Looking at the big picture to plan land treatments

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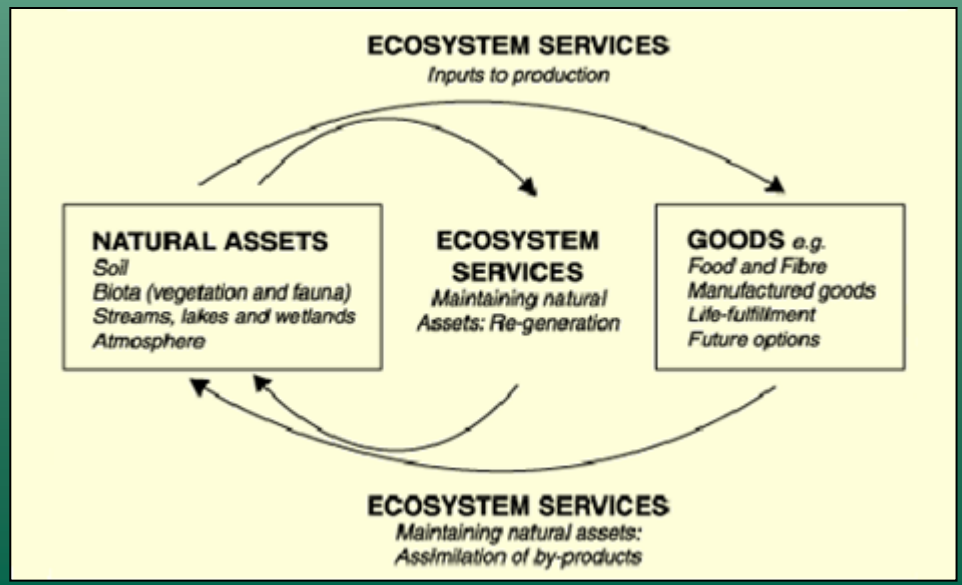
Why land treatment planning?

- Enhance land productivity
- Ecosystem services and land sustainability
- Meet human needs while safeguarding Earth's resources



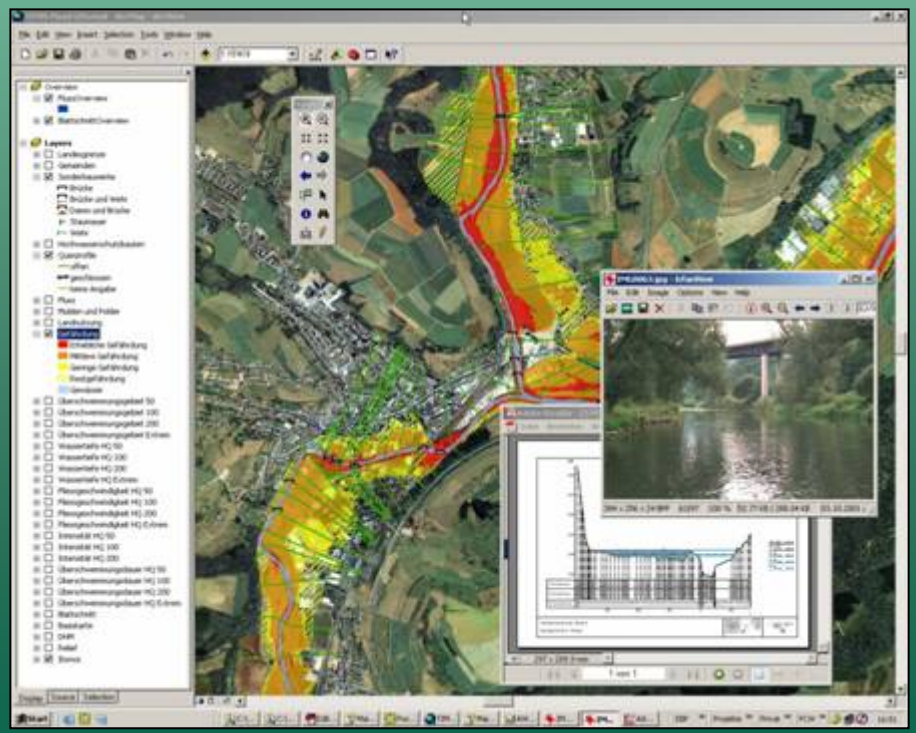
Land treatment planning

- Site preparation
- Selection of plant material
- Post-fire treatments
- Post-fire monitoring
- Weed management
- Range improvements of vegetation structure
- Habitat improvements

Spatial technology

Important tools in Land Treatment Planning

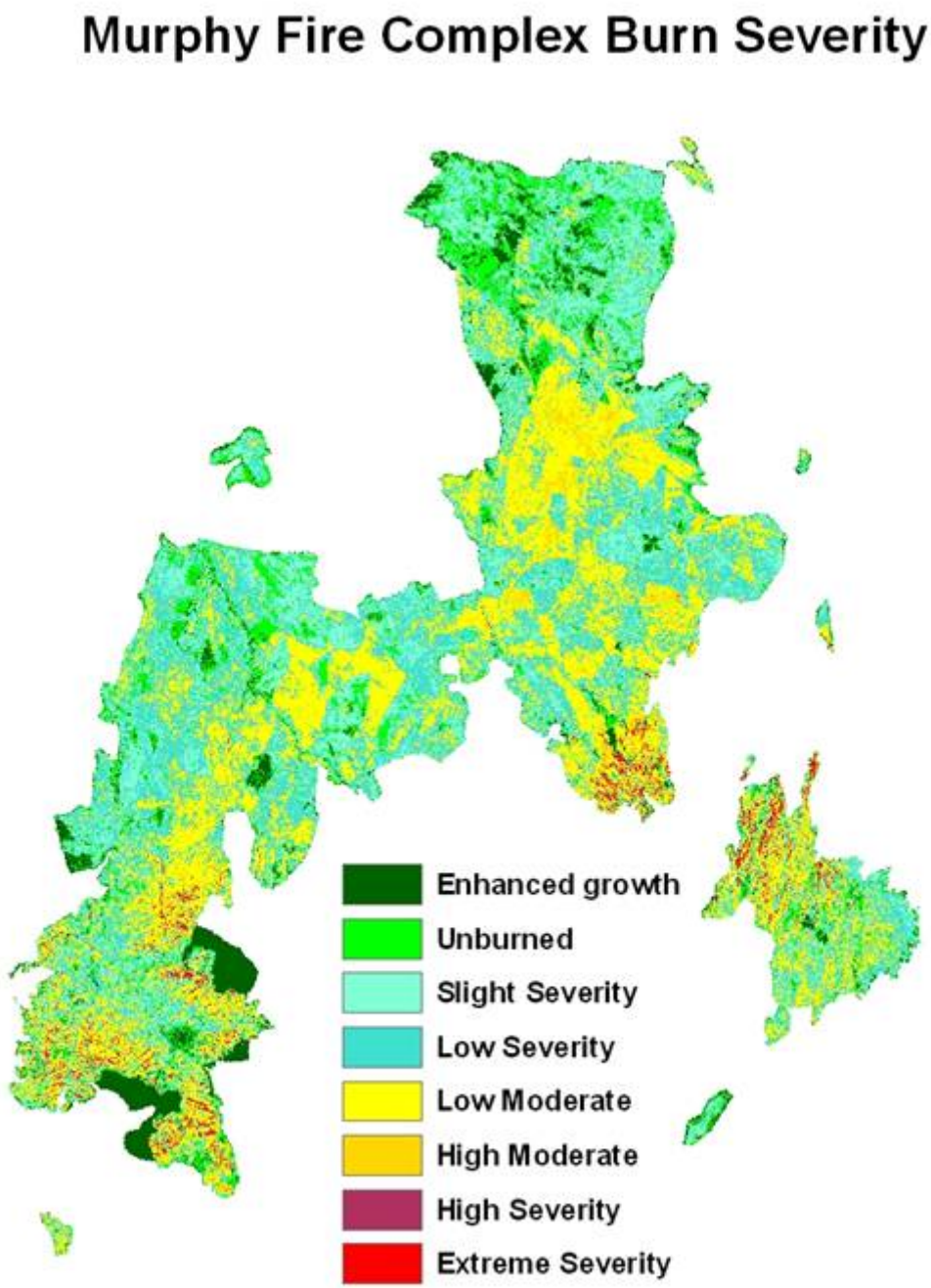
- Geographic information systems (GIS)
- Global positioning systems (GPS)
- Remote sensing



Planning treatments in burned areas

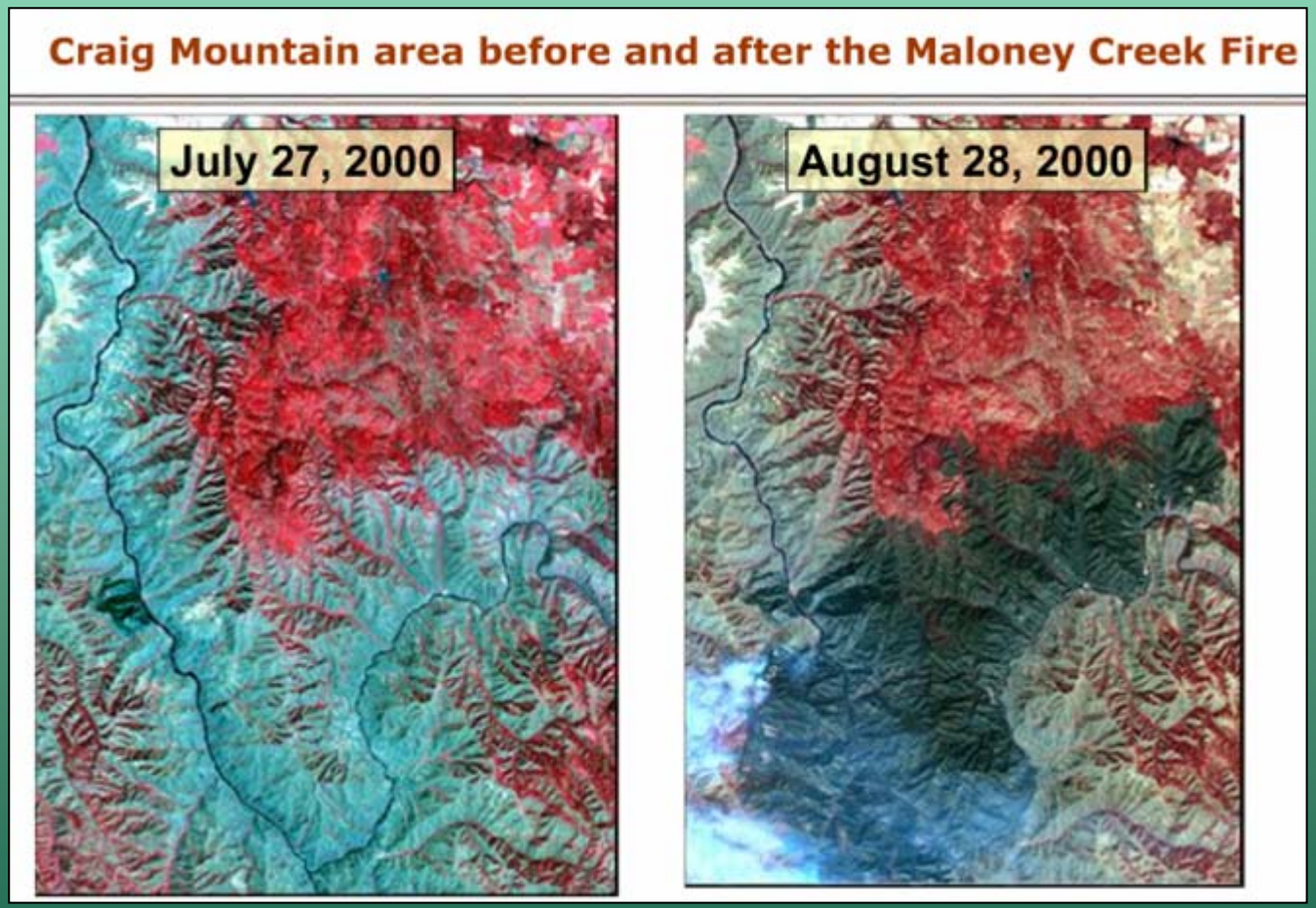
Murphy Fire Complex burned > 600,000 acres of Idaho and Nevada rangelands in 2007

Burn severity maps were created via remote sensing assessments (dNBR index)



Burn Severity Maps

Where do they come from?



dNBR = (R4-R7) / (R4+R7)

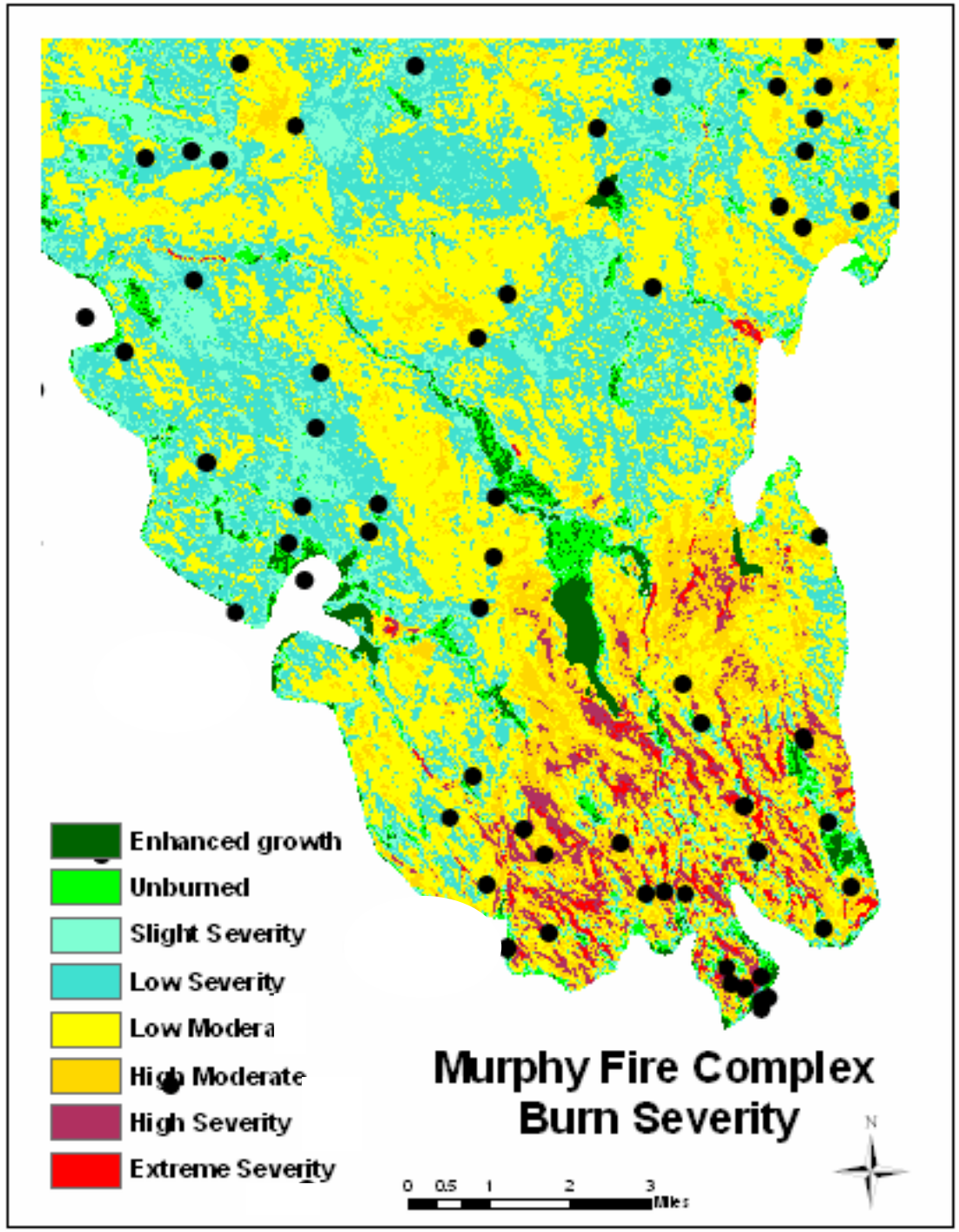
Burn Severity in Rangelands?

- dNBR index as a remote measure of burn severity was developed in Glacier NP but is currently being applied across ecosystems
- Research on the meaning of dNBR in rangelands is ongoing
- dNBR is really a measure of the change in greenness

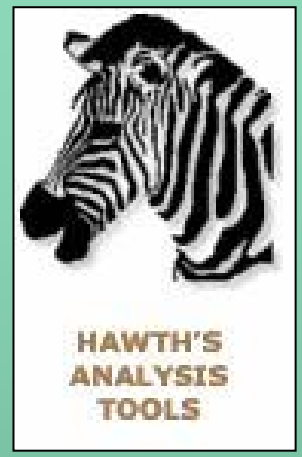
Murphy Fire Complex

Stratify samples along a burn severity gradient

Digital map in a geographic information system ArcGIS



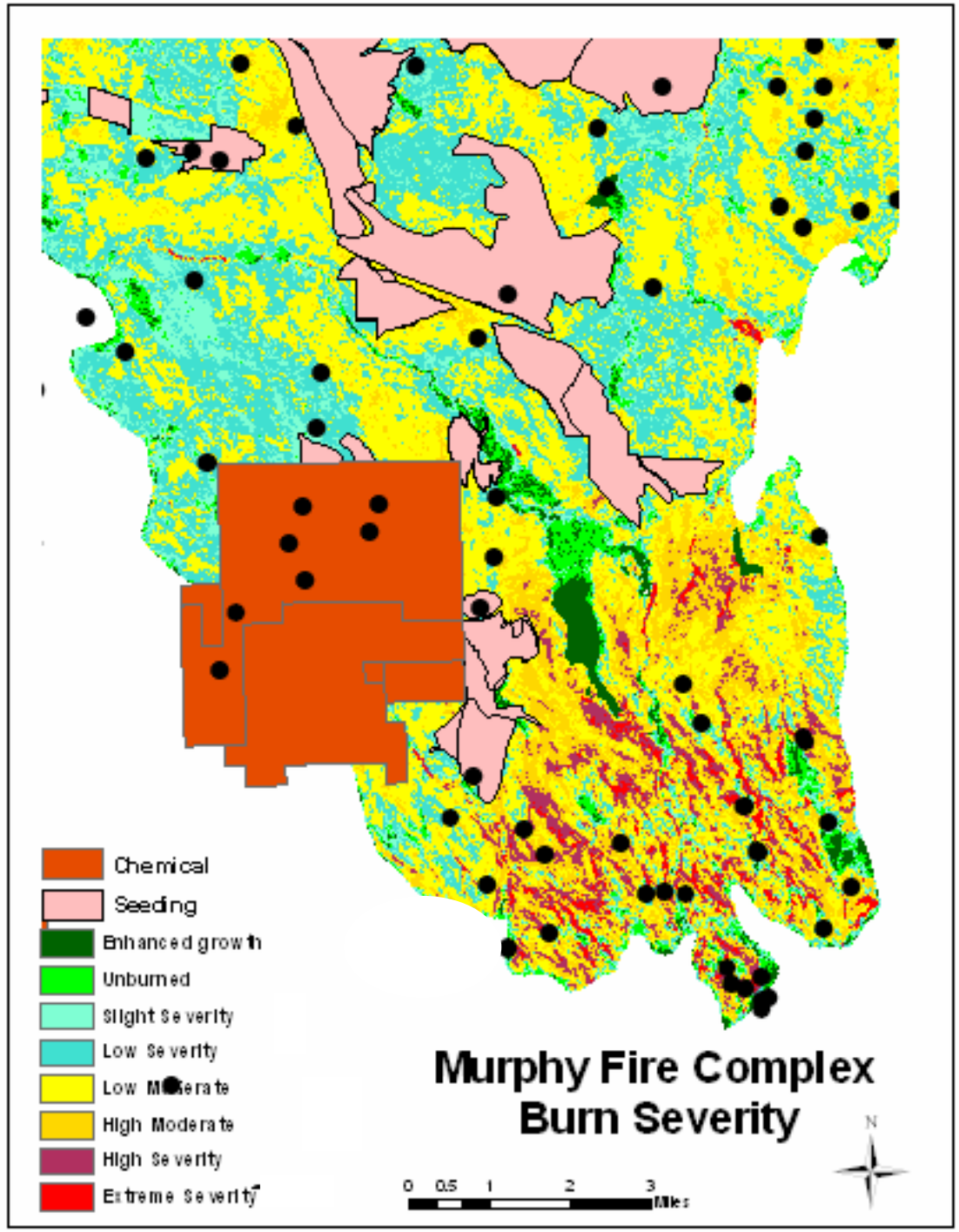
Hawth's Tools



- ArcGIS extension available at http://www.spatialecology.com/
- Create random selection
- Stratified random sampling
- Generate random or regular points
- Creates random 3D points (xyz)
- Creates a vector GRID

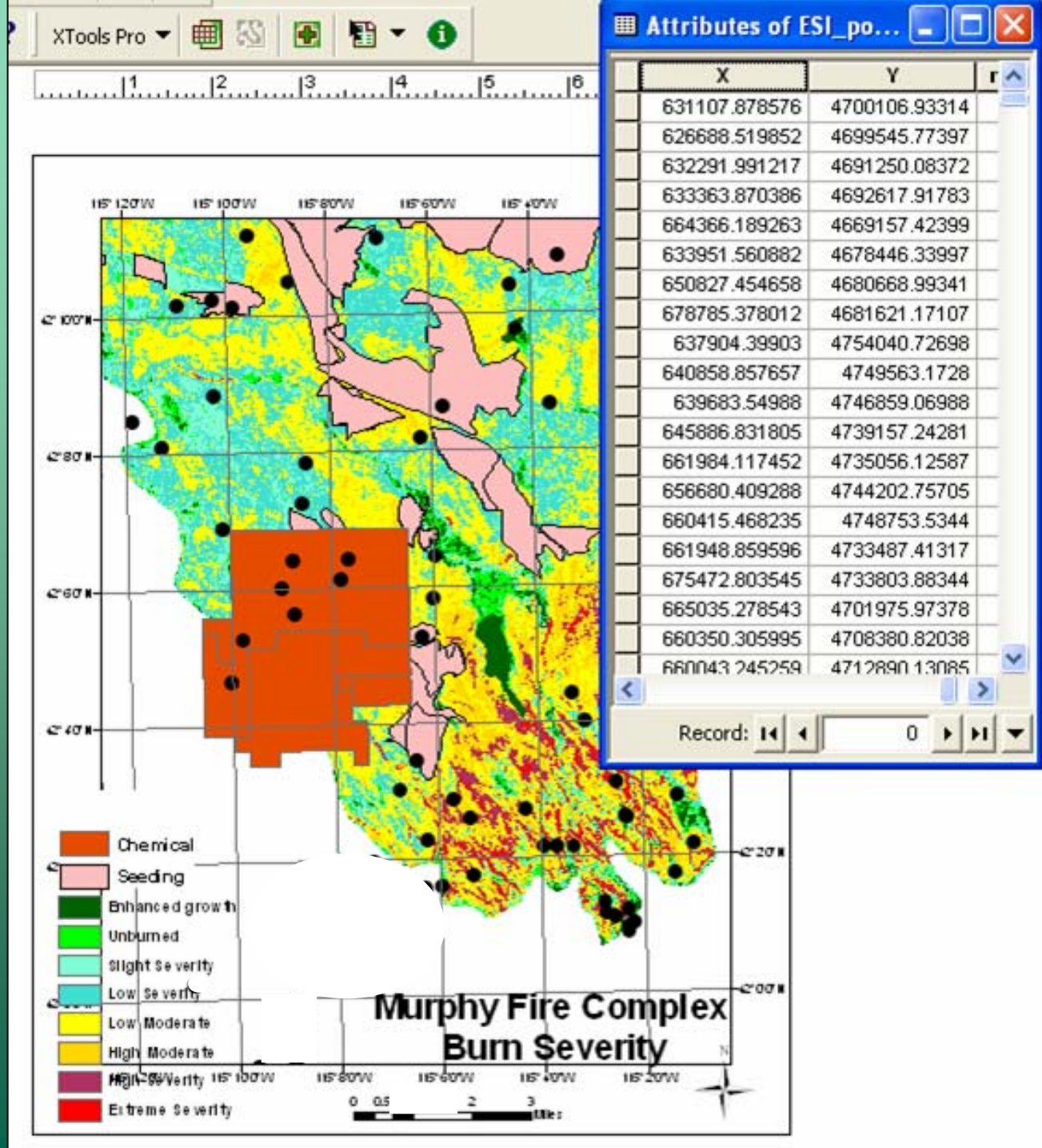
……..and much more……

Select sampling-points that are not within a previous seeding or chemical treatment



Coordinates can be found in the GIS for each sampling location

Coordinates can be entered into a GPS



GPS

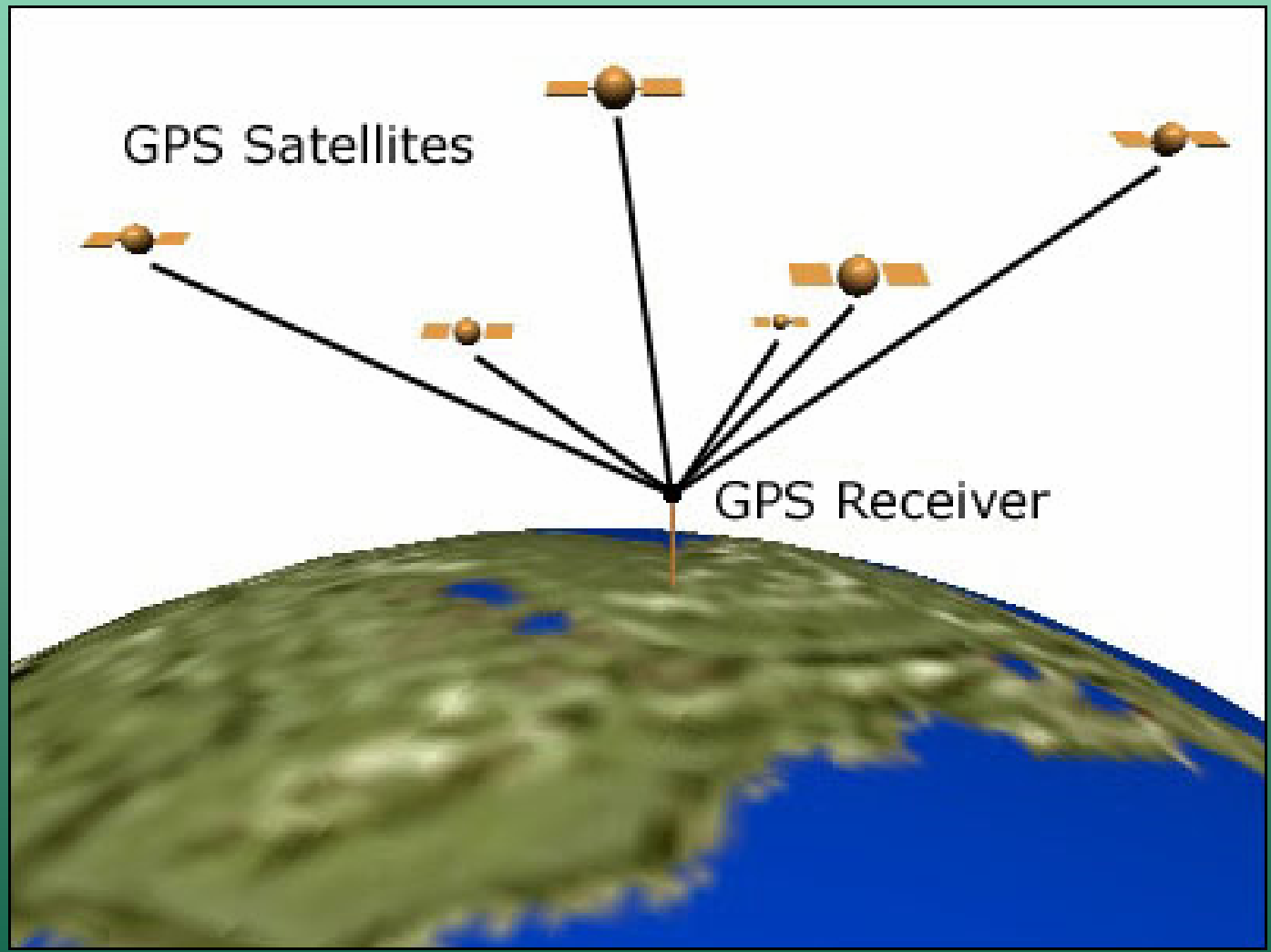
What unit should I buy?

Figure 2. Trimble Pro-XRS GPS system.

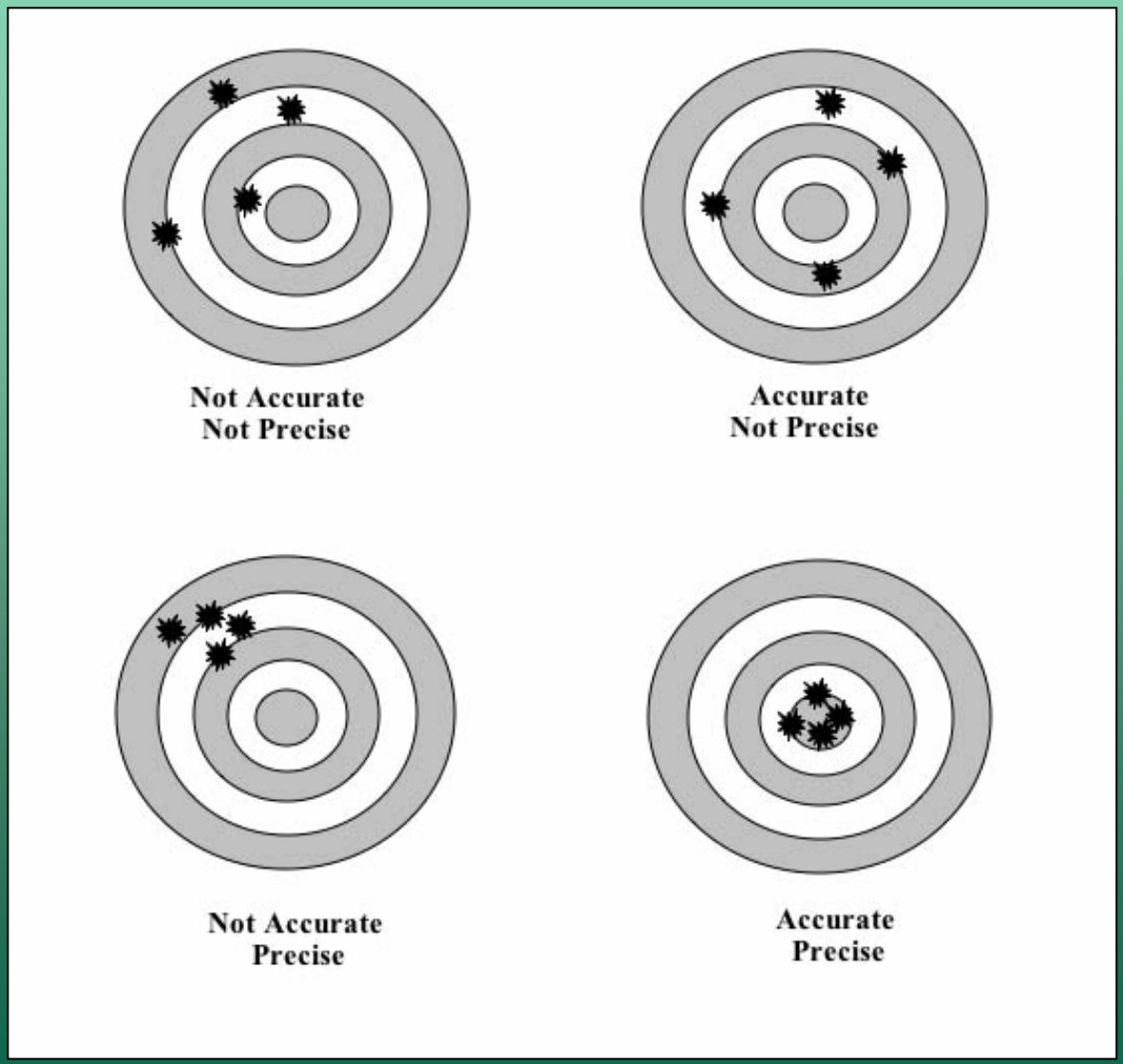
GPS Considerations

- Price of the unit
- Spatial accuracy
- Battery power – disposable or rechargeable
- Data storage and database capabilities
- GIS capabilities in the field
- Differential correction options

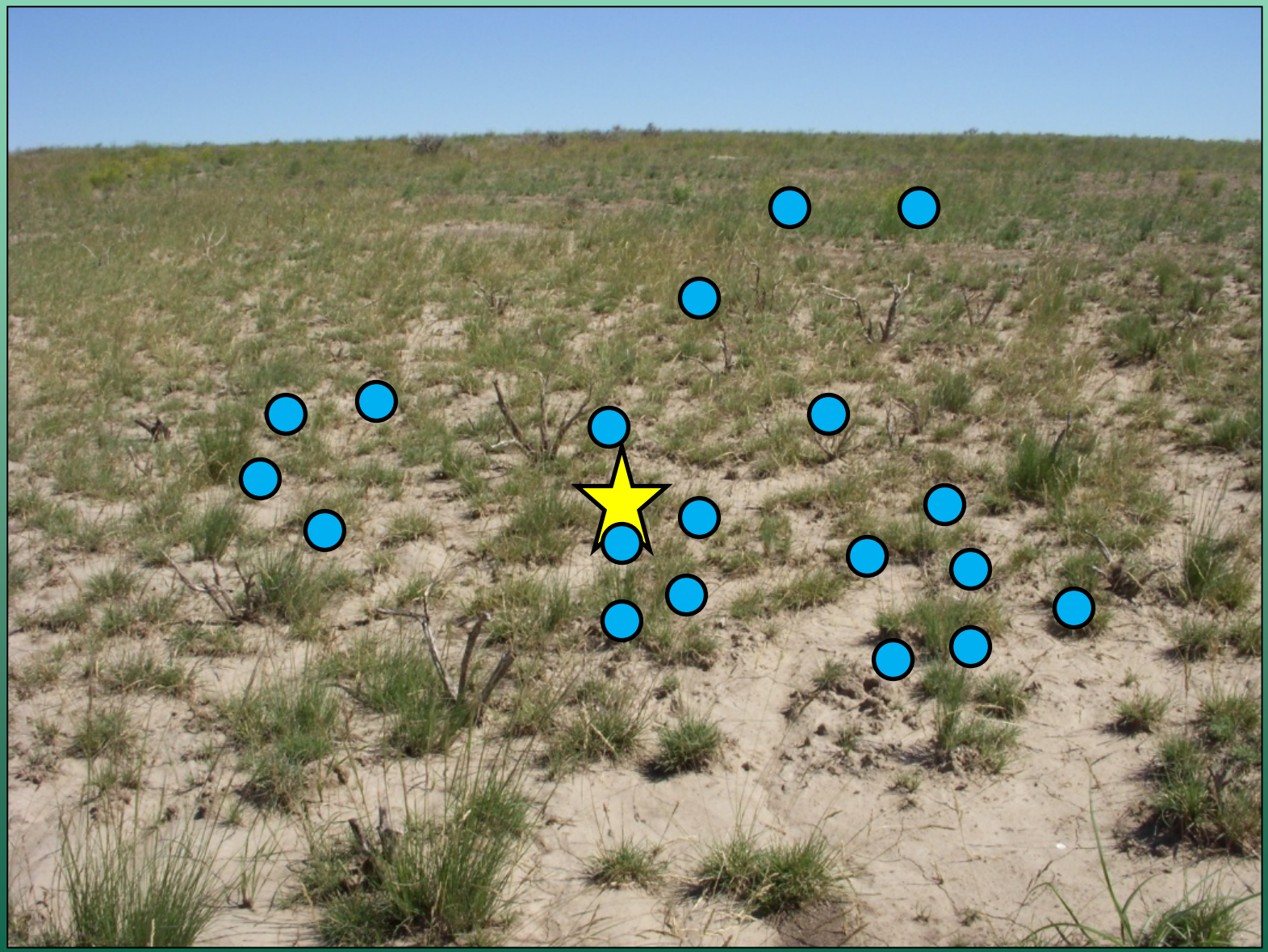
How does GPS work?



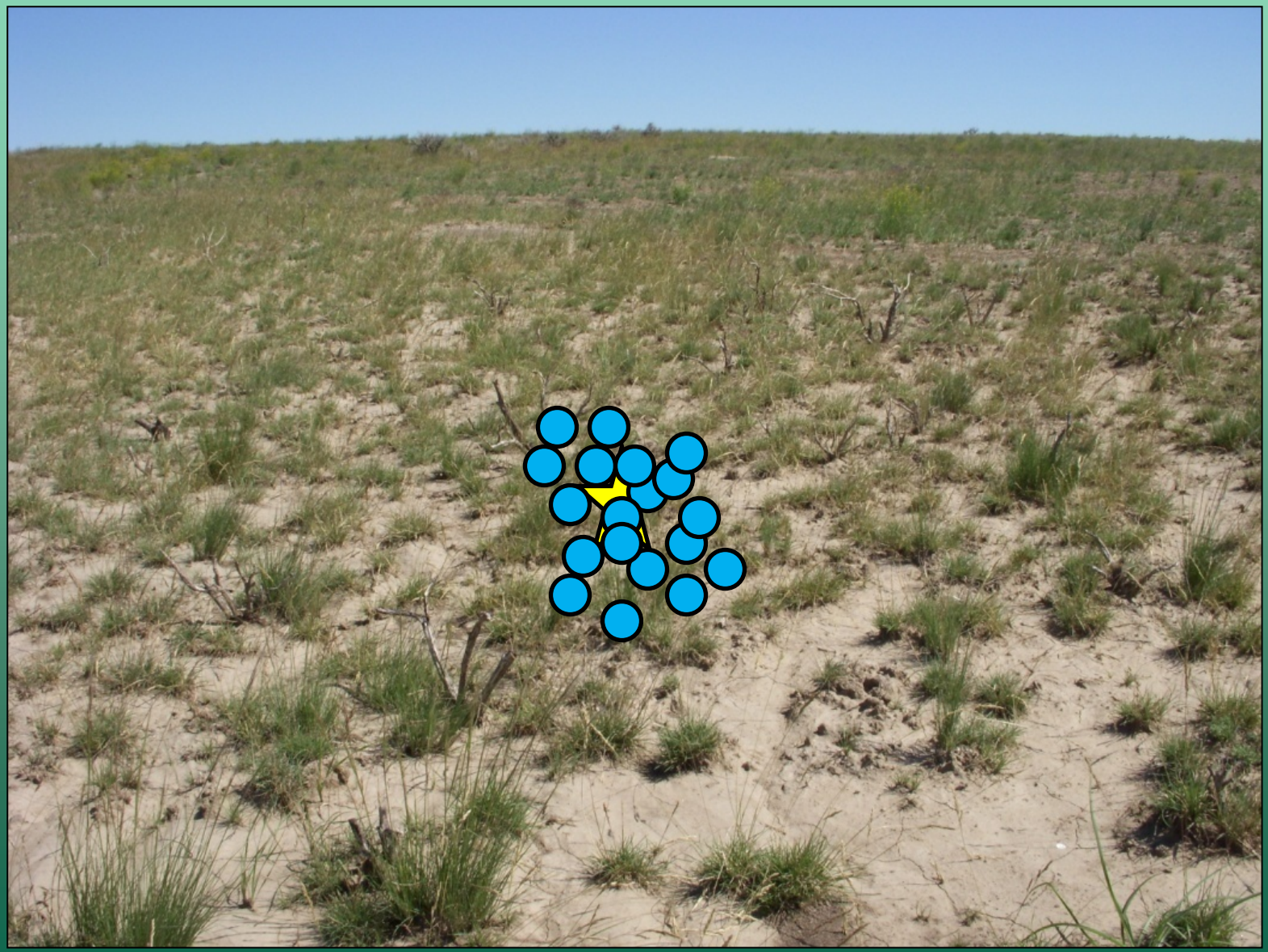
Accuracy vs. Precision



The GPS point cloud



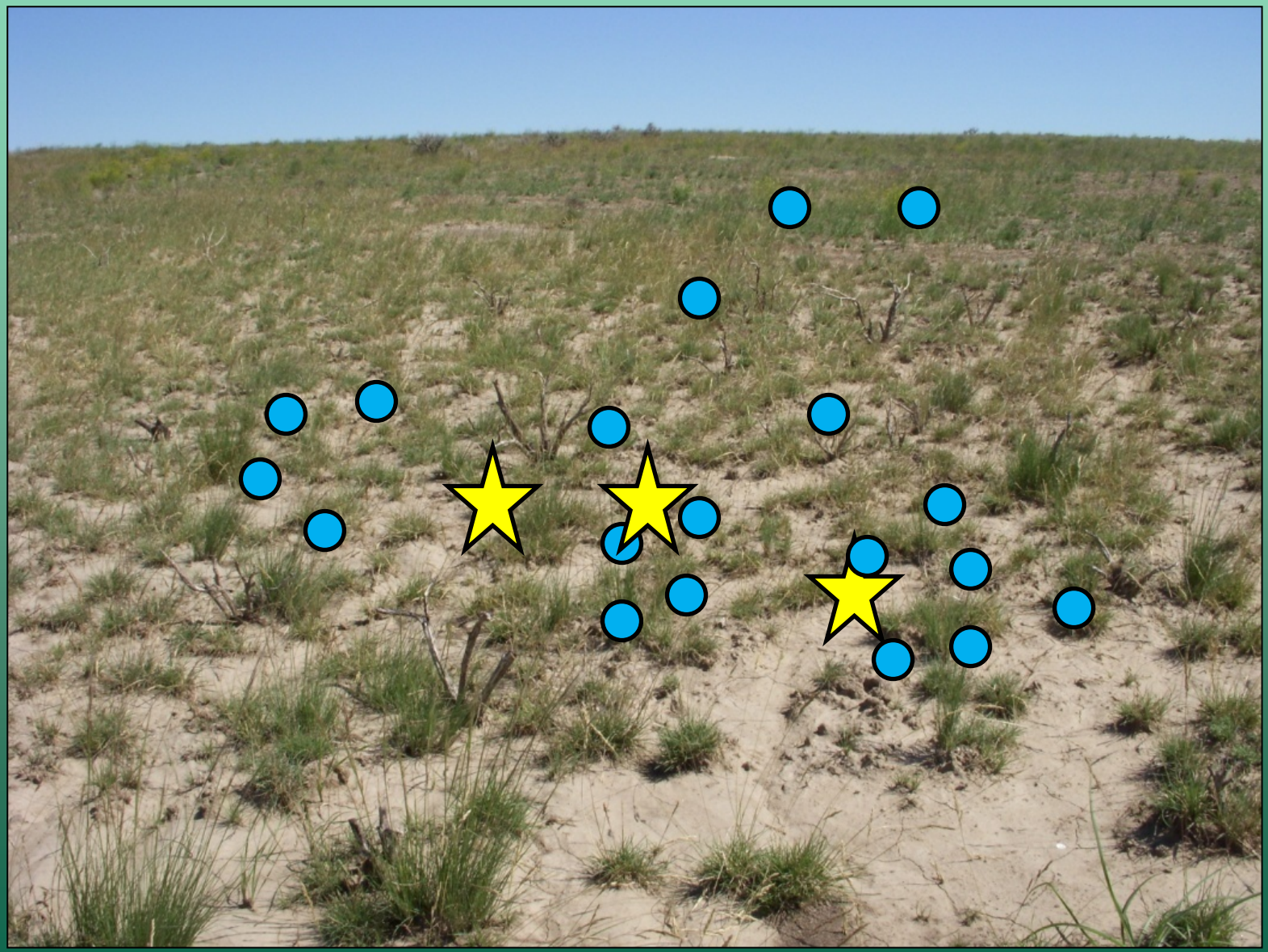
The GPS point cloud



How do you know the accuracy of the data collection

- PDOP – Positional Dilution of Precision
  - Trimble units
  - PDOP is affected by satellite configuration
  - < 6 accuracy according to specs
  - Points collected PDOP > 6 can be removed
  - Spatial accuracy often reported for recreational units
  - DGPS reported

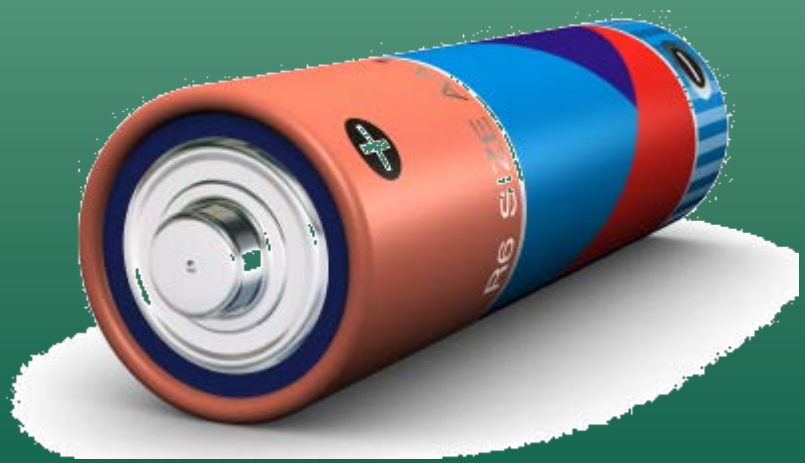
The actual location is a result of a moving average for recreational grade GPS units



Battery Power

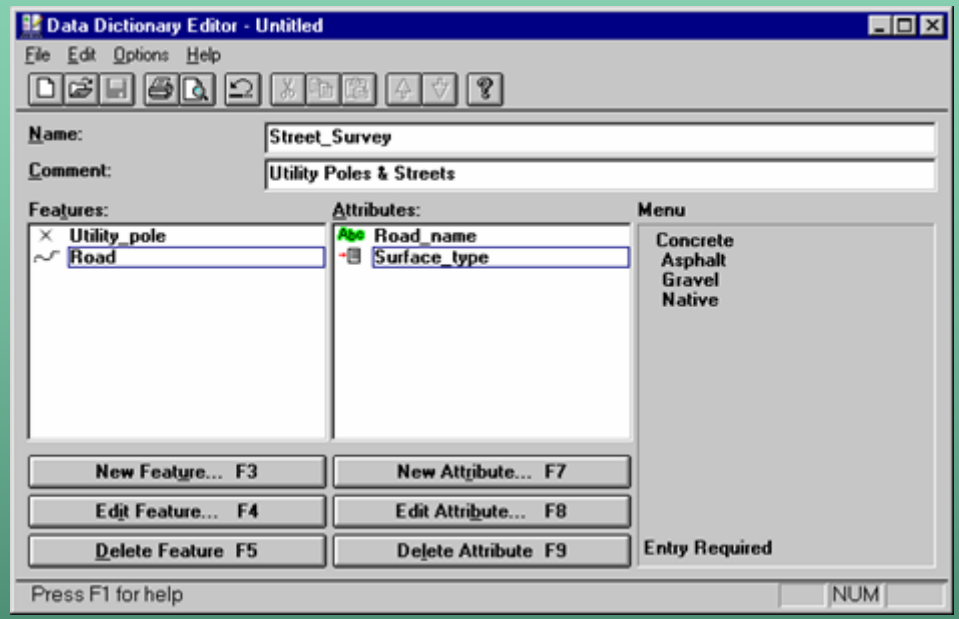
Re-chargeable or disposable

- Do you have access to power
- Can you charge in your vehicle
- How long do you need the power to last
- Is weight and size and issue



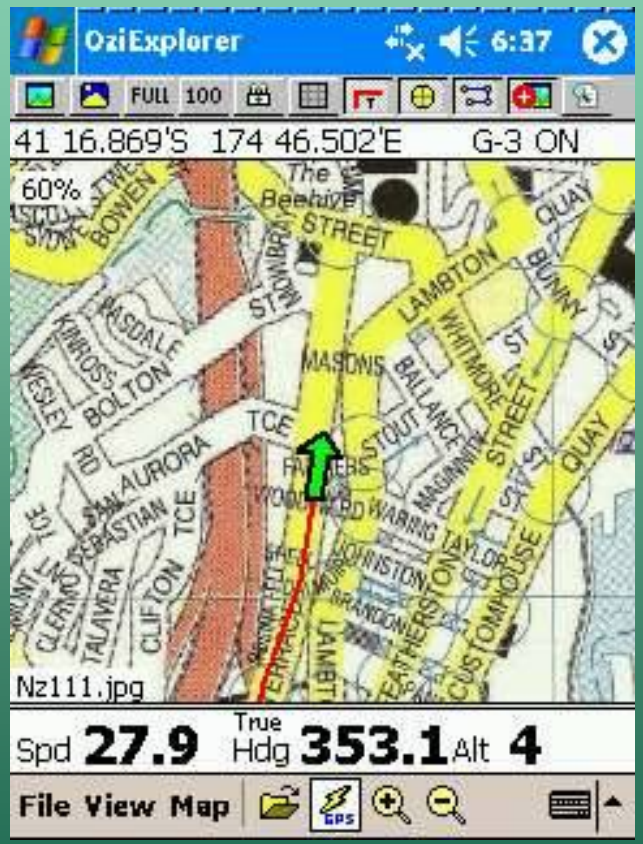
Data Storage

X	Y	ID
540344	3456098	1
560932	3457092	2
554098	3458902	3
.	.	.
.	.	.
.	.	.
.	.	.
.	.	.



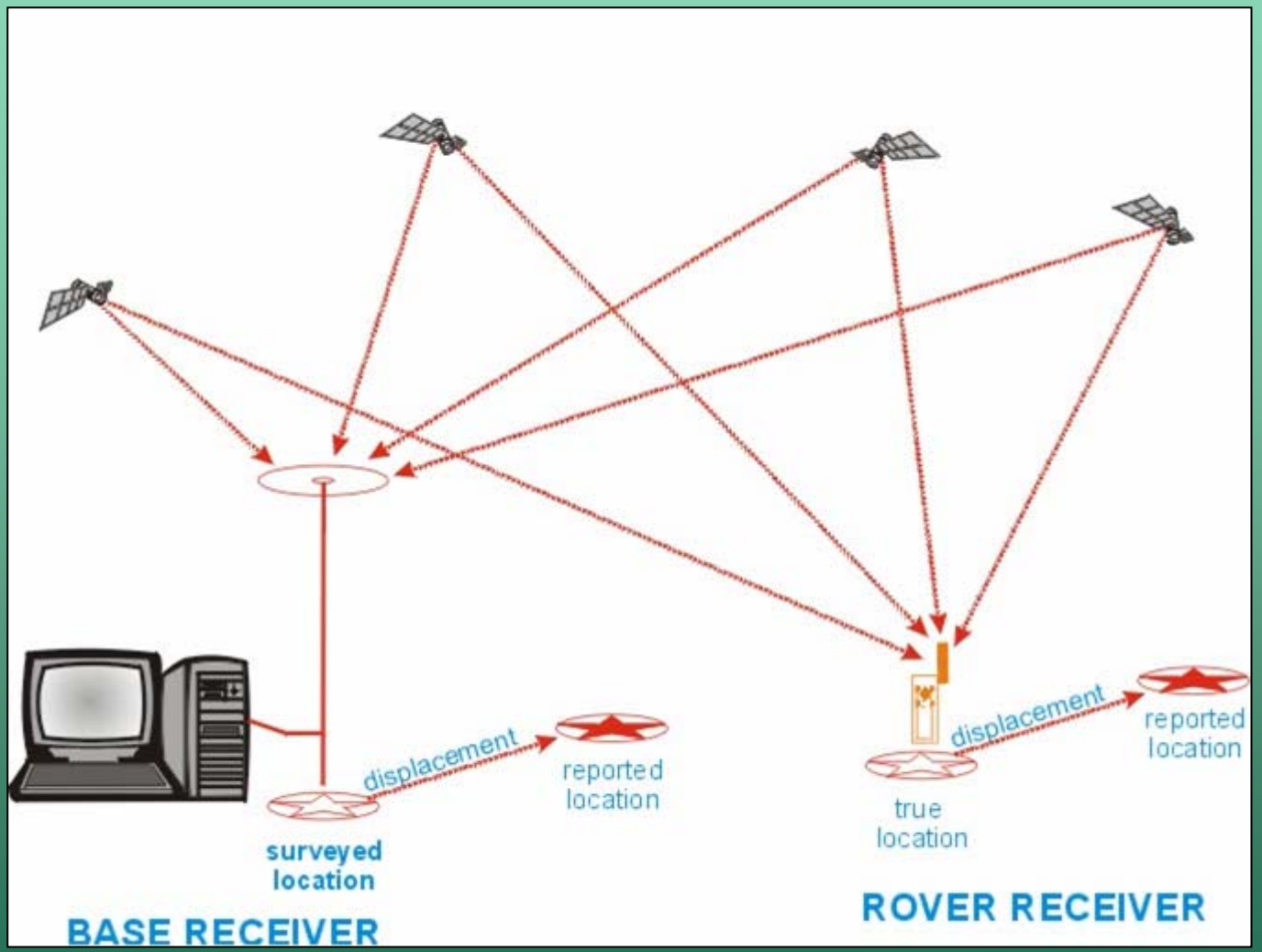
- Simple data vs. Data Dictionary

Mapping capabilities



- GIS software
  - –ArcPad
  - –TerraSync

Differential Correction



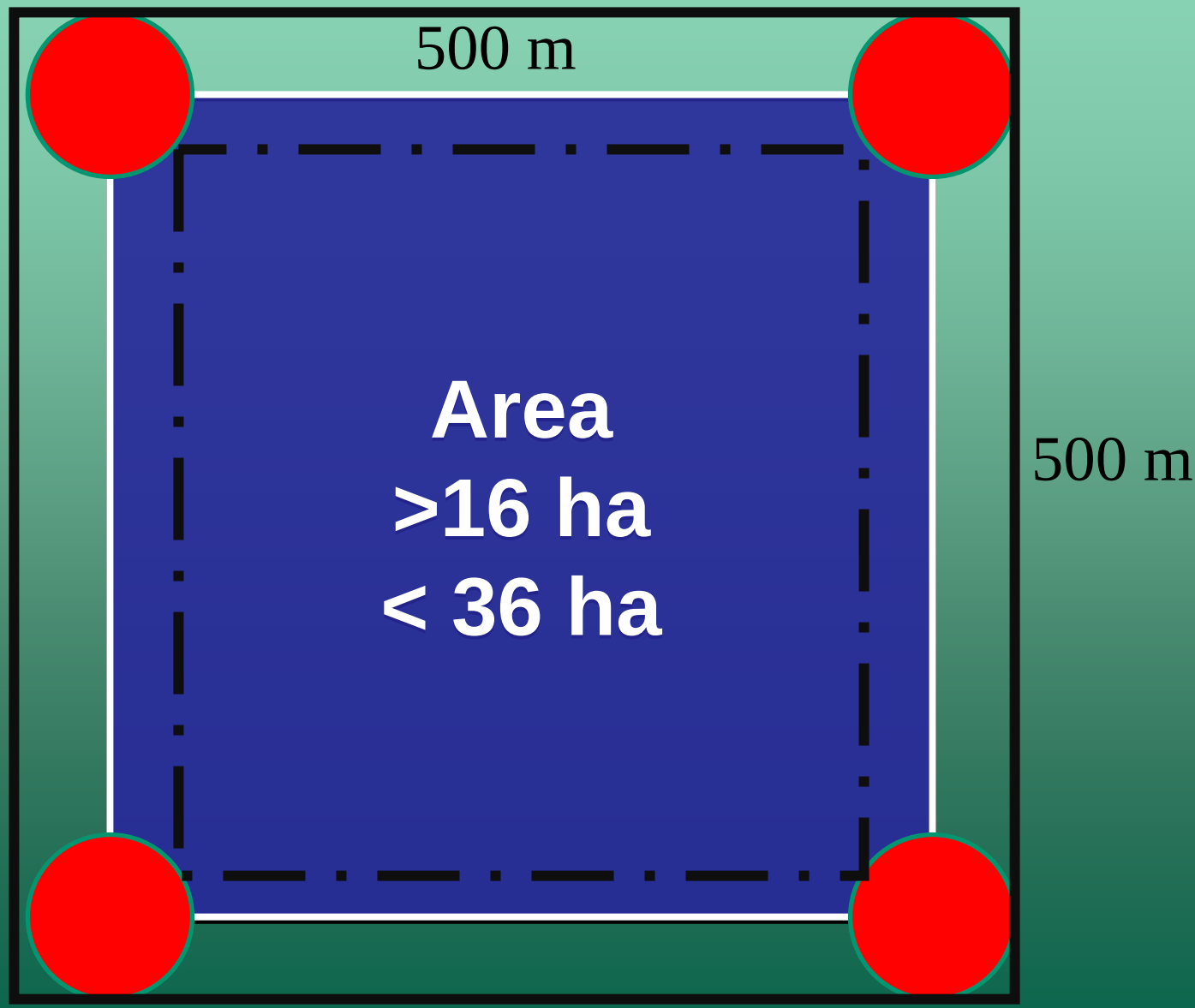
- Real Time or Post-processing

Differential Correction

- WAAS – Wide Area Augmented System (real-time, some of the time)
- Receiver for correction signal (Beacon, satellite service…)
- Download correction files from Base Stations (Available via WWW) for Post-Processing

Spatial Uncertainty

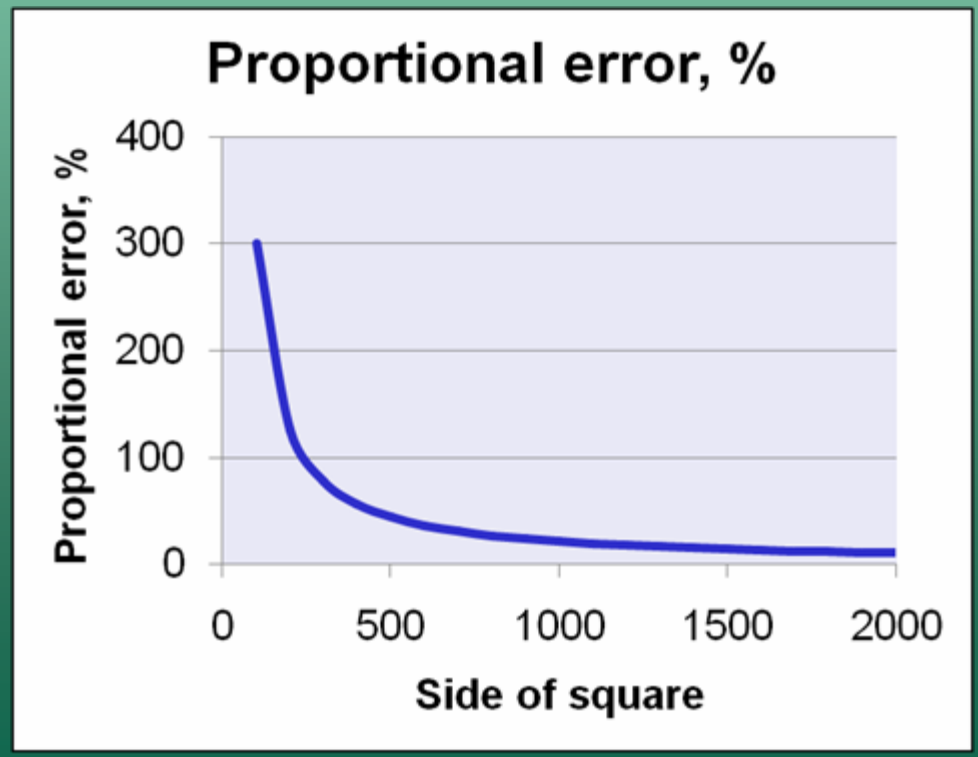
50 m error



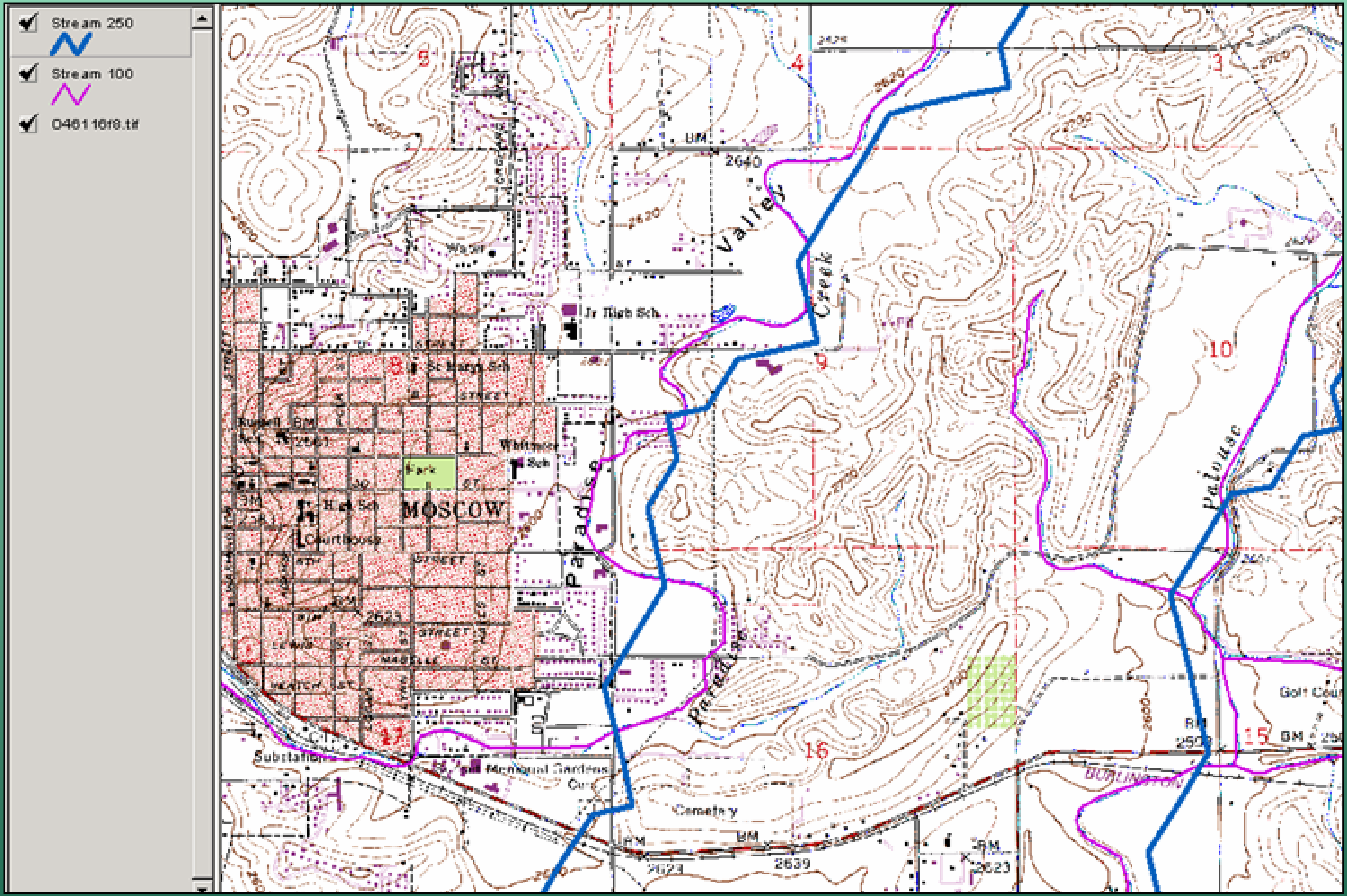
Proportional Error

- The error in distance is usually the same across the map
- The proportional error will be larger for small polygons

500 x 500 m



Map Scale

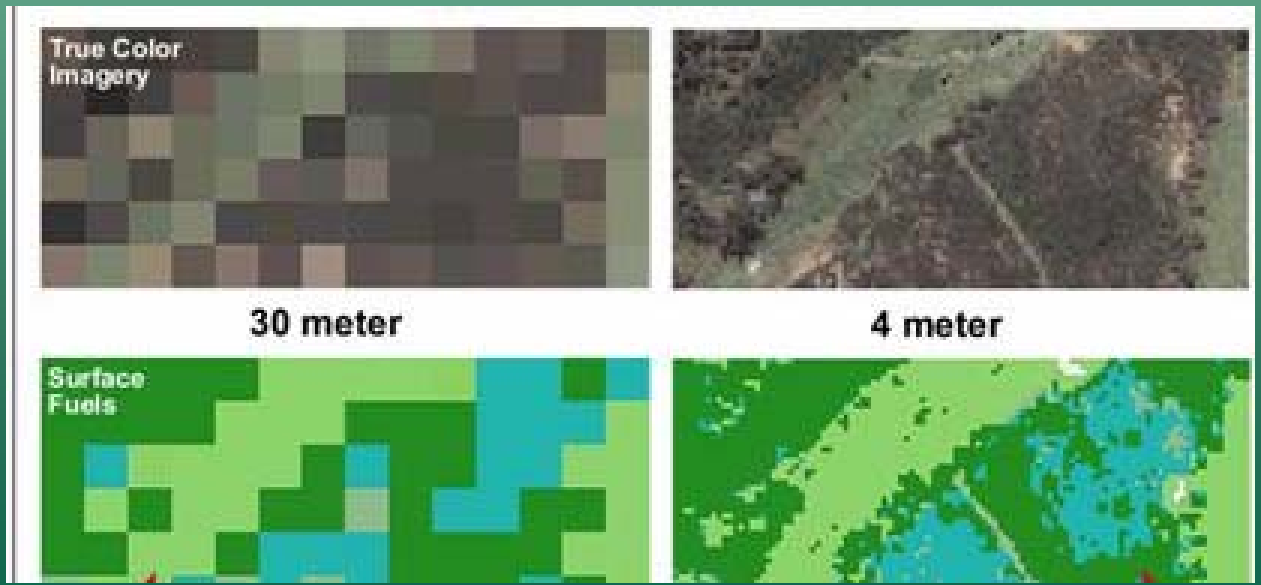

Stream 250
Stream 100
04611618.tif
Valley
Creek
Paradise
Palouse
MOSCOW
Jr High Sch
St Marys Sch
Whitman Sch
Courthouse
Substation
Cemetery
Golf Cou
2640
2623
2639

Effects of Map Scale

- Fine scale maps have more detail and portray smaller features – smaller minimum mapping unit (MMU)
- Fine scale maps have a higher spatial accuracy
- Fine scale maps has a higher resolution and may take up more space on the computer (if digital)
- Fine scale maps are not ‘better’ than broad scale maps but they provide more detail - it depends on your needs

Resolution

- **Spatial** Resolution – what is the pixel size?
- **Thematic** resolution – how many classes of sagebrush are included in the map
  - Sagebrush species
  - Cover classes



Juniper woodlands expansion

Succession in a Western Juniper Community

Grassland after fire

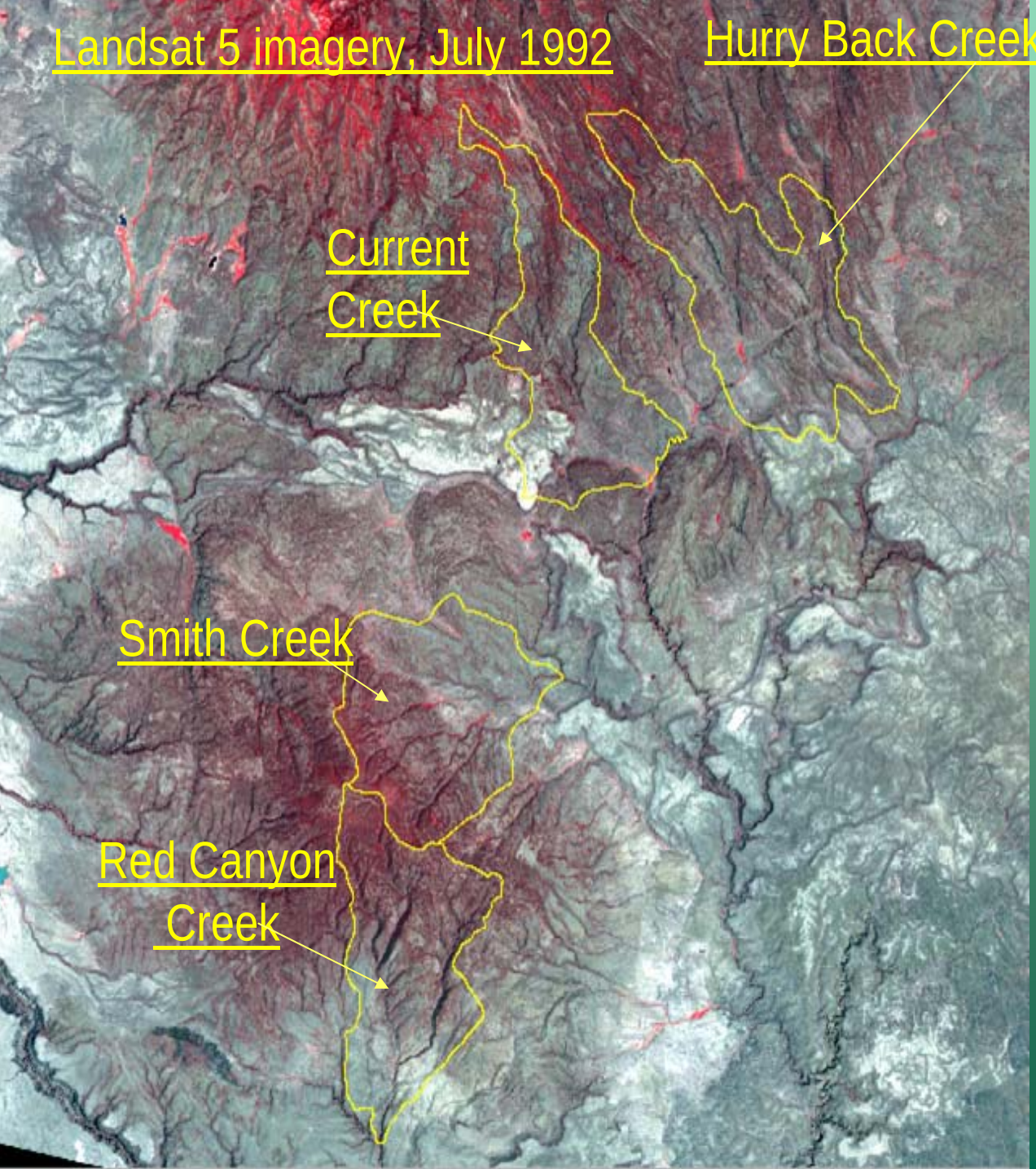
Mountain big sagebrush steppe

Stand initiation juniper (Phase 1)

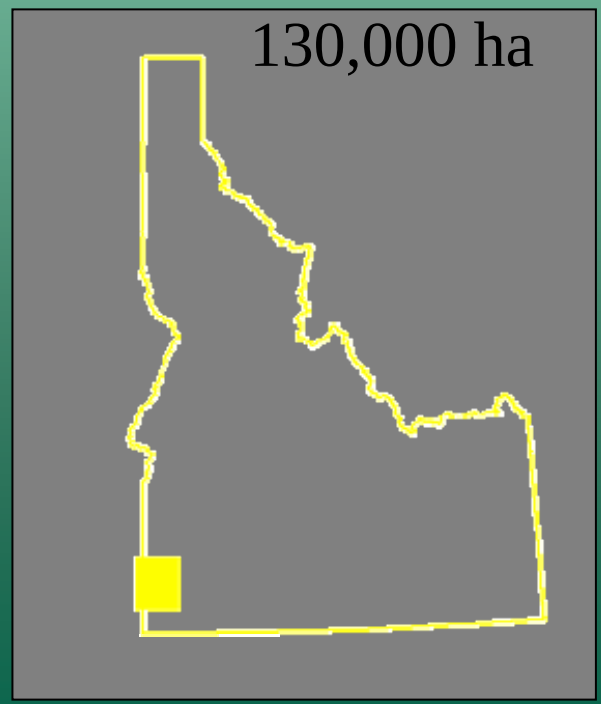
Open young juniper (Phase 2)

Young multistory juniper (Phase 3)

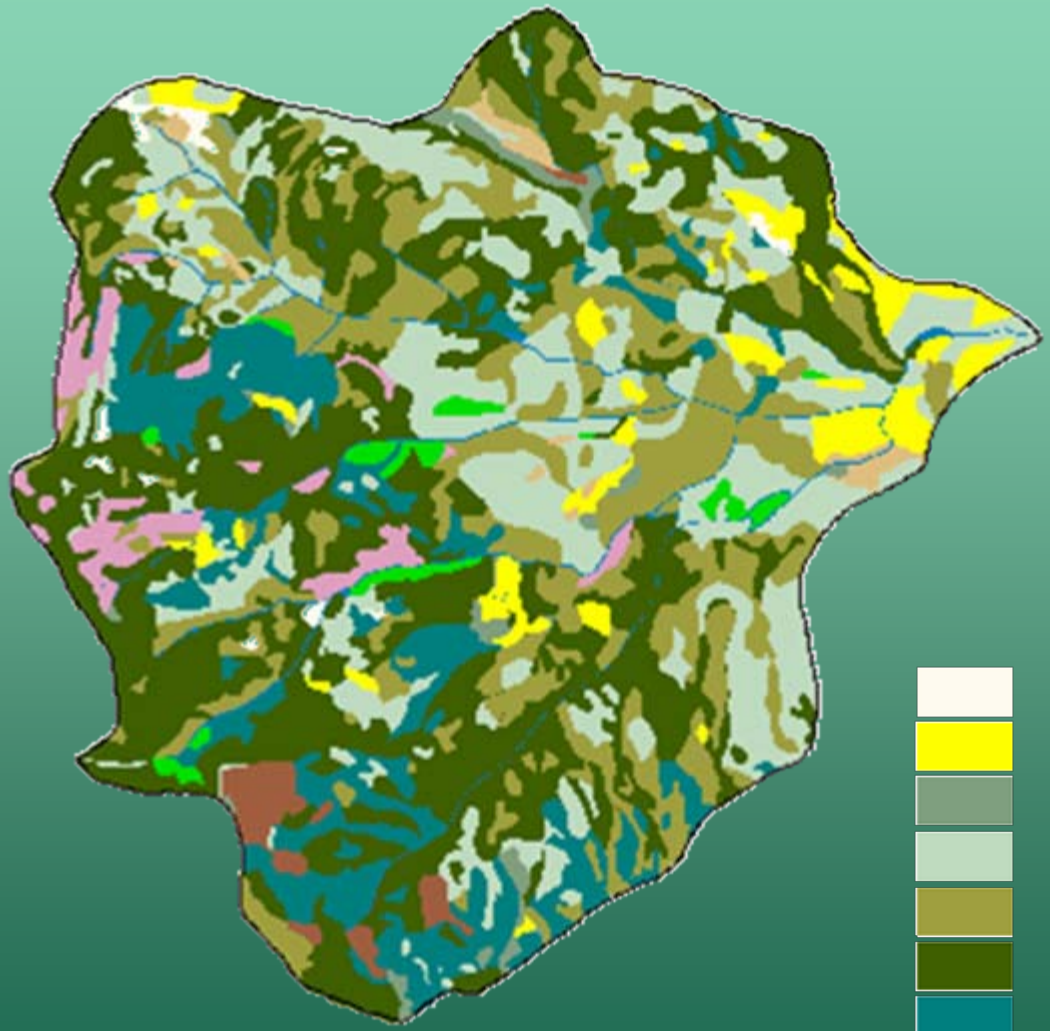
Mature juniper woodland



116° W Long, 43° N Lat
Elevation 800-2500 m
Precip. 250 – 1000 mm



Map of Successional Stages

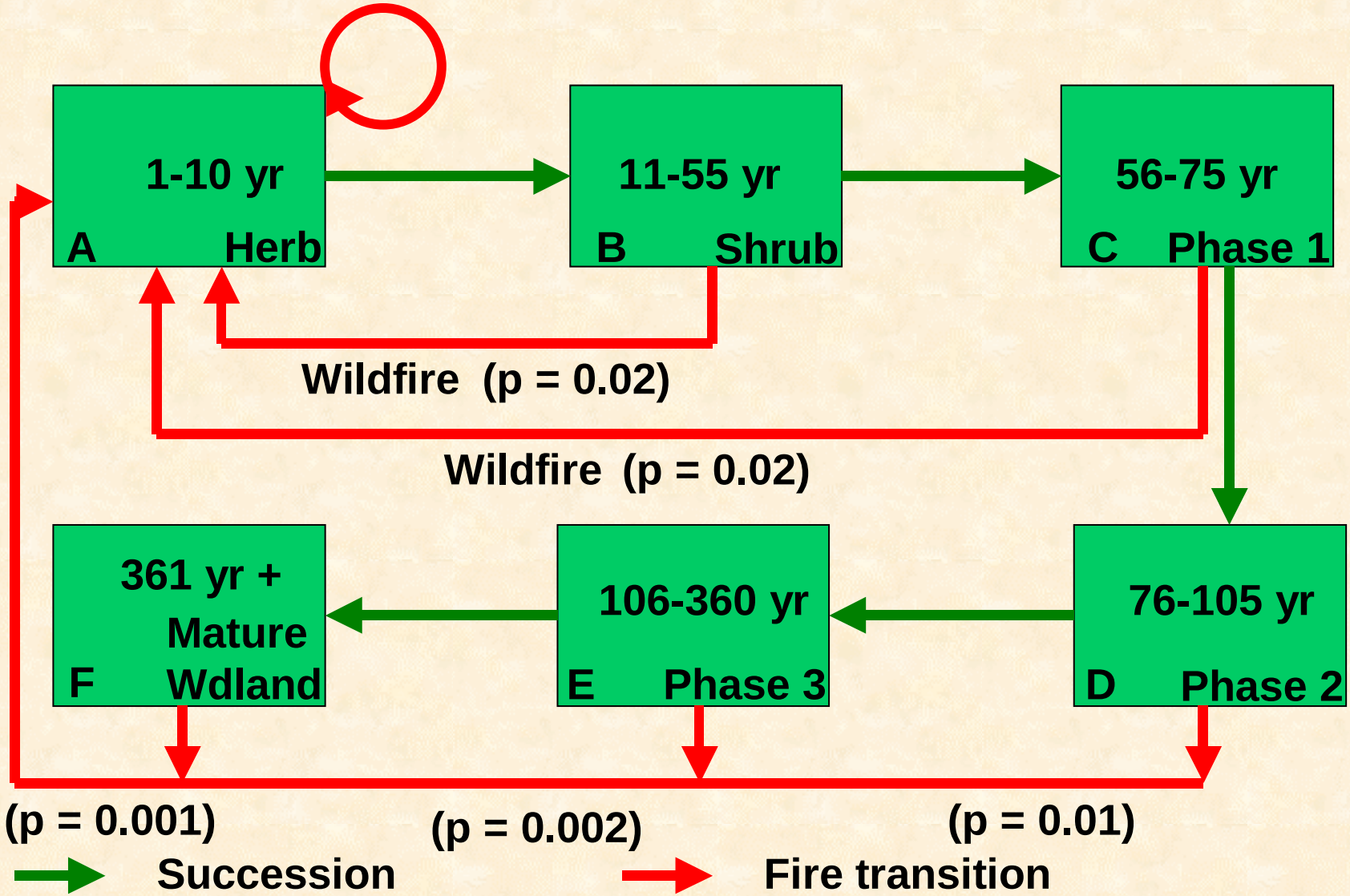


Areas in Phase 1 and 2 could be prioritized prescribed burning for treatment

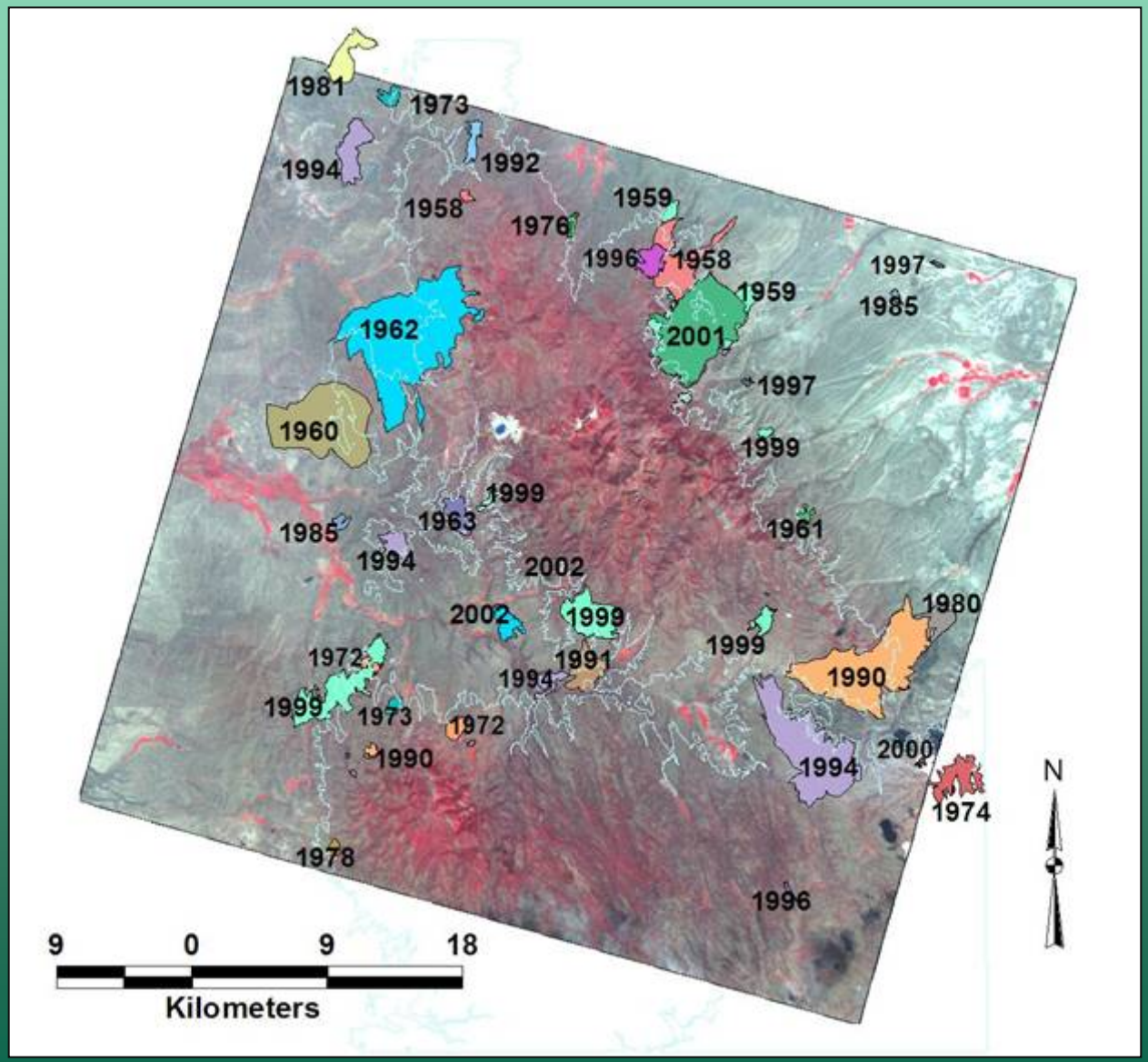
Adjacency!

Grassland	**0.7**
Low sagebrush	**4.4**
Mtn. big sagebrush	**1.4**
Phase 1	**0.3**
Phase 2	**19.9**
Phase 3	**34.4**
Mature woodland	**11.2**
Mtn.-mahogany	**2.6**

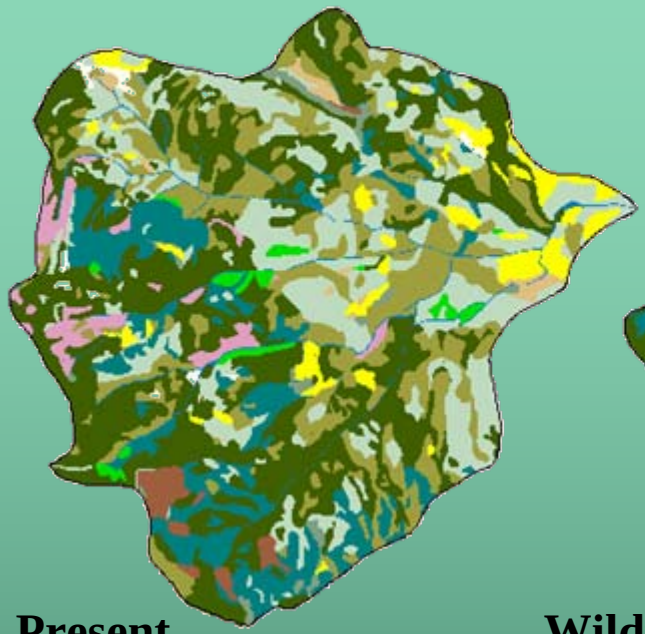
Vegetation Dynamics Development Tool – VDDT
Diagram for Western juniper / Mountain big sagebrush steppe



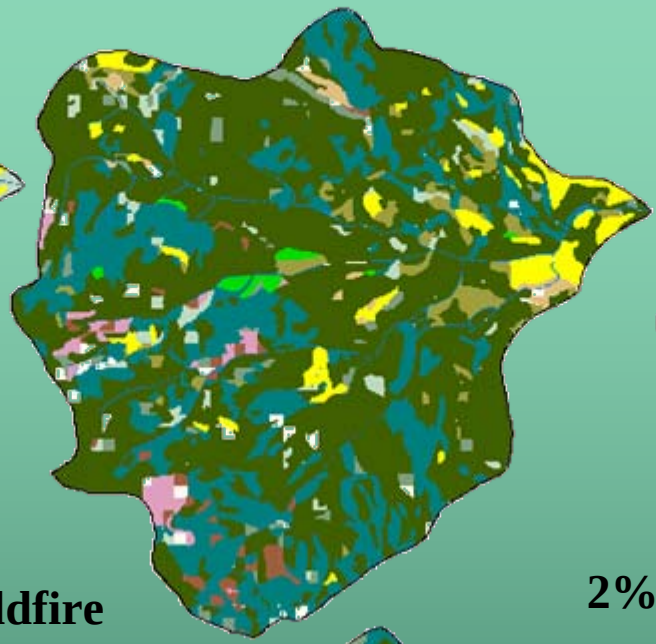
Fire Atlas Data



Smith Creek Watershed Composition after 100 years

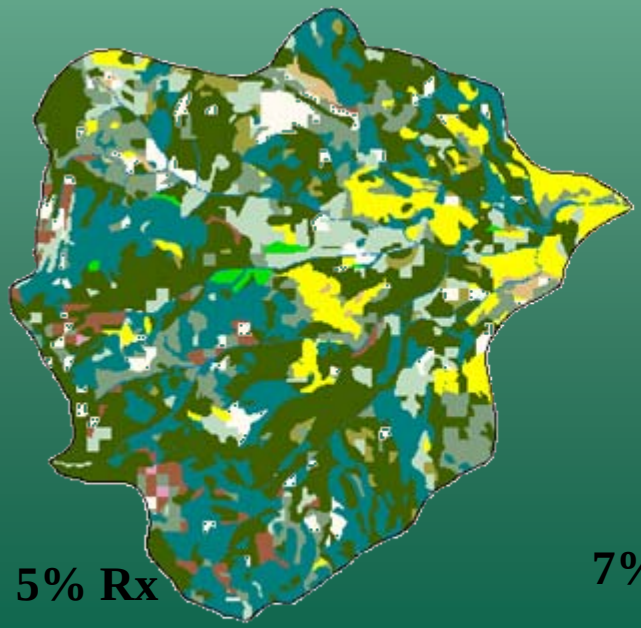


Present

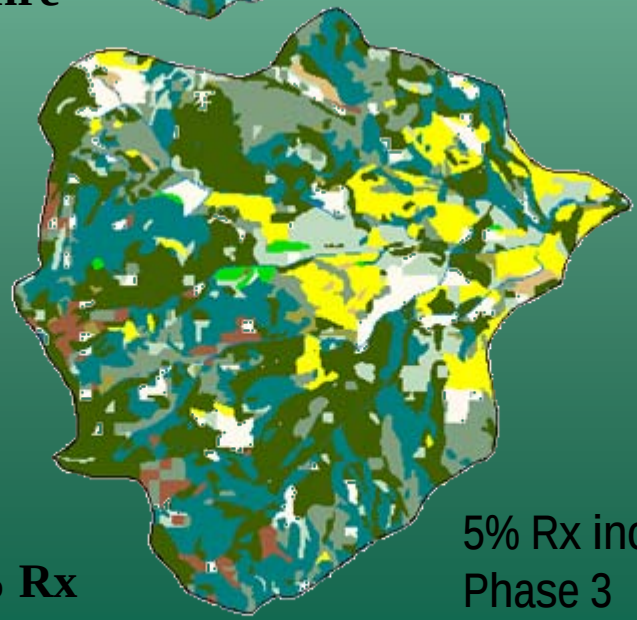


Wildfire

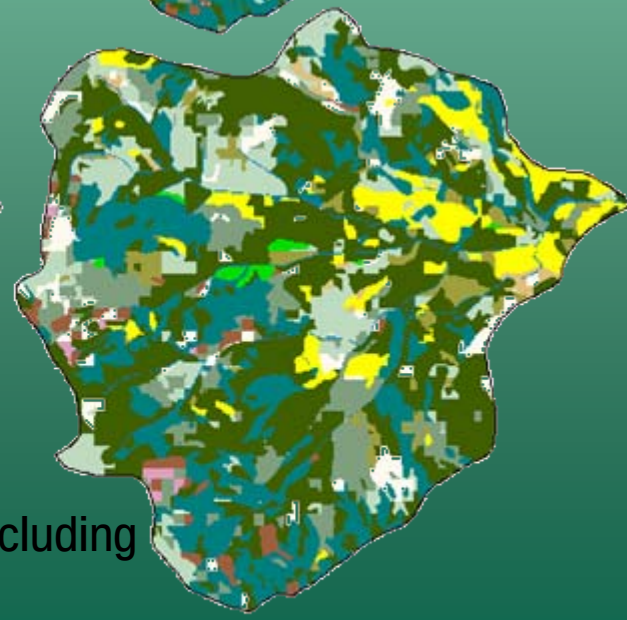
2% Rx



5% Rx



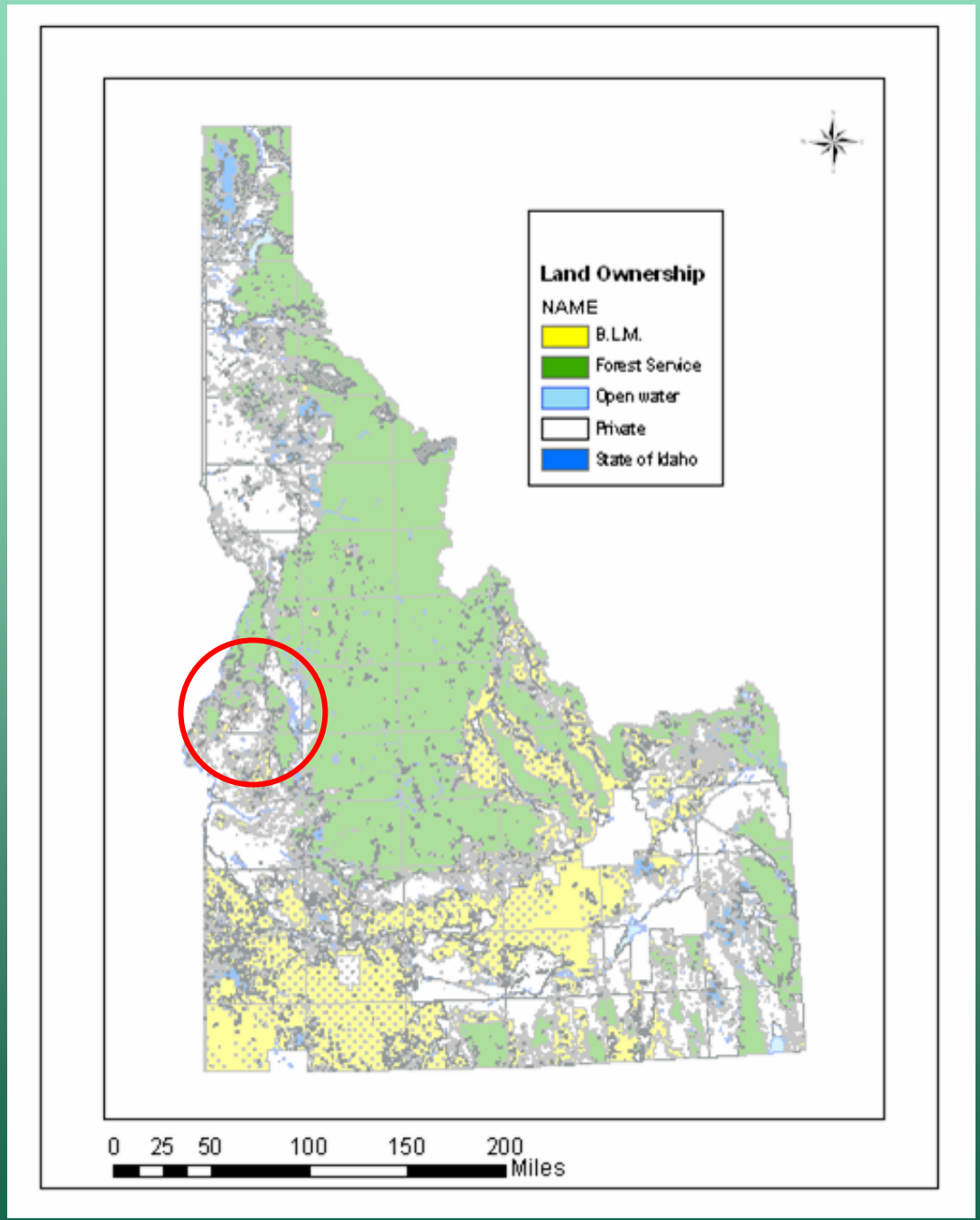
7% Rx



5% Rx including
Phase 3

Habitat assessments

- Telemetry – record locations of use and movements
- Map current habitat
- Predict areas of likely use – habitat modeling
- Prioritize areas for habitat improvements

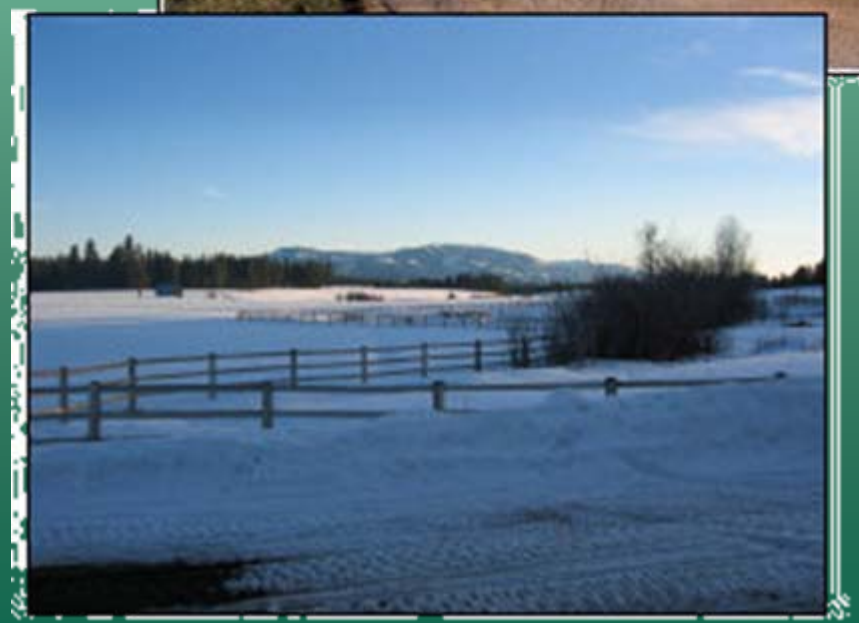


Northern Idaho Ground Squirrel

Listed under the ESA

Who manages the NIdGS habitat?

The OX Ranch and adjacent Forest Service lands



Endangered Species Act (ESA)

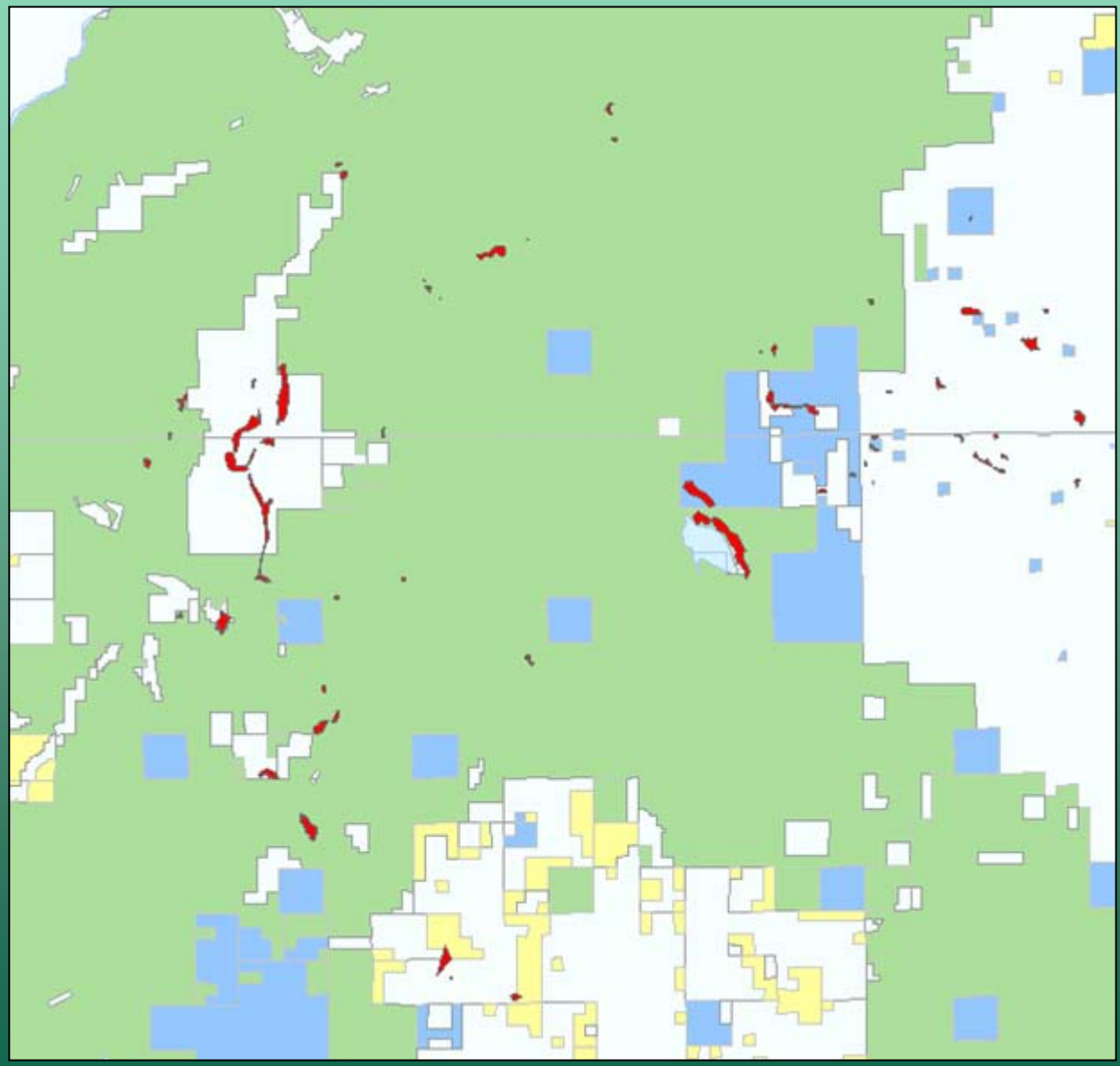
What are the consequences of having an endangered species on your land?

Private land: You cannot take (kill)
Public land: You cannot jeopardize

How can you protect yourself if you have an endangered species on your land?

Safe Harbor Agreement - an agreement with the USFWS to provide habitat for the endangered species

Known locations of the Northern Idaho Ground Squirrel

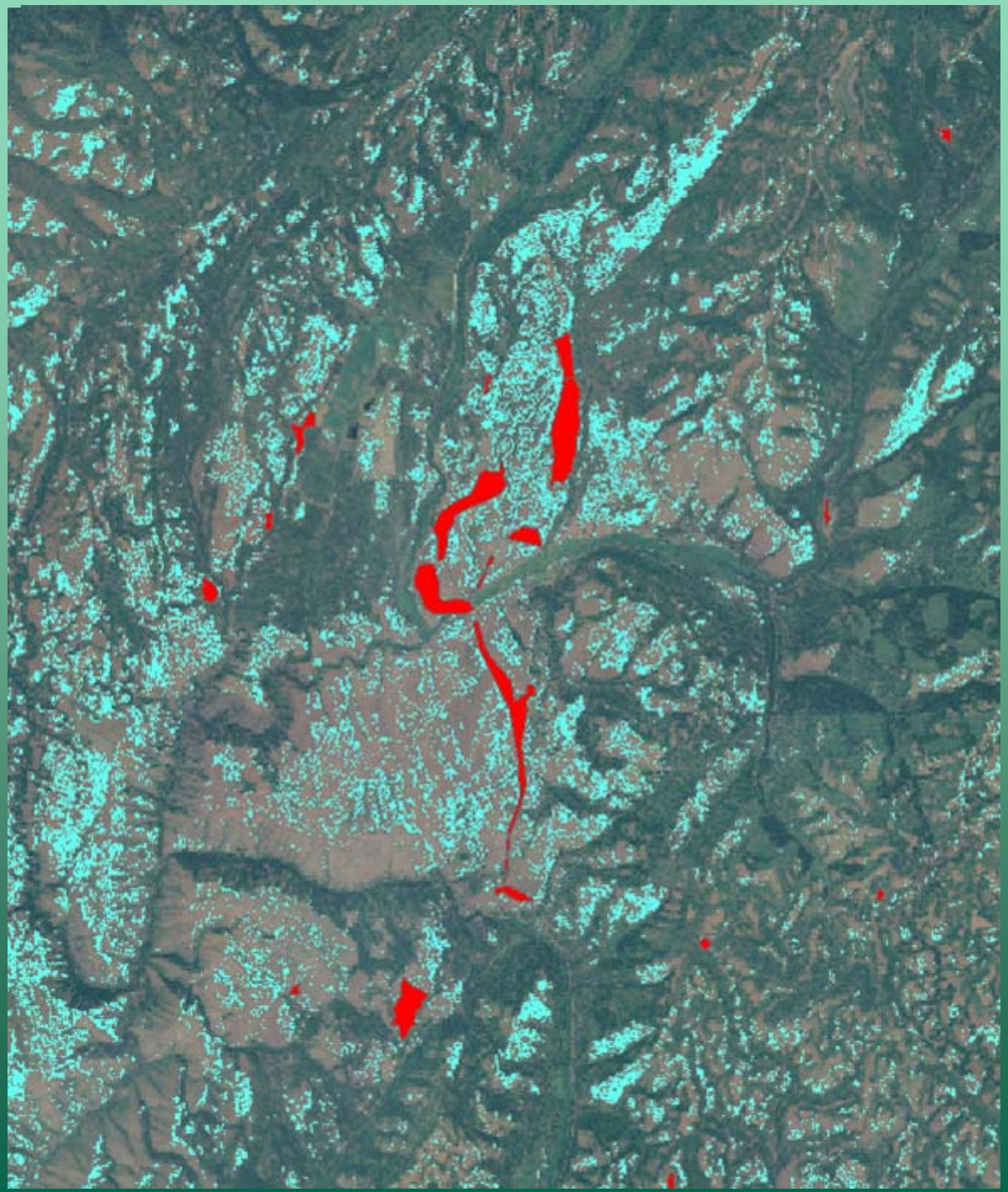


Habitat

- Low tree cover
- South-facing slopes
- Rocky shallow soils

Map of habitat to maintain needed for the Safe Harbor Agreement

Remote sensing to find areas of likely NIdGS occupancy



Considerations

- What spatial error is acceptable?
- What scale map do I need?
- What pixel resolution is desirable?
- What are the smallest objects I would like to observe?
- Can I justify the extra cost for more accurate data?
- How much data storage space do I have?

Planning Land Treatments