-3182

E-mail: cofrana@ex1.wes.army.mil

Aquatic and Wetland Plant Information Retrieval System

Website: <http://aquat1.ifas.ufl.edu>

Contact: Victor Ramey

Agency/Organization: Center for Aquatic Plants, Information Center, University of Florida

Phone: 352-392-1799

E-mail: varamey@nervm.nerdc.ufl.edu

Biota of North America Program

Website: <http://trident.ftc.nrcs.usda.gov/plants/>
Contact: John Kartesz
Agency/Organization: Department of Biology, University of North Carolina
Phone: 919-962-0578
E-mail: jkartesz@jkartesz.bio.unc.edu

Florida Exotic Pest Plant Council (FLEPPC) Invasive Plant Database

Website: N/A. Data are available in hard copy.
Contact: Greg Jubinsky
Agency/Organization: Florida Exotic Pest Plant Council
Phone: 850-539-9681
E-mail: jubinsky_g@epic6.dep.state.fl.us

Forest Health Monitoring Program

Website: N/A. Data are available in hard copy.
Contact: Ken Stolte
Agency/Organization: Forest Service, USDA
Phone: 919-549-4020
E-mail: kstolte@rtppmail.emapfhn.gov

Forest Service Noxious/Invasive Database

Website: N/A. Data are available in digital media and hard copy.
Contact: Rita Beard
Agency/Organization: Forest Service, USDA
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E-mail: rbeard@woftcol@fs.fed.us

INVADERS Database Project

Website: <http://invader.dbs.umt.edu>
Contact: Peter M. Rice
Agency/Organization: Biology Division, University of Montana
Phone: 406-243-2671
E-mail: biopmr@selway.umt.edu

Man and the Biosphere Flora (MABFlora)

Website: <http://ice.ucdavis.edu/MAB>
Contact: James F. Quinn
Agency/Organization: Division of Environmental Studies, University of California at Davis
Phone: 530-752-1768
E-mail: jfquinn@ucdavis.edu

Natural Resources Management and Assessment Program (NRMAP) and National Park Service (NPS) Exotic Plants

Website: N/A. Data are available in digital media.
Contact: Bill Commins
Agency/Organization: National Park Service, DOI
Phone: 202-208-4631
E-mail: Bill_Commins@nps.gov

NPS Species List Database (NPSpecies), a subset of NRMAP

Website: N/A. Data are available in digital media.
Contact: Joe Gregson
Agency/Organization: National Park Service, DOI
Phone: 970-225-3559
E-mail: Joe_Gregson@nps.gov

Noxious Weed Information System (NWIS)

Website: <http://endeavor.des.ucdavis.edu/weeds/>
Contact: Patrick Akers
Agency/Organization: California Department of Food and Agriculture
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E-mail: pakers@cdfa.ca.gov

ROADVEG

Website: N/A. Data are available in digital media.
Contact: Ira Bickford
Agency/Organization: Utah Department of Transportation
Phone: 801-965-4119
E-mail: srdomain.src0f01.ibickfor@state.ut.us

The Plants Database

Website: <http://plants.usda.gov/plantproj/plants/index.html>
Contact: Mark Skinner
Agency/Organization: Natural Resources Conservation Service, USDA
Phone: 504-775-6280
E-mail: mkskinner@npdc.nrcs.usda.gov

Wildland Weeds Management and Research—“Weeds on the Web”

Website: <http://tncweeds.ucdavis.edu>
Contact: Barry Meyers-Rice
Agency/Organization: The Nature Conservancy and the University of California at Davis
Phone: 530-754-8891
E-mail: bazza@ucdavis.edu

Other Plant Databases

Calweed Database

Website: <http://endeavor.des.ucdavis.edu/weeds/>
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 Fax: 916-654-2403
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Terrestrial Vertebrates

North American Breeding Bird Survey. The North American Breeding Bird Survey (BBS) database contains data from roadside surveys for more than 500 species of birds, of which approximately 250 to 300 species are considered to be well sampled. The BBS monitors the status and trends in bird populations using approximately 4,000 randomly located routes scattered across the continental United States, Canada, and Alaska. Surveys were initiated east of the Mississippi River in 1966, in central North America in 1967, across the continental U.S. and Canada by 1968, and in Alaska and northern Canada in the early 1980s. Surveys are conducted by skilled volunteers able to identify all of the breeding birds on the survey route by sight and sound. Each route is 24.5 miles long, and the observer conducts 3-minute point counts at 0.5-mile intervals. Routes are surveyed once during the breeding season, usually in June, but sometimes earlier in desert regions and in the southern states. The BBS database, which is accessible on the Internet, may be used to estimate population trends for native and exotic species at various geographic scales including states, provinces, physiographic regions, and larger regions. It may also be used to display temporal trends and geographic patterns in distribution and relative abundance. For most species of breeding birds, the BBS is the only source of data on status and trends at large geographic scales.

Website: <http://www.mp2-pwrc.usgs.gov/bbs/bbs.cfm>
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Iowa Department of Natural Resources Annual Roadside Surveys. Since 1962, the Iowa Department of Natural resources has conducted annual roadside surveys to monitor the abundance of gray partridge and ring-necked pheasant. Data are obtained from 210, 30-mile routes, and counts are conducted on sunny, cool mornings with heavy dew. The data are analyzed for nine geographic regions and statewide. Since 1963, additional data regarding the size and distribution of the harvest of these birds have been obtained from a random mail survey of small game hunters.

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Arthropods

North American Nonindigenous Arthropod Database (NANIAD). NANIAD is a database in Microsoft Access format, on North American nonindigenous insects and arachnids. The database contains information on more than 2,441 species in two orders of Arachnida (Pseudoscorpiones, Acari) and 18 orders of Insecta, within which names of taxa are alphabetically arranged by family, genus, and species. The development of NANIAD was initiated as part of a project U.S. Congress' Office of Technology Assessment (OTA) on nonindigenous insects and arachnids, for which the final report, "Pathways and Consequences of the Introduction of Nonindigenous Insects and Arachnids in the United States" by K. C. Kim and A. G. Wheeler was submitted to OTA in 1991. The report examined the current status of nonindigenous species of U.S. insects and arachnids, major entry factors and pathways, impacts, case studies, and analysis of information gaps. The NANIAD project was continued through a grant in 1993 from the National Biological Control Institute (NBCI) of USDA's Animal and Plant Health Inspection Service (APHIS), and the initial development of the database was completed in 1995. Preparation of the database utilized an extensive literature search, contributions from 123 taxonomists, various reports, and several databases including the USDA Biological Control

Documentation Center's database on importation of biological control organisms, the USDA Agricultural Research Service's North American Immigrant Arthropod Database and Western Hemisphere Immigrant Arthropod Database. NANIAD includes information on:

- Species name and classification
- Natural distribution
- Immigrant distribution
- Economic/ environmental impacts
- Habitat/host
- Status
- Date and location of first entry
- Date and location of reentries
- Type and pathway of entry
- Biology/ecology
- Literature citation

A mechanism is needed for continuous integration of new records as they become available from publications and taxonomists. The database requires updating to include records of new entries and pathways that have accumulated during the last decade. Basic information is currently available on a website. However, development of search capabilities is needed to enable analysis of patterns of interactions involving points of origin, introduction, and establishment of nonindigenous arthropods to support future pest management policies.

Website: <http://www.InvasiveSpecies.org>

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Systematic Entomology Laboratory Databases. The Systematic Entomology Laboratory of the USDA Agricultural Research Service (ARS) has various databases and expert systems which are currently being made available on the Internet and on CD-ROM. The databases include (1) species inventories of the holdings of the Smithsonian Institution's National Entomological Collection, (2) catalogs of insects important to agriculture, and (3) information on how to identify various insects of

agricultural importance. Projects for specific insect groups include:

Diptera—The ARS leads an international effort to develop a biosystematic database of world Diptera (flies) parts of which are being disseminated as they are completed. Currently, this database includes all the family-group names (4,296 records), genus-group names (18,000 records), and some species-group names (78,742 records). The final database, to be completed by the year 2000, will probably include more than 250,000 records. Completed databases include a catalog of the family-group names, the Systematic Database of Nearctic Diptera providing basic nomenclatural data for all flies found in North America, and the first fascicle of World Diptera covering the Tephritidae (fruit flies). An expert system for the identification of fruit flies of importance to agriculture is also complete and available on CD-ROM. In addition, the ARS Diptera staff is building an inventory of the Diptera in the National Entomological Collection (about 18,000 records are already available on the Smithsonian Institution's website).

Lepidoptera—ARS is developing and maintaining various databases on Lepidoptera (butterflies and moths). A large database on world Noctuidae (noctuid moths) and its associated bibliography, already published, are continuously updated. Specimen label databases for Chionodes (Gelechiidae—gelichiid moths, about 18,000 entries) and North American cuculline and simpistine Noctuidae (30,000 to 40,000 entries) are active and growing. Mapping programs are also in use. A pilot project to test the feasibility of developing a computerized library of colored photographs of lepidopterous larvae (with data on hosts and distribution) has been started with the digitizing of about 200 slides. The computerized library archives these valuable photographs so that they are protected from deterioration and yet are easy to reference for making taxonomic determinations, for publishing, and for creating prints and CD-ROMs.

Homoptera—The ARS Homoptera staff has developed collection databases for Aphididae (aphids), Aleyrodidae (whiteflies), and Psyllidae (psyllids). An inventory database for species in the Coccoidea (scale insect) collection, including information on species names, synonymy, distribution, host associations, pest status, etc. Data on

several major families of scale insects have been completed and are accessible on the Internet at <http://www.sel.barc.usda.gov/scalenet.htm>. This database is already being used to provide information to action agencies and state departments of agriculture in tracking invasive species, such as the pink hibiscus mealybug.

Hymenoptera—The ARS Hymenoptera staff has developed collection databases Eulophidae, Aphelindae, Tanaostigmatidae, and Toryminae. These families include important larval parasites of insects.

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Hymenoptera On-Line provides access to literature and specimen-based data for the order Hymenoptera (ants, wasps, bees, sawflies, chalcids, ichneumons, etc.). The database is developed and maintained by Ohio State University. The scope is worldwide. The database structure is based upon the information model of the Association of Systematic Collections. The database contains information on species taxonomy and classification, geographic distribution, seasonal phenology, biological associations, and systematic literature. The website also facilitates connections to other relevant Internet accessible databases.

Website: http://iris.biosci.ohio-state.edu/hymenoptera/hym_db.html
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Exotic Bees of North America. The Bee Biology and Systematics Laboratory maintains a database on exotic bee species. Since the 17th century, 21 species of foreign bees are known to have joined the 3,800 native North America species, or 0.5 percent of the overall continental fauna. Of the six deliberately

introduced bee species, all but the honey bee were released to pollinate agricultural crops. Most other species were accidentally introduced from Europe in trans-Atlantic cargoes. Most remain restricted to limited areas of the eastern United States and adjacent Canada. Four species have spread transcontinentally.

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Microbial Databases with Broad Coverage

Microbial Germplasm Database (MGD). MGD lists, in varying degrees of detail, organisms held in research oriented stock collections held at universities and research stations. Most collections are maintained by individual researchers, primarily plant pathologists, and reflect their particular research interests. Collections often span many years and contain organisms from habitats that no longer exist. In some cases, the collection manager has provided data to fully characterize the individual strains. In other cases, only very general information has been provided.

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U.S. National Fungus Collections Databases. Databases developed at the U.S. National Fungus Collections are continuously updated by the Systematic Botany and Mycology Laboratory of USDA's Agricultural Research Service. They provide access to information about fungi, primarily those associated with plants of agricultural importance. The following databases may be selected individually on the website, or searched together for information on a particular fungus or host.

Nomenclature—About 32,000 scientific names of fungi have so far been reviewed and listed, along with accurate authorities, synonyms, alternate states, notes on worldwide distribution, and important literature references. This database enables the user to select data from various databases about a particular fungal species or host.

Specimens—The database enables the user to access the database of fungal specimens in the herbarium of the U.S. National Fungus Collections. This is the world's largest fungal collection, and includes more than one-million specimens from around the world. Information associated with these specimens constitutes an enormous data resource, especially about plant-associated fungi. All groups of importance to agriculture have been completed including the Uredinales (rusts), Ustilaginales (smuts), Polyporales (polypores) Deuteromycetes (imperfect fungi), and Ascomycetes.

Host-Fungus Distribution—Reports of fungi on vascular plant hosts from both inside and outside the U.S. are continuously entered as new publications are received. The database includes over 340,000 reports of about 62,000 fungal species on 14,500 plant hosts from 408 localities throughout the world. A reference is cited for each entry and all references are found in the literature database listed below.

Literature—The database includes all important references on the systematics of fungi of agricultural importance. More than 25,000 references have been entered. References may be retrieved by author's name, scientific names of the fungi (genus and species) and hosts (often limited to plant genus name), or separately entered keywords.

The newest addition to the databases is an interactive identification system for species of *Tilletia* (bunt fungi) in the U.S. based primarily on plant host data and the characteristics of fungal teliospores. The database includes photomicrographs and illustrations of descriptive terminology to aid in teliospore identification. For example, the system enables the user to distinguish the teliospores of Karnal bunt of wheat from the teliospores of a new species of *Tilletia* on ryegrass (*Lolium perenne*) with which Karnal bunt has been confused.

Website: <http://nt.ars-grin.gov>

Respondents: David F. Farr and Amy Y. Rossman

Agency/Organization: Systematic Botany and

Mycology Laboratory, ARS, USDA

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Fax: 301-504-5810

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Other Microbial Databases

Association of Applied Biologists Description of Plant Viruses

Website: <http://www.res.bbsrc.ac.uk/dpv/index.htm>
for information to obtain CD-ROM

Contact: Carol Millman

Agency/Organization: Horticulture Research International

Phone: +44 (0)1789 470-382, ext.191 (United Kingdom)

Fax: +44 (0)1789 470-234

Virus Identification Data Exchange (VIDE)

Website: <http://biology.anu.edu.au/research-groups/MES/vide/refs.htm>

Contact: Michael Dallwitz

Agency/Organization: CSIRO Division of Entomology

Phone: +61 (0)6 246 4075 (Australia)

Fax: +61 (0)6 246 4000

Plant Pests and Disease Agents

Identified Plant Pests Regulated by APHIS is an interactive database of plant pests (insects and other arthropods, mollusks, plant pathogens, etc., but not weeds), listed by name in the regulations of the USDA Animal and Plant Health Inspection Service (APHIS). However, it is not a comprehensive list of all pests for which APHIS may take action upon inspection of commodities or conveyances at ports of entry. The focus is at the species level; however, some records are provided at the family level; e.g., Tephritidae (fruit flies). The regulatory information has been obtained from the Code of Federal Regulations, Title 7, Volume 5, Parts 300 to 399. The database is updated quarterly. Information in the database is useful to commercial importers and/or exporters, port inspection officers, risk assessment specialists, and other parties interested in international trade and associated pest organisms. Data fields include:

- Pest scientific name
- Pest common name
- Pest phylum
- Pest class
- Pest order
- Pest family
- Pest type
- Host scientific name
- Host common name
- Pest location
- Code of Federal Regulation Number

Website: <http://www.InvasiveSpecies.org>

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Port Information Network-309 (PIN-309). The USDA Plant Protection and Quarantine (PPQ) unit of the Animal and Plant Health Inspection Service conducts quarantine inspection as a primary defense against entry of foreign insects, mites, snails, nematodes, plant pathogens, and federal noxious weeds. Approximately 1,300 PPQ officers serve at international airports, seaports, and border stations to inspect passengers, baggage, agricultural commodities, general cargo, and ship's stores. Officers inspect these introduction pathways for pests, pathogens, and federal noxious weeds. PIN-309 is a centralized database system that records and tracks all quarantine significant pests detected by officers. USDA uses this information to support risk assessments, international phytosanitary discussions, port resource allocation, local program analysis, customer inquiries, and other types of analysis. Upon request, customized reports from PIN-309 are available to researchers outside PPQ for analysis regarding movement of certain potentially invasive alien species.

Website: N/A

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National Agricultural Pest Information System (NAPIS). NAPIS provides plant pest survey data in conjunction with the Cooperative Agricultural Pest Survey (CAPS). It describes the results of a wide range of plant pest surveys conducted throughout the U.S., and serves as the official U.S. phytosanitary database under the standards of International Plant Protection Convention. Emphasis is on surveys for exotic pests, pests which may impact export of U.S. agricultural products, cooperative program pests, and biological control agents. CAPS projects facilitate the collection and management of data on these subjects.

NAPIS data are referenced to a state and county, and each record may have point-location referencing. Access to NAPIS has been provided to the State Land Grant University, the State Department of Agriculture, and the headquarters for the USDA-APHIS-PPG unit in each state and in Puerto Rico. Other USDA agencies also have access to NAPIS. CAPS members and other users may access NAPIS via direct dial telephone service or the Internet. CAPS members may use NAPIS for managing data on any nonvertebrate plant pest, and may enter individual records, summary records, presence/absence data, or quantified data. In addition to formatted data, NAPIS contains graphic and textual information in a World Wide Web link format.

NAPIS has replaced hard copy publications which formerly reported the results of various USDA pest surveys (i.e., the Cooperative Plant Pest Report, the Cooperative Economic Insect Report, and the Plant Disease Report). Data previously reported to these publications is now entered into NAPIS, which can download data in coded or plain-language forms and generate a variety of reports, including specialized reports tailored for particular projects or needs. Used with standard geographic information system (GIS) software, NAPIS data can also be downloaded to create maps and analytical reports.

Website: <http://ceris.purdue.edu/napis>

Respondent: Dave McNeal

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Exotic Forest Pest Information System for North America (EFPISNA). The database, being developed by the USDA Forest Service and maintained by the NSF Center for Integrated Pest Management, identifies exotic insects, mites, and pathogenic organisms with potential to cause significant damage to North American forest resources. It contains valuable background information on each identified pest and serves as a resource for regulatory and forest protection agencies in North America. The database indicates the relative importance of each pest based on the ability to maintain a free-living population and to cause either economic or environmental damage in its new range. The pest risk assessment model developed for this project emphasizes potential for establishment and impact. Information on pathways for introduction and means of dispersal is provided in Pest Fact Sheets. The on-line database, initially deployed with minimal records in November 1998, should prove useful for the assessment and management of introduced pests, wood products and other commodities from foreign sources. The number of pest records in the database is expected to increase greatly in 1999.

EFPISNA is being developed under the sponsorship of the North American Forest Commission and involves, Canada, the U.S., and Mexico. The database will be available in French, English, and Spanish.

Website: <http://www.ExoticForestPests.org>
Respondent: Joseph G. O'Brien
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Phone: 651-649-5266
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E-mail: obrie031@tc.umn.edu

Slow-the-Spread Gypsy Moth Database. The database is part of a cooperative pilot project of the USDA Forest Service, Animal and Plant Health Inspection Service, and state governments to delay the damage and management costs associated with the spread of the exotic gypsy moth to new forest areas. Since its introduction to North America near Boston in 1869, the gypsy moth has slowly expanded its range and, in 1998, infested somewhat less than one-third of the potentially susceptible U.S. forests. Spread rates have increased during the last 30 years and projections indicate that the species could infest most of the remaining susceptible forests in the South

and Midwest during the next 30 years. The database contains monitoring data, collected and reported using standardized procedures, from the Slow-the-Spread (STS) pilot project conducted from 1992 to 1998 in portions of Michigan, North Carolina, Virginia, and West Virginia. STS deploys grids of pheromone traps to intensively monitor transition areas where numerous distinct, low-density populations have recently become established ahead of the expanding population front. Detected populations are treated. Without treatment these populations would continue to expand, coalesce, and contribute to increased spread. Analyses using the database have shown that the rate of gypsy moth spread could be slowed by at least 60 percent through comprehensive implementation of these management practices throughout the transition area.

The distributed database currently has nodes in four (soon to be five) states. All nodes run Oracle-E27 either on Sun SPARC stations or on PCs with Windows NT operating systems. The Virginia Gypsy Moth Information Management System in the Department of Entomology at Virginia Polytechnic Institute and State University (Virginia Tech) maintains the master database with approximately 600 megabytes of data stored online, as well as the primary STS web server (on a Sun workstation). Web pages are the major means for disseminating STS information at all project levels. Their primary functions are to introduce the project, distribute survey reports and maps, facilitate access from the field to the STS FTP server, provide a repository of historical data, and facilitate evaluation and analysis of information. Efforts have been made to have all servers present data in an identical or similar format to provide a seamless interface among the different servers. As the STS program expands, the distributed design of the database and Web server will allow for a seamless expansion of the information system toward the goal of an operational, national STS program.

Website: <http://www.gypsymoth.ento.vt.edu/STS>
Respondent: Sally Waldon
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Phone: 540-231-9119
Fax: 540-231-9131
E-mail: swaldon@vt.edu

Historical Gypsy Moth Data. The database provides data collected through several pest management programs, including the USDA Forest Service's Appalachian Integrated Pest Management (1988 to 1992) and Slow-the-Spread (1993 to present) Programs. The database consists of georeferenced data on male moth counts (1980 to 1998) of the gypsy moth *Lymantria dispar* L. and egg mass sampling (1988 to 1991). Data on male moth counts can be analyzed on-line to monitor the progression of the population front and to suggest areas for placing delimiting grids of traps and for treatment. All files are in ASCII format with three columns separated with tabs or spaces, and x y counts, where counts refer to male moth counts in a pheromone trap or counts of gypsy moth egg masses in a plot.

Website: <http://www.ento.vt.edu/~sharov/stsdec/histdata.html>

Respondent: Alexei Sharov

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Phone: 540-231-7316

Fax: 540-231-7131

E-mail: sharov@vt.edu

Other Plant Pest and Disease Databases

CABI Crop Protection Compendium

Website: <http://cabi.org>. See website for information to obtain CD-ROM.

Contact: Peter R. Scott

Agency/Organization: CAB International

Phone: +44 (0)1491 832-111 (United Kingdom)

Fax: +44 (0)1491 826-090

E-mail: cabi@cabi.org

Global Plant and Pest Information System

Website: <http://pppis.fao.org/Content.htm>

Contact: Tonie Putter

Agency/Organization: Food and Agriculture Organization

Phone: +39 06 5705-4022 (Italy)

E-mail: Tony.Putter@fao.org

New and Emerging Plant Diseases Project

Website: <http://www.ces.ncsu.edu/depts/ent/clinic/Emerging/>

Contact: O.W. Barnett

Agency/Organization: Department of Plant Pathology, North Carolina State University

Phone: 919-515-2730

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Animal Diseases

WILDPro Multimedia. WILDPro is being developed by the U.S. Geological Survey's National Wildlife Health Center and cooperating organizations to provide data on wildlife diseases. The project is designed from a user's perspective and organizes data in a structure unlike traditional fixed databases. The database allows users to find information through hypertext links rather than through search queries, although queries are available. When completed, WILDPro will contain data on species biology, disease agents, and disease conditions; link environmental, ecological, and habitat data; and provide source references for all data. The program allows for direct entry of new data and direct input from preexisting databases. Flowcharts offering step-by-step guidance for the identification and control of diseases are also included, with hypertext links to supporting data. Geographical data are linked to both disease agents and affected species.

Website: N/A

Respondent: Joshua Dein

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Fax: 608-270-2415

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Wildlife Health Epizootiological Database

(EPIZOO). EPIZOO is a computerized record of wildlife mortality and morbidity events (epizootics), summarizing information gathered by personnel at the U.S. Geological Survey's National Wildlife Health Center. EPIZOO tracks events throughout the U.S. and territories, primarily in migratory birds. Data include incident, dates, species involved, history, population numbers, total sick/dead, and morbidity and mortality information. Complete data from 1975 to the present are included, as well as some data from earlier years.

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Respondent: Joshua Dein

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Wildlife Health Diagnostics Database

(DIAGDATA). The diagnostics database is a computerized record of specimens (from serum samples to carcasses) sent to the U.S. Geological Survey's National Wildlife Health Center for processing and diagnostic work-up. The data file includes five 80-character lines of coded data for each specimen. Data include history and record-keeping information (identifier numbers, species, sex, submitter information, etc.); types of tests run (virology, bacteriology, parasitology, chemistry, etc.) and some test results for heavy metals, particularly lead; and diagnostic results. The diagnostic coding system is based on the terminology of the Systematized Nomenclature of Medicine (SNOMED), with certain modifications and additions to fit Center needs. SNOMED is a structured nomenclature and classification of terminology used in human and veterinary medicine.

Terms are assigned in any or all of the following five categories for each diagnosis:

1. Topography—anatomic term for the site of interest.
2. Morphology—information on the pathogenic change or process associated with the site of interest.
3. Etiology—cause or causal agent of the disease or dysfunction.
4. Disease—disease, disease entity, or syndrome.
5. Link—qualifier to link one diagnosis to another.

Historical and some procedural information is available for data from 1975 (when the Center opened) through 1983. Coding of diagnostic information on these older submissions is ongoing, but slow. Beginning in 1984, all five lines of data are provided for all cases that have been finalized.

Website: N/A

Respondent: Joshua Dein

Agency/Organization: National Wildlife Health Center, Biological Resources Division, USGS, DOI

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Fax: 608-270-2415

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OIE World Animal Disease Data. The International Office of Epizootics (OIE) maintains a database on the status of selected animal diseases found throughout the world. Currently, diseases are listed by their potential for spread and the severity of damage caused. "List A" contains transmissible diseases which have the potential for very serious and rapid spread, without regard to national borders, which have serious socioeconomic or public health consequences, and which are of major importance in the international trade of animals and animal products. "List B" contains diseases which are considered to be of socioeconomic and/or public health importance within countries and which are significant in the international trade of animals and animal products. The database is available both in hard copy and in electronic form via the Internet. Searches can be conducted either by disease or by geographic location. OIE's website provides information on disease classification; disease distribution; standards for surveillance, diagnosis, and reporting; control; laboratories; experts; and other information.

Website: <http://www.oie.int>

Contact: Steve Weber

Agency/Organization: Veterinary Services, APHIS, USDA

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Introduced Beneficial Organisms

Releases of Beneficial Organisms (ROBO) in the U.S. and Territories. The USDA Agricultural Research Service's Biological Control Documentation Center (BCDC) manages ROBO to document the introduction, field release, and recolonization of exotic natural enemies (both invertebrate and microbial) of invertebrate pests and weeds in the U.S. (including Hawaii and U.S. Caribbean and Pacific territories), and the shipment of such organisms from the U.S. to foreign countries. Importation and release

of exotic pollinators is also recorded. ROBO is currently being reprogrammed from its origin on a Wang computer system to operate on the UNIX Sun computer of the USDA's Germplasm Resources Information Network (GRIN). The ROBO database currently includes records for only five years (1981 through 1985). Entry of historical data from the voluminous records of past importations and releases resident in the Documentation Center, as well as data on current importations and releases, are expected to be accomplished rapidly when database reprogramming is completed in 1999. ROBO is still in the process of development on the Internet in early 1999. This includes final development and testing of the data entry screens, refinement of data search capabilities, and final review of five years data (19,706 records) currently included in the database. USDA facilities (Agricultural Research Service, Animal and Plant Inspection Service, and Forest Service) and their cooperators (including many U.S. universities, state departments of agriculture, etc.) will then be able to enter current data and search the database via the Internet, allowing the Documentation Center to fill the gaps between 1986 to the present and to add data for importations and releases from 1934 to 1980. ROBO provides important information for use in efforts to address threats from invasive species, protect global biological diversity, and develop U.S. regulations relating to international trade involving exotic organisms.

Website: <http://www.ars-grin.gov/nigrp/robo.html>
 Respondent: Jack R. Coulson
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 Documentation Center, ARS, USDA
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 Fax: 301-504-6355
 E-mail: jcoulson@nal.usda.gov

Aquatic Organisms

Nonindigenous Aquatic Species Database.

Primarily in response to the introduction of the zebra mussel into the Great Lakes, Congress enacted the Nonindigenous Aquatic Species Prevention and Control Act of 1990. The major focus of the Act was to set a framework to monitor, control, and prevent the introduction of nonindigenous aquatic species. A core element of this framework was to create an Information Service to provide timely data on the presence and distribution of introduced

aquatic species. In 1993, the Nonindigenous Aquatic Species Program was established. The program is founded on a database containing more than 39,000 geographically referenced accounts of aquatic organisms introduced to fresh and marine waters since 1850. More than 1,100 species of vertebrates, invertebrates, their diseases and parasites, as well as vascular and nonvascular plants are tracked. Nonindigenous coverage includes exotic species as well as native organisms introduced outside of their natural range. Staff scientists from the U.S. Geological Survey's Florida-Caribbean Science Center research and compile spatial data from a variety of sources including published literature, agency reports, monitoring programs, museum accessions, on-line databases, professional communications and a website reporting form. The database is composed of fields that set a protocol for extracting and referencing data. Records are normalized by georeferencing according to USGS hydrologic unit, which correlates occurrence data to drainage basin. Real time Internet access to a portion of the dataset ensures that new records are available within 24 hours to the World Wide Web. Website users can perform state or hydrologic basin queries, obtain fact sheets and distribution maps, or contact the staff for custom reports.

Website: <http://nas.er.usgs.gov>
 Respondent: Pam Fuller
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 Center, Biological Resources Division, USGS, DOI
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 Fax: 352-378-4956
 E-mail: Pam_Fuller@usgs.gov

National Marine and Estuarine Invasions

Database. The database focuses on marine and estuarine alien species in U.S. waters, including organisms that occur in tidal waters of all salinities (i.e., freshwater to full marine salinities). The database is developed and maintained by the Smithsonian Environmental Research Center (SERC) with the primary goal of describing the patterns and effects of alien species invasions in coastal communities at multiple spatial and temporal scales. For each species, the database includes detailed information about taxonomy, invasion history (e.g., mechanism and date of introduction, source region, history of spread, etc.), population biology (e.g., life-history characteristics, abundance), community ecology

(e.g., habitat utilization, environmental tolerances, interspecific interactions, and ecological effects), economic impacts, as well as associated references for each topic area. Although the database is used to synthesize available information on a species-by-species basis, it is explicitly designed as a research and management tool to test hypotheses about invasion patterns and processes. It can be queried to examine patterns and impacts of invasion by taxa, region, habitat, date of invasion, mechanism of introduction, source region, etc. The database is now complete for Chesapeake Bay and analyses of invasion patterns and effects are at various stages of completion. SERC is presently expanding the scope of this database to include other coastal sites and regions throughout the U.S. to (1) characterize invasion patterns on a national scale and (2) measure spatial variation in the extent and consequences of invasions. The database (and resulting analyses) will continue to develop and expand over many years, as part of the National Ballast Water Information Clearinghouse, and will provide a national information source on marine and estuarine invasions through SERC's website.

Website: <http://www.serc.si.edu>

Respondent: Gregory M. Ruiz

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Smithsonian Environmental Research Center

Phone: 301-261-4190, ext. 227

Fax: 301-261-7954

E-mail: ruiz@serc.si.edu

The Aquaculture Health Page is a compilation of links to aquacultural information on fish, molluscan, and crustacean diseases, nutrition, multimedia, educational programs, diagnostic services, drugs, water quality, conferences, and organizations.

Website: <http://geocities.com/CapeCanaveral/Lab/7490/index.html>

Respondent: Bill Lussier

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and Further Education

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Indian River Lagoon Species Inventory. The high biodiversity of the Indian River Lagoon (IRL), located on Florida's central East Coast, is a valuable

coastal resource which is increasingly impacted by anthropogenic activities. A taxonomic listing of over 2,400 plants and animals, compiled initially by Hilary Swain, provides an important basis for disseminating and updating information on the status of IRL's biodiversity. The Smithsonian Marine Station is converting the IRL Species Inventory into an Internet-accessible database, using a format that will allow for updating and revising the initial data and for expanding the database to include available information on species life history, habitat requirements, ecology, economic importance, special status (exotic, threatened, endangered), and geographic range, including distribution within the IRL. The expanded database is scheduled to be accessible at <http://www.sms.si.edu> by May 1, 1999.

Website: N/A

Respondent: Joseph Dineen

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Other Databases on Aquatic Organisms

Aquatic, Wetland, and Invasive Plant Information Retrieval System. Database provides access to numerous sources of information and services relating to aquatic and wetland invasive plants in Florida.

Website: <http://aquatl.ifas.ufl.edu/>

Contact: Karen Brown

Agency/Organization: Center for Aquatic and
Invasive Plants, University of Florida

Phone: 352-392-1799

Fax: 352-392-3492

E-mail: kpb@gnv.ifas.ufl.edu

Directory of Nonnative Marine Species in British Waters.

Website: <http://www.jncc.gov.uk/advisors/marine/dns/>

Contact: N. C. Eno

Agency/Organization: Joint Nature Conservation
Committee

Phone: +44 (0)1733 562-626 (United Kingdom)

Fax: +44 (0)1733 555-948

E-mail: Feedback@jncc.gov.uk

Florida Department of Environmental Protection Biological Database. Taxonomic database for aquatic organisms in Florida. Majority of data for freshwater invertebrates; considerable information on marine invertebrates; and 400,000 records from 1950 to present.

Website: <http://www.flmnh.ufl.edu/fbic/dep.html>
 Contact: Landon Ross
 Agency/Organization: Florida Department of Environmental Protection
 Phone: 904-487-2248
 Fax: 904-922-5368
 E-mail: ross_1@dep.state.fl.us

Introduced Marine Species in Australian Waters. Provides lists of introduced marine species for Australia as a whole and for the seven Australian states.

Website: <http://www.ml.csiro.au/~hewitt/CRIMP/isppfram.html>
 Contact: Castray Esplanade
 Agency/Organization: National Center for Research on Introduced Marine Pests
 Phone: +61 (0)3 323-452 (Australia)
 Fax: +61 (0)3 323-485
 E-mail: crimp@marine.csiro.au

Introductions of Aquatic Species (DIAS)
 Website: <http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/mainpage.htm>
 Contact: D. Bartley
 Agency/Organization: Fisheries Department, Food and Agriculture Organization
 Phone: +39 06 5705-4376 (Italy)
 E-mail: devin.bartley@fao.org

Seaweed Database includes scientific names, distribution, and other information on benthic marine green, brown, and red algae, and the genus *Vaucheria*, for more than 6,500 species, subspecies, varieties, and formae.

Website: <http://140.203.14.29/Tango/species.qry/function-form>

Contact: Michael D. Guiry
 Agency/Organization: Martin Ryan Marine Science Institute
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 E-mail: mike.guiry@seaweed.nuigalway.ie

Global and Regional Databases with Broad Taxonomic Coverage

World's 100 Worst Invasive Species. The World's 100 Worst Invasive Species is a database funded by the total Foundation and making up a part of the Global Invasive Species Programme (GISP) "Early Warning" section. This database will focus on invasive species that threaten conservation and biodiversity values, rather than agricultural, economic or other interests. It is intended to serve as a tool for public awareness and education and thus is limited (artificially, but usefully so) to 100 species only. Species will be included if they are deemed to be amongst the top 100 of those high-risk species (e.g., the brown tree snake being developed by the World Conservation Union's Invasive Species Specialist Group and cooperating organizations, for elucidation and testing of database design and content for two larger-scale regional databases. World's 100 Worst will focus on species that threaten conservation and biodiversity, rather than agriculture or other values. The database is intended to serve as a tool for public awareness and education, and is thus limited to 100 species. Species will be included if they are deemed to be amongst the top 100 of those presenting a high global risk to biodiversity; e.g., the brown trees snake, a small, nocturnal, generalist predator which has devastated the native land birds of Guam, and is easily transported worldwide after self-concealment in aircraft undercarriages and packaging.

The system will be structured as a *Paradox* database with web-page front end. It will be a globally accessible, free, and a user-friendly information source. The project is being managed by Sarah Lowe from the World Conservation Union's (IUCN) Invasive Species Specialist Group, in collaboration with many partners. Technical expertise is supplied by the Hawaiian Ecosystem at Risk (HEAR) Project,

and specifically Phillip Thomas. A publication will be available for parties without access to Internet.

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Integrated Taxonomic Information System (ITIS).

ITIS is the first comprehensive, standardized reference for the scientific names, as well as synonyms and common names, of all the plants and animals of North America and surrounding oceans. The goal of ITIS is to create an authoritative, easily accessible, well-documented database with scientifically credible integrated information on species names and authors, their taxonomic classification, commonly used synonyms, common names, species nativity (native or introduced), and general distribution. The ability to refer to an authoritative taxonomic nomenclature or dictionary of accepted biological names is a prerequisite to biological data sharing and effective communication about flora and fauna. ITIS is a cooperative effort of several U.S. federal agencies including the U.S. Geological Survey, Environmental Protection Agency, Agricultural Research Service and Natural Resource Conservation Service, National Oceanic and Atmospheric Administration, and the National Museum of Natural History, Smithsonian Institution. Within the past year, Agriculture-Canada has joined the ITIS effort. ITIS is also a partner in the global Species 2000 program to index the world's biological diversity. ITIS partner agencies collaborate with taxonomic specialists throughout the world who serve as "stewards" to develop, review, and verify the reliability and quality of the taxonomic data represented. ITIS data are periodically reviewed to ensure current information is being presented. The database can be directly accessed from the World Wide Web.

Website: <http://www.itis.usda.gov/itis>
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Invasive Species of Indian Ocean Islands. The database is currently being developed to disseminate information about invasive species, and specifically those which threaten biodiversity and conservation values. The geographical focal area, at least for the first phase of database development, is the small islands of the Pacific and Indian Oceans. Small isolated ecosystems are particularly vulnerable to invasion by more cosmopolitan species, and as a result, suffer huge losses of native biodiversity. The database is part of the "Early Warning" section of the Global Invasive Species Programme (GISP); this section aims to put in place systems that will either prevent new invasions or provide expertise to control or stop invasions detected in their early stages, before too much damage is done. The system under development is a *Paradox* database with web-page front end. The project is being managed by Sarah Lowe from the World Conservation Union's (IUCN) Invasive Species Specialist Group, in collaboration with many partners. Technical expertise is supplied by the Hawaiian Ecosystem at Risk (HEAR) Project, and specifically Phillip Thomas. An updateable hard-copy handbook will be produced, in conjunction with the database, for users without Internet access.

Website: <http://www.issg.org>
Respondent: Sarah Lowe
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Harmful Nonindigenous Species in Hawaii. The database is a loosely-bound collection of databases and electronic information sources containing information about alien species which are or could be detrimental to the economy, quality of life, and/or natural resources of the state of Hawaii. The U.S. Geological Survey's Biological Resources Division, in cooperation with partner agencies and organizations, is developing the database as a component of

the Hawaii Ecosystems at Risk (HEAR) Project. The purpose of the HEAR database is to provide access to information about nonindigenous species to land managers, decision makers, and the general public. The individual data sets comprising the database are maintained by HEAR as well as federal, state, and private sector organizations. Data sets include information such as: detailed harmful nonindigenous species write-ups; one-page public education flyers on particular species; permanent-plot/transect-based data from protected areas; island- and area-specific distribution and “controllability” data; plant pathogen data; herbicide-treated areas (national park data); information on alien threats to endangered/ threatened species; and information on other data sets relevant to alien species in Hawaii. Most information in the HEAR database currently focuses on plants, although some information on vertebrates and invertebrates is included. However, any harmful or potentially harmful nonindigenous species is eligible for inclusion. The individual data sets comprising the HEAR database codify species information based on statewide de facto standard “taxon codes,” developed by HEAR, which in turn are based on standard nomenclature maintained by Bishop Museum (the State Museum of Natural and Cultural History). Using these data sets, HEAR has developed a prototype modeling system for predicting the potential range of alien species in Hawaii based on species-specific climatic tolerance information. HEAR’s goal is to eventually put all HEAR-maintained data on the World Wide Web; and much of the HEAR database is already available on-line in various formats. More detailed descriptions of all components of the database are available through HEAR’s website.

Website: <http://www.hear.org>
 Respondent: Philip A. Thomas
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Illinois Natural History Survey Collections. The database provides computerized specimen label data from the extensive collections of the Illinois Natural History Survey (INHS). It includes data for the entire INHS collections of vascular plants, fish, mammals, reptiles and amphibians, mollusks, and crustacea,

plus a few selected orders of insects. However, some assemblages containing a large number of non-indigenous species, mostly within the insects, have not yet been entered. All completed databases, except vascular plants, are available on the Internet at the INHS homepage under “On-Line INHS Databases.” Georeferencing of specimens, at whatever level permitted by the label data, is included in some of the insect databases. Coordinates associated with specimens are plotted as point locations, place names, or county records using unique symbols. These maps are currently served to the Internet in a somewhat static form. Interactive mapping using the Internet may soon be possible, and will further encourage applications of the data in mapping, modeling, and prediction of species occurrence. This system is envisioned for all INHS data in the future.

Currently, only the mollusk database indicates whether a species is indigenous or not. Other INHS databases could be linked through taxon names to such resources as the USDA’s North American Nonindigenous Arthropod Database. This would permit coding of species origins, at least at the continental level. Difficulty arises in coding species origins when smaller political and geographic units are considered. This more specific coding must be accomplished on a state-by-state basis.

INHS, founded in 1858, is the second oldest and largest of the state biological surveys in the U.S. INHS maintains major collections of aquatic and terrestrial organisms from middle North America, including more than 6 million insect specimens (ninth largest collection in North America) and 712,000 fish. As many INHS-supported state and regional surveys of fauna and flora occurred prior to pervasive degradation of natural habitats, the collections have exceptional value for documenting geographic and temporal distributions of indigenous and nonindigenous taxa.

Illinois is a hub for commerce and transportation. It retains very little of its natural habitat, and is especially vulnerable to the establishment and spread of nonindigenous, invasive species. The Asian longhorn beetle outbreak in suburban Chicago is a startling example of just how fast an invader can become problematic. To encourage an integrated approach to the study and management of non-indigenous species, a consortium of Illinois natural

resource agencies recently proposed to state government a new Illinois Exotic Species Invasion Management Strategy for fiscal year 2000. The objectives of this initiative include (1) identification and assessment of nonindigenous species threats in Illinois, (2) development of an educational program for young Illinoisians, and (3) development and implementation of exclusion and control technologies for invasive, nonindigenous species. The INHS database provides essential information for implementing the proposed strategy.

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Other Databases with Broad Taxonomic Coverage

Fish and Wildlife Information Exchange

Website: <http://fwie.fw.vt.edu/www/nframes/species.htm>
Contact: Jeff Waldon
Agency/Organization: Department of Fisheries and Wildlife Sciences, Virginia Tech
Phone: 540-231-7348
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MABFlora/MABFauna Database. On-line database documenting occurrence of vascular plant and animal species (primarily vertebrates) in biosphere reserves and other significant protected areas, and various available metadata on reported species (including identification of nonindigenous species). Database includes country, regional, and global species checklists for plant and animal groups. Current coverage includes 379 biosphere reserves in 75 countries.

Website: <http://ice.ucdavis.edu/MAB>
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Hawaii Biological Survey Databases

Website: <http://www.bishop.hawaii.org/bishop/HBS/hbsdb.html>
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