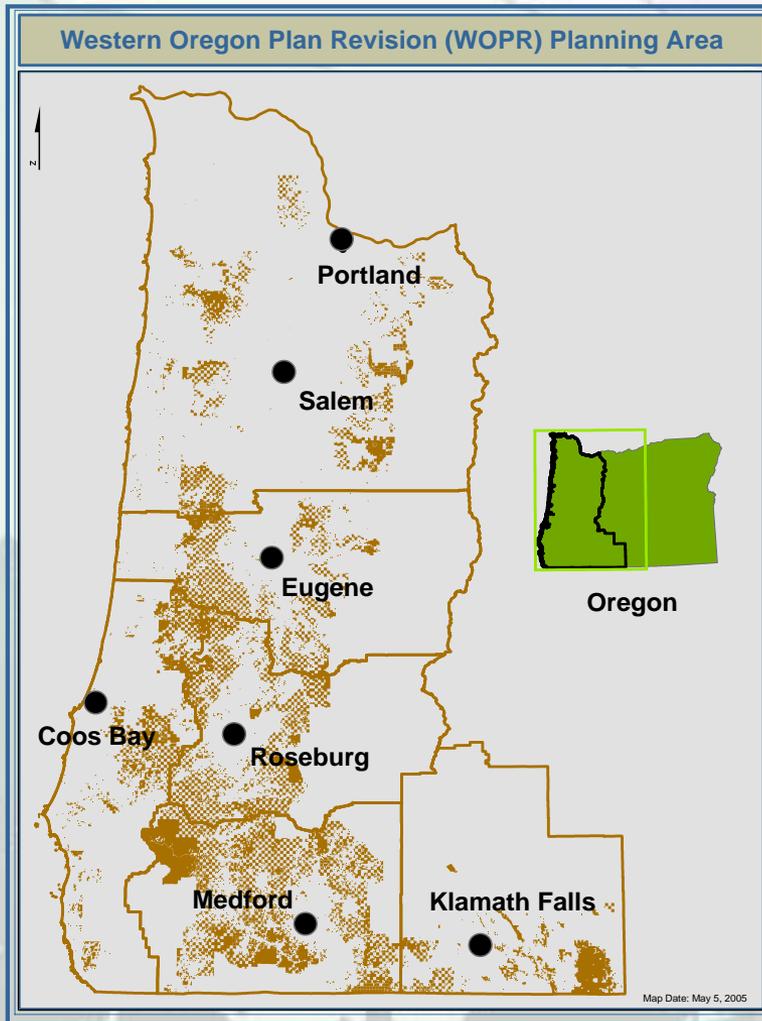
The background of the slide is a light-colored map of Oregon, showing its geographical outline and some internal boundaries. Overlaid on the map is a semi-transparent image of a landscape featuring a blue lake in the center, surrounded by green and brown terrain, and several dark green evergreen trees in the foreground.

The Context for Writing Geo-processing Scripts and Models for the Western Oregon Resource Management Plans (WOPR)

**Jeffery S. Nighbert
Bureau of Land Management
Portland, Oregon**

Western Oregon Plan Revision (WOPR)



2.5 Million Acres of BLM

6 Districts

Multiple Use Issues:

Ecology, Social/Economic, Timber and Silviculture, Forest Products, Special Status Species, Invasive Plants, Wildlife Habitat, Fisheries, Hydrology, Fire and Fuels, Air Quality, Recreation, Soils, Livestock Grazing, ACEC, Heritage and Paleontology, Transportation, Minerals and Energy

Table 1 - Legal Status of BLM-administered Lands in Western Oregon (Acres)

District	O&C and Coos Bay Wagon Road Lands	Public Domain	Acquired*	Total
Salem	349,300	51,600	2,100	403,000
Eugene	304,200	10,500	400	315,100
Coos Bay	279,400	41,800	1,500	322,600
Roseburg	406,500	19,800	0	426,300
Medford	764,900	96,100	4,800	865,800
Klamath Falls	46,900	174,800	3,200	224,900
Total	2,151,200	394,600	12,000	2,557,700

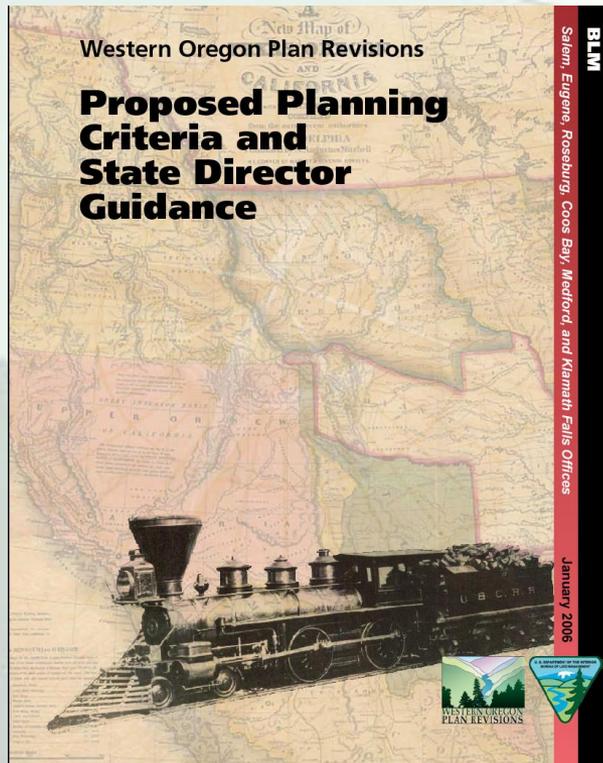
*Federal lands acquired by purchase or donation under an authorization other than Federal Land Policy and Management Act.

Three Considerations

- **Plan Analysis and Data requirements**
 - What GIS products and services are actually needed?
- **Records management concerns**
 - What do you need to keep track of?
 - What should be saved?
- **GIS Processing and Data Management needs**
 - In 'GIS' terms, what must be done to meet the above needs?

Analysis, Data and Product requirements :

“Proposed Planning Criteria and State Director Guidance”(203 pages)



There were 18 issues identified. Each issue had its own section addressing the following:

- Analytical Assumptions
- Analytical Methods and Techniques
- Analytical Conclusion
- Data Needs
- Data Display
- Questions for Scientists
- References

Issues:

Ecology, Social/Economic, Timber and Silviculture, Forest Products, Special Status Species, Invasive Plants, Wildlife Habitat, Fisheries, Hydrology, Fire and Fuels, Air Quality, Recreation, Soils, Livestock Grazing, ACEC, Heritage and Paleontology, Transportation, Minerals and Energy

Analysis and Data Needs Example

Analytical Question #4

What levels of bald eagle habitat will be available under each alternative?

Analytical Assumptions

- Bald eagle nests are located within 2 miles of large-order streams and large bodies of water in western Oregon, and within 4 miles in the eastern Cascades.
- Bald eagle nests are located in dominant and co-dominant canopy trees (Anthony and Isaacs 1989).
- The quality of bald eagle foraging habitat is inversely related to distance to nearest point of human disturbance (Anthony et al. 1982).
- Habitat suitability is based on two parts: (1) aquatic foraging habitat, and (2) nesting/roosting habitat.
- The habitat suitability relationship will not change over time; the relationship, once established, will be used throughout the analysis to compare the amount of habitat available under differing alternatives and at differing times into the future.
- The role of private lands in contributing bald eagle habitat will be assumed to remain constant throughout the analysis period. Current Oregon Forest Practice Rules and Statutes require protection of all known bald eagle nests, roost areas, and foraging perches.

Assessment Methods and Techniques

- The Umpqua Land Exchange Project developed a Habitat Suitability Index (HSI) model based on the quality of foraging habitat and nesting/roosting habitat (Vesely et al. 2001).

The basic Habitat Suitability Index model is:

$$\text{eagleHSI}_i = (\text{FHI}_i * 0.4) + (\text{NHI}_i * 0.6)$$

FHI_i = foraging habitat subindex

NHI_i = nesting habitat subindex

- Habitat Suitability Index scores will be calculated for all BLM forest capable habitats.
- Habitat indices will be grouped and quantities modeled at years 0, 10, 50, and 100 for all alternatives. Ten-year and 100-year timeframes represent short-term and long-term impacts; 50 years represents an intermediate timeframe that will be useful for determining speed of recovery/stability.

Analytical Conclusions

- Ranking of alternatives relative to their ability to create/maintain bald eagle habitat.

PROPOSED PLANNING CRITERIA AND STATE DIRECTOR GUIDANCE

Data Needs

- Forest Operations Inventory/Current Vegetative Survey (FOI/CVS) data – vegetative data for Habitat Suitability Index input.
- Hydrologic data (streams and ponds/lakes) – aquatic habitat data for Habitat Suitability Index input.
- Physiographic provinces – may be necessary to develop a different Habitat Suitability Index for each physiographic province.
- Human disturbance locations (such as boat ramps and campgrounds) – data input in aquatic habitat calculations.
- Fifth-field watersheds – Habitat Suitability Index analysis units.

Data Display

- Maps to display habitat and Habitat Suitability Index scores.
- Bar graphs to compare habitat levels and Habitat Suitability Index scores across alternatives and through time.

Question for Scientists

- Are habitat assumptions in the Umpqua Land Exchange Project valid for the entire planning area, or does the model need to be adapted to each physiographic province?

References

- Anthony, R.G. and F.B. Isaacs. 1989. Characteristics of bald eagle nest sites in Oregon. *Journal of Wildlife Management* 53:148-159.
- Anthony, R.G. et al. 1982. Habitat use by nesting and roosting bald eagles in the Pacific Northwest. In: 47th North American Wildlife and Natural Resources Conferences Transactions, WMI.
- Vesely, D.G., et al. 2001. Chapter 4 – Wildlife and Coarse-Filter Biodiversity Assessment. In: Umpqua Land Exchange Project Multi-Resource Land Allocation Model Handbook.

Records management concerns:



Litigation and the BLM

Preparing Ourselves For Court

Borrowed from Stacey R. Grimes, CLA
Regional Litigation Paralegal
Region 6, 2006

Assume Agency Involvement in Litigation

- **LITIGATION IS UNAVOIDABLE IN EVERY SITUATION**
- **TIME IS VERY LIMITED:** No matter how hard we try, how much analysis or consultation we do, we can end up in litigation
 - Offices need to commit the people necessary to provide the requested information
 - Priorities of key people may need to be rearranged and additional help may be needed for document preparation, coping and other tasks – First 60 days after lawsuit is served is labor intensive

Influential Poster!!!!



5 Rules of Litigation

1. If you did it but didn't write it down, It Didn't Happen!
2. If you wrote it down but can't find it, It Doesn't Exist!
3. If you're in Court and can't find it in 20 Seconds, It Doesn't Exist!
4. If you cause the Judge/Attorney Pain, They will cause YOU Pain!
5. If it's not Important to You, It's NOT Important to the person tasked with compiling the AR!!!!

Note: AR = Administrative Record

GIS Processes and Data Management Needs

Traceable work and information flow

- Assignments, Tasks, Timelines, defined products, reasons you made a decision
- Work Requests
- Data Request: shipped or received
- Source information

- Navigation:

- Access
- Defined Directory Structures
- Naming Schemes
- Database Schemes

- Data and GIS processes

- Data Quality Act
- Metadata, security, reproducible
- Consistent, Standard
- Models or Scripts
- Use Known version of data

- Data publishing

- Maps, charts, tables in different formats
- Metadata also needed for these

REASONS FOR GOOD DOCUMENTATION

- Leads to Reasoned Decisions
- Maintains Agency Credibility
- Ensures Defensible Decisions
- Better Project Implementation
- Timeframes for Responding to Appeals and Lawsuits are short and firm
- Required by Regulation

Key GIS Processing Components

GIS Data Management

- **All work performed must have a task number**
- **All Work performed in Task Directory**
- **Final products are loaded into WOPR SDE**

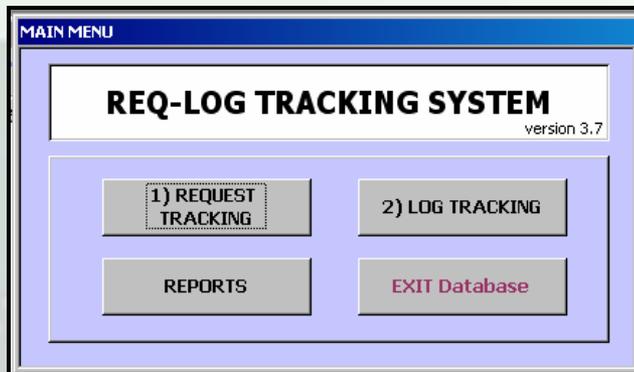
GIS GeoProcessing

- **GIS processes used must be documented**
- **All GIS tasks must use a Model or a Script**

Key Records Management Components:

Assignment / LogTracker:

- Access Database and VB application
- Records WOPR Assignments and Tasks, assigns WOPR Task Number
 - All data and processes for WOPR must have a WOPR Task number
- Records Data sets received and Data sets released
- Records Comments and text from specialist about status of project, findings or other notes.



1) REQUEST TRACKING

Project Name: Western Oregon Planning Revision | Project Code: WPR | Request ID: 1 | Go To Record: [dropdown]

Associated Logs: Setup/View Associated Logs

Request Date: 02/05/2005

Requester: ALAN HOFFMEISTER | Type of Request: MAP

Contact: DUANE DIPPON | Project Team: Public Affairs

Request Description: Create a map showing the WOPR plan area, BLM oc & PD, FS boundaries and NPS boundary. Obtained FS boundaries.

Assigned To: JEANNE KEYES | Assigned Date: 02/09/2005

Completion Location: [empty] | Completion Date: 02/15/2005

Work Directory: \\blm\dfs\or\loc\gis\projects\or\state_office\wopr | Request Status: COMPLETED

Archived?: No | Archive Date: [empty] | Project Phase: AMS

Quality Check: none

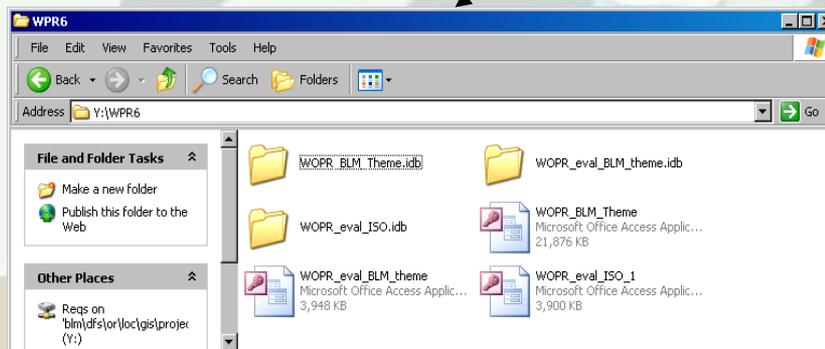
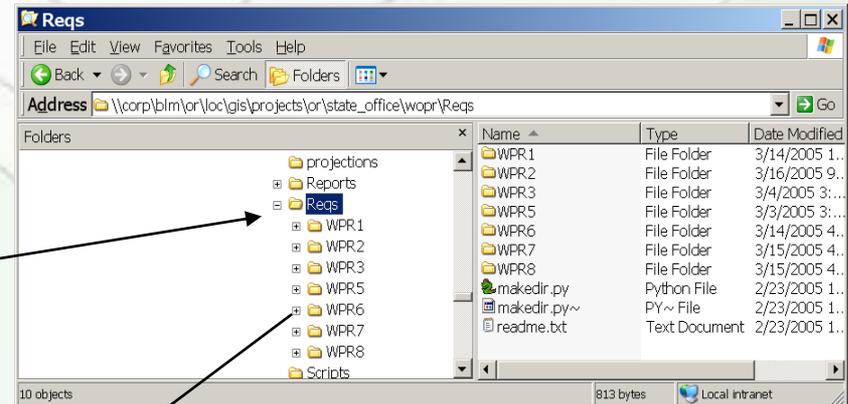
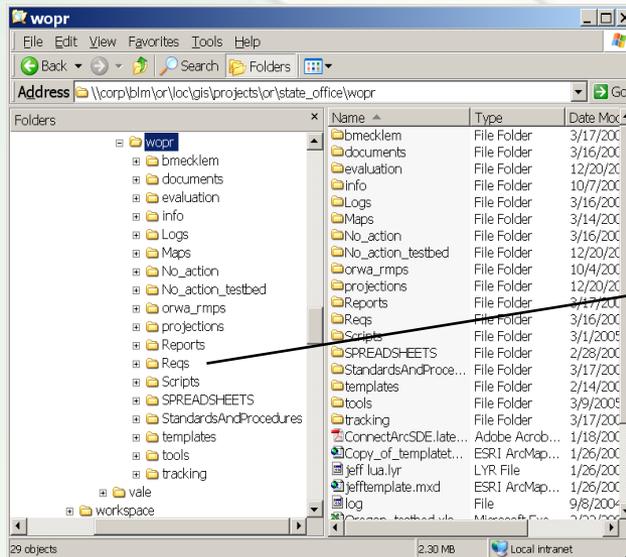
Comments: Comments
"Select for Coos Bay OC & PD ownership from BLM LLI SDE database, also select for FS not equal to "" to obtain actual FS Ownership, not "" other ownership"" or blank polygons. Used FS boundaries from 2002 LUA interagency data request, filename r6bindy02c2 after trying several different datasets. Check out wopr_hasenmanR11.mxd. See readme file in WPR1."

New Record | Save | Save & Close

Record: 1 of 224

WOPR Directory Structure

- Central Space for all WOPR Spatial data and related information
- Stores all ancillary folders for documents, tools, maps, templates, utilities etc.
- Stores all WOPR Task Folders



Example:

The US F&WS is in the process of designating critical habitat for the Fender's blue butterfly, Kinkaid's lupine and Willamette Daisy. I have sent you an e-mail with the download file from their web site: "ArcGIS data layers and metadata for locations of proposed critical habitat areas."

1) REQUEST TRACKING

Project Name: Western Oregon Planning Revision | Project Code: WPR | Request ID: 102 | Go To Record: [dropdown]

Associated Logs: [Setup/View Associated Logs]

Request Date: 11/18/2005

Requester: DUANE DIPPON | Type of Request: DATA

Contact: DUANE DIPPON | Project Team: Data

Request Description: The US F&WS is in the process of designating critical habitat for the Fender's blue butterfly, Kinkaid's lupine and Willamette Daisy. I have sent you an e-mail with the download file from their web site: "ArcGIS data layers and metadata for locations of proposed critical habitat areas."
Please add these these data as separate GIS "layers", one for each species.
Please make a map, showing in the required closeup so that the proposed critical habitat can be seen

Assigned To: JEANNE KEYES | Assigned Date: 11/18/2005

Completion Location: [text field] | Completion Date: 12/12/2005

Work Directory: [text field] | Request Status: COMPLETED

Archived?: [checkbox] | Archive Date: [text field] | Project Phase: No Action

Quality Check: [text field]

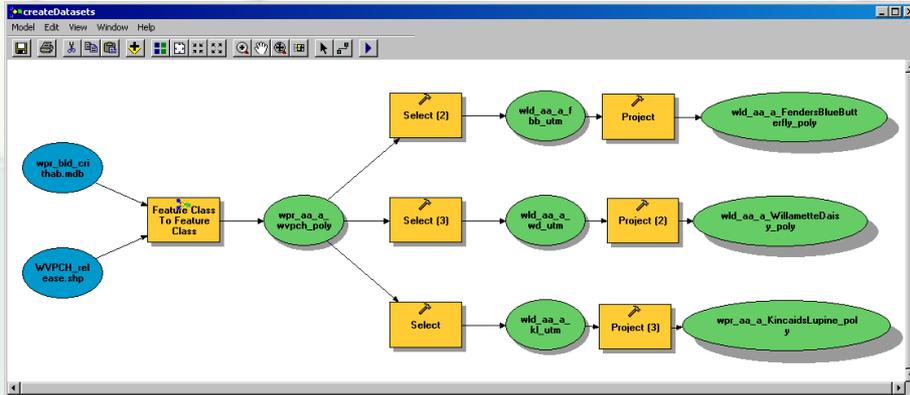
Comments: [text area]

[New Record] [Save] [Save & Close]

Record: 102 of 224

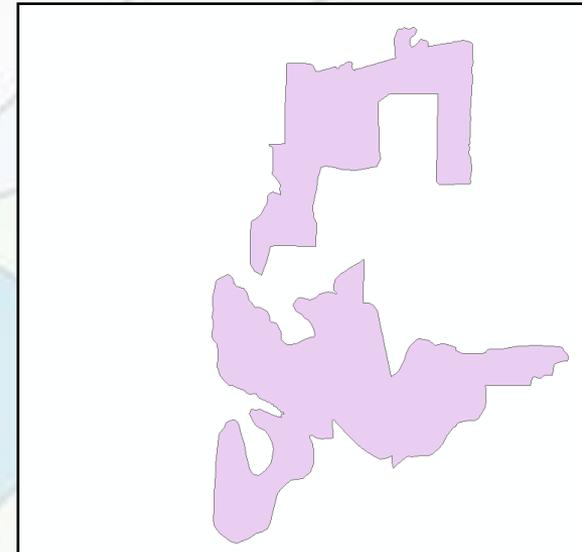
Please add these these data as separate GIS "layers", one for each species.

Please make a map, showing in the required closeup so that the proposed critical habitat can be seen relative to BLM ownership (these are fairly small areas). We will also need a summary of the number of acres of designated critical habitat on BLM lands by Species, by District. These map(s) and tables will need to be sent to Joan Severs and Doug Kendig.



wld_aa_a_FendersBlueButterfly_poly
Personal GeoDatabase Feature Class

Description	Spatial	Attributes
Keywords		
Theme: Critical Habitat, WOPR (Western Oregon Plan Revision), analysis		
Place: Willamette Valley		
Description		
Abstract Prairie boundaries were created by referencing recovery team work, contractors, agency employees, and survey reports.		
Purpose This layer was created to better represent the areas occupied by the Fenders Blue Butterfly, Willamette Daisy, and Kincaid's Lupine during the preparation of Willamette Valley proposed critical habitat.		
Supplementary Information BLM (Bureau of Land Management), WOPR (Western Oregon Plan Revision) WOPR Theme Group: WLD (Wildlife) WOPR Phase: AA (All Alternatives) WOPR Purpose: A (Analysis)		
Status of the data		
Time period for which the data is relevant		
Publication information		
Data storage and access information		
Details about this document		



Python Script or Model?

- **We were using 9.1 – Model Builder better in 9.2**
- **Model Builder – strong points**
 - **Preferred model builder for designing and documenting work flow.**
 - **Model builder worked well for even lengthy processes.**
 - **Model builder good for sharing standard processes.**
 - **Requires few programming skills**

Python Script or Model?

- **Python – strong points**
 - **Easy to iterate, easy to insert conditionals, flags**
 - **Easy to read/write files and process lists**
 - **Easy to manipulate variables**
 - **Easy to integrate with other software**
 - **Easy to create logs, reports of processing, use python functionality.**
 - **Easier to automate spatial analyst functions requiring variable expressions, conditions, export, import etc.**
 - **Easy to create a tool that will work in a model**
 - **Easy to run on the command line in a “batch”**

Results and Lessons Learned

Cons—

- **Data was a constant problem**
- **New infrastructure paradigm took ‘getting used to’**
- **Technology is constant state of flux**
- **Human Nature comes into play**
- **We had to use ArcInfo grid more than we planned because at 9.1 there was no .VAT file**

Pros—

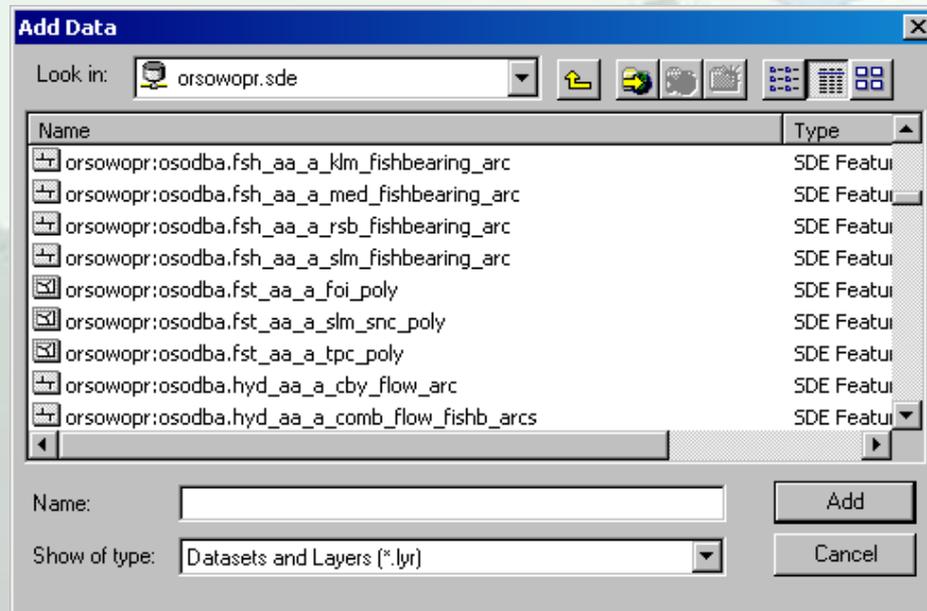
- **Infrastructure worked**
- **Human elements worked well**
- **Task tracker and log system were central to keeping track of where we were.**
- **Model builder and python were instrumental in accomplishing work and document, and re-running the process with different parameters**
- **ArcGIS was really productive for creating maps, charts and graphs, and tables.**

Questions?

Jeffery S. Nighbert
Bureau of Land Management
Portland, Oregon
jnighber@or.blm.gov

WOPR ArcSDE Informix Instance

- Central Space for all 'Corporate WOPR' Spatial data
- Read only access for ArcIMS, ArcGIS users
- Metadata is imbedded with feature classes





the watershed. As a result of this ownership pattern, the BLM can only partially influence certain outcomes and ecological functions. By contrast, most of the lands managed by the Forest Service are large, contiguous blocks (Figure 6).

Finally, not only are the lands managed by the BLM widely scattered, but they represent only about 11 percent of the planning landscape (Figure 7).

Chapter 2 includes discussions regarding the management implications of this ownership pattern.

Figure 5 – Fifth Field Watersheds



Figure 6 – Ownership as a Watershed Proportion in the Planning Area

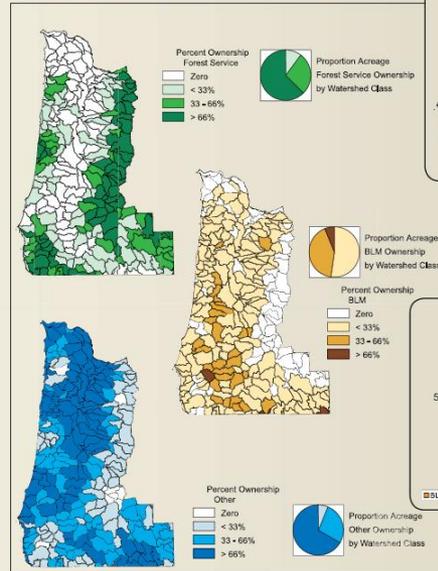


Figure 7 – Proportion of Major Ownership Classes in the Planning Area

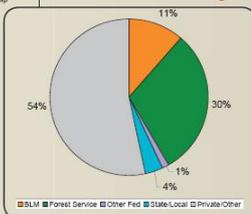
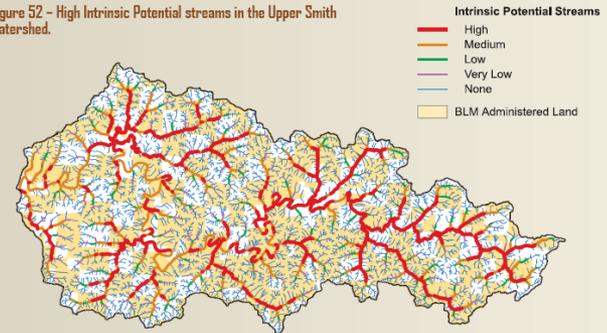


Table 11 – Percent BLM Ownership and Miles of Listed Fish Bearing Streams by Sample Watersheds

Fifth Field Watershed	% BLM Ownership	Anadromous and/or Listed Fish Streams (Miles)	
		BLM	Other
Sixes River	2.5	2.6	50.0
Lower South Umpqua River	3.8	1.3	91.0
Calapooia River	4.7	0.1	56.8
Lower Coast Fork Willamette River	6.0	1.2	27.3
Eagle Creek	6.0	4.1	31.2
Calapooia Creek	7.5	5.2	142.0
Little River	14.6	5.9	31.7
East Fork Illinois River	15.5	2.0	17.3
Spencer Creek	16.1	-----	-----
Rogue River – Grants Pass	23.3	0.0	20.0
Klamath River – John C. Boyle Reservoir	26.4	n/a	n/a
Upper Umpqua River	34.5	41.3	123.7
Evans Creek	41.4	16.0	53.0
Deer Creek	41.6	9.0	37.0
Lake Creek	43.3	18.7	60.2
Upper Siuslaw River	44.4	73.4	127.0
Upper Alsea River	52.9	16.4	40.5
Upper Smith River	59.4	90.4	81.0
Rogue River – Horseshoe Bend	95.5	30.0	17.0

Figure 52 – High Intrinsic Potential streams in the Upper Smith watershed.

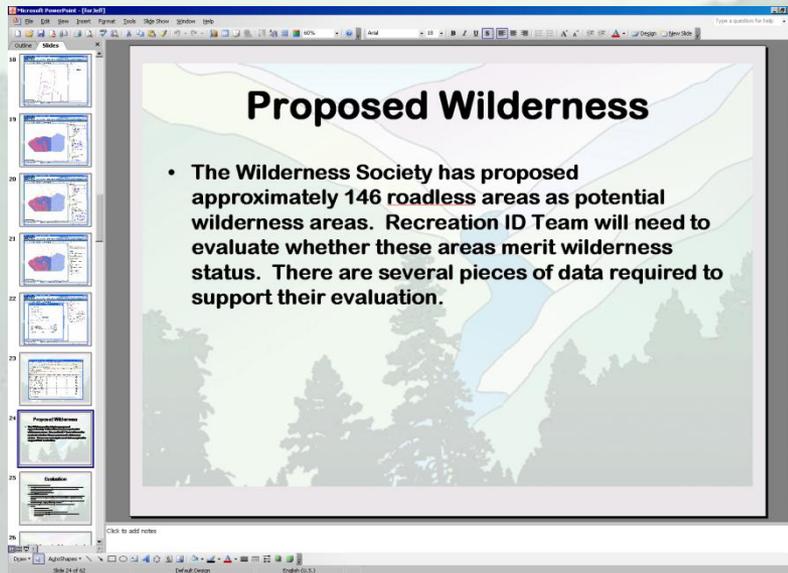


Key WOPR Platform components:

ID teams, Data stewards, Resource Specialists

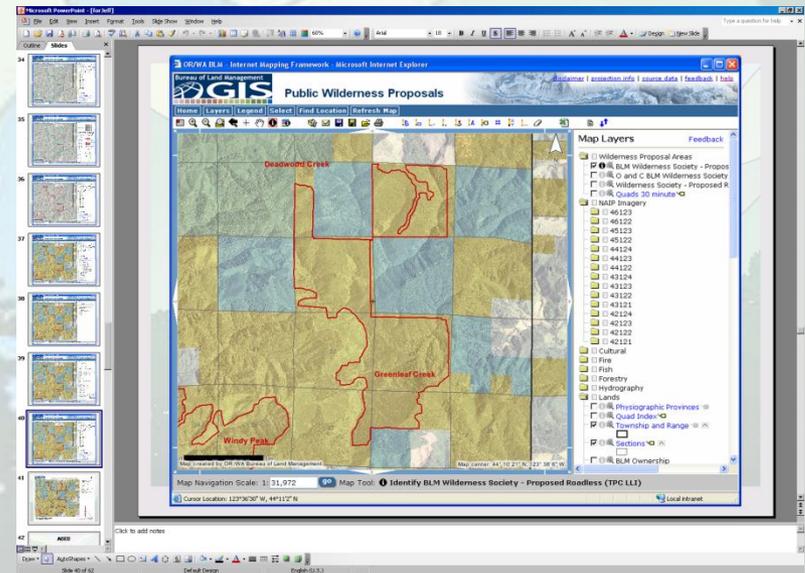
- Users Located in field offices and HQ
- ArcIMS
- Special purpose sites (data review, user comments, data input)

Example: Proposed Wilderness Criteria Review



Proposed Wilderness

- The Wilderness Society has proposed approximately 146 roadless areas as potential wilderness areas. Recreation ID Team will need to evaluate whether these areas merit wilderness status. There are several pieces of data required to support their evaluation.



Public Wilderness Proposals

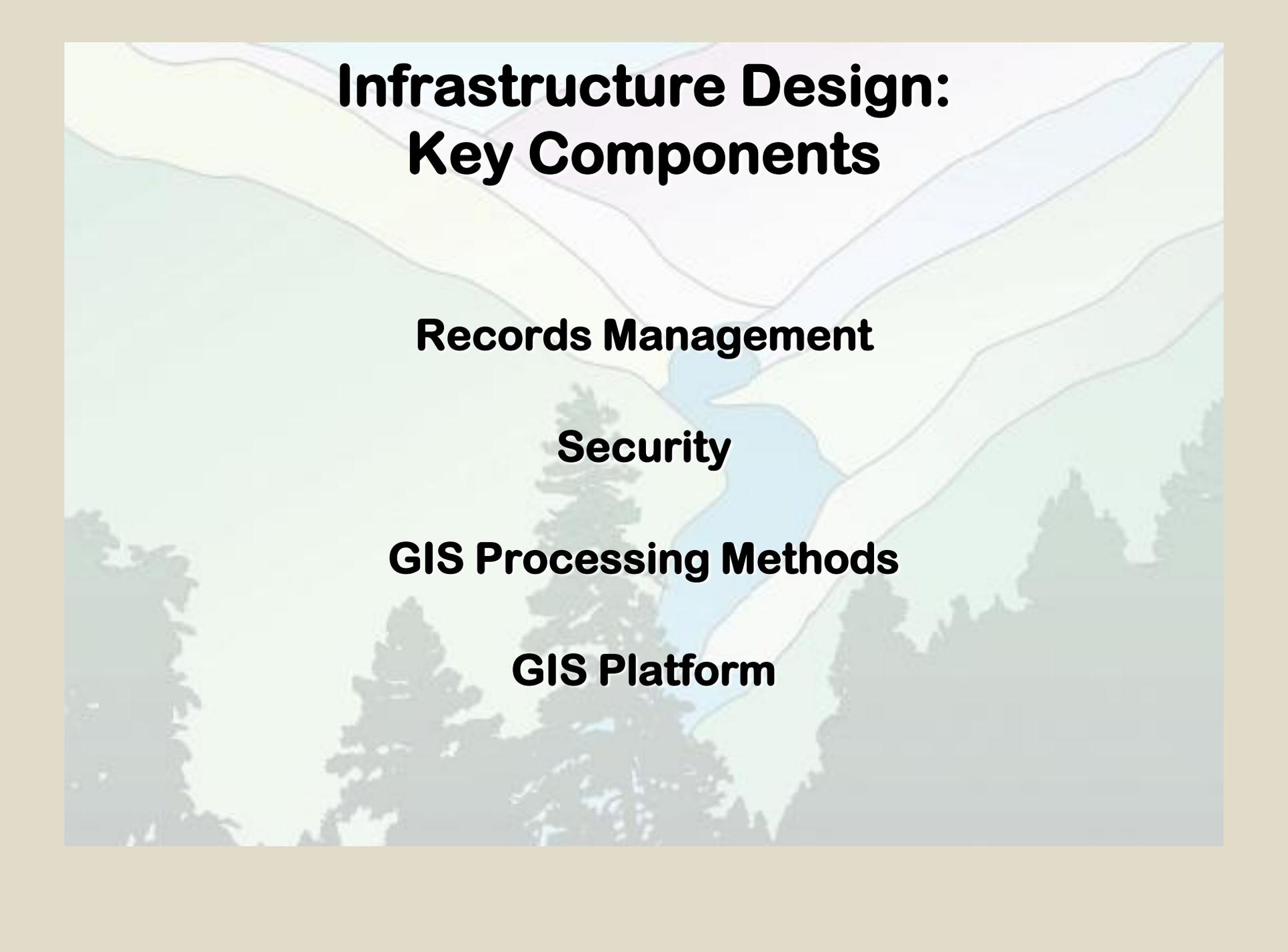
Map Layers

- Wilderness Proposal Areas
 - BLM Wilderness Society - Propo...
 - G. and C. BLM Wilderness Society
 - Wilderness Society - Proposed R...
 - Quads 30 minute
- NAIP Imagery
 - 40123
 - 40122
 - 44124
 - 44123
 - 43123
 - 43122
 - 43121
 - 42124
 - 42123
 - 42122
 - 42121
- Cultural
 - Fire
 - Fire
 - Forestry
 - Hydrograph
 - Land
- Physiographic Provinces
- Quad Index
- Township and Range
- Sections
- BLM Ownership

Map Navigation Scale: 1:1,972

Map Tool: Identify BLM Wilderness Society - Proposed Roadless (TPC L1)

Center Location: 122°36'30" W, 49°11'27" N

The background of the slide is a stylized map. It features a central blue lake with a winding path leading to it. The surrounding land is colored in various shades of green and yellow, representing different terrain or land use. In the foreground, there are dark green silhouettes of trees, suggesting a forested area. The overall aesthetic is clean and professional, typical of a technical presentation.

Infrastructure Design: Key Components

Records Management

Security

GIS Processing Methods

GIS Platform

Assignment

- **Design and Implement a GIS infrastructure for the Western Oregon Resource Plan Revision (WOPR) which will facilitate successful data management and analysis.**

infra

Below; beneath; under; after; -- often used as a prefix.

Source: *Webster's Revised Unabridged Dictionary, © 1996, 1998*

structure

Something arranged in a definite pattern of organization

Source: *Webster's Revised Unabridged Dictionary, © 1996, 1998*

Key WOPR Platform components:

- **Data managers and QA/QC personnel**
 - **Citrix ArcGIS Desktop (ArcCatalog): data loading, data review, metadata**
 - **NPS Metadata Tool**
 - **ArcSDE for informix – WOPR Corp data repository**
- **Casual Users**
 - **ArcIMS and ArcIMS Metadata server**

Key Security components:

Physical security and management:

- Centralized data storage on disc and sde in Portland, Oregon
- Archives and Backups are stored on and off site
- Portland site is in a Federal Building that is guarded
- Computer center has two security levels, very limited access

Network Security

- Active Directory Authentication
 - Strong passwords,
- WOPR security group policies,
 - WOPR Manager
 - WOPR Editor
 - WOPR User
- Individual folder and file access controls

Database Security

- Strong password Unix authentication
- Strong password Informix and Oracle authentication
- RDBMS table and record security

Corporate Backup and Archive facilities

- **Robotic DLT tape system**
- **Existing procedures for Backup and Archive**
- **Existing procedures for On-site and Off-site storage**
- **Existing procedures for data restoration and requests**
- **Scheduled backups and archives**

Security Concerns

- **Physical Security:**

Is data physically safe from internal or external threats?

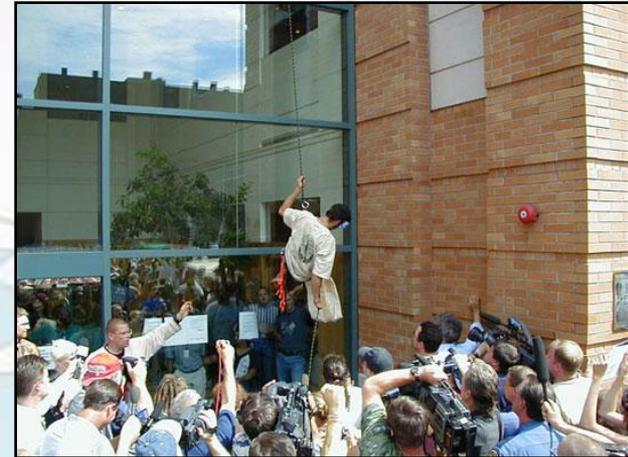
- **Systems/Network security**

Is data safe from hackers or accidental damage

- Is access restricted? Can only certain people view the data?

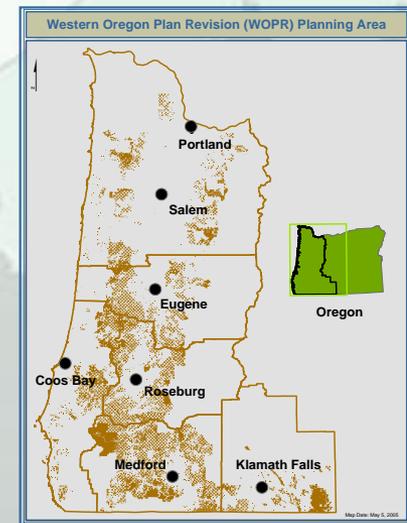
- **Backups/Archive:**

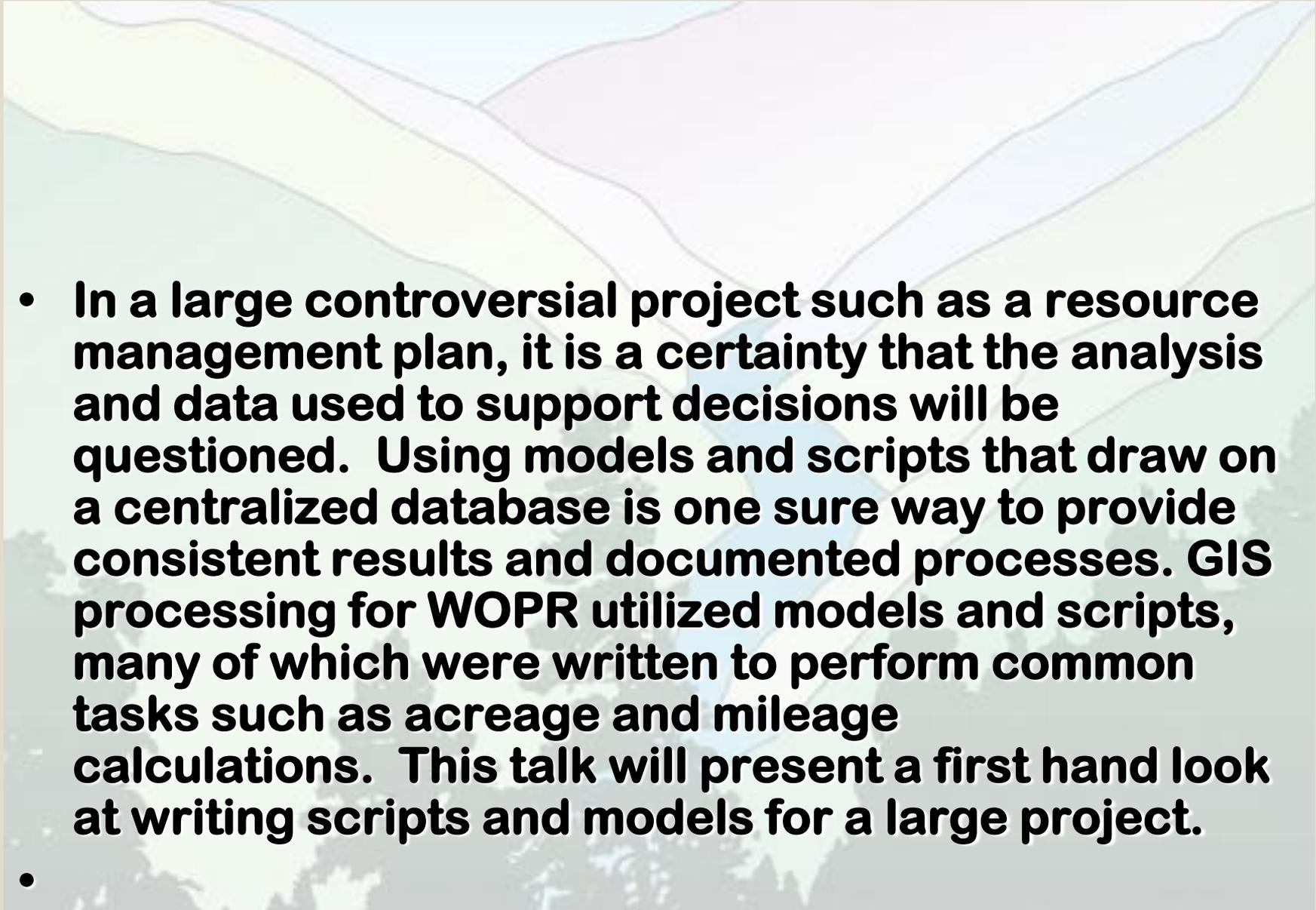
Is data available in the event of a disaster, system outage, or retrieval at a later time.



Processing Hardware/software requirements

- **Match User needs with Hardware and software functionality**
 - **User Classes**
 - Id team member – No GIS skills
 - GIS expert – Heavy cruncher/Cartographer
 - Data manager – load data, build metadata, track data holdings
 - End User/Future User
 - **Which hardware/software will be used for what?**
 - What software meets the needs of which user group?
 - What type of Access is needed by each group?
 - **Centralized vs. de-centralized**
 - What processes should be done centrally in Portland, which ones in the field?



- 
- **In a large controversial project such as a resource management plan, it is a certainty that the analysis and data used to support decisions will be questioned. Using models and scripts that draw on a centralized database is one sure way to provide consistent results and documented processes. GIS processing for WOPR utilized models and scripts, many of which were written to perform common tasks such as acreage and mileage calculations. This talk will present a first hand look at writing scripts and models for a large project.**

-

A topographic map with a lake and forest silhouettes. The map features contour lines and a central blue lake. The background is a light green and yellow gradient, with dark green silhouettes of trees at the bottom.

Above All Else:

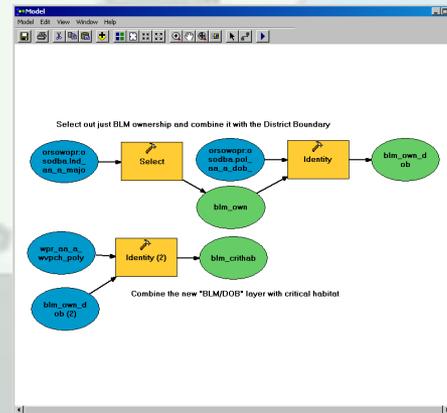
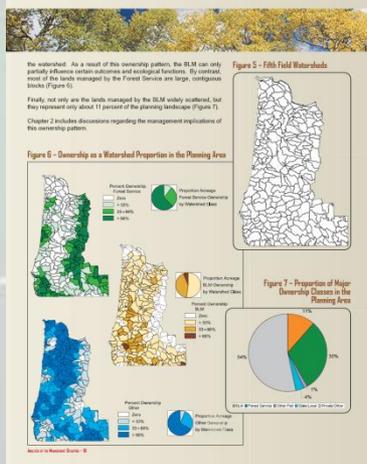
“It has to Work!”

Key WOPR Platform components:

Configurations to meet needs of different user groups.

- **GIS Professionals and Cartographers**

- Users Located in field offices and HQ
- Heavy use of models and scripts, batch processing
- Citrix Client services and centralized storage, including batch services
- Citrix ArcGIS Desktop, ArcInfo WS, Spatial analyst extension
- Citrix ArcSDE for source data, reference data and
- Citrix ArcGIS Publishing (QC plots, Final maps, charts, graphics)



WOPR Record Keeping

- **We must be able to fully document how we arrived at the results which support a management decision, as well as produce the information used to arrive at that point.**
- **Since we are uncertain what decisions will be made with our analysis, we have to save everything.**

WOPR Spatial Data Naming Scheme

- A Standard coded scheme for helping users recognize content of data
- A Standard coded scheme for easy archive and retrieval of WOPR data

WOPR Spatial Name:

<theme_group>_<Project_phase>_<data_purpose>_<district>_<theme>_<spatial_type>

Theme groups: Land use Planning: “LUP”

Project phase: AMA: “a”

Data purpose: Analysis: “a” Cartographic: “c”

District: BLM District Salem: “slm”

Theme abbreviation or data set name: land use plan: “lup”

Spatial type: Polygon: “poly”, polyline: “arc”

orsowopr.osodba.as_a_cob_poly

project phase is ‘as’ – AMS

data purpose is ‘a’ – Analysis

theme is ‘cob’ – County boundaries

spatial type is ‘poly’ – Polygon spatial type