Managing Cultural Resources with Predictive Models in Minnesota, USA

Elizabeth Hobbs, Ph.D.
Minnesota Department of Transportation
May, 2009
GIS Data and Models

- Modeled Landscape
- Landscape Suitability Model: Landform Sediment Assemblages
- Mn/Model: Archaeological Predictive Model
- HydModel: Prehistoric Surface Water
Mn/Model: Statewide Archaeological Predictive Model

- Potential for finding archaeological resources at surface
- Site avoidance
- Survey design
HydModel: prehistoric surface water

- **Input GIS dataset**
- **Tool output dataset**
- **Final model output dataset**

**Mn/DOT soils Derived from SSURGO**

**Potential Historic Lake/Wetland/Riverine areas derived from soil polygons**
- Use if GLO delineations are not available

**Tool 1**
- Select great groups
- Identify riverine using LANDFMR
- Filter lake, wetland features using HYDRIC and DRAINAGECL
- Eliminate areas < 3 acres

**GLO lakes**

**Tool 2**
- GLO lake correspondence

**Tool 3**
- NWI natural feature selection plus RDWI
- Only if available

**Selected natural wetland features and areas derived from RDWI**

**Tool 3a**
- NWI natural feature selection plus RDWI

**Tool 4**
- Combine all potential historic water features

**Selected**
- Natural wetland features and areas derived from RDWI

**Potential Historic Lake/Wetland/Riverine with GLO correspondence**

- Use if GLO delineations are not available

**Landform Sediment Assemblages**

**All historic water features**
Predicting Surface Archaeological Sites

Mn/Model archaeological predictive model

Mn/Model with HydModel, showing prehistoric surface water features
Landform Sediment Assemblages Mapping

- Geomorphic mapping (1:24,000 scale)
- Focus on river valleys and other depositional environments
Four-dimensional

- Data for sediment at depths of:
  - 0-1 meter
  - 1-2 meters
  - 2-5 meters

- Relative age
LSModel: Landscape Suitability Model

- Potential for preservation of deeply buried archaeological sites

- 0-1 meter
- 1-2 meters
- 2-5 meters
Deep Site Testing Protocol

- Field Protocol
  - Trench
  - Core
  - Evaluate alternative methods
Survey Design

Mn/Model

HydModel

LSModel
Summary and Recommendations

- High quality data and models
- Field protocols
- Access to models
- Supporting studies