

GREAT PLAINS COOPERATIVE ECOSYSTEM STUDIES UNIT STRATEGIC PLAN

Introduction

The Great Plains Cooperative Ecosystem Studies Unit (GP-CESU) was founded in October 2000 as a partnership among eight universities in the region [University of Nebraska (host), University of North Dakota, Colorado State University, University of Minnesota, Little Priest Tribal College, University of Oklahoma, Langston University, and Texas A&M University] and four federal agencies (USDI Bureau of Land Management, National Park Service, USDA Forest Service, and US Geological Survey). Since 1990, additional partners were added, including South Dakota State University, University of South Dakota, University of Wyoming, and the U.S. Bureau of Reclamation. Other partnerships are currently pending. The overall goal of the GP-CESU has been to facilitate interactions among these institutions and agencies through better communication (primarily via annual meetings, a web site, and mailings) and more active research, education, and technical assistance in the region (by improving the connection between agency needs and university expertise). An Executive Committee comprised of one representative from each university and college, and each federal agency, oversees the GP-CESU's activities and provides input on ways to improve. In addition, a Manager's Committee made up of representatives from each of the agencies and the host institution help to develop the annual work plan, based upon agency needs region-wide. The strategic plan described here is intended to serve only as a guide for these efforts, rather than a set of constraints on the multitude of research and technical assistance opportunities that this unique partnership has to offer.

Mission and Vision

The mission of the GP-CESU is to determine the ecological state of public lands of the Great Plains and examine its future within the context of private lands. This determination is focused on improving the scientific basis for managing ecosystems in the region, through more active and interactive technical assistance, research, and education among the partner institutions and agencies.

Ecological and social systems in the Great Plains face rapid environmental and socioeconomic change as a result of increasing environmental stress, strong demographic shifts (with concomitant shifts in public perception of the environment), depopulation and resulting social and institutional transformations. Thus, the overall vision of the GP-CESU is to foster a better understanding of the underlying causes and consequences of changes in land use, the applied ecological principles involved, and the social implications of this rapid change. The goal is to create a regional base to develop insight and direction for better managing Great Plains natural resources, particularly on federally managed lands, by forming consortia of scientists across agency and state boundaries. The GP-CESU seeks to provide technical assistance to federal agencies, facilitate collaboration between the partner agencies and university personnel as well as among universities and among agencies, and to enhance research opportunities for university and federal scientists by developing fundamental linkages between resource needs and scientific

expertise.

Strategic Themes

As a product of the annual meeting of the Executive Committee (i.e. all GP-CESU partners), the following eight specific themes were identified by the GP-CESU partners to be areas of strategic concern in the Great Plains and therefore of great interest to the overall mission and vision of the GP-CESU:

Theme 1. Biological invasions and their impact on existing ecosystem integrity

Exotic species introductions continue to threaten biodiversity, species richness, and ecosystem integrity throughout the Great Plains region. There is ample evidence that native prairies, wetlands, rivers, streams, riparian zones, lakes, and floodplains located on both highly managed and essentially unmanaged public and private lands are under increasing pressure via plant and animal invaders, such as purple loosestrife, common carp, mosquito fish, water milfoil, and musk thistle. The GP-CESU is ideally suited for addressing invasive species ecology and control questions, because federal land managers from all agencies (BOR, NPS, BLM) must deal with this issue from ecosystem- and landscape-scales beyond their borders to develop effective management strategies. The communication, collaboration, and larger scale that the CESU system has to offer is unprecedented in this regard. Our strategy is to develop a comprehensive plan for exotic species control through population to landscape-scale studies on multiple sites.

Theme 2. Habitat fragmentation for species-threatened and endangered

Nebraska alone is home to seven endangered species (e.g., pallid sturgeon, least tern, and piping plover), with an additional 76 endangered species found throughout the Great Plains region (defined here as states along the latitudinal gradient from North Dakota to Texas). Habitat loss and fragmentation via agricultural conversion, urbanization, and commercial development have contributed greatly to the decline in biodiversity, in both the short- and long-term. For example, Nebraska has lost approximately 35% of its historic wetlands since the late 1700's, including a significant loss of its rare saline wetlands near Lincoln. The GP-CESU “network” is again ideally positioned to address this complex of issues, as federal lands such as national parks in many cases represent islands or fragments of relatively pristine habitat for rare and threatened plants and animals.

Theme 3. Health of wetlands, lakes, streams, and rivers- including agrochemicals, & nutrients

The U.S. EPA has identified non-point source pollution as the most important factor currently impairing our nation’s waters. In the Great Plains, the primary NPS inputs of concern in rivers, streams, wetlands, lakes, and reservoirs are actively applied agrichemicals [including nutrients (esp. nitrates and phosphorus), pesticides (esp. atrazine), and fertilizer contaminants (esp. heavy metals)] and sediments via soil erosion and runoff. The quality of waters in the Midwest is also threatened by a number of point sources, including nutrients, heavy metals, and pharmaceuticals associated with confined animal feeding operations (CAFOs), abandoned munitions sites (contaminants include TNT, RDX), past and present grain storage facilities (carbon tetrachloride), and underground storage sites (including a variety of fuel additives). Given the highly managed nature of aquatic systems in the region, water quantity issues are also

a major concern, particularly during periods of drought. Federal, state, county, municipality, natural resource district, and irrigation district boundaries do not adequately delineate the water quality and quantity problems in this region, thus a consortium of federal and university partners offers promise in addressing these critical issues.

Theme 4. Preservation and/or restoration of native aquatic and terrestrial communities

Many of the most pristine prairies, wetlands, lakes, and rivers in the U.S. occur within our national park system and on other federal lands. Our ability to preserve, restore, and maintain these areas for the future depends in part on understanding of their ecology and a desire to work together to answer difficult questions posed in the other themes in the GP-CESU strategic plan. The ability of the NPS to draw on the technical expertise of their university and federal partners in the region more effectively and efficiently will clearly aid in this effort. A searchable catalogue of federal agency resource needs and university expertise is key to the GP-CESU facilitating this work and making it more successful than at anytime in the past.

Theme 5. Social and cultural values of natural areas under changing population and land use

The latter four themes address crucial issues at the human-ecosystem interface. As demographics in agricultural states continue to shift from rural areas to urban centers, societal attitudes toward natural areas also change. The relative value of protected lands, national and state parks, water resources, and wildlife also shift as the economic base for a county and state change. Changes in land use practices, land ethic, political power, and the continued trend toward corporate farms are also factors in the dynamic transformation of rural landscapes. With the wealth of expertise on the socioeconomics of natural resources in the Great Plains CESU (esp. University of Minnesota, Texas A& M University, and University of Nebraska), studies to examine these complex interactions are viewed as central to its strategic plan.

Theme 6. Timely transfer and access of information for resource management and policy

The establishment of readily obtained and searchable databases and web sites, linkages to the extension/outreach systems in the Land Grant institution partners, and closer ties with federal, state and local natural resource managers and decision-makers is viewed as a vital component of the GP-CESU. Development of a web designed web site with links to a variety of existing databases, as well as current updates of ongoing projects that are part of the GP-CESU, are considered essential to the success of the entire CESU network.

Theme 7. Implications of global environmental change on managed and unmanaged ecosystems

Agriculture continues to be an important component of economy, culture and people in the states within the GP-CESU, thus the impacts of global climate change on crop production, water supplies, and wildlife are of particular concern. Working with the Great Plains Regional Center of the National Institute for Global Environmental Change (NIGEC), located at the University of Nebraska, the GP-CESU should play an important role in determining the ecological, social, cultural, and economic effects of this large-scale problem. Many of the ecological challenges facing this region are complex, for example many of the river drainages lie in a west-to-east direction, so as mean seasonal temperatures shift northern, many fish species will be unable to relocate to cooler waters because of the lack of natural waterways to serve as

conduits for dispersal in that direction.

Theme 8. Implications of land use change on ecosystem integrity

Land use changes in the U.S. are perhaps no more profound than in the Great Plains. Even within agriculture, increased efficiencies in irrigation practices have altered the hydrology of entire landscapes, wider spread adoption of Best Management Practices (e.g., riparian buffer strips, terracing, no till, and contour farming) have decreased soil erosion, and wiser use of agrichemicals has reduced runoff into adjacent streams. Nevertheless, commercial development, urban sprawl, contamination of groundwater supplies, over commitment of water quantities for conjunctive use, and continued eutrophication of surface waters present a myriad of challenges for land managers and decision-makers at all levels. The GP-CESU is again in an ideal position to work with its federal partners to address these issues in many areas, particularly on federally managed lands.

Strategic Directions

Three overall directions for the GP-CESU are inherent in the success of addressing these eight themes, namely (1) increasing our understanding of ecosystems in the Great Plains (including their human components), (2) enhancing university-agency interactions and communication, and (3) improving university collaboration within the region. Direction (2) is viewed as particularly critical to the success of the unit early in its development, because it is viewed as fundamental to collaboration and subsequent improvements in our understanding. Without clear and ongoing linkages between agency partner needs and university partner expertise, few projects will be undertaken and little new knowledge gained. The CESU is uniquely positioned to provide those critical linkages via searchable resource needs catalogues, directories of federal and university personnel and expertise, and frequent on-line updates of projects underway and funding opportunities. As at the national CESU level, the regional CESU web site is the medium for establishing this linkage, via what has been described as an “open file cabinet” electronic system.

The overriding approach of the GP-CESU is *ecosystem-based* in addressing the complex and large-scale ecological issues facing this region. Thus, each national park or other federally managed land area is not viewed in isolation, rather as a land unit embedded within a matrix of other land use. In addition, many of the challenges facing these resources are not locally unique (e.g., invasive species), consequently ecosystem-scale approaches to addressing such problems is appropriate, beneficial, and perhaps best facilitated by the CESU network. The patchwork of federally managed lands also represents a unique opportunity to study larger scaled issues by providing multiple study sites, broader ecological gradients characteristic of the Great Plains, and the necessary infrastructure and access needed for landscape scale research. A major goal of the GP-CESU is to take advantage of these “opportunities of scale” to address ecological issues of direct relevance to the region on both public and private lands, in both unmanaged and managed ecosystems.