

Technology Deployment Initiatives and Partnership Program

Request for Funding FY 2005

FHWA Strategic Goal Area: Productivity; Human & Natural Environment

Focus Technology: Context Sensitive Solutions

Project Title: Locating sensitive natural and cultural resources for project planning using remote sensing technology

Problem Statement: At present, project planning typically involves development of a preliminary alignment before resource inventories are undertaken. Road locations are typically within high-sensitivity resource areas. Resource surveys are taken at a project-specific level, and conflicts often result in additional survey and design.

Proposal: Explore the practicability and accuracy of resource inventories at the landscape level to identify high-probability landforms for natural and cultural resources. The Thompson River Road project will be utilized for this proposal. The following objectives will be achieved during this project:

1. Use landform analysis and environmental reconstruction for site predictive modeling. The following attributes can be isolated for field inventory and verification:
 - Saddles
 - Moraines
 - Ridges
 - Meadow “islands”
 - Stream Confluences
 - Rapids with associated terraces
 - Ecotones
 - Transhumance corridors
 - Talus slopes
 - Mineral deposits (licks)
 - Geological strata of tool-quality stone locations
2. Human preferences for unique or advantageous landscapes and environmental features are well known. Use spatial technology and geomorphology to highlight and isolate such landforms for field verification, to improve site predictive modeling on a landscape level. Apply regional pollen analyses to an environmental reconstruction to model potential changes in site location due to climatic change and shifting ecotones over the last 12,000 years. The modeling will map the expansion/contraction (environmental succession) of plant and animal resources, and by extension human use, over time within the region

Human subsistence and use of the landscape follows change in climate and ecotones. Current observations of site patterning are based upon very recent conditions. Use of deep-time climate

and subsistence analysis should enable better site inventory and evaluation, especially in locations currently classified as low or moderate probability.

3. Use LandSat and Eros band comparison imagery, and other remote sensing technology, to document:
 - Vegetation changes since 1972 due to logging and fire management
 - Road development and changes since 1972
 - Seasonal changes in local hydrology (springs, seeps, permanent water sources)
 - Mineral deposits or licks
 - Diurnal and annual temperature gradients in Thompson River Valley fall through spring, where “hot spots” of warmer temperatures may attract use.

Remote sensing technology offers capabilities on a landscape level that are not available elsewhere. Seasonal fluctuations in hydrology and temperature gradients are significant influences on human use of the landscape. Humans will have exploited animal use of the landscape at locations advantageous to both.

Benefits: The benefit is to undertake critical resource inventories prior to the commitment of substantive design resources. This will enable designers to holistically apply the principles of Context Sensitive Design/Context Sensitive Solution at a synthetic and landscape level rather than at a site-specific, incremental approach.

Resources/Cost: \$100,000

Duration: March 1, 2005-September 30, 2006

Organization/Method: The work will be performed through a Reimbursable Agreement with the Confederated Salish and Kootenai Tribes of the Flathead Indian Reservation.

Submitter:

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