Vegetation Inventory and Survey Methods: A Reclamation Tool

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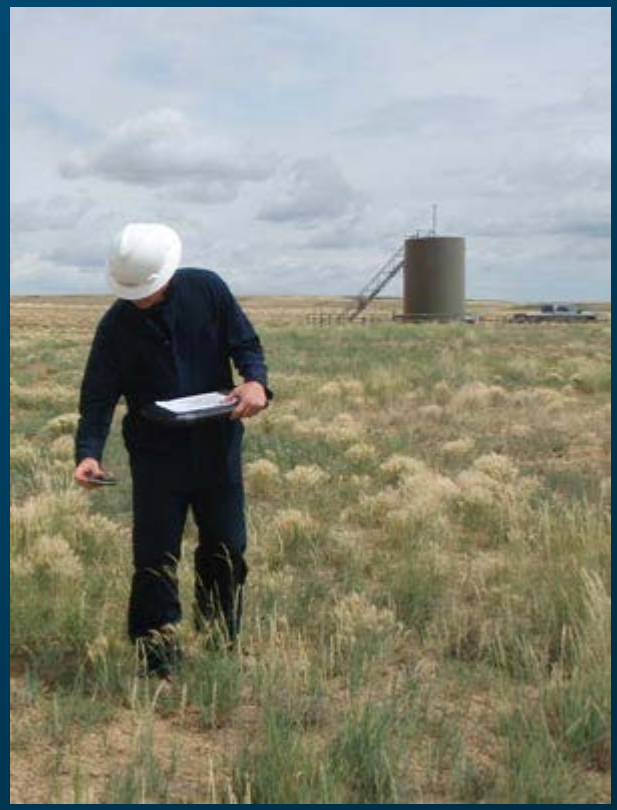
Vegetation Inventory or Survey

Component of Reclamation Activities

- Planning
- Revegetation
- Diversity
- Weed Management
- Sensitive Species
- Species Salvage



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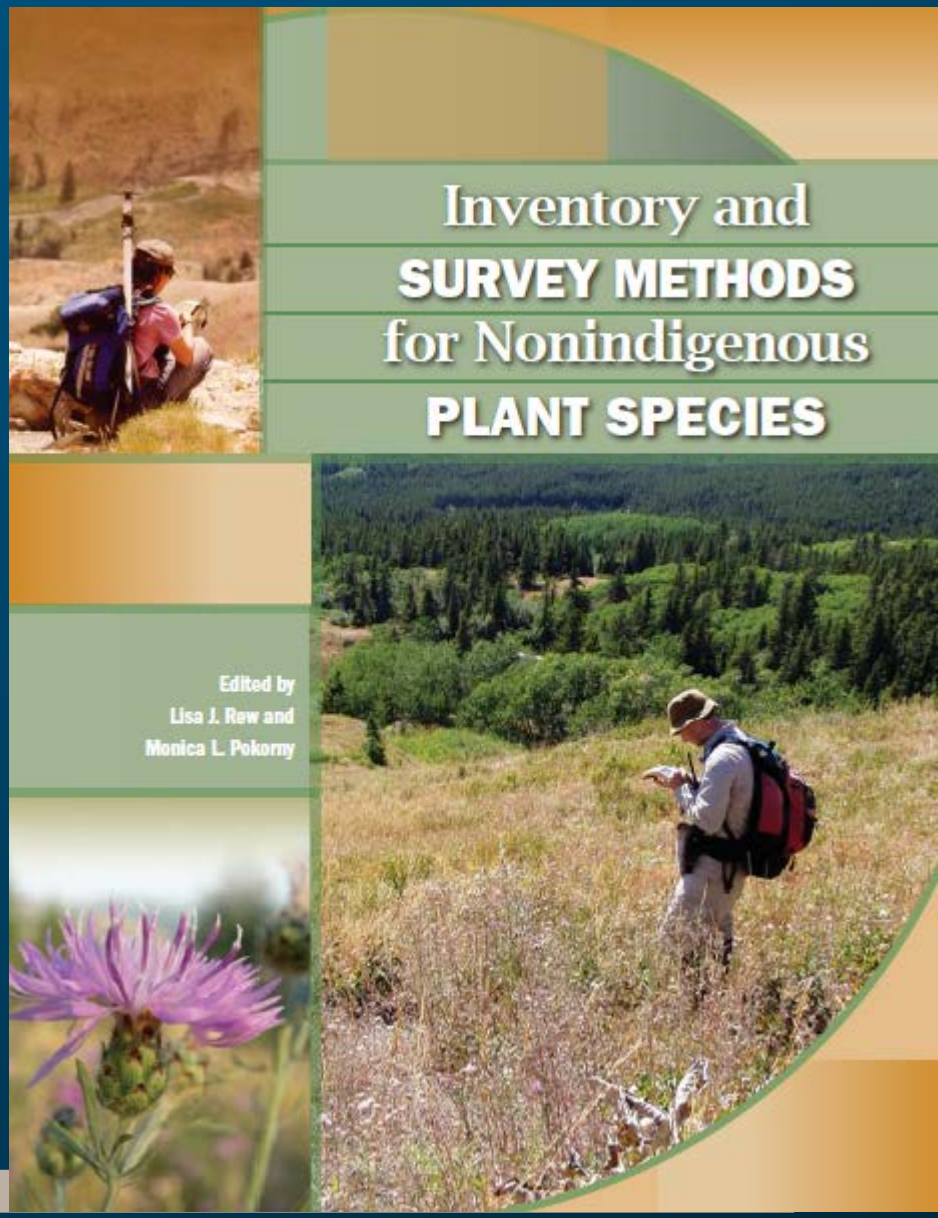
Inventory & Survey

What vegetation is present

Where it is located

Fundamental for management and future monitoring



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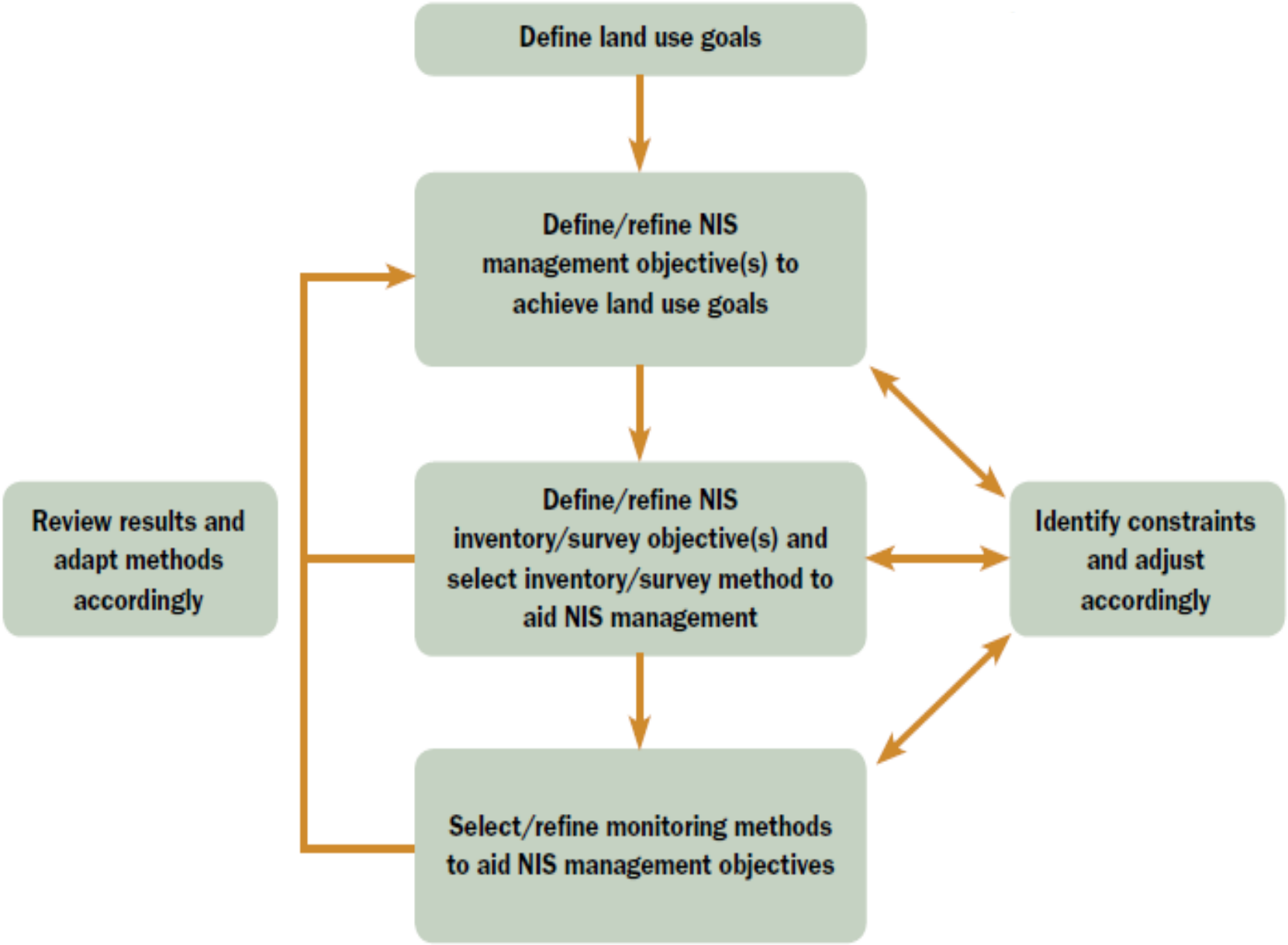
Objectives and Constraints

Clearly define survey and inventory goals and objectives

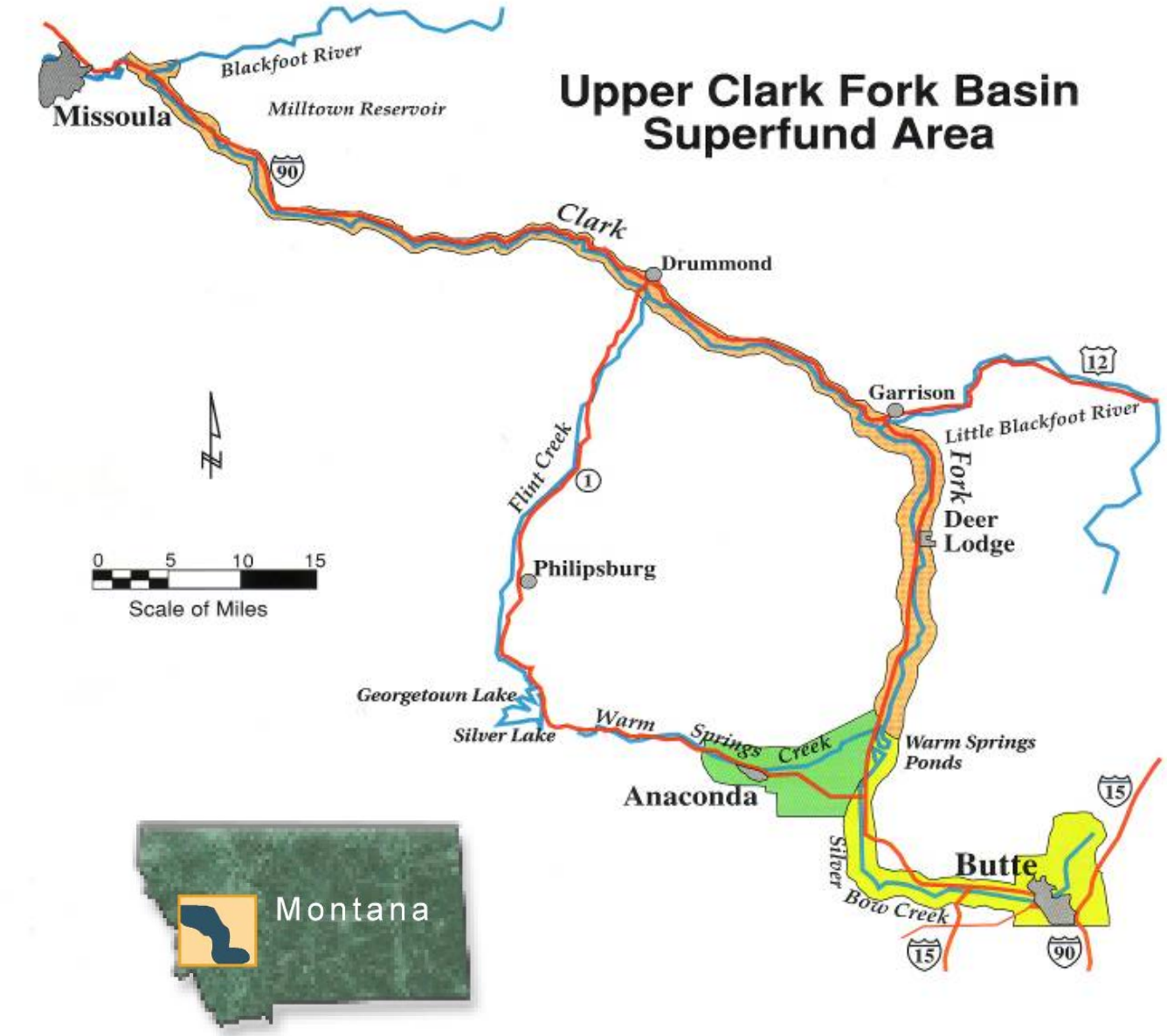
- How will data be used to meet land use goals
- What data to collect
- How much information is needed
- What future parameters will be monitored

Consider project constraints

- Size of area, topography, access
- Costs and timing
- Regulatory requirements


Define land use goals
Define/refine NIS management objective(s) to achieve land use goals
Define/refine NIS inventory/survey objective(s) and select inventory/survey method to aid NIS management
Select/refine monitoring methods to aid NIS management objectives
Review results and adapt methods accordingly
Identify constraints and adjust accordingly

Case Study



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Riparian Evaluation System (RipES)

- **Pre-remedial design tool for the Clark Fork River Superfund Site**
- **Characterize the floodplain**
- **A consistent, repeatable classification process**
- **Applied to Reach A of the CFR operable unit**
  - 46 river miles
  - 100 year floodplain
  - 9941 acres
  - 153 landowners

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RipES – Data Collected

-Data-driven decision making

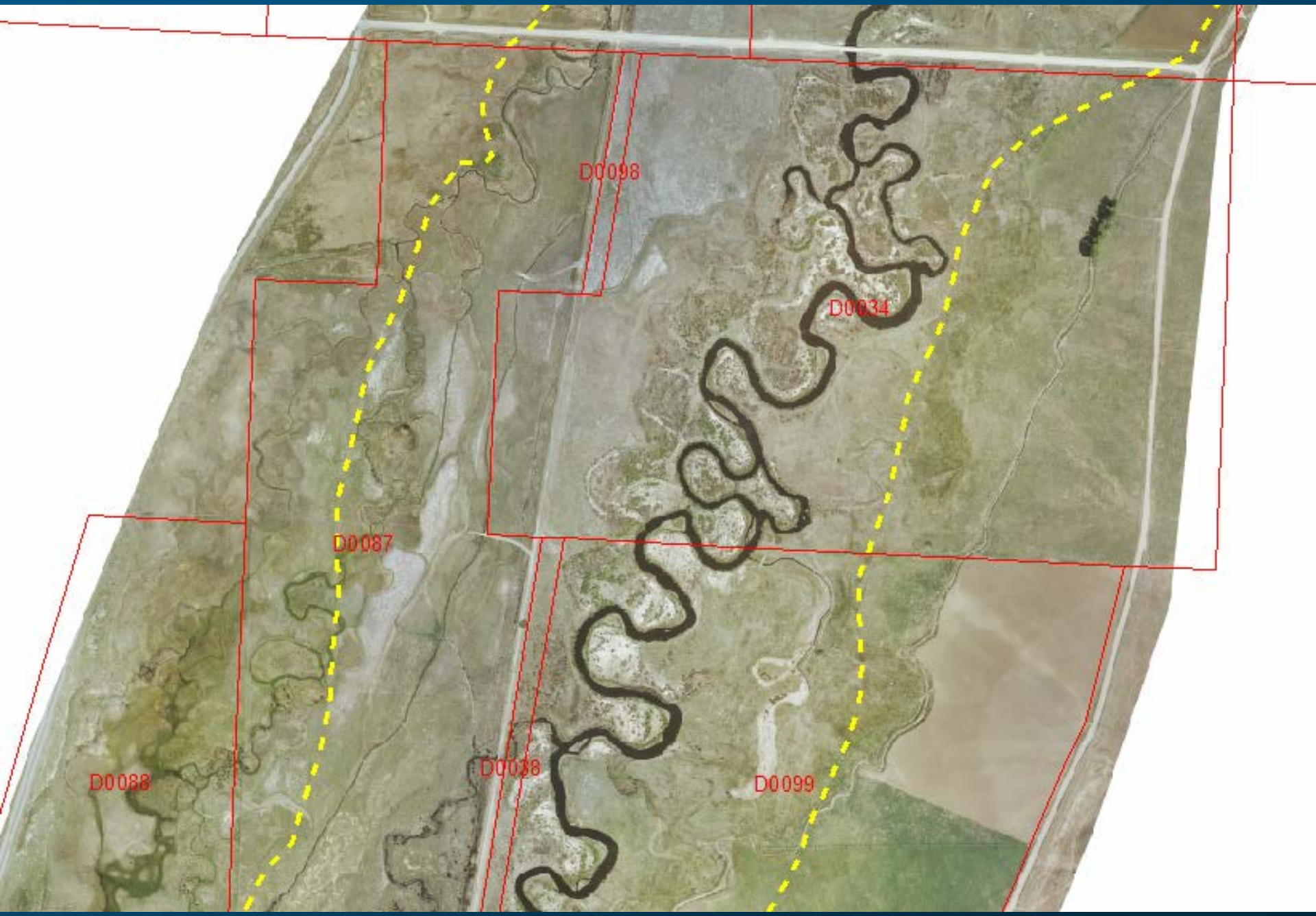
- Landscape Stability
- Contamination Severity
- Plant Community Attributes

-Exact location, surface area, volume

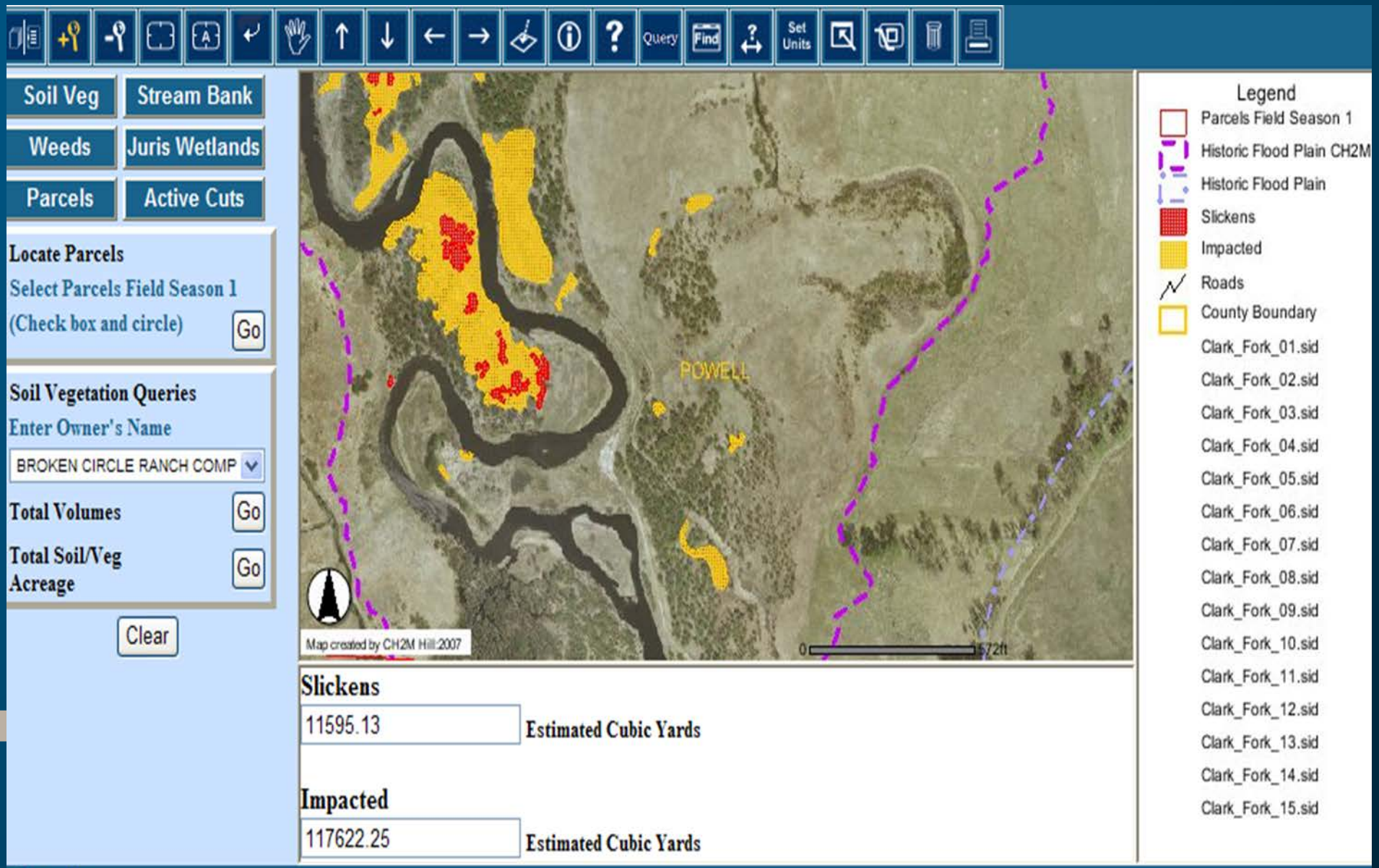
-Locate cultural features

-Attributes displayed as GIS layers

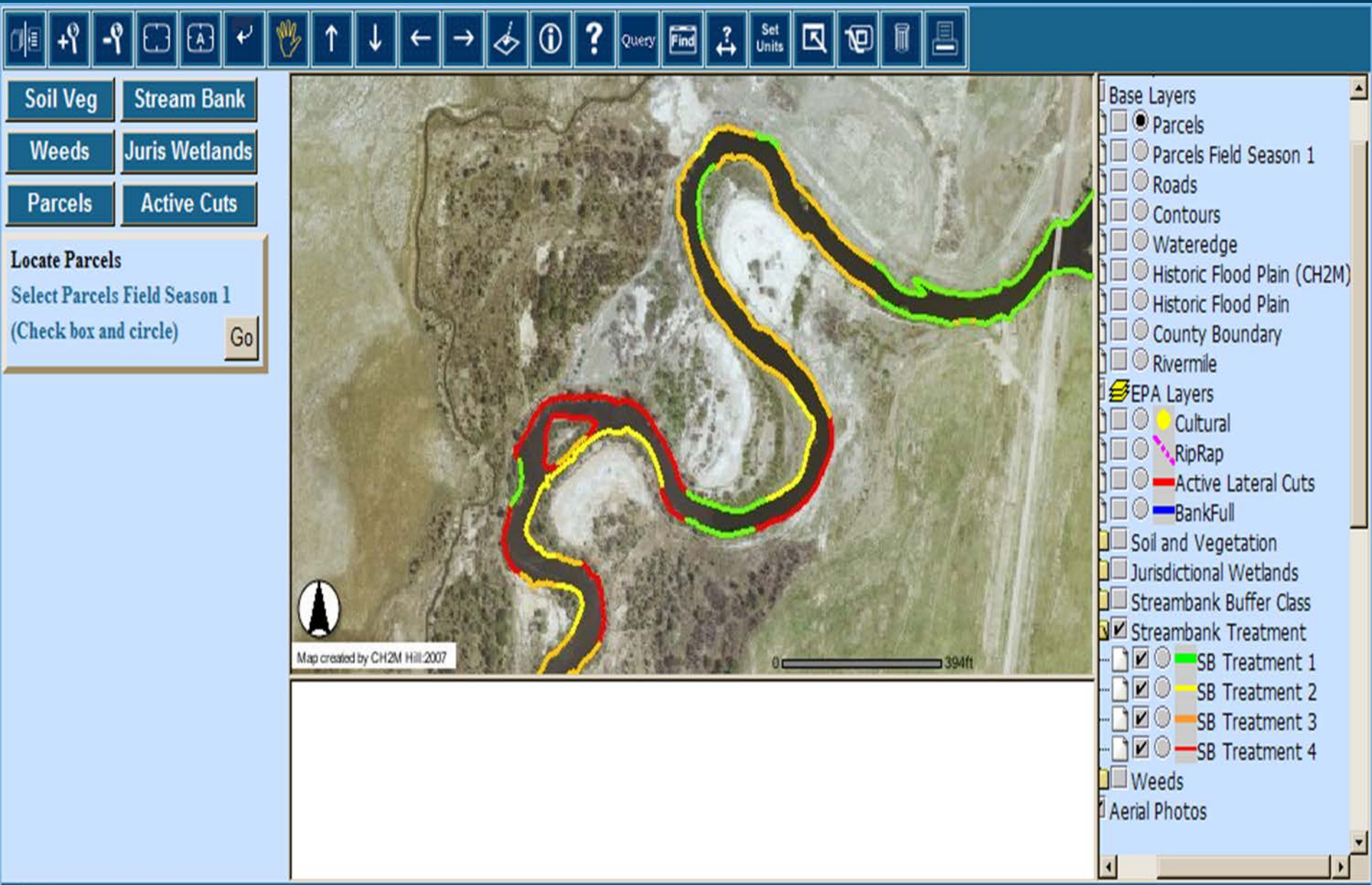
-Develop system for data storage and presentation


D0098
D0034
D0087
D0088
D0038
D0099

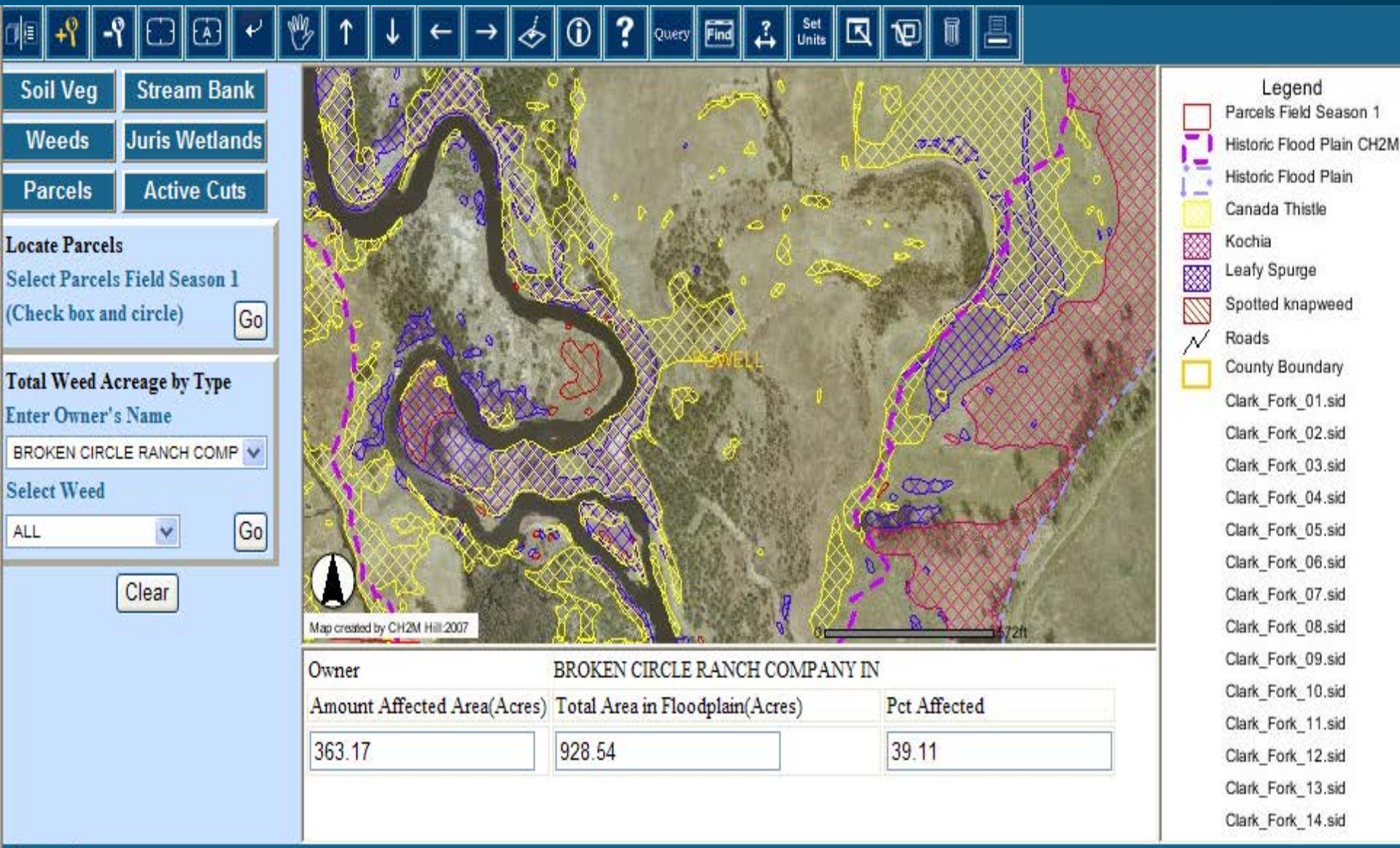
Results


Query
Find
Set Units
Soil Veg
Stream Bank
Weeds
Juris Wetlands
Parcels
Active Cuts
Locate Parcels
Select Parcels Field Season 1
(Check box and circle)
Go
Soil Vegetation Queries
Enter Owner's Name
BROKEN CIRCLE RANCH COMP
Total Volumes
Go
Total Soil/Veg Acreage
Go
Clear
POWELL
Map created by CH2M Hill 2007
0
Legend
Parcels Field Season 1
Historic Flood Plain CH2M
Historic Flood Plain
Slickens
Impacted
Roads
County Boundary
Clark_Fork_01.sid
Clark_Fork_02.sid
Clark_Fork_03.sid
Clark_Fork_04.sid
Clark_Fork_05.sid
Clark_Fork_06.sid
Clark_Fork_07.sid
Clark_Fork_08.sid
Clark_Fork_09.sid
Clark_Fork_10.sid
Clark_Fork_11.sid
Clark_Fork_12.sid
Clark_Fork_13.sid
Clark_Fork_14.sid
Clark_Fork_15.sid
Slickens
11595.13
Estimated Cubic Yards
Impacted
117622.25
Estimated Cubic Yards
Zoom In

Results


Query
Find
Set Units
Soil Veg
Stream Bank
Weeds
Juris Wetlands
Parcels
Active Cuts
Locate Parcels
Select Parcels Field Season 1
(Check box and circle)
Go
Map created by CH2M Hill 2007
0
394ft
Base Layers
Parcels
Parcels Field Season 1
Roads
Contours
Wateredge
Historic Flood Plain (CH2M)
Historic Flood Plain
County Boundary
Rivermile
EPA Layers
Cultural
RipRap
Active Lateral Cuts
BankFull
Soil and Vegetation
Jurisdictional Wetlands
Streambank Buffer Class
Streambank Treatment
SB Treatment 1
SB Treatment 2
SB Treatment 3
SB Treatment 4
Weeds
Aerial Photos

Results


Query
Find
Set Units
Soil Veg
Stream Bank
Weeds
Juris Wetlands
Parcels
Active Cuts
Locate Parcels
Select Parcels Field Season 1
(Check box and circle)
Go
Total Weed Acreage by Type
Enter Owner's Name
BROKEN CIRCLE RANCH COMP
Select Weed
ALL
Go
Clear
Map created by CH2M Hill 2007
Legend
Parcels Field Season 1
Historic Flood Plain CH2M
Historic Flood Plain
Canada Thistle
Kochia
Leafy Spurge
Spotted knapweed
Roads
County Boundary
Clark_Fork_01.sid
Clark_Fork_02.sid
Clark_Fork_03.sid
Clark_Fork_04.sid
Clark_Fork_05.sid
Clark_Fork_06.sid
Clark_Fork_07.sid
Clark_Fork_08.sid
Clark_Fork_09.sid
Clark_Fork_10.sid
Clark_Fork_11.sid
Clark_Fork_12.sid
Clark_Fork_13.sid
Clark_Fork_14.sid
Owner
BROKEN CIRCLE RANCH COMPANY IN
Amount Affected Area(Acres)
Total Area in Floodplain(Acres)
Pct Affected
363.17
928.54
39.11
Zoom In

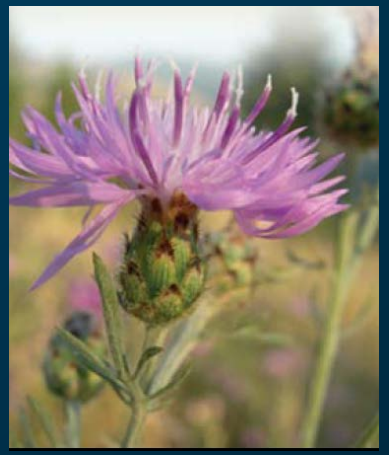
Selecting a New Weed Inventory Method

Objectives

- Weed control prior to reclamation
- BMP (prevention, containment) on private lands
- Protect reclamation remedy in long-term
- Monitoring during and after construction

Constraints

- Budget
- Large area
- Limited personnel and time frame



Data Needed

Species – Noxious weeds

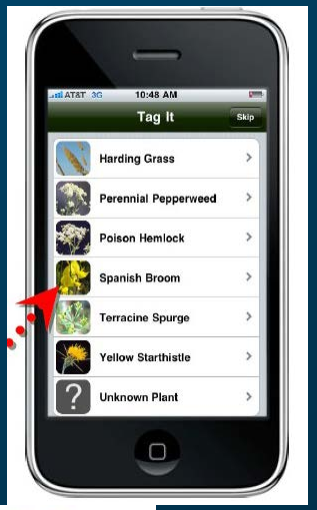
Location - UTM

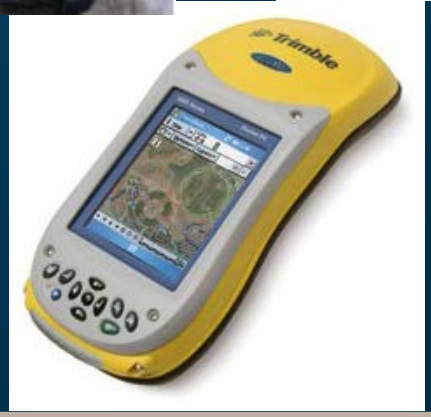
Size of Infestation

- < 0.1 acre
- 0.1 - 0.25 acre
- 0.26 - 1 acre
- 1.1 - 2.5 acres
- 2.6 - 5 acres

Canopy Cover

- Trace (<1%),
- Low or occasional plants (1-5%),
- Moderate or scattered plants (6-25%),
- High or fairly dense plants (26-100%)





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Landscape-Scale Wildland Inventory

Effective Detection Swath Width

Transects - 30 meters apart

Patch Separation Resolution

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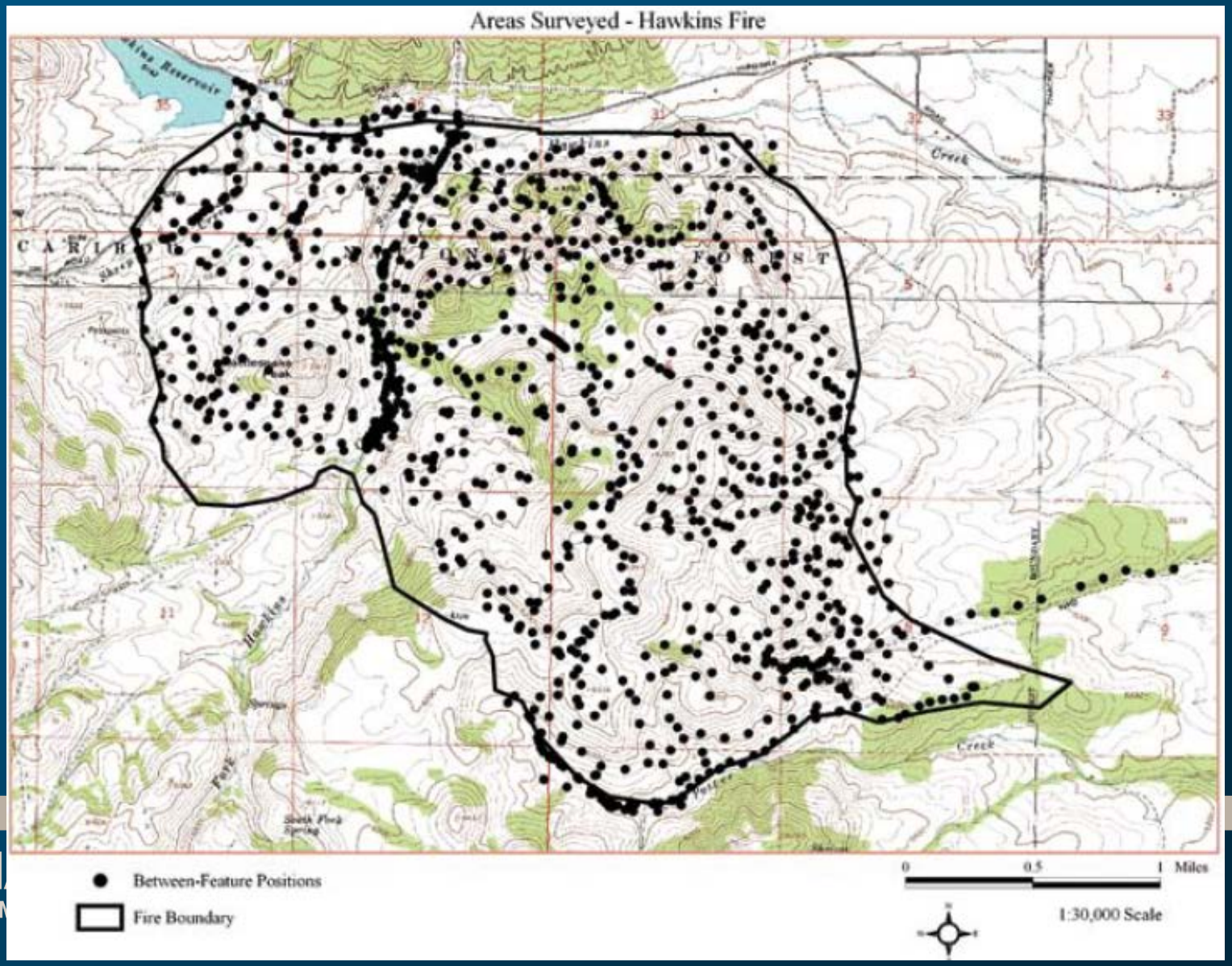
Between Feature Points



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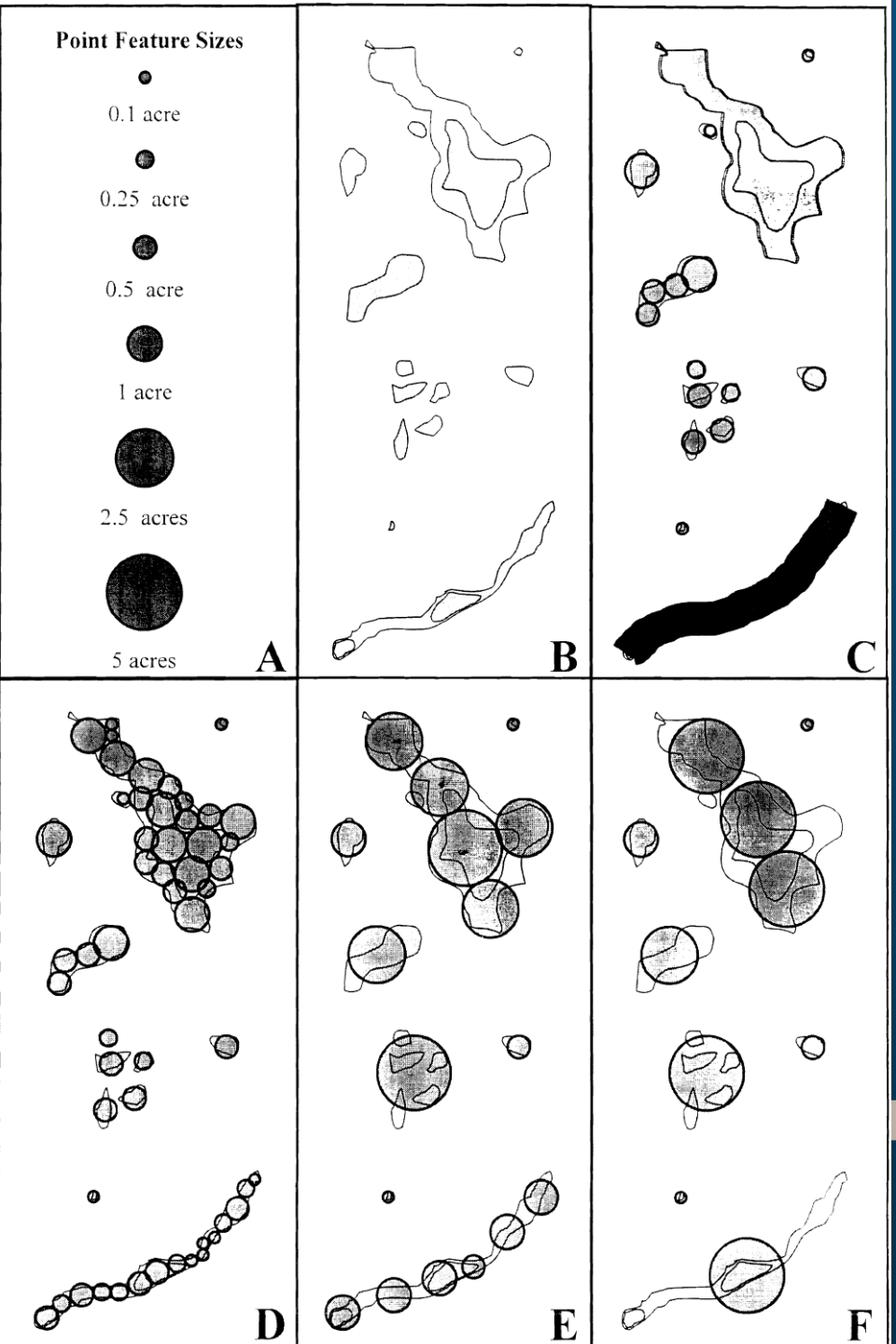
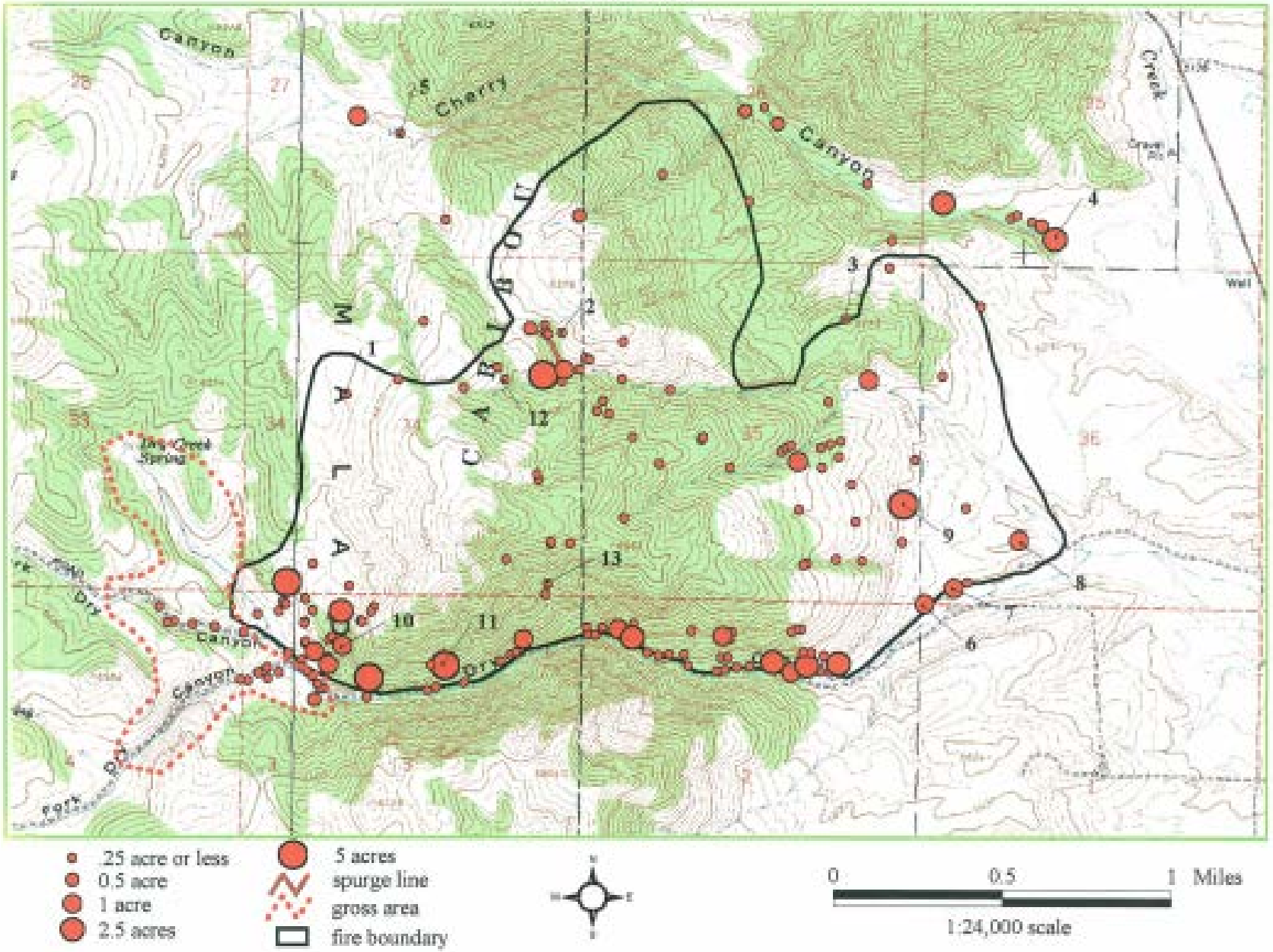
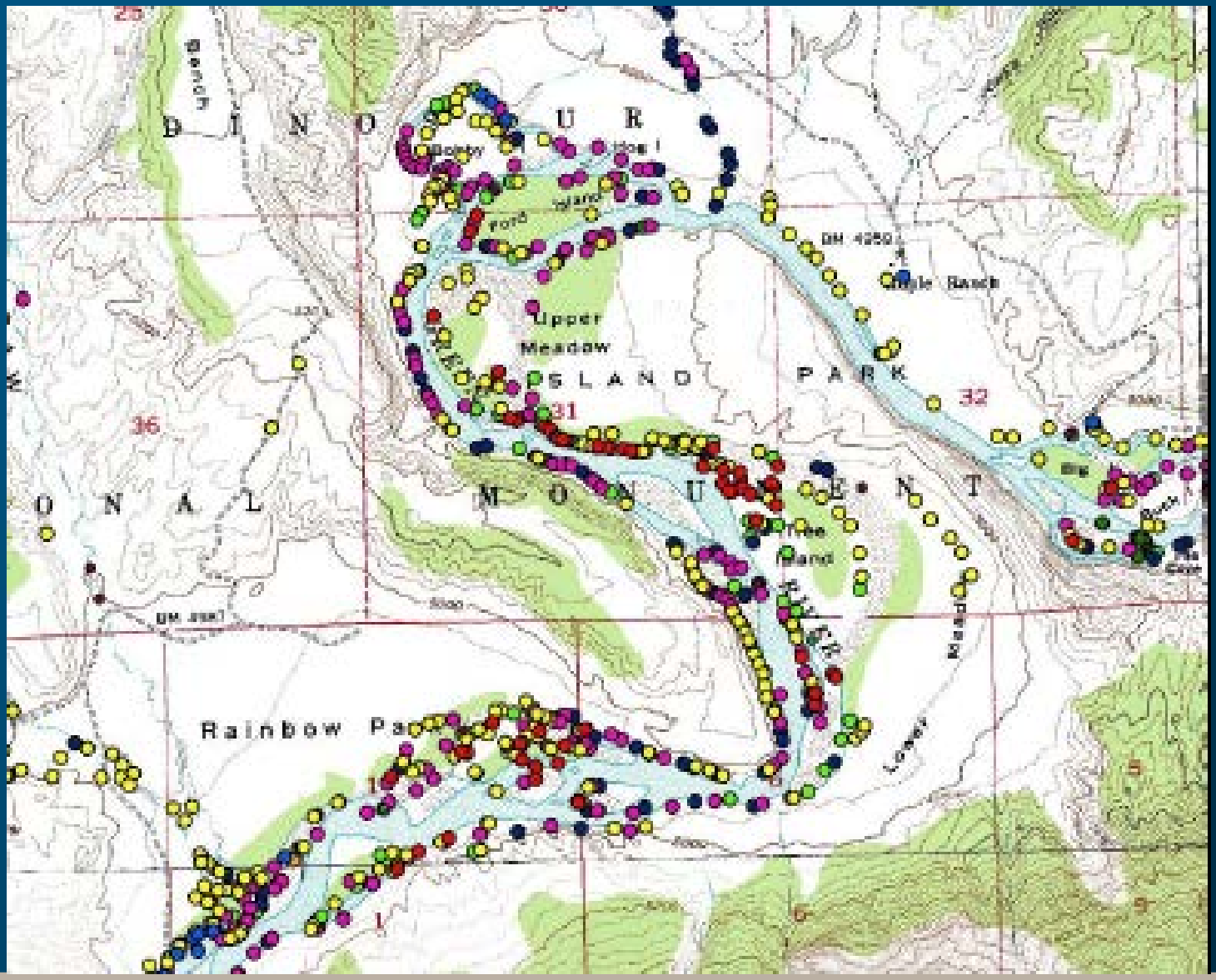


Collect Features

- Point
- Line
- Polygon

Leafy Spurge





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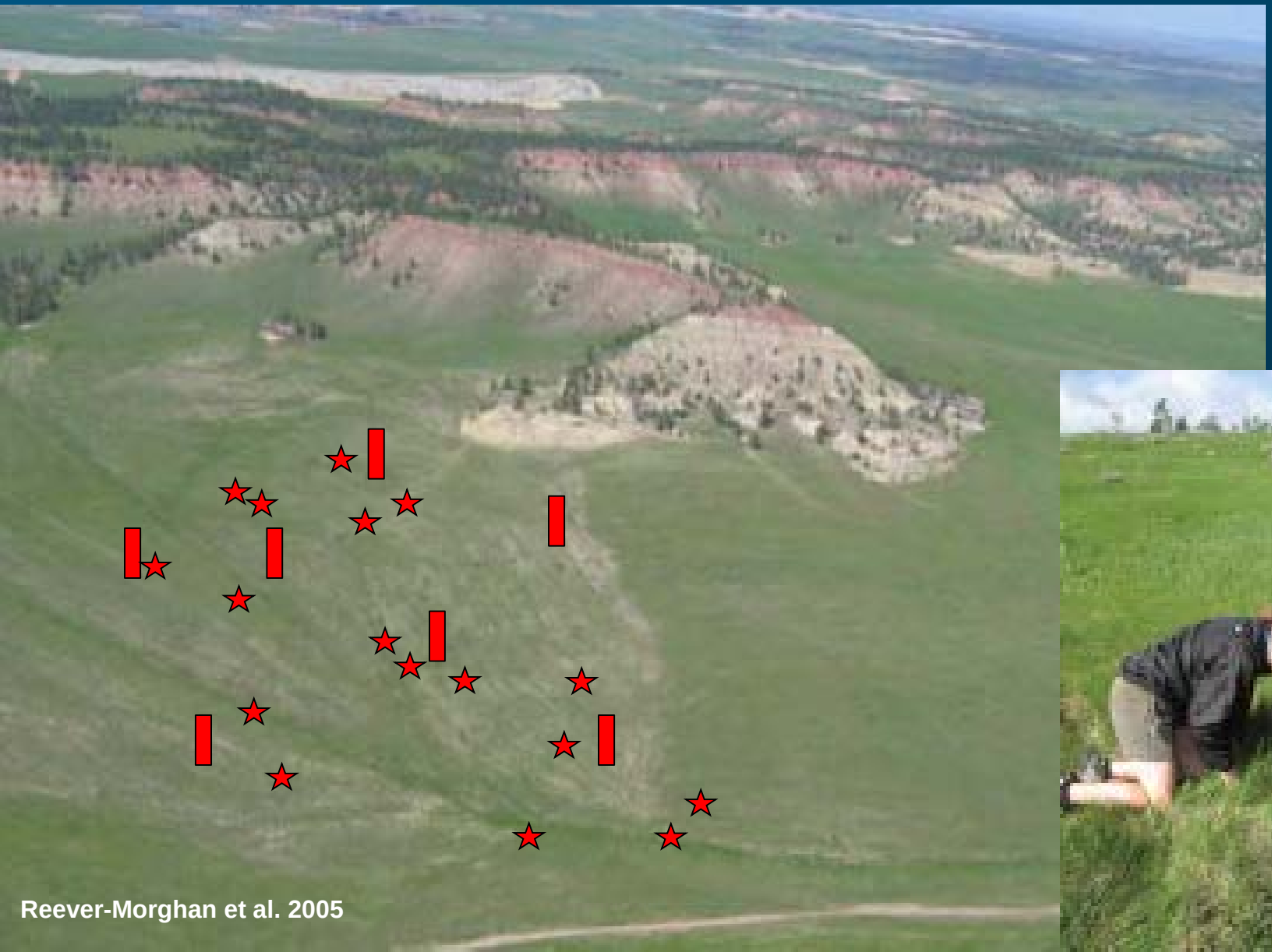
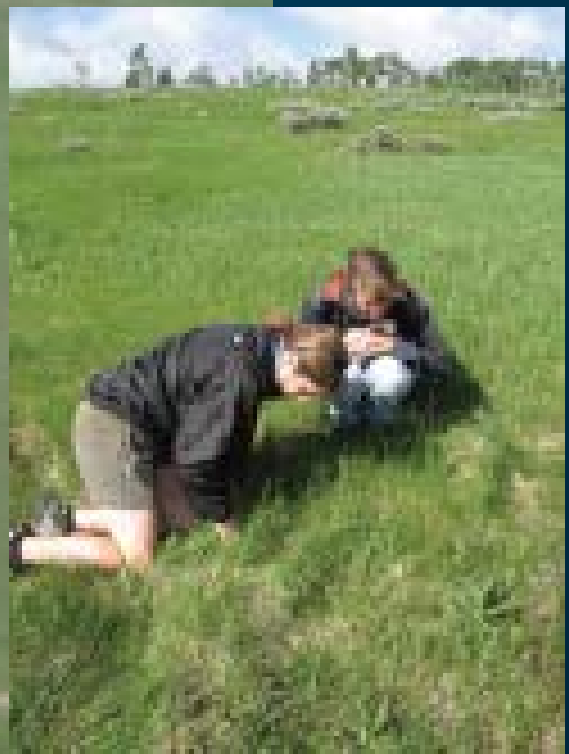
Advantages

- **90% confidence of finding all weed occurrences**
- **Collect data to apply toward management as locate weeds**
- **Accurate acreage of weed infestation by species**
  - 18 species of weeds, 5298 ac. infested
- **Easily produce maps**
- **Cost effective – saved client ~ $150,000**

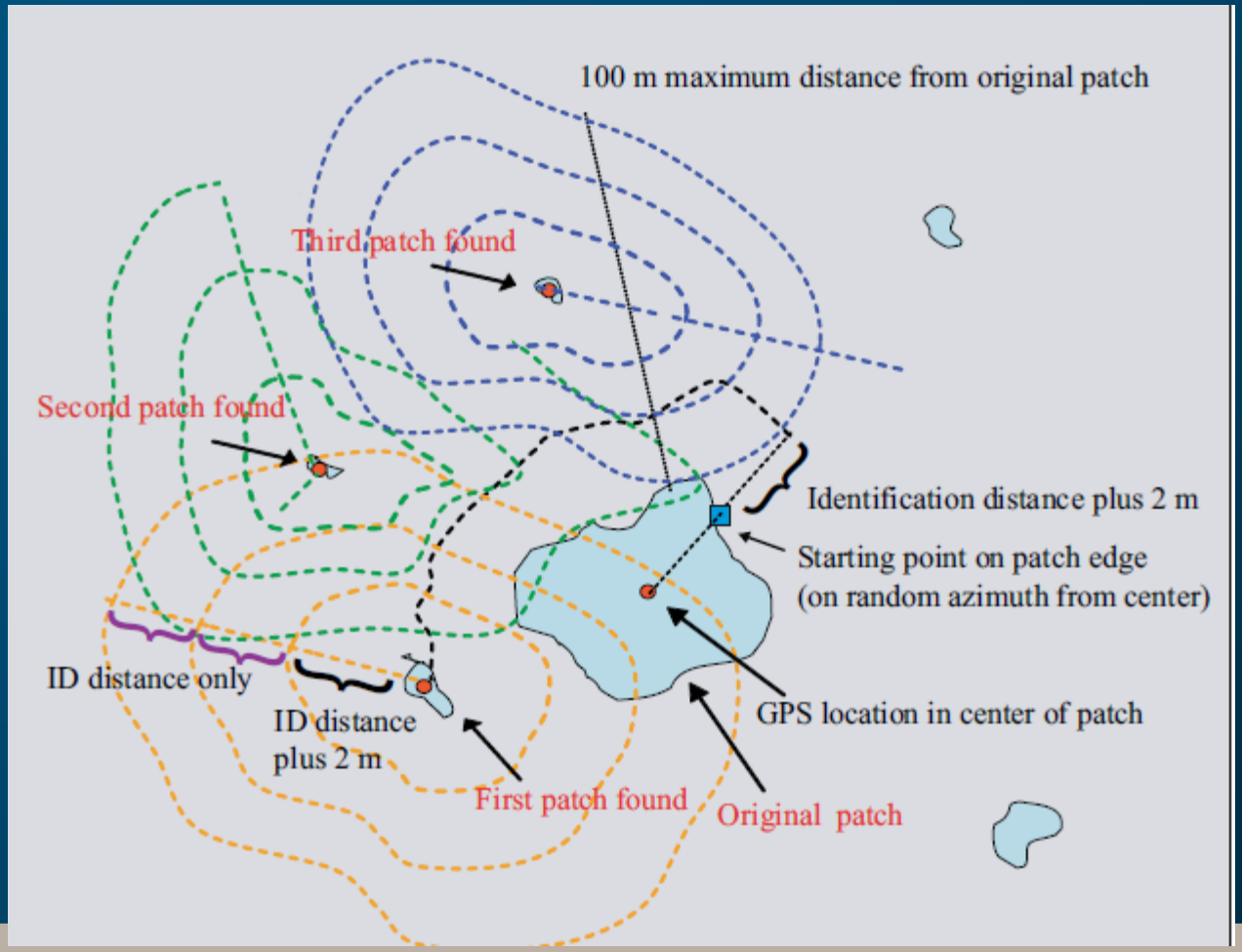
Inventory of Species Diversity on Reclaimed Coal Mine





Reever-Morghan et al. 2005

Adaptive Sampling Design



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Questions?

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