



SELECTING NATIVE PLANTS USING VEGSPEC – A WEB-BASED EXPERT SYSTEM

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Establishment of vegetation can be a cost-effective approach to protect vulnerable landscapes from soil erosion, to improve degraded wildlife and livestock habitat, to protect water sources from pollution, and to shelter homes and farms from wind and snow. However, the choice of the most appropriate species and establishment techniques to use for various revegetation, reclamation and ecosystem restoration projects can be difficult to determine. Recommendations are often needed quickly, but such information is not easily found. For example, Bureau of Land Management managers must provide detailed proposals for wildfire revegetation within three weeks after the fire is extinguished. They often do not have time to thoroughly research their species or technique options. They need an expert system to help them prescribe appropriate species and techniques for establishing plants.

Many landowners and agencies prefer to use native species in their revegetation plans, but often are faced with either altered soils or insufficient information about native plant communities to determine the species that should occur naturally at their site. Since plant germination, establishment, survival and reproduction are dependent on soil characteristics and climatic conditions, revegetation experts use information on these environmental conditions to suggest potential plant species for sites. These same expert qualities have now been included in a computer program.

VegSpec is a web-based expert system developed cooperatively by the USGS, US Army Corps of Engineers, and the USDA Natural Resources Conservation Service (NRCS). It is available to all land managers through user-friendly interactive sessions on the Internet. Using a series of rules relating to climate, soils, and management

objectives, the VegSpec program queries three databases to match adapted plants with specific site conditions. The three databases are: (1) the NRCS currently published soil surveys for all 50 states; (2) long-term monthly temperature and precipitation data for selected climatological stations in each of the 50 states; (3) a plant database of more than 2500 plants (including cultivars of many species) with nearly 90 growth and adaptation characteristics for each plant.

The VegSpec user is prompted to provide information related to the state, soil-mapping unit, and the nearest climatological station that best describes the site. Should the user not have access to these data, they will need to complete a soil attribute and climate table. After describing the site, the user selects a series of objectives for revegetation, such as rangeland plantings, forest products, erosion control, filter strips, landscaping, windbreaks, or pasture lands. Additional purposes, such as wildlife habitat, trampling resistance, or fire tolerance, also may be selected. Users may limit the selection of plants to native species only. VegSpec defines native as species with origins in the United States. To achieve a finer-scale definition of native, a user must choose species that fit their definition.

Each objective and purpose is associated with expert rules that limit the selection of plants to those best adapted for the site. Thus, the user is provided with a list of potential plants that will establish, grow, and withstand the conditions and uses of that site. From the list of potential plants, the user selects

the particular species they wish to use. If the user has multiple objectives for the site, they may elect to rerun the program and generate a second set of potential plants. Additional species may be selected from this second list and these selected plants will be added to the first group of plants.

After species selection, the user is prompted to construct the planting design. VegSpec downloads a Java applet that contains spreadsheets for selecting planting techniques and calculating seeding and planting designs. When completed, the user may print a report describing the site, the selection process and the planting prescription.

VegSpec users save time and money by quickly developing a planting design that will improve revegetation success through the selection of adapted plants for their site and desired uses. Users may access VegSpec free of charge with computer hardware and software that meet the following minimum requirements: (1) either Netscape (version 4.06 or higher) or Internet Explorer (version 4.0 or higher); (2) a 14.4 Kbps or faster modem (28.8 Kbps or faster is recommended) or a direct Internet connection. VegSpec is reached through a link on the USDA PLANTS homepage at Internet address <http://plants.usda.gov>