Imazameth was applied again at Ainsworth and Tilden sites in June 1995 and 1996 to previously non-treated areas and to half of the areas treated in September 1994 and 1995 with imazameth. Visual estimates of leafy spurge control on a scale of 0% (no control) to 100% (complete control) were determined at 11 months after treatment (MAT) in the fall at sites in Nebraska and 12 MAT at Jamestown. Imazameth applied in the spring to previously non-treated areas provided no better that 60% leafy spurge control. Application of imazameth at 140 g ai ha^{-2} in the fall provided better than 80% leafy spurge control at Nebraska sites and 65% control at Jamestown. Fall applications of imazameth at 210 and 280 g ai ha^{-2} or fall + spring applications at 140 and 210 g ai ha^{-2} resulted in greater than 95% control of leafy spurge. Fall applications of picloram + 2,4-D provided less than 35% leafy spurge control at Jamestown and Tilden. Imazameth provided good to excellent control of leafy spurge.

Recovery Of Microbiotic Crusts Following Fire: Implications For Management Of Rehabilitated Rangelands. *Julie Kaltenecker, Mike Pellant*, Bureau of Land Management, Boise, ID 83706, and *Marcia Wicklow-Howard*, Boise State University, Boise, ID 83725. (P17)

Rangelands in southern Idaho have undergone conversion from shrub-steppe to annual grasslands due to invasion by cheatgrass (*Bromus tectorum*) and an associated increase in wildfire frequencies. Extensive areas are seeded with perennial species following fire in an effort to minimize the extent of the transformation and probability of repeated burning. The microbiotic crust, an important component in some sagebrush communities, is adversely affected by fire, soil surface disturbances, and loss of the native community structure associated with annual grass invasion. We investigated the response of microbiotic crusts to fire and seeding impacts for the first two years following disturbance. Permanent monitoring plots were established on four rehabilitated sites in spring, 1995. Portions of each site were excluded from the drilling process. Percent cover of all vascular and non-vascular vegetation was recorded and compared between treatments and years. After two growing seasons, perennial vegetation was well established in the seeded treatments of both sites. Cheatgrass was absent at two of the sites. There was no recovery of the microbiotic crust. Reintroduction of livestock onto rehabilitated rangeland normally occurs following the second growing season. Impacts due to livestock trampling could retard further recovery of the microbiotic crust and detract from the overall goals for landscape stability.

Rangeland Health Of A Watershed In Southwestern Idaho. *Mike Pellant, Julie Kaltenecker* and *Mike Boltz*, Bureau of Land Management, Boise, ID 83706. (P18)

Rangeland health incorporates properties of ecological function and soil stability of both upland and riparian systems. Qualitative assessment procedures were used to evaluate the rangeland health "status" of the Birch Creek drainage in the foothills of the Owyhee Mountains in the summer of 1996. This watershed is characterized by great diversity in plant communities and soils as elevation and precipitation range from 2,300 to 6,500 feet and 8 to 16 inches annual precipitation, respectively. A Geographical Information System (GIS) was used to extend point evaluations of rangeland health to landscape units. Useful GIS themes included soil mapping units, ecological status, livestock use patterns and vegetation. The majority of the Birch Creek riparian area was classified as non-functioning. Lower elevation uplands generally met the soil stability criteria for rangeland health while ecological processes were negatively affected by the presence of cheatgrass (*Bromus tectorum*), an exotic annual grass. Ecological processes were functioning on the higher elevation uplands; however, some areas were at risk of accelerated erosion due to inadequate ground cover. The combination of GIS technology and qualitative assessment procedures provided a useful picture of rangeland health in the Birch Creek Watershed.

Decline Of Aspen (*Populus tremuloides*) In The Interior West. *Dale L. Bartos* and *Robert B. Campbell, Jr.*, Intermountain Research Station, Logan, UT 84321 and Fishlake National Forest, Richfield, UT 84701. (P19)

Western aspen forests are unique because they reproduce primarily by suckering from the parent root system. Generally a disturbance or die back is necessary to stimulate regeneration of the stands. Unlike other tree species, if aspen stands are lost from the landscape, generally they will not return through natural processes. If current conditions continue (e.g., lack of fire, wildlife use, grazing by livestock) that have prevailed for the past 100 to 140 years, most aspen stands will eventually be replaced by conifers, sagebrush, or possibly tall shrub communities. Data (Renee O'Brien, personal communications) for the State of Utah show that there has been approximately a 60% decrease in aspen dominated lands since the arrival of European man. Similar results have been reported by others. A study of the Burnt Flat analysis area and the Monroe Mountain subsection on the Fishlake National Forest in south-central Utah showed that nearly 70% of the areas where aspen dominated in the past 200-300 years have had much of the aspen replaced, mostly by mixed conifers or sagebrush. When aspen dominated lands convert to conifer with a minor component of aspen, substantially less water is available for streamflow, understory biomass production is greatly reduced, and there is a marked decline in the diversity of plants and animals. The high priority situations where landscapes need action are mixed-conifer/aspen (particularly where subalpine fir dominates) and

aspen/sagebrush transition zones. Recommendations to regenerate aspen include the need for immediate, large-scale (500-1,000+ acres) treatments that mimic natural mosaic patterns.

Soil Properties Associated With Various Stages Of Succession In The Aspen Ecosystem. *Michael C. Amacher* and *Dale L. Bartos*, Intermountain Research Station, Logan, UT 84321. (P20)

In the Interior west, if current conditions continue (e.g., lack of fire, wildlife use, grazing by livestock, natural succession) that have prevailed for the past 100 to 140 years, most aspen stands will eventually be replaced by conifers, sagebrush, or possibly tall shrub communities. Current estimates are there has been a 60% decrease in aspen dominated lands since the arrival of European man. This decrease is persistent across the entire state of Utah and probably holds true for most of the Interior West. This loss of aspen from the landscape translates to a loss of water, forage, and biodiversity. Numerous areas throughout the West that were once dominated by aspen are in a late successional stage, and if restoration treatments are to be successful, action must be taken soon. Questions have arisen concerning the suitabilities of these late successional soils (either occupied by conifer or sagebrush) to be once again occupied by aspen. Therefore, during the summer of 1995 we made initial studies to see if these late successional soils have changed sufficiently to preclude aspen from reestablishing on them. We measured pH, exchangeable cations, extractable P, total organic carbon, total nitrogen, and organic matter content of soils developed under conifers, mixed conifer-aspen, and aspen. No significant differences were found among stand types for the measured soil properties. These results indicate that late successional soils would support aspen regrowth provided stand altering treatments are applied before soil genesis proceeds further.

An On-Line Demonstration Of "PLANTS", A Developing, Dynamic Database Of Plant Attributes, Nomenclature, Taxonomy And Symbols. *James Bunch, James F. Henson* and *Wendall Oaks*, USDA, NRCS, National Plant Data Center, Baton Rouge, LA 70874-4490 and USDA, NRCS, Information Technology Center, Fort Collins, CO 80526. (P21)

The PLANTS database provides U.S. federal agencies with a standardized set of plant names and other attribute information. PLANTS is limited in scope and includes the following types of data: scientific name, author, synonyms, plant symbol, species distribution, NWI indicator status, growth form, gross habit, representative common names, U.S. nativity, Federal/state status, plant images and bibliographical data. PLANTS is updated routinely and reflects the most up to date information available from the botanical community. The authors will present an on-line demonstration of PLANTS. The PLANTS on-line access is World Wide Web: http://plants.usda.gov.

Utilization Of The Hydrogeomorphic Method Of Functional Assessment (HGM) To Investigate The Effects Of Transmission Line Clearing On Wetland Function: A Case Study. *Jeffrey S. Ward, Julia W. Gaskin* and *Wade L. Nutter*, Earth Systems Associates, Ltd., Athens, GA 30605. (P22)

The hydrogeomorphic method of functional assessment (HGM) is an effort to quantify project-related functional changes that occur in wetland ecosystems. HGM classes are based upon the dominant hydrologic and geomorphologic characteristics of wetlands. Reference standards are established from examples of the highest functioning wetlands in each HGM class. Changes in function are determined by departure from reference standards. Project targets are based on the reference standard and are defined as the level of function that can be sustained following project implementation. The HGM approach was applied to a riparian-source dominated riverine wetland on a recently cleared transmission line right-of-way (ROW) in the Ridge and Valley physiographic province of Georgia. Undisturbed wetlands at least 60 meters (200 feet) off the cleared ROW were assessed to establish the reference standards. Departures from the reference standards were observed in hydrologic functions as a result of disturbance due to tower construction at the toe slope affecting surface and subsurface flow paths. Significant departures were also observed in the biogeochemical and habitat functions. Departure from reference in the habitat functions was largely due to the conversion of a mixed pine-hardwood stand to an even-aged shrub/scrub community. As secondary succession progresses, the functions should recover and approach the project target.

Regeneration Ecology Of Rangeland Grasses In Upland Balochistan, Pakistan. *Sarfraz Ahmad* and *Christopher A. Call*, Dept. of Rangeland Resources, Utah State University, Logan, UT 84322-5230. (P23)

As *Cymbopogon-Chrysopogon* grasslands in upland Balochistan deteriorate under heavy grazing by small ruminants, *Chrysopogon aucheri* (*Ch*) is gradually replaced by *Cymbopogon jwarancusa* (*Cy*). Management and restoration of *Cy-Ch* grasslands require knowledge of the regeneration ecology of these dominant species. Diaspores (spikelets) were collected from *Ch* and *Cy* plants at a representative grassland site and characterized for morphology, viability and germinability. Experiments were conducted at the same site during 1996 to: characterize diaspore dispersal from *Ch* and *Cy* plants to the soil surface and movement of diaspores across the soil surface; investigate *Ch* and *Cy* diaspore predation by birds, small mammals and insects; and determine the quantity, viability and germinability of *Ch* and *Cy* diaspores in the soil seed