original surveyors. They interpolated this data using two Arc/Info interpolation processes and indicator kriging (a method to create continuous surface data from points) to create a map. They then compared their map to a map of "true" vegetation obtained from aerial photographs. While the interpolation methods accurately estimated the relative forest composition of the landscape and the dominant vegetation types, they could not accurately estimate the actual area occupied by the vegetation types or re-create landscape patterns found in the historic landscape. The authors do not recommend using these methods in combination with the survey data to re-create pre-European settlement vegetation at small scales and recommend ways in which to increase accuracy.

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A Multistage Approach to Estimate Fish Abundance in Streams Using Geographic Information Systems. 2000. Toepfer, C.S., W.L. Fisher, Dept. of Zoology, Oklahoma State University, Stillwater, OK 74078, wfisher@okstate.edu; and W.D. Warde. **North American Journal of Fisheries Management** 20(3):634-645.

The authors developed a three-stage method that incorporates Geographic Information Systems (GIS) for estimating fish abundance in large streams. GIS technology facilitates the classification and analysis of large stream segments that are logistically difficult to sample visually. As a case study, the authors used this method to estimate the abundance and population dynamics of the leopard darter (*Percina pantherina*) in Big Eagle Creek in southeastern Oklahoma. They 1) classified and mapped stream habitat types, 2) quantified the suitability of the habitats for stream fishes, and 3) used this information to estimate fish population abundance and expanded the estimates to an entire stream segment. Although the method has some difficulties, the authors believe that GIS technology has potential as a tool for fisheries research and management.

GENERAL REVEGETATION & MONITORING

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Sampling Method Captures Vegetation and Wildlife Data in a Sagebrushgrassland Ecosystem (Arizona)

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We are experimenting with a multi-perspective sampling method that we think will be useful in monitoring vegetation, fuel loads, and wildlife on the sagebrush-grassland meadows of the Kaibab Paiute Reservation in northern Arizona. This work is in preparation for burning treatments that will be conducted in fall 2002. The new procedure integrates four existing sampling methods, including 1) a shrubland ecosystem monitoring plot structure developed by the National Park Service (Western Region Prescribed and Natural Fire Monitoring Task Force 1992), 2) a point-intercept method for sampling vegetation cover (USDA Cooperative Extension Service 1996), 3) a method for using scat counts to survey animal absence/presence (Cooperrider and others 1986), and 4) an inventory system for determining fuel load developed by the Forest Service (Brown 1974, Brown and others 1982).

Since 1999, we have monitored experimental plots using this methodology and feel we have been able to obtain a well-rounded data set. We believe that this method has several advantages:

- It requires less installation time than other methods and allows more time for data collection.
- It replaces two different sampling methods and obtains the same or better quality data.
- It separates vegetation and wildlife sampling areas allowing collection of both sets of data simultaneously.
- It is holistic in its approach.

Establishing the monitoring plot was fairly straightforward. We established a single 50-m x 4-m belt transect plot bisected by a 50-m centerline transect (Figure 1). We monitor vegetation (shrubs) on the right side of the centerline transect and wildlife on the left side. At the zero point (0P) and the 50-m point (50P) we established a photo point. Two meters above and to the left of the 0P, we established a 0.5-m x 2-m vegetative quadrat. We established a similar-sized vegetative quadrat 2 meters below and to the right of the 50P. The entire plot was located parallel to the slope to capture any vegetation differences due to changes in gradient.

We recorded each plant species and the height of individual plants along with the substrate at 0.3-m intervals, beginning from 0P along the centerline transect. These data will help us determine species richness, relative frequency, and percent cover. We measured height to check for browsing. We also measured fuels over a 150-foot section along the centerline transect, using the U.S. Forest Service inventory system (Brown 1974, Brown and others 1982). Litter and duff depths were measured at each 5 foot interval. We also counted the number of individual shrubs in three categories: up to 1 inch diameter, 1-3 inches diameter, and more than 3 inches in diameter at the first 25 feet, 50 feet, and 150 feet, respectively. We categorized shrubs greater than 3 inches in diameter as either rotten or solid. We will use these data to determine the kilogram per hectare of fuel load for each meadow. Converting the outputs of the fuel load model to metric units reduces the total number of conversions that need to be calculated. We also took a photo at both photo points facing the plot center as a baseline for documenting changes resulting from prescribed fire treatments.

Within the shrub belt transect, we measured the occurrence of each shrub species and counted the number of shrubs in four different life stages (seedlings, resprouts, mature, dead). These data will be used to determine the structural make-up of the shrub community in the study areas.

To better estimate the occurrence, density, and average height of understory species, we tallied and measured the height of each individual in the two vegetation quadrats outside the large belt transect plot. We used a 10-cm x 10-cm visual refer-

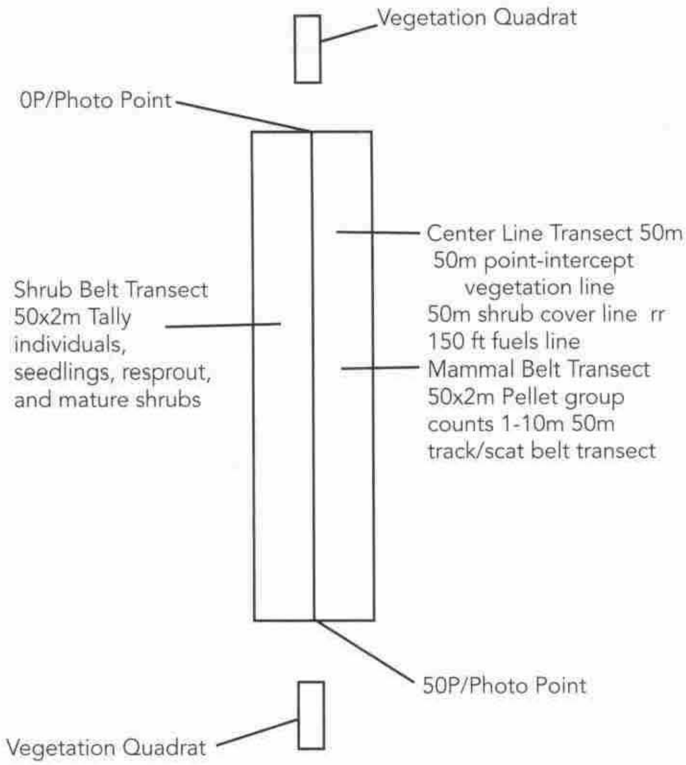

Figure 1. Sagebrush-grassland monitoring plot structure.

ence—equivalent to 1 percent of the area of the quadrat—to determine percent vegetative cover.

Finally, we counted deer tracks, coyote tracks and scat, and bobcat tracks and scat throughout the entire wildlife transect. We counted deer and rabbit scat only in the first 10 m of the transect (starting at 0P) due to the large quantities of deer and rabbit scat on the study sites.

We plan to use these data to determine selected wildlife use of the area following burn treatments. We found evidence of mule deer (*Ocdocoileus hemionus*), the primary species of concern, in every plot within the study site. Remeasurement of all plots, following the application of prescribed fire, will indicate mule deer use of the area.

Because we are still in the experimental stage with this methodology, we hope that other practitioners and researchers will try this procedure and to provide us with their feedback. This will help us further develop this sampling method.

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Cooperrider, A.Y., R.J. Boyd, and H.R. Stuart,eds. 1986. Inventory and monitoring of wildlife habitat. U.S. Department of Interior, Bureau of Land Management Service Center. Denver, CO, 858 pp.

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Rapid Sampling of Plant Species Composition for Assessing Vegetation Patterns in Rugged Terrain. 2000. Meentemeyer, R.K. and A. Moody, Dept. of Geography, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3320. **Landscape Ecology** 15(8):697-711.

Meentemeyer and Moody argue that the use of a high-powered telescope allows the rapid collection of detailed species composition data from remote vantage points at both a site level and patch level, assuming the areas have a homogeneous vegetation composition. This sampling methodology is appropriate in environments that permit open visibility but have poor accessibility. The authors analyzed data gathered from remote sampling of a steep watershed dominated by closed-canopy chaparral. They conclude that scaling the data from site level to patch level results in minimal bias. The authors believe that this methodology strikes an acceptable balance between sampling efficiency and field-data accuracy.

RECLAMATION

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Cameco, Key Lake Regreening Project, in Harmony with Nature. 2000. Haji, L., Cameco Corporation, Key Lake Operations, 2121 11th St. West, Saskatchewan, SK STM 1J3, Canada, 306/884-2100, Lotfollah_Haji@cameco.com. **Land and Water** 44(3):43-46.

As a result of mining activities of the Key Lake Operation, a joint operation of Cameco Corporation and Cogema Resources, approximately 2,470 acres of disturbed land in north-central Saskatchewan require reclamation. The author discusses the progress of Key Lake Operation's five-year revegetation plan, developed from continuing on-site experimental reclamation projects, to return the sites to a state similar to the pre-mining era. Objectives include identifying the most suitable species for the site conditions, using native species from the surrounding areas when possible, and harvesting seeds of native species from seed farms. The plan calls for using native or noninvasive species to stabilize the areas for the climax species.

ENDANGERED SPECIES

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Hawaiian Bird Chick Is a First. 2000. Maxfield, B., Field Office, U.S. Fish & Wildlife Service, Honolulu, HI. **Endangered Species Bulletin** 25(5):22.

The Keauhou Bird Conservation Center on the island of Hawaii is working with other public agencies and private landowners for Hawaiian forest bird conservation. The hatching there of an endangered Maui parrotbill (*Pseudonestor xanthophrys*) chick in July 2000 marks the first time the species has been bred in captivity. The parrotbill's decline seems due mainly to a disease introduced by non-native mosquitos. Before reintroduction is possible, forest restoration and elimination of non-native predators is necessary. The Center also holds two other endangered Hawaiian