

UPPER COLUMBIA BASIN NETWORK VEGETATION CLASSIFICATION AND MAPPING PROGRAM

The Upper Columbia Basin Network (UCBN) includes nine parks with significant natural resources in the states of Idaho, Montana, Oregon and Washington. These parks collectively include and protect habitat for a variety of plant and animal species over a wide geographic area of the Pacific Northwest and include examples of most low elevation habitats. Park lands range from relatively pristine environments (Craters of the Moon) to high recreation use (Lake Roosevelt) to grazing use (City of Rocks) to significant cultural landscapes (Big Hole, Nez Perce and Whitman Mission) to significant fossil resources (Hagerman and John Day Fossil Beds). These parks represent lands in contiguous blocks (Hagerman Fossil Beds), lands fractured and scattered over four states (Nez Perce), lands linear in nature (Lake Roosevelt), and lands small in size (Minidoka Internment and Whitman Mission). The difference in size between parks is considerable with WHMI at 93 acres and CRMO (including the BLM Preserve) at approximately 740,000 acres.

These park units have limited budgets and little staff and are not able to provide personnel and funds for many of the natural resource issues they face. The operating budget for the parks varies with two parks in the Network having a budget over 1 million dollars and no park over 2 million dollars. The resources available at the Network level greatly increase their capacity to meet the increasingly complex resource management issues.

INTRODUCTION

In 1999, the National Park Service (NPS) launched the Natural Resource Challenge, a 5-year program designed to strengthen natural resource management in the Nation's national parks (National Park Service 1999). The single biggest undertaking of the Challenge was to augment ongoing park inventory and monitoring efforts into an ambitious comprehensive nationwide program. The Servicewide Inventory and Monitoring (I&M) program was introduced to 270 parks identified as having significant natural resources. Under this program, parks have been organized into 32 networks to conduct long-term vital signs monitoring. Each network links parks that share geographic and natural resource characteristics, allowing for improved efficiency and the sharing of staff and resources. The network organization facilitates the collaboration, information sharing, and economies of scale in natural resource monitoring. Parks within each of the 32 networks work together and share funding and professional staff to plan, design, and implement an integrated long-term monitoring program.

The UCBN network located in the Northwest portion of the United States is currently conducting a vegetation classification and mapping project under the leadership of the National Vegetation Mapping Program. Cogan Technology Inc. (CTI) has been tasked to provide assistance under various contracts with Engineering-environmental Management, Inc. (e²M), Bureau of Reclamation (BOR) and the University of Idaho. One sub-task under the contract is to create a comprehensive multi-year work plan for the parks in the UCBN, with recommendations for completing the plant community classification, digital database, and map products. Elements addressed within this work plan are described more fully under the Elements section of this document and the document generally follows the NPS report style guide. This work plan will be reviewed with appropriate national vegetation mapping program leaders and will be provided to the UCBN as a hard copy and electronically on a CD.

The area to be sampled, classified, and automated into a digital database includes the nine parks and surrounding regions, known as the environs (Figures 1, 2, and 3 beginning on page 4). The total project area for the nine parks, including either a 2-km or 0.5-km (1/4 mile) environs around each unit, is approximately 1.1 million acres; of this amount CRMO occupies approximately 931,000 acres.

This proposal presents an ambitious plan for completing park vegetation maps and associated plant community classifications within the next five years (FY2006-2011). The network wishes to cost-share this project with the national USGS/NPS Vegetation Mapping Program and national Fire Program. The total projected cost for the 5-year project is \$2,335,127 of which, \$247,900 have already been obligated by UCBN. This represents an average cost of \$2.10 per acre.

RELEVANCE OF VEGETATION CLASSIFICATION AND MAPPING TO OTHER PROJECTS IN THE UCBN

The most compelling aspect of the NPS Vegetation Mapping Program for the UCBN is the baseline vegetation data that it will provide. Historically the lack of vegetation projects across the UCBN Parks was due to limited budgets and staff available to develop and lead a park vegetation mapping project. Now with the support of the national program it is anticipated that once created the classification and digital spatial data will become the standard vegetation resource tool generating many potential uses. These include visitor education (interpretation), wildlife habitat management, archaeology, invasive plant management, forest insect pest and disease management, forest community restoration, and urban-interface issues.

Long-term monitoring of the vegetation at UCBN parks is an important consideration. Current, accurate vegetation maps that are consistent in thematic and spatial resolution are needed to allow UCBN staff to identify, map, and monitor changes in the patterns of landcover on lands within and adjacent to UCBN parks and to provide base-level support for various vital sign monitoring (e.g., sampling design, viewshed analysis, focal species occurrences). In conjunction with the Network, needs for long-term monitoring are the needs of the park resource managers. A key to management of vegetative resources at the park is knowing their current distribution and abundance and having a database available as a GIS coverage. Vegetation maps that are currently available are not helpful to resource managers or the I & M program because they lack accuracy assessments and in some cases, do not contain thematic or spatial resolution needed. Available maps for each park unit with information on year of imagery, spatial resolution, thematic resolution, spatial extent, accuracy, and imagery sensor are shown in this workplan.

To better understand ecosystem changes the UCBN is also pursuing creating coarser resolution products for monitoring purposes using their own funding. Specifically the UCBN would like to combine the vegetation mapping in the future with a combination of satellite imagery including the ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) sensor. The advantages of the ASTER data includes providing the Parks with an inexpensive (\$60/scene) measurement and monitoring tool that will facilitate change detection in future years. Using the baseline vegetation data created in this project the UCBN plans to classify the ASTER images to monitor changes in landcover and use over time and update the vegetation maps as needed. These periodic updates to vegetation maps will be affordable and a valuable monitoring tool for UCBN. Once the baseline vegetation maps are completed, the second

generation of the map will likely cost approximately 30% less. Generations of mapping following the second generation should see an additional reduction in cost of another 30%.

The UCBN also wishes to collaborate with adjacent land owners and will assist the National Vegetation Mapping Program and associated contractors to cultivate and hopefully solidify such partnerships. Currently these efforts have successfully included the Idaho National Laboratory (INL) lands adjacent to CRMO. This is a Department of Energy (DOE) site that totals over 500,000 acres. Methods and contractors used at CRMO will also be used at INL and funding will be supplied by DOE. This project will yield a larger pool of vegetation information and will increase the mapping area by 50%. As other parks in the UCBN are started similar partnerships with other neighbors will be explored.

Finally a secondary emphasis of the network vegetation mapping program is to acquire on-the-ground fuels data to support fire management in the following parks: CRMO, HAFO, and JODA. This data will be used to support fire fuel management activities including the placement of fire breaks, fuel reduction and controlled burn planning. It is hoped that that additional ground data collected at each plot will be used to help model the fire fuel loading and generate fuel maps and other useful products.

OVERALL STRATEGY

Following the guidelines provided by the national program UCBN proposes to create vegetation classifications to the association level of the National Vegetation Classification System (NVCS) and spatial databases (i.e. maps) to approximately the alliance level. Costs are divided between five major tasks: field reconnaissance, image processing/digitizing, creation of the spatial database, conducting an accuracy assessment including field key preparation, and generating the necessary deliverables (**Attachment A**). This project is planned to occur over a 6-year period and across five federal fiscal years. Completion of these projects will likely be incremental with all parks anticipated for completion by December 2011. The work described herein covers the complete range of activities, listed below, to finish the project cost-effectively and in a reasonable time frame.

Proposed Projects and Tasks	
1.	Planning Sessions and Scoping Meetings;
2.	Preliminary Plant Alliance/Association and Species Lists;
3.	Aerial Photography and Digital Ortho-photography Acquisition and Preparation;
4.	Field Data Collection;
5.	Vegetation Classification, Alliance/Association Descriptions and Field Key;
6.	Aerial Photo-interpretation and/or Image Processing and Segmentation;
7.	GIS Database and Vegetation Map Preparation;
8.	Accuracy Assessment;
9.	Final Reports and Deliverables.

Important parameters to be reviewed at the planning meeting for each park in the UCBN:

- A review of vegetation data and driving environmental variables, including, but not limited to:
 - Elevation breaks/influence on vegetation distribution;
 - Precipitation gradient;
 - The effect of soils on plant distribution through use of available soil surveys;
 - Patterns that suggest the driving variables such as aspect, slope, slope position, and moisture gradient;
 - Evaluation of the existing GIS map of environmental polygons used in previous mapping work.
- Refine the preliminary vegetation classification, based on NPS staff knowledge of the vegetation data in this area.
- Conduct a field trip in the park to overview the vegetation for the above purposes and to discuss sampling issues and ecological characteristics of the parks.
- A review of work space, tools, and some of the products including aerial photography, any photointerpretation efforts, and legacy data summary;
- Identification of plant associations that may be sampled;
- Vegetation sampling direction concerning plot placement, size, shape, etc.
- Determining best use of legacy data for classification, allowing planning and budgeting for field data collection.
- Discuss potential partnering and cooperation with neighbors.
- Discuss and finalize the project boundary based upon contributions from partners.

The UCBN proposes to work cooperatively with Dan Cogan (CTI), Gina Wilson (University of Idaho Landscape Dynamics Lab), Karl Brown (NPS National Vegetation Mapping Program), John Erixson of Northwest Management Inc (NWM) and Jim VonLoh (e²M) to complete these projects. CTI will coordinate all aspects of the vegetation mapping projects in close cooperation with Lisa Garrett and UCBN. It is anticipated that the field work component including plot and accuracy assessment point collection will use experienced crews provided by e²M and NWM. The vegetation classification portion will be conducted by cooperative agreements between UCBN and the respective State Heritage programs. Finally the mapping and deliverables will be coordinated and completed by CTI.