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## **Using Collaborative Tools for Energy Corridor Planning**

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Robert Moore, Robert Sullivan***

### **2008 ESRI Federal User Conference**

*Land and Environment Track*

*Decision Support for Managing Protected Lands Session*

*Thursday, February 21, 4:00pm - 5:30pm*



U.S. Department  
of Energy

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## Abstract

In November 2007, a Draft Programmatic Environmental Impact Statement (PEIS) on Designation of Energy Corridors on Federal Land in the Western 11 States was released for public comment. The draft PEIS proposes a network of 6055 miles of energy corridors on lands managed by seven different federal agencies. Determining the proposed locations of the corridors was a large collaborative effort among the agencies and included local, state, and federal land managers. To connect this geographically dispersed group of people, the project team employed a variety of approaches to evaluate corridor siting issues, including sharing GIS layers and electronic maps, a downloadable GIS database and ArcReader project, workshops, and Internet webcast teleconferences. This collaborative approach allowed complex siting issues to be understood and discussed from many perspectives, and greatly assisted in effective decision making. As a result of this collaborative effort, the draft PEIS proposes a corridor system that avoids many sensitive resources and protected lands while accommodating expected energy development.

## Why Plan for Energy Corridors Now?

- Energy **demand has been steadily increasing** throughout the United States, and has challenged the ability of energy producers and suppliers to meet the growing demand of cities such as Los Angeles, Las Vegas, and Phoenix.
- Congress passed the **Energy Policy Act of 2005** which, in part, targeted problems associated with energy delivery.
- The transport of energy from production to demand areas invariably requires passage across **federal lands** managed by one or more federal agencies.
- The designation of **federal energy corridors** would aid developers of energy transmission projects by identifying suitable routes across federal lands.



## What Does Section 368 of the Energy Policy Act Require?

- Section 368 of the Act calls for the Secretaries of Energy, Agriculture, Interior, Commerce and Defense to:
  - Designate energy corridors on **federal lands in the eleven western states** where future electric transmission lines as well as oil, natural gas, and hydrogen pipelines could be developed to support increased energy delivery.
  - Perform any **environmental reviews** required to complete the corridor designations.
  - Incorporate the designated corridors into the relevant agency **land use and resource management plans**.
  - Complete the same activities for the remaining 39 states by 2009.



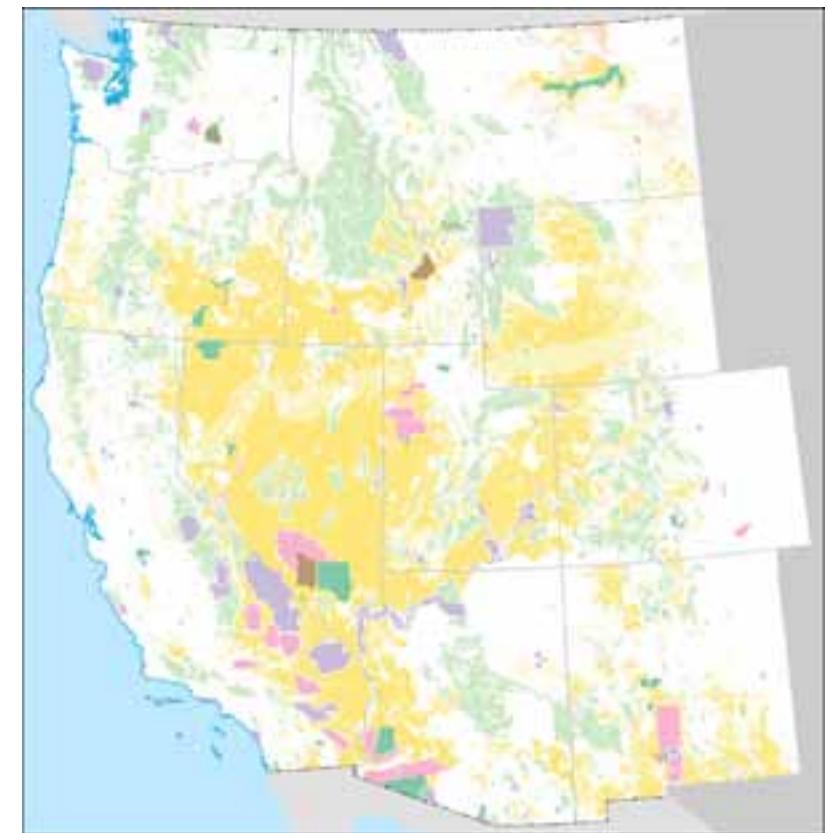
## *What Progress Has Been Made So Far?*

- Perform environmental reviews:
  - Draft Programmatic Environmental Impact Statement (PEIS) was released November 2007
- Designate corridors:
  - 6055 miles of corridors have been proposed on federal lands in the 11 western states
- Incorporate the designated corridors into the relevant agency land use and resource management plans.
  - PEIS is expected to support records of decision for amending over 100 land use plans to designate the energy corridors
- Complete the same activities for the remaining 39 states by 2009
  - Process is starting for the remaining states
  - Considerably less federal land exists in these states except for Alaska



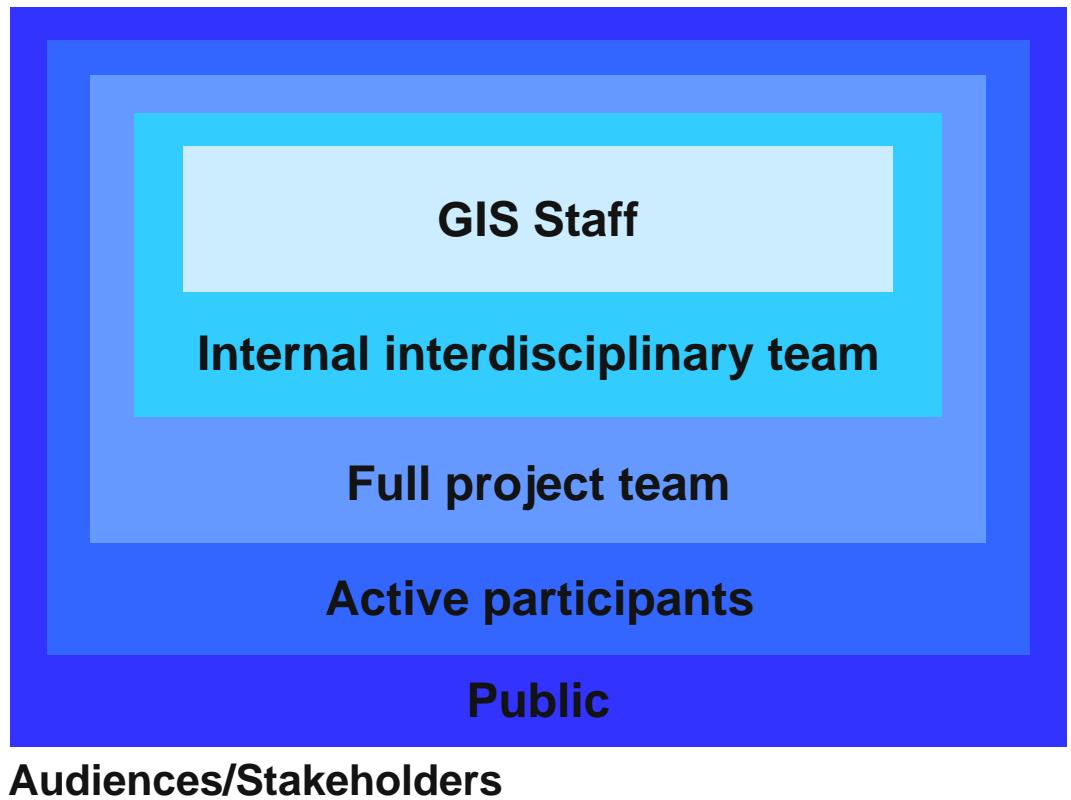
## **What Were the Key Challenges of Designating Energy Corridors on Federal Lands in the Western 11 States?**

- These states cover a vast region of about 1,185,000 square miles.
- Nearly half (48.4%) of the land is federally owned.
- There are many federal agencies, each with different missions and procedures.
- There are numerous siting constraints, including:
  - Physical barriers such as mountain ranges, canyons and rivers, and
  - Many land use restrictions and protected natural resources, such as
    - *National Parks and Monuments,*
    - *National Wildlife Refuges,*
    - *Wildernesses and Wilderness Study Areas, and*
    - *Cultural resources.*
- **A GIS approach was the only practical means to accomplish the task.**
- **Efficient planning and communication among the many stakeholders was essential.**



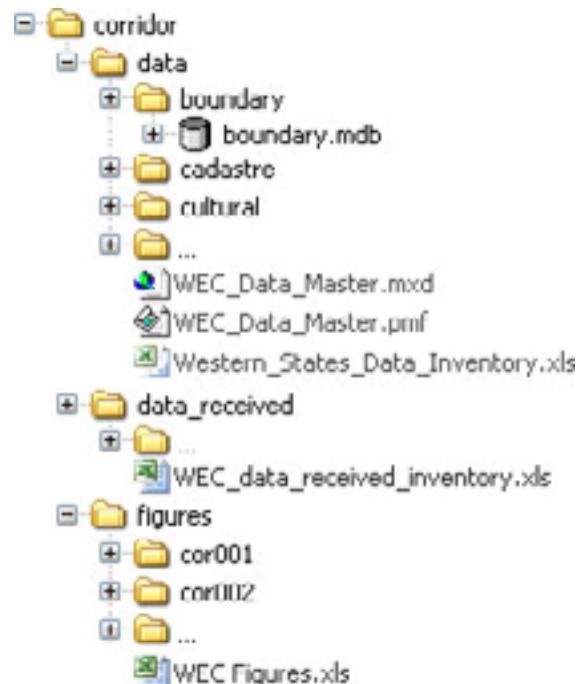
## *What Were the Major GIS Activities?*

- Methodology and data needs
- GIS database assembly
  - Nearly 100 unique themes
- Corridor planning/revision
  - Workshops
  - Data calls
- Corridor analysis
  - Support of PEIS and management team
  - Calculations/analysis
- Map and data products
  - Figures and map atlas for PEIS document
  - Data files for public release
- Each stage involved a variety of audiences and stakeholders, and required different strategies for effective communication



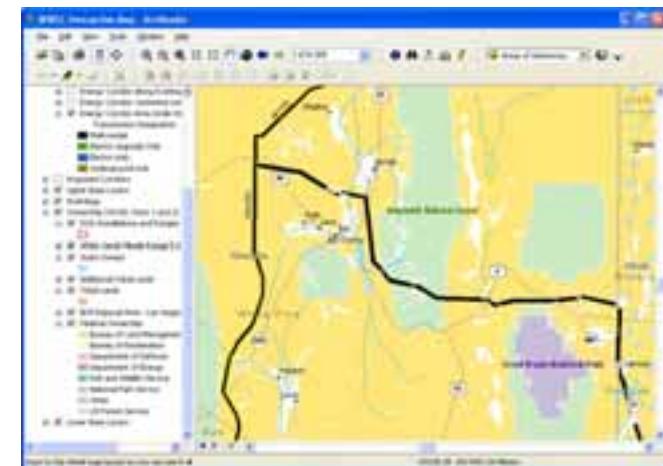
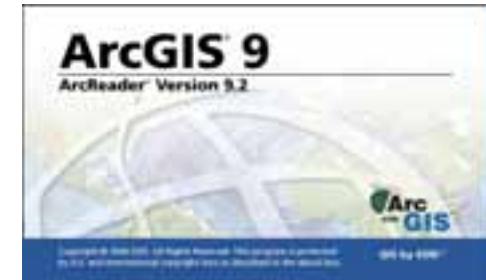
## What Strategies Were Used to Manage the GIS Work?

- Main database carefully maintained
  - Tri-Service Spatial Data Standard for organization and naming
  - Metadata from sources included
- Master ArcMap project file helped standardize products
- Organized storage of raw data received and sources
- System for maps and figures
  - Tracking of requests and status
  - Project files must point to main database, not working directories
  - Specifications for map design and symbolization
- Difficult balance between flexibility and consistency
  - **Flexibility** needed to support requested changes/new data
  - **Consistency** needed for production of maps and analysis



## *How Was the Internal Interdisciplinary Team Supported?*

- GIS database mirrored daily to shared project drive
- General-purpose and focused ArcReader projects
  - Training session provided to explain database content and ArcReader
  - Team members were able to answer questions themselves and plan maps
- GIS staff “at the table” throughout project
- Organized process for analysis
  - Changes “frozen” during analysis period
  - GIS staff partnered with scientific staff
- Organized process for document figures
  - Specifications for maps improved consistency and quality
  - Organized review process reduced revision cycles



## How Was the Full Project Team Supported?



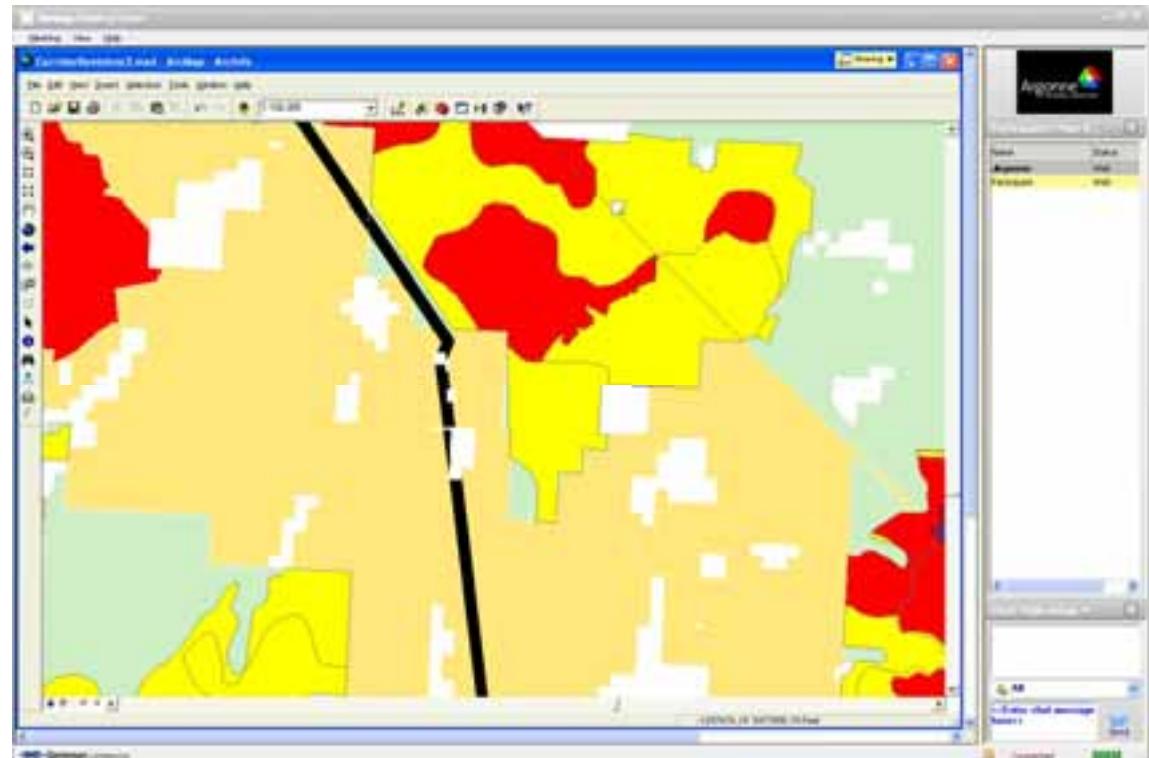
- GIS workshops for major planning and review sessions
  - Live editing and display by GIS staff

The screenshot shows a web page titled "Energy Corridor PEIS Extranet". The header includes links for Home, News, Calendar, Documents, Tribal Information, Comment Search, Map Comment Search, Links, Contacts, and User Community. The main content is titled "Document Collection" and features a "Search" button. Below the search bar are three document categories with their respective counts:

- Public Hearings Materials: 3 documents
- Agency Contact Lists: 2 documents
- April Draft PEIS Documents: 69 documents

## *How Was the Full Project Team Supported?*

- Data calls for corridor planning and review
  - Map series organized by jurisdictional areas
  - ArcReader projects with supporting GIS database
  - Hundreds of corridor refinements received
- Internet webcasts for planning among distributed participants
  - Over 50 organized webcasts were held
  - Many more webcasts were used for editing sessions
  - Status maps circulated to illustrate planning issues and decisions



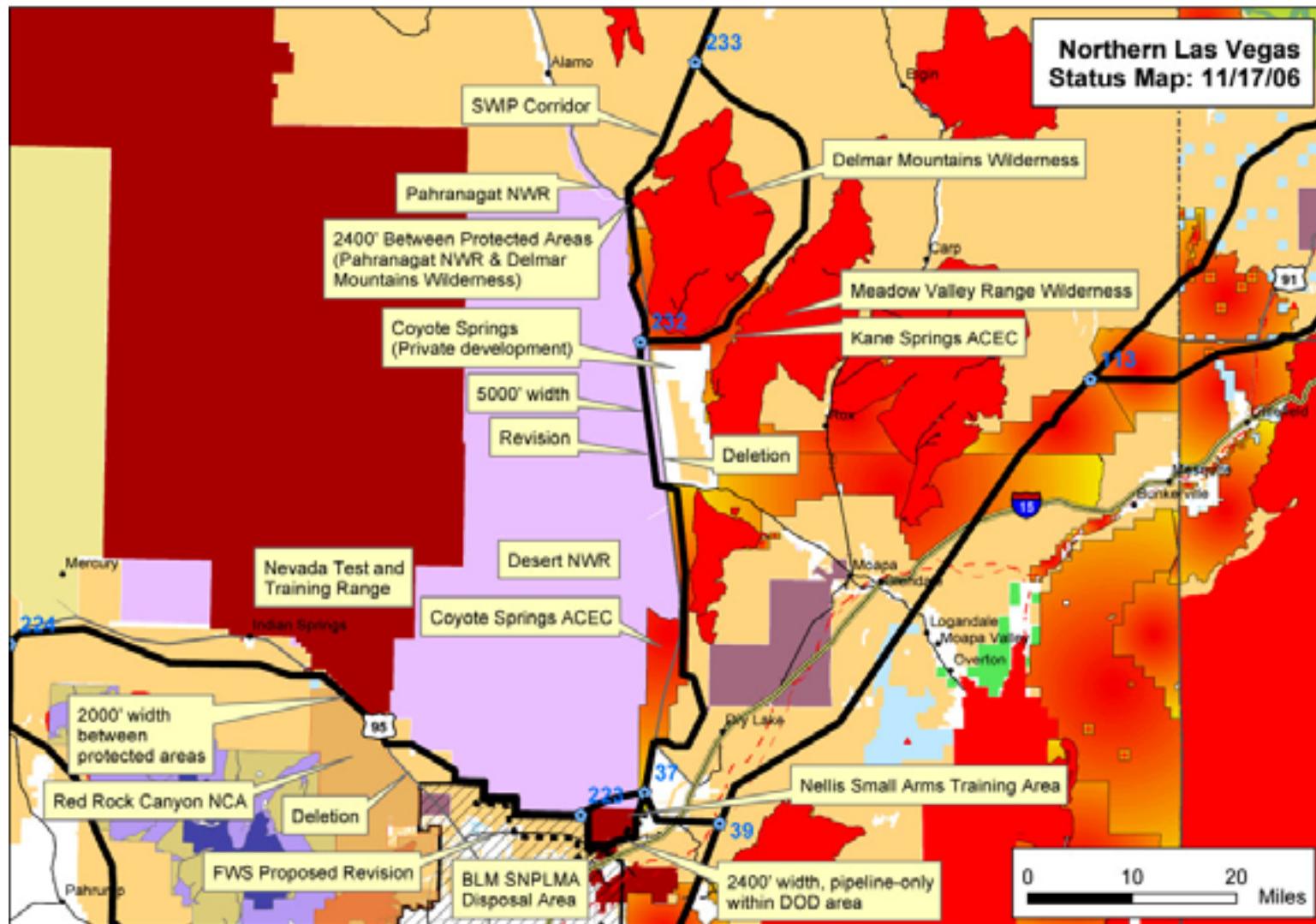
**Example webcast view of GIS editing session**

## ***How Were the Corridors Developed?***

- Examples of communications supported by webcasts:
  - Arizona: A proposed corridor between Phoenix and Flagstaff was finally dropped across the Tonto and Coconino National Forests after several webcasts, information exchange, and considerable dialogue. The main issues were related to protected areas and insufficient width of existing pathways to establish a viable corridor.
  - Colorado: Multiple webcasts and other communication with several BLM and FS offices and NPS were needed to resolve the location of corridor 87-277 along US-50 across the Continental Divide at a ski area as well as skirting areas of critical environmental concern and a National Conservation Area.
  - Nevada: Negotiating routes for several critical energy corridors around all the sensitive and protected areas near Las Vegas was probably the most demanding challenge on the entire project. It involved many webcasts and coordination with BLM, FS, FWS, NPS, DOD, DOE, and others to reach agreement on these corridor locations.

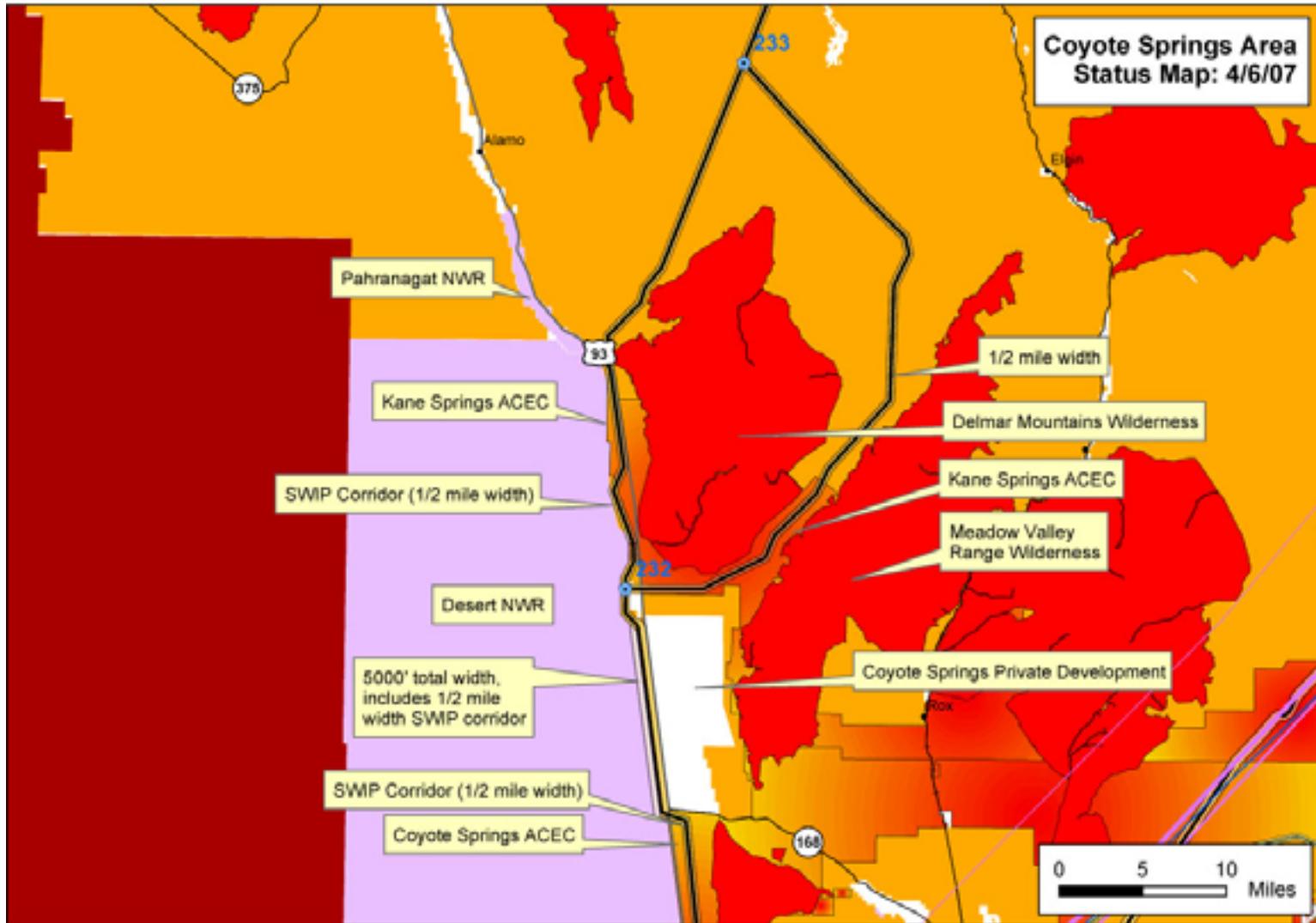
# How Were the Corridors Developed?

Ongoing Work by Federal Agencies on Potential Energy Corridors in the Western States  
Preliminary Draft - Subject to Change



# How Were the Corridors Developed?

Ongoing Work by Federal Agencies on Potential Energy Corridors in the Western States  
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## How Were the Corridors Developed?

Conceptual network



Preliminary refinement



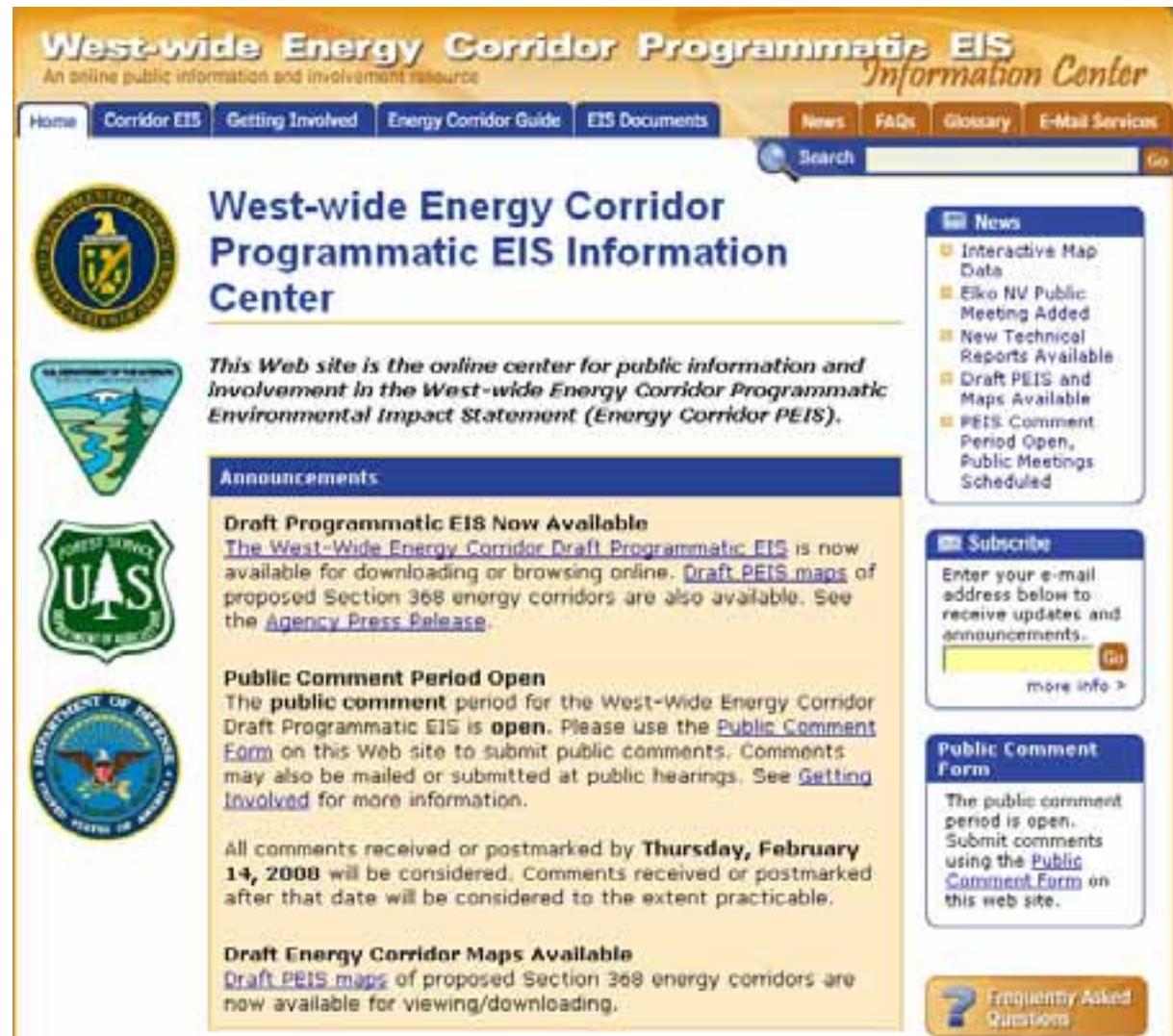
Draft corridor



- Example of corridor development in three phases (SW Colorado)
  - “Three steps” maps were produced for each state and used in public meetings to illustrate the planning process

## How Were Active Participants and the Public Included?

- Public web site ([CorridorEIS.anl.gov](http://CorridorEIS.anl.gov)) available throughout project
- E-mail subscription for updates and announcements
- Maps of preliminary corridors released before draft PEIS
- Map, data, and document download
- Public comment forms during scoping and Draft PEIS comment periods



The screenshot shows the homepage of the West-wide Energy Corridor Programmatic EIS Information Center. The header features the title 'West-wide Energy Corridor Programmatic EIS Information Center' and a sub-header 'An online public information and involvement resource'. The navigation menu includes links for Home, Corridor EIS, Getting Involved, Energy Corridor Guide, EIS Documents, News, FAQs, Glossary, and E-Mail Services. A search bar is located at the top right. The main content area displays the title 'West-wide Energy Corridor Programmatic EIS Information Center' and a brief description: 'This Web site is the online center for public information and involvement in the West-wide Energy Corridor Programmatic Environmental Impact Statement (Energy Corridor PEIS)'. Below this is a section titled 'Announcements' with three items: 'Draft Programmatic EIS Now Available', 'Public Comment Period Open', and 'Draft Energy Corridor Maps Available'. To the right, there are three boxes: 'News' (listing recent updates like 'Interactive Map Data' and 'Elko NV Public Meeting Added'), 'Subscribe' (a form to enter an email address), and 'Public Comment Form' (instructions for submitting comments). A 'Frequency Asked Questions' section is also present at the bottom right.

## How Were Active Participants and the Public Included?

- Draft PEIS released November 2007
  - Hardcopy includes 131-page map atlas
  - DVD version includes PDF maps and ArcReader project



## What Resources Were Provided to View the Proposed Corridors?

GIS and map products for different capability levels/interests



Map atlas for PEIS document in PDF form

- *Two 1:1,000,000 scale map series*
- *Three state map series*



Interactive ArcReader map with GIS database (187 Mb)

- *Includes ArcReader and ArcGIS project files*
- *GIS database has layers used for maps in map atlas*



Energy corridor GIS files for GIS professionals (2.3 Mb)

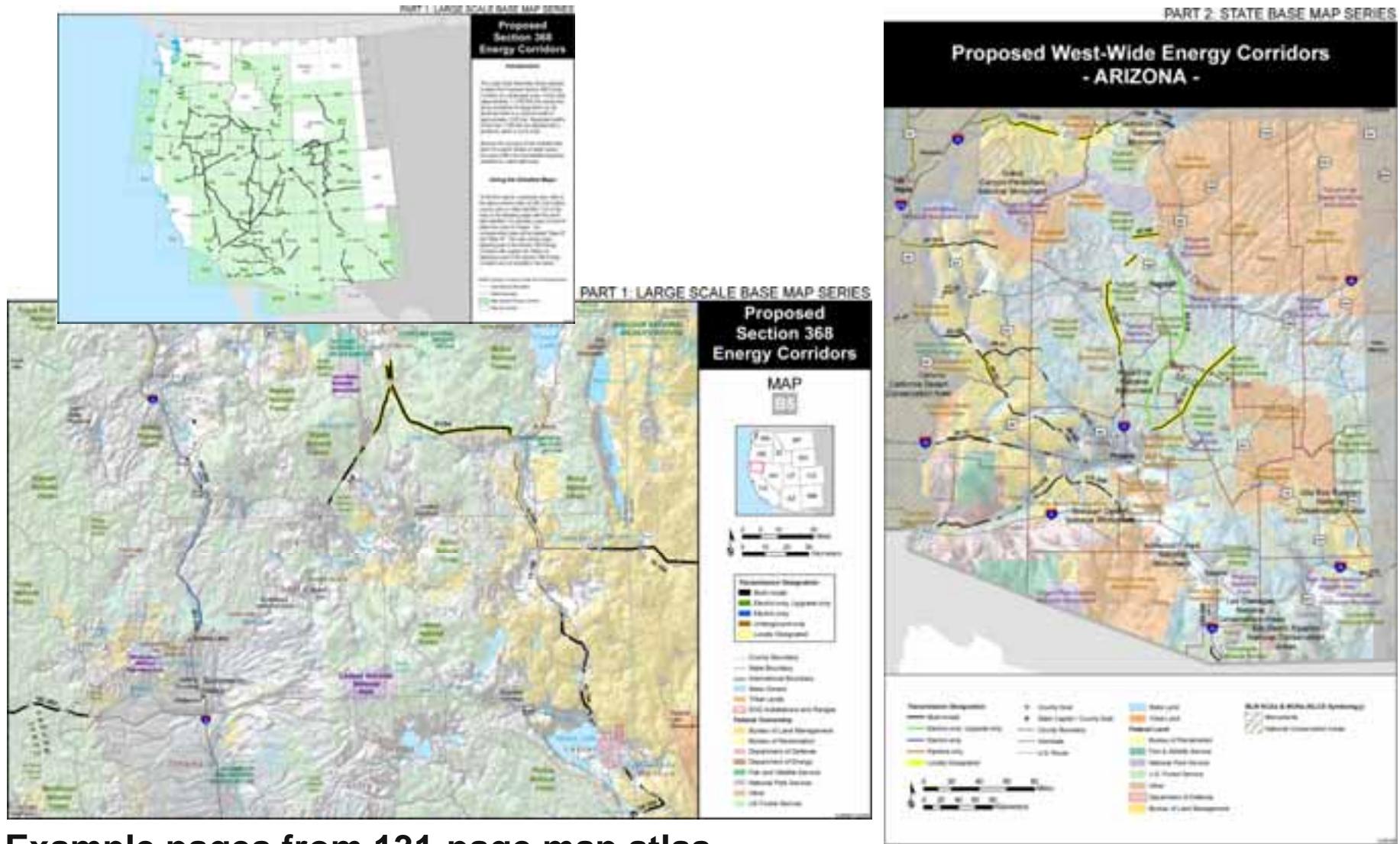
- *Geodatabase and Shapefile formats with metadata*



Keyhole Markup Language (KML) file of corridors (11.4 Mb)

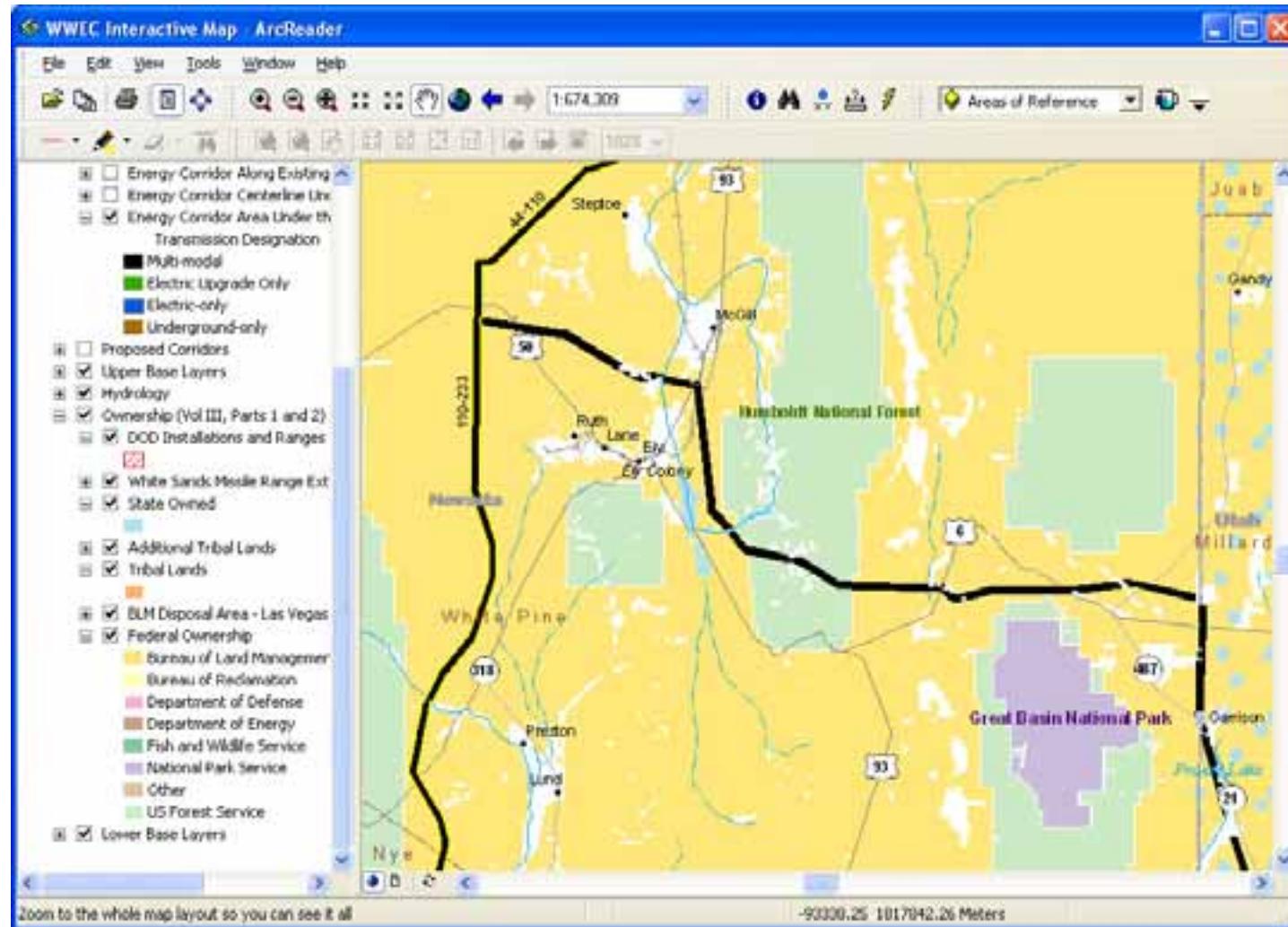
- *Viewable in Google Earth, ArcGIS Explorer*

## What Resources Were Provided to View the Proposed Corridors?



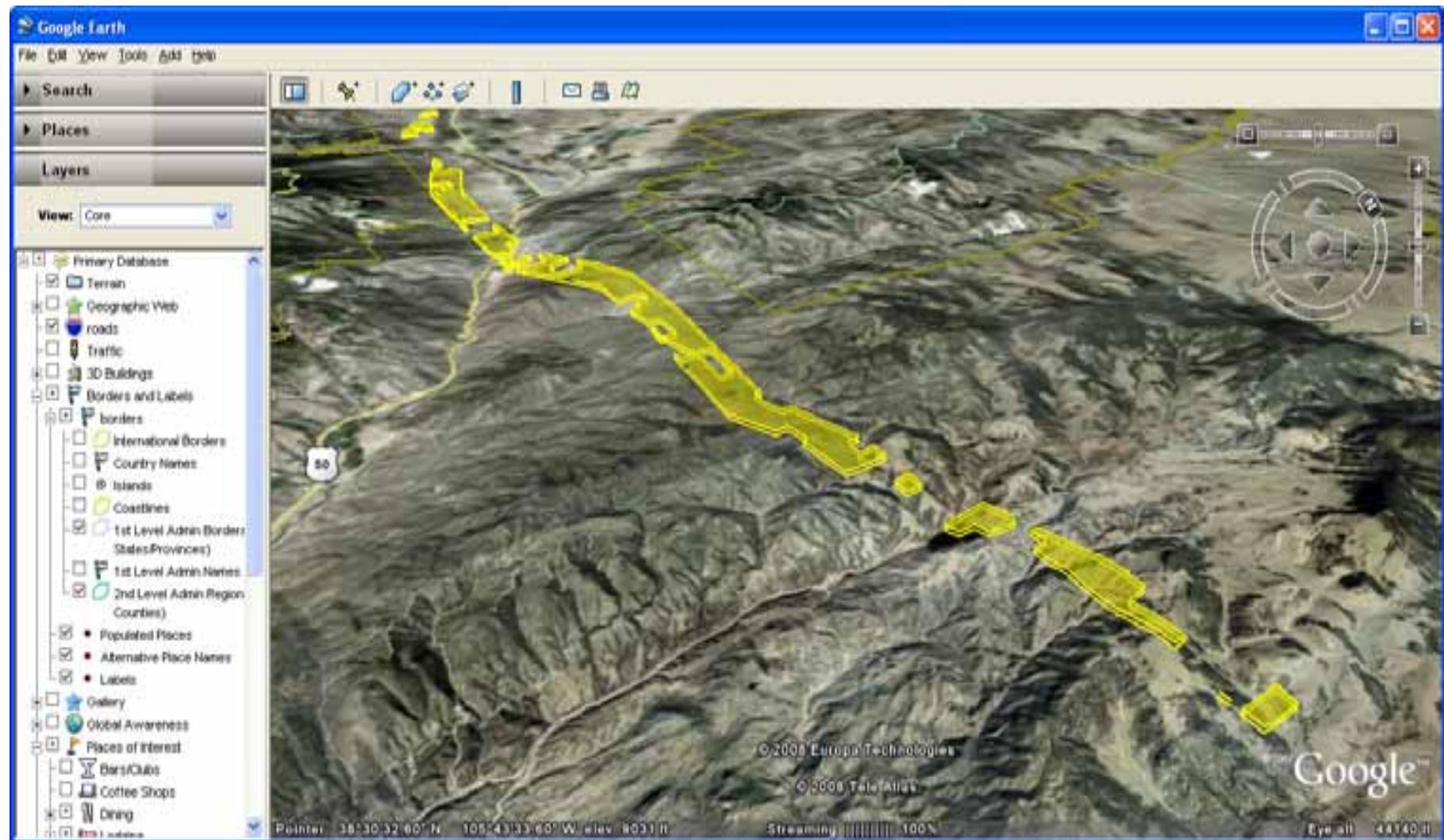
Example pages from 131-page map atlas

## What Resources Were Provided to View the Proposed Corridors?



Publicly released ArcReader project with GIS database

## What Resources Were Provided to View the Proposed Corridors?



Publicly released KML file as viewed in Google Earth

## More Information

- Project Web Site: <http://CorridorEIS.anl.gov>
- Lead Federal Agencies
  - U.S. Department of Energy
  - U.S. Department of the Interior, Bureau of Land Management
- Cooperating Federal Agencies
  - U.S. Department of Agriculture, Forest Service
  - U.S. Department of Defense
  - U.S. Department of the Interior, Fish and Wildlife Service
- Authors:
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