

CREATING A DATABASE OF DISTRIBUTION AND CONDITION OF WHITEBARK AND LIMBER PINES⁴

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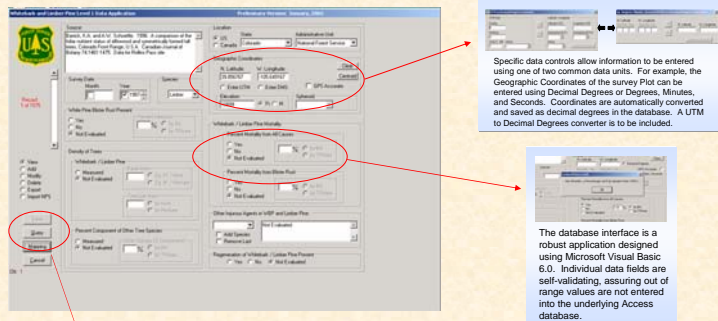
Introduction

Whitebark pine and limber pine are well distributed throughout western North America. The impacts of white pine blister rust and other damaging agents are also found West-wide. These are forest types that have relatively little research compared to other white pine forest types, and thus the dynamics and impacts of detrimental changes are less understood. Although surveys have been done locally, information has not been compiled for a range-wide look at these two species. It is important to determine the condition of these forest types so restoration efforts can be developed and focused properly. A prototype database was developed by Eric Smith (USFS) and Holly Kearns (Colorado State University) for limber pine in Wyoming and Colorado. This initial effort has been expanded into a broader database with a GIS component.



Database/Interface Development

The Whitebark and Limber Pine Information System (WBLIS) consists of a limited number of critical fields representing key plot data variables that can be queried and GIS-linked via a user-friendly interface. A workshop was held to develop this list of critical fields required to make a database application which can be easily queried. The application connects to the underlying MS Access Database using Microsoft Jet Database Engine technology. The application inserts, modifies and deletes values in the database using industry standard Structured Query Language (SQL) statements.



Specific data controls allow information to be entered using one of two common data units. For example, the Geographic Coordinates of the survey Plot can be entered using Decimal Degrees or Degrees, Minutes, and Seconds. Coordinates are automatically converted and saved as decimal degrees in the database. A UTM to Decimal Degrees converter is to be included.

The database interface is a robust application designed using Microsoft Visual Basic 6.0. Individual data fields are self-validating, assuring out of range values are not entered into the underlying Access database.

The interface has a function that allows the user to query the key variables using a query builder or using SQL language. This example shows a query for plots of whitebark pine with the presence of blister rust. This query identified 735 survey plots meeting these criteria. Figure 1 is a map of the survey plots resulting from this query. Only 96 plots are mapped because location data remain to be added for the other plots.

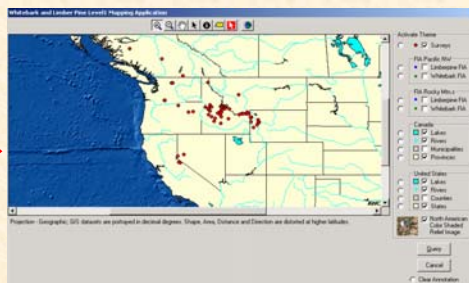


Figure 1. Whitebark pine survey plots with white pine blister rust

GIS/Mapping Component

Plot data from the USFS FIA Pacific Northwest and Rocky Mountain Stations are being used to map the distribution of whitebark and limber pines. Condition data have been extracted from FIA plots in the Northern Region and will be incorporated into the database. Condition data from other FIA plots in the west remain to be extracted and incorporated.

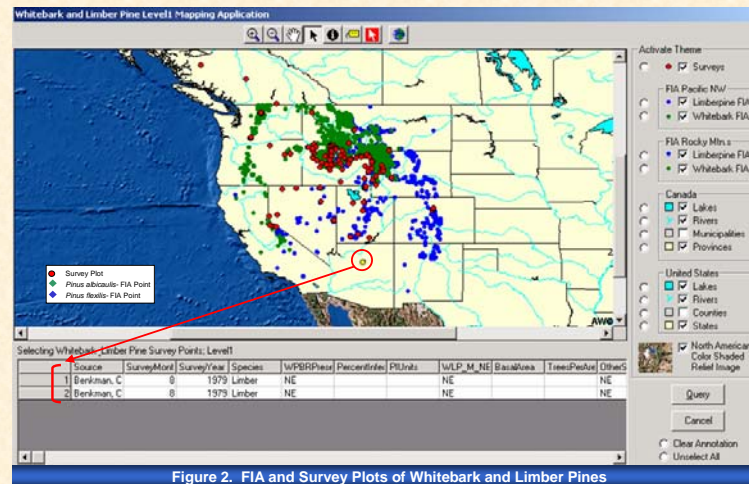


Figure 2. FIA and Survey Plots of Whitebark and Limber Pines



Figure 3. Distribution of Whitebark Pine



Figure 4. Distribution of Limber Pine

A data mapping function gives the application limited GIS functionality allowing survey plots from the database to be represented geographically over top of FIA data points and reference features like State and/or County Boundaries (Figure 2). The user can use the mapping interface to capture/edit coordinates for new or existing survey plots. Survey plots may be selected and their data displayed/edited interactively (Figure 2). All reference feature data, including FIA, may be labeled or viewed with the 'Identify' tool. Note the survey plots in Figure 2 (denoted by red circle) that identify limber pine beyond the general distribution suggested by the FIA data.

Figures 3 and 4 provide an initial estimate of the distributions of whitebark and limber pines based on the FIA and survey plot data in the United States. Data entry has not been verified and additional survey plots are being added to the database which will update the distribution maps.

This Mapping function is made possible by the inclusion of Map Objects Lite[®], version 2.0 by Environmental Systems Research Institute (ESRI). These Active X program components allow the application to be distributed royalty free to any PC while providing many of the GIS functions found in ESRI products like ArcView[®], ArcInfo[®] and ArcGIS[®].

Cooperators

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Survey Contributions to Date= 39 Sources, Totaling 1611 Plots. Contributing Organizations Include: USFS FHP, USFS Research, USFS FIA, NPS, University of Montana, Colorado State University, University of Colorado, Utah State University, University of New Mexico, University of Alaska Fairbanks, State University of New York, Montana State University, University of Wyoming, Northern Arizona University, University of California Davis, British Columbia Ministry of Forests

Summary

This effort will result in an interactive database, plus maps of the species distribution, the known locations of blister rust, the overall condition of the species, and a map that depicts the obvious data gaps on the condition of these two species. This database application will fit on a CD that can be distributed to interested parties, who can then enter new records into the database clones on their own systems. Newly entered data can then be exported and sent to a "yet to be identified" data repository for evaluation and potential upload into the main tables. The goal is for this database to be web-accessed.

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