

## **CIPM Research Grants Final Report**

**Title: CIPM Database for Invasive Plant Species in the Western United States**

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### **Proposal objectives:**

1. Create a database of biological information on the 109 known invasive plant species in the Northwest United States.
2. Make the database available to land managers.
3. Identify information gaps to further expand and verify the database through a subsequent CIPM RFP.

### **Results:**

#### *Database Construction*

A Microsoft Access database consisting of cross-linked tables and data input forms was constructed. Database format allows easy input and display of quantitative and qualitative biological, demographic, and management information and links species data with source citations.

#### *Data Collection*

Data for species identified in the University of Montana's INVADERS database as being invasive and/or noxious in the Northwest were collected from a rigorous examination of the scientific literature, primarily utilizing AGRICOLA and Academic Search Premier research databases. In addition, online databases were consulted, including the INVADERS database system, the USDA Forest Service's Fire Effects Information System (FEIS), the USDA Natural Resources Conservation Service's PLANTS database, and The Nature Conservancy's Invasive Species Initiative (ISI). Data collection on fifty species has been completed; completed species are listed in Appendix A. With a few exceptions, species were prioritized based on 1) their widespread noxious status in northwestern states and/or 2) for the quantity of biological and demographic information available. The remaining 50+ species are either not widespread throughout the northwest or have relatively little demographic or biological information available on them.

Collected information was entered into data input forms, described in Appendix B. Database organization simplified the literature and database review process by identifying key demographic and biological data. Utilizing species codes and citation identification numbers similarly streamlined the data entry process. Database organization allows quick referral to demographic, biological, and management data and facilitates cross species comparisons. Using a data filter set to the species code, information for each species within a particular data form is quickly accessed.

**Discussion:**

Significant data gaps were revealed through the course of this project. While the biology and demographics of a few species such as *Abutilon theophrasti*, *Bromus tectorum*, and *Centaurea solstitialis* have been extensively researched, the majority of noxious plant species in the Northwest have not received much scientific attention. The species most extensively studied are those that cause significant financial harm to agriculture or forestry. Species that cause significant ecological harm in natural areas but are easily controlled in agricultural settings have received relatively less attention. Furthermore, studies have primarily focused on species management in agricultural settings. Basic biological and demographic information is lacking for many of species examined. Occasionally, a species with a unique life history characteristic, such as the periodicity of *Onopordum acanthirum* seed germination, has received focused scientific study, while other basic biological information about the species has not been reported.

Data collected and organized for the Database for Invasive Plant Species in the Western United States has been used to inform the computer model, Invasive Species Estimator. The Invasive Species Estimator (ISE) is a unique model of species spread joining the science of invasive species with current Geographical Information System (GIS) technology. The resulting system can help predict where control efforts will be most productive, will become a repository of information on species spread and control, and can predict the rate at which a species will cover a particular area. ISE stores rules governing spread and species demographic information, originally collected for the Database for Invasive Species of the Western United States, in a geo-database called NWISE.mdb. This information is used to produce an expansion layer. Spread rate and area coverage are estimated from the expansion layer. The ISE was developed for use by federal land management agencies such as the USDA Forest Service.

**Publications:**

None

**Literature Cited:**

Please see database. There is an extensive literature cited section for each species.

**Products**

Invasive Plant Species Database

Two Appendices explaining components of the database

Interface among components (to be completed)

**Long-Term Goal/s and Continued Progress of Research**

At this point, the Database for Invasive Plant Species in the Western United States is primarily a data organization and storage system designed for data entry rather than for data retrieval. Before the database can achieve its intended purpose—to make demographic and biological information on noxious plant species available to land managers—a data retrieval page must be constructed.

Information on the remaining 59+ species identified in the INVADERS database as being invasive or noxious in the Northwest has yet to be collected. However, because these species have not received as much scientific attention as the 50 species already completed, it should take comparatively less time to complete literature reviews for them.

### **Benefits of Seed Money**

The research grant provided by the Center for Invasive Plant Management provided complete funding for all stages of database construction, data collection, and data entry.

### **Advancing This Research:**

The database is available to CIPM for distribution to land managers and scientists. It also can be used to improve existing databases on invasive plant species. Since much of the data gathered is locally derived, the Research Advisory Committee could prepare an RFP for 2007-2008 that calls for scientists and land managers to:

1. verify the data presented in the database for particular plant species, or
2. conduct empirical research to fill gaps identified in the data base.