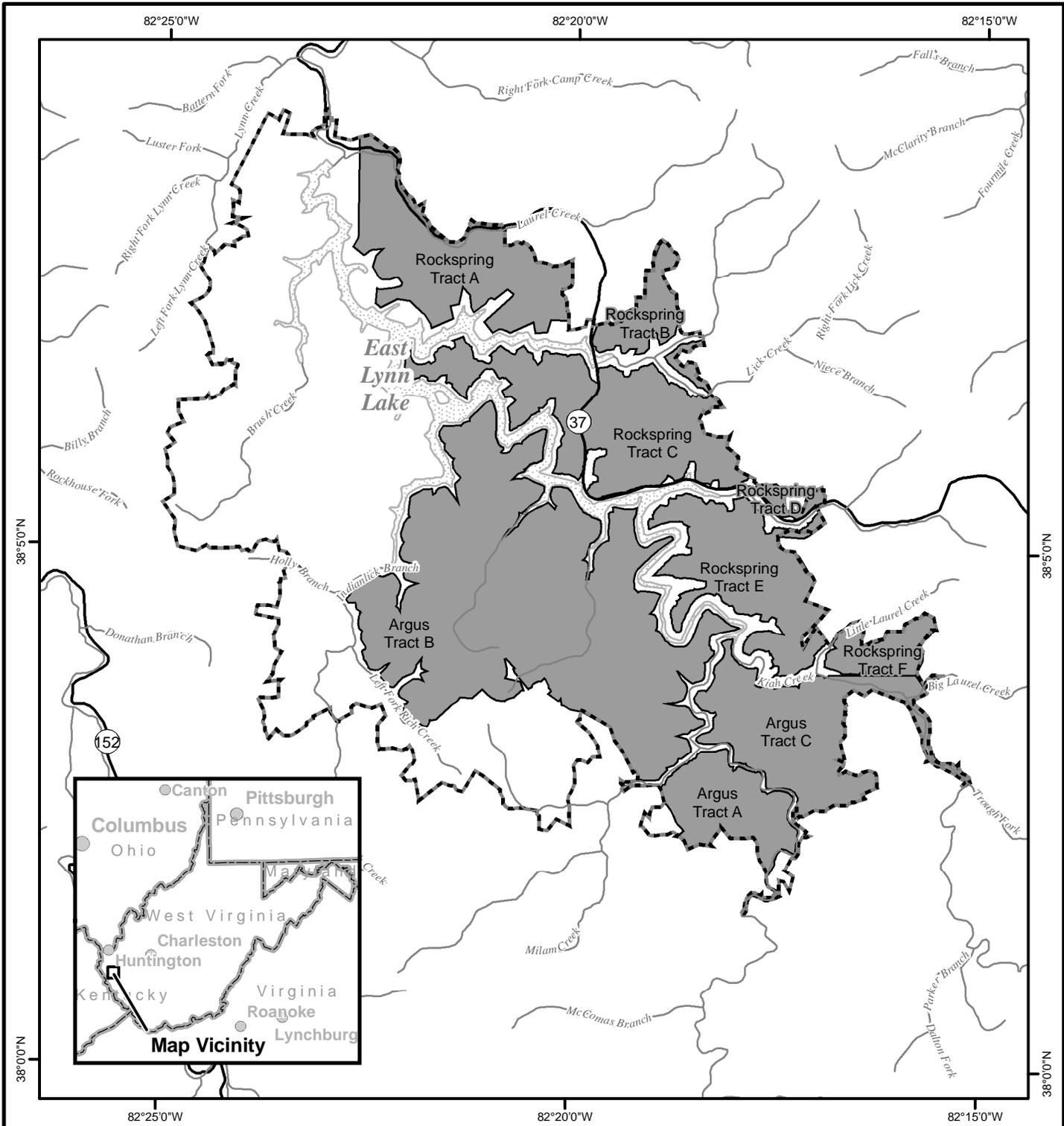


Final Land Use Analysis and Final Environmental Impact Statement
for the East Lynn Lake Coal Lease

FIGURES

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LEGEND

- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Lake
- Stream
- Road

REFERENCES

Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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N

1 0.5 0 1 Miles

SCALE 1:100,000
 WHEN PRODUCED AT 8-1/2X11IN

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**PROPOSED LEASE TRACT
 VICINITY MAP**

FILE 8-5x11_ELL_EIS_ProjectSite.mxd
 DATE AR 02/06/2009

FIGURE 1.1-2

OVERSIGHT AGENCIES

Council on Environmental Quality (CEQ)



Created by the *National Environmental Policy Act* of 1969 (NEPA), the CEQ is responsible for environmental policy development and the oversight of federal agencies implementing NEPA.

Members of the CEQ are appointed by the President of the US.

Specific Responsibilities

- Issue regulations and other guidance for implementing NEPA.
- Resolve lead agency disputes.
- Mediate interagency disputes over environmental policy.
- Provide training and advice to federal agencies regarding NEPA compliance.

U.S. Environmental Protection Agency (USEPA)



In addition to its regulatory capacity, the USEPA has three important roles defined by the NEPA process: to review, to notify the public, and to act as a cooperating agency.

Specific Roles and Responsibilities

- Review
 - The USEPA files and reviews all EISs for document adequacy and environmental quality of the proposed action.
- Notify the Public
 - The USEPA receives all EISs and provides public notice in the *Federal Register*.
- Cooperating Agency
 - The USEPA cooperates with lead agencies concerning the implementation of USEPA environmental programs and regulations.

IMPLEMENTING AGENCIES

Lead Federal Agency

U.S. Department of the Interior Bureau of Land Management—Eastern States (BLM) Springfield, VA



Responsible Official: Mr. Juan Palma, Eastern States Director
Contact Person: Mr. Chris Carusona, Planning and Environmental Coordinator

Role

The *Water Resources Development Act of 1999* removed the USACE consent authority, while the BLM remained the coal leasing decision maker for the USACE East Lynn Lake Project

Decisions to be Made

The BLM Eastern States Office will determine with a Record of Decision:

- Whether or not to lease the federal coal tracts
- What additional stipulations should be applied, if any

Cooperating Agencies



U.S. Department of the Army Corps of Engineers (USACE) Huntington District Huntington, WV

Responsible Official:
Col. Dana R. Hurst, Commander
Contact Person:
Mr. John Preston, Ecologist

The USACE is the Surface Management Agency for the East Lynn Project

Role

The USACE will, to the extent it determines, participate in internal scoping, alternatives analysis, study development and technical reviews.

The USACE will, to the extent it determines, provide information, data and comment, help collect data, participate in discussions about data assessment and technical reports, and provide technical expertise to assist in evaluating the effectiveness of all alternatives and the LUA/EIS.



U.S. Department of the Interior Office of Surface Mining (OSM) Lexington, KY

Responsible Official:
Mr. Brent Wahlquist, Regional Director
Contact Persons:
Mr. Gerald Waddle, Field Office Manager
Mr. Jeff Coker, Biological Scientist

Role

The OSM is responsible for providing recommendations to the Secretary of the Interior regarding approval, disapproval, or conditional approval of the mine plan on lands contained within the federal lease area.

The OSM will bring specialized knowledge to the review process as it applies to the pending action, specifically regarding: ground stability and subsidence, groundwater and hydrologic issues, and mine portal issues.



West Virginia Division of Natural Resources (WVDNR) Pt. Pleasant, WV

Responsible Official:
Mr. Frank Jezioro, Director
Contact Persons:
Mr. Randy Kelley, Wildlife Biologist

In 1983, the USACE issued a 25-year license to the WVDNR to manage the East Lynn Lake Wildlife Management Area (WMA)

Role

The WVDNR will, to the extent it determines, provide information, data, and comments regarding those elements of the LUA/EIS and the data and analyses which it has special expertise.

WVDNR helps to collect data to the extent possible, participates in discussions about data assessment and technical reports, and provides technical expertise to assist in evaluation of the effectiveness of the proposed alternatives and the LUA/EIS.

**Figure 1.1-3 NEPA Process Oversight and Agency Involvement
East Lynn Lake LUA/EIS**

BLM Milwaukee Field Office—Eastern States



EAST LYNN LAKE

U.S. Army Corps of Engineers Developed Recreation Areas
WV Division of Natural Resources – Wildlife Management Area

1 Below Dam Area



2 Overlook Area



3 Lake Office



4 Lakeside Area



5 Lick Creek Area



6 Swimming Area



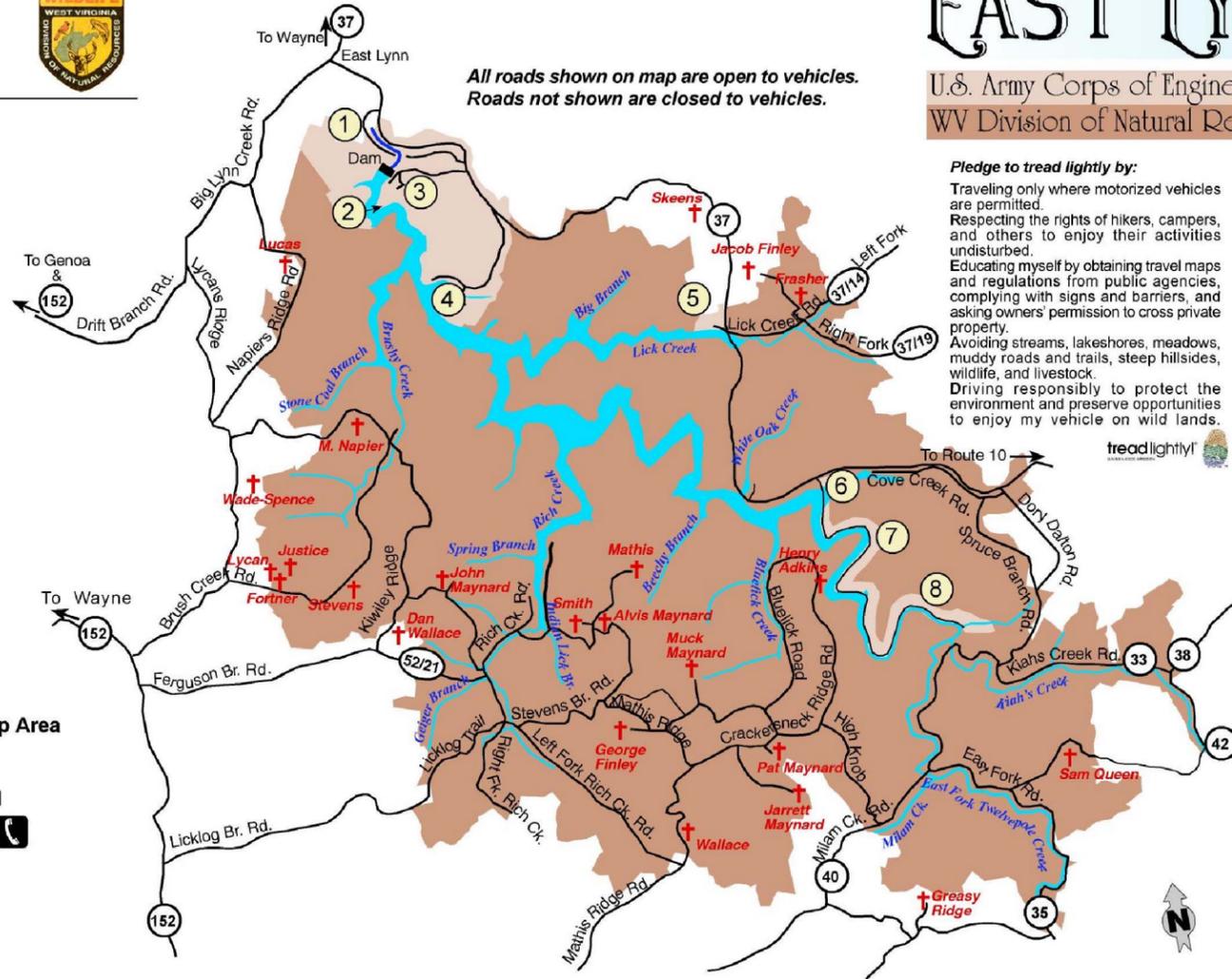
7 East Fork Launch Ramp Area



8 East Fork Campground



† Cemeteries



All roads shown on map are open to vehicles.
Roads not shown are closed to vehicles.

Pledge to tread lightly by:

Traveling only where motorized vehicles are permitted.
Respecting the rights of hikers, campers, and others to enjoy their activities undisturbed.
Educating myself by obtaining travel maps and regulations from public agencies, complying with signs and barriers, and asking owners' permission to cross private property.
Avoiding streams, lakeshores, meadows, muddy roads and trails, steep hillsides, wildlife, and livestock.
Driving responsibly to protect the environment and preserve opportunities to enjoy my vehicle on wild lands.



Title 36 Code of Federal Regulations: (portions thereof)

- .2 (c) "The operation and/or parking of a vehicle off authorized roadways is prohibited.... Taking any vehicle through, around, or beyond a restrictive sign, recognizable barricade, fence, or traffic control barrier is prohibited."
- .2(e) "No person shall operate any vehicle in a careless, negligent or reckless manner so as to endanger any person, property or environmental feature."
- .12(e) "the possession and/or consumption of alcoholic beverages on any portion of the project land or waters, or the entire project, may be prohibited when designated and posted by the District Commander."

Wildlife Management Areas & State Forest WVDNR, Wildlife Management Area Rules and Regulations: (portions thereof)

- (d) Camping is lawful Only on designated areas.
- (e) "All-Terrain Vehicle" or "ATV" means any motor driven vehicle specifically designed for off-road recreational activities that is not subject to vehicle registration requirements established under the provisions of Chapter 17A of the West Virginia Code.
- (f) The use of all-terrain vehicles (ATVs and snowmobiles) is prohibited except where specifically permitted by posted signs on designated roads and trails.
- (g) The driving of any vehicle, ATV, or snowmobile in a manner so as to harass, chase or annoy any animal or bird is prohibited.
- (h) The maximum speed limit for vehicles is thirty (30) miles per hour, unless a lower speed limit is posted. All traffic signs and directions must be observed.
- (i) The driving of any vehicle in a manner which creates a nuisance to other persons by repetitive or continuous cruising is prohibited.

For Additional Information Call:
U.S. Army Corps of Engineers, East Lynn Lake: (304)849-2355
or WV Division of Natural Resources (304)675-0871

For emergencies dial 911.

<http://www.lrh.usace.army.mil/or/eastlynn>

Feb. 01

REFERENCE

United States Army Corps of Engineers (2001)

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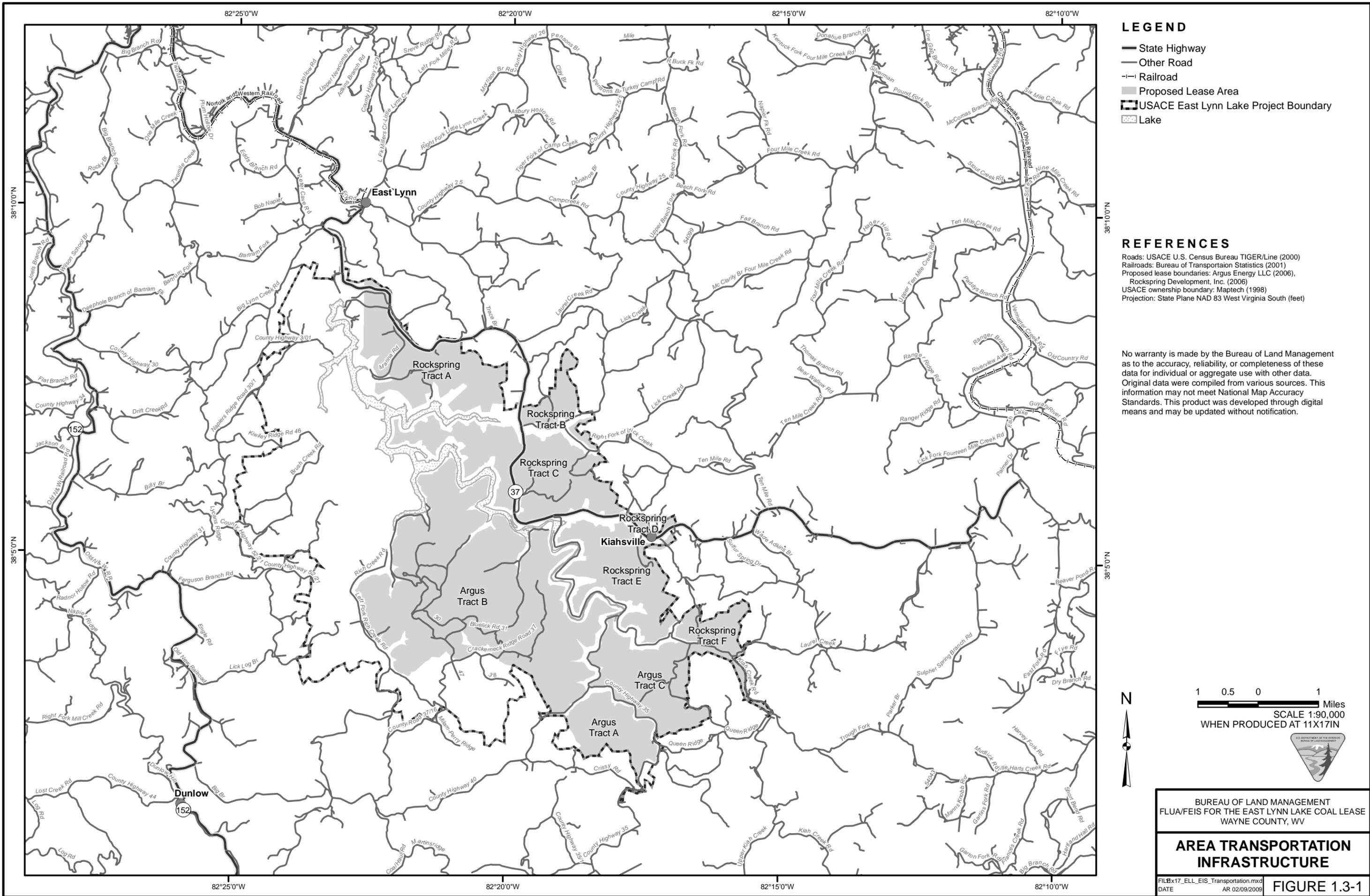


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**EAST LYNN LAKE
WILDLIFE MANAGEMENT AREA**

FILE 11x17_ELL_EIS_WMA.mxd
DATE AR 02/06/2009

FIGURE 1.1-4



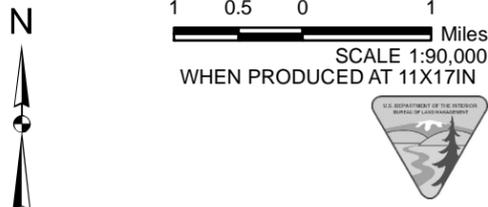
LEGEND

- State Highway
- Other Road
- Railroad
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Lake

REFERENCES

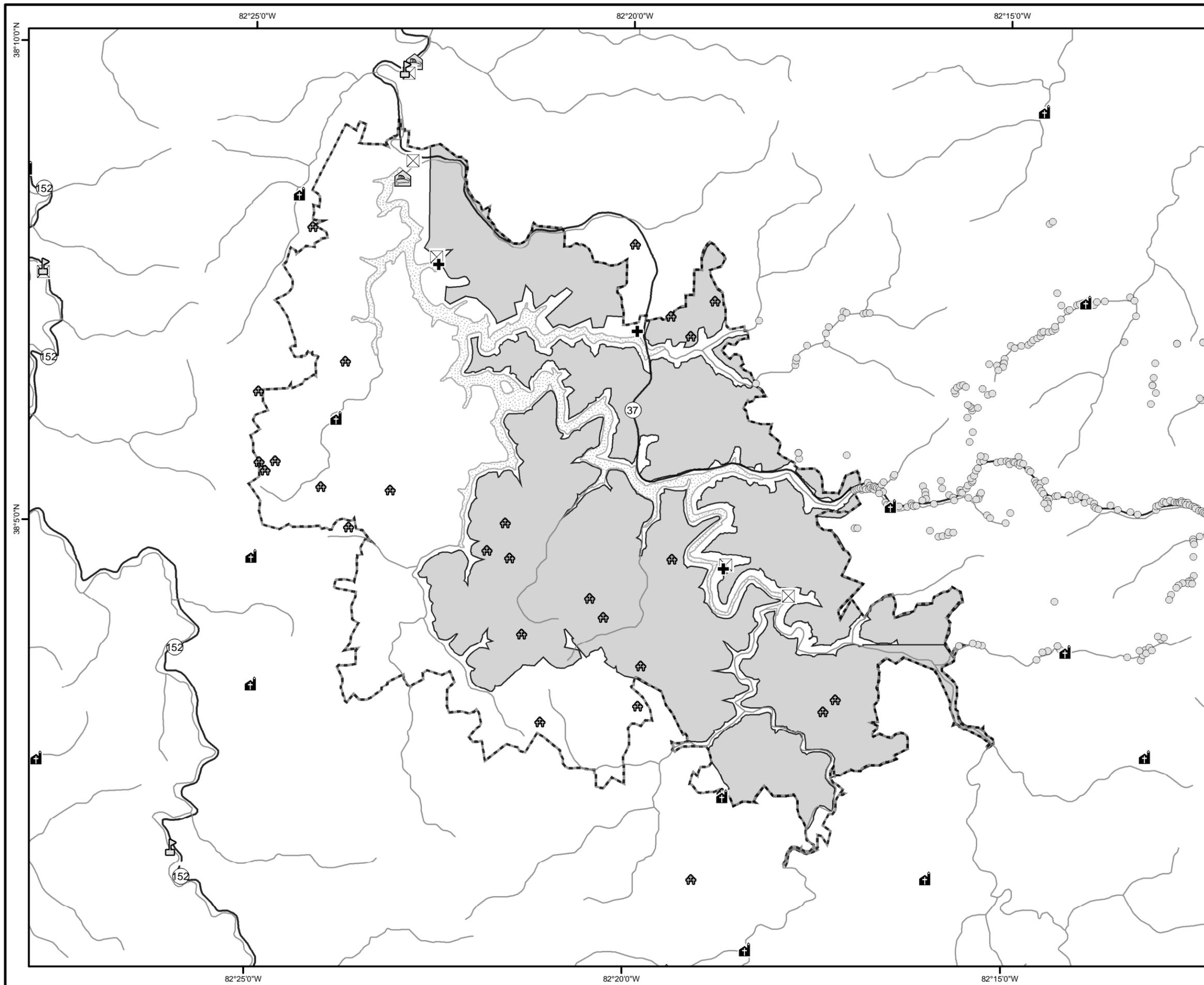
Roads: USACE U.S. Census Bureau TIGER/Line (2000)
 Railroads: Bureau of Transportation Statistics (2001)
 Proposed lease boundaries: Argus Energy LLC (2006),
 Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**AREA TRANSPORTATION
 INFRASTRUCTURE**



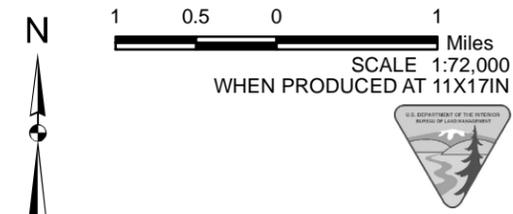
LEGEND

- ☒ Sewage Treatment Plant
- ⊕ Water Treatment Plant
- ⊗ Cemetery
- Ⓜ Church
- 🏫 School
- 🚒 Fire Department
- House
- Proposed Lease Area
- ⊔ USACE East Lynn Lake Project Boundary
- Stream
- Road
- ▨ Lake

REFERENCES

Sewage treatment plants: WV Dept. of Env. Protection (2002)
 Water treatment plants: USACE (2006)
 Cemeteries: Anslinger and Others (2007), USACE ELL Recreation Map (USACE) (2007), Argus Energy LLC (2006)
 Churches: GNIS (1981)
 Schools: WV Army National Guard (2005)
 Fire Departments: WV Div. of Forestry (2002)
 House/building locations: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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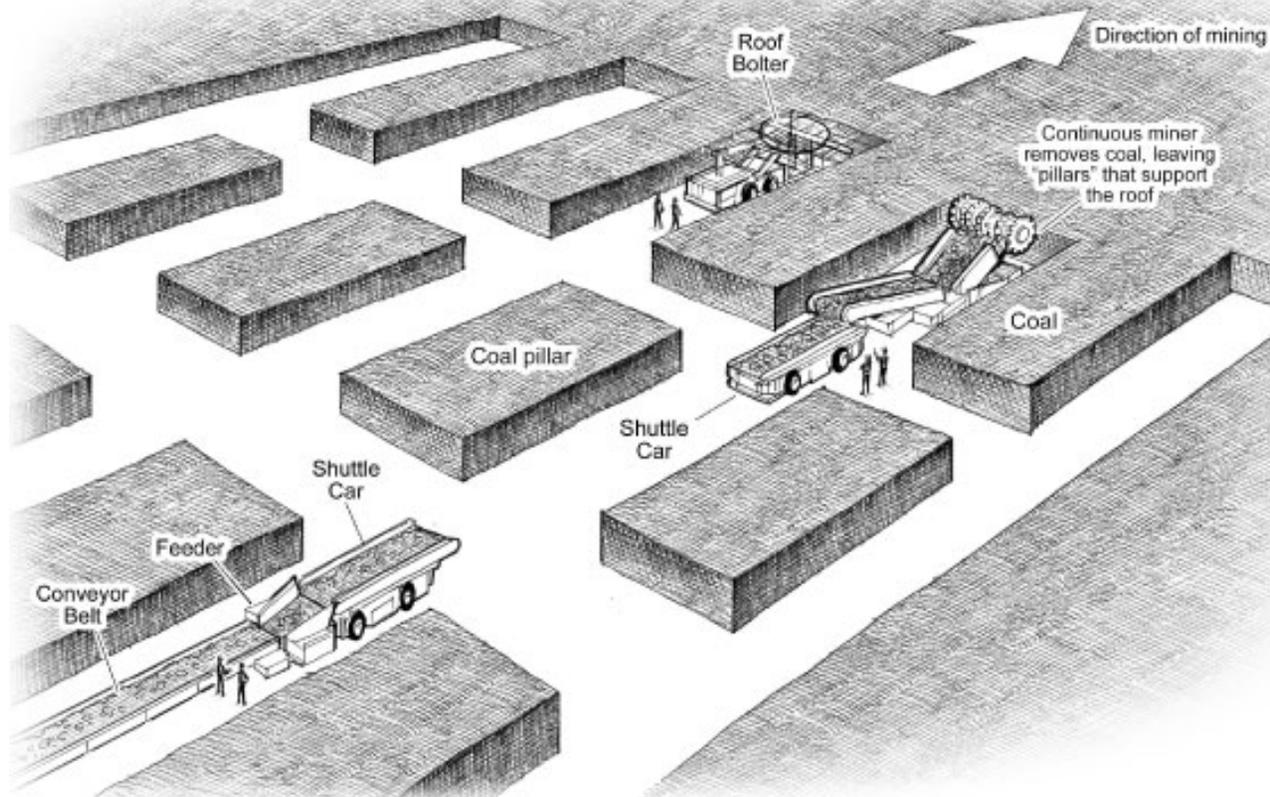


BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

FACILITIES AND INFRASTRUCTURE

REFERENCE

Energy Information Administration



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SCALE: N.T.S.



BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

ROOM-AND-PILLAR MINE SCHEMATIC

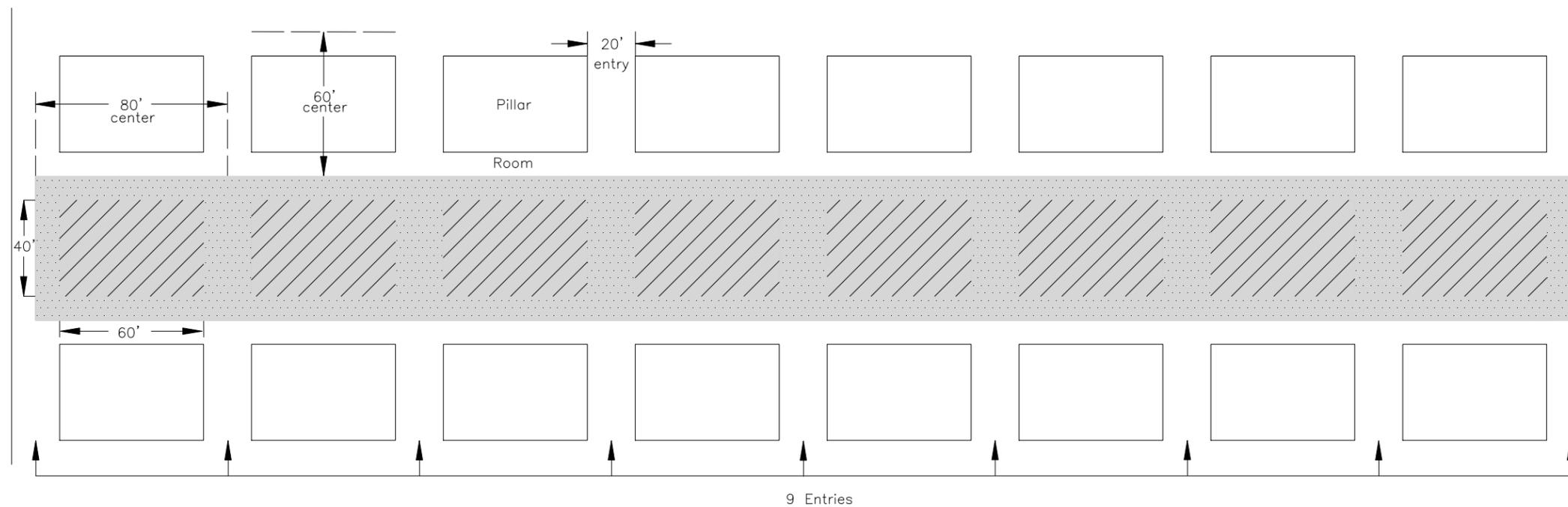
FILE 8-5x11_RoomPillarSchematic.mxd
DATE AR 02/06/2009

FIGURE 2.1-1

REFERENCES

BLM Reasonably Foreseeable Development Scenario
(RFDS) (BLM 2007a)

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THESE ARE TYPICAL FACE PRINTS ONLY. ENTRY WIDTHS, ENTRY AND CROSSCUT CENTERS, CROSSCUT ANGLES, NUMBER OF ENTRIES AND OTHER MINING CONFIGURATION FACTORS MAY VARY FROM THAT SHOWN SO LONG AS THE MINIMUM PILLAR DIMENSION IS MAINTAINED.

EXTRACTION RATE CALCULATIONS

-  AREA OF IN SITU COAL = 60'x80' = 4,800 SQ. FT.
-  AREA OF PILLARS = 60'x40' = 2,400 SQ. FT.
-  RECOVERY = $\frac{4,800 \text{ SQ. FT.} - 2,400 \text{ SQ. FT.}}{4,800 \text{ SQ. FT.}} = 50\%$

PILLAR LOADING

$$\text{RECOVERY} = S_v \frac{\text{AREA OF PILLARS}}{\text{AREA OF IN SITU COAL}} = S_v \frac{4800 \text{ SQ. FT.}}{2400 \text{ SQ. FT.}}$$

(S_v = VIRGIN OVERBURDEN)

SCALE: N.T.S.

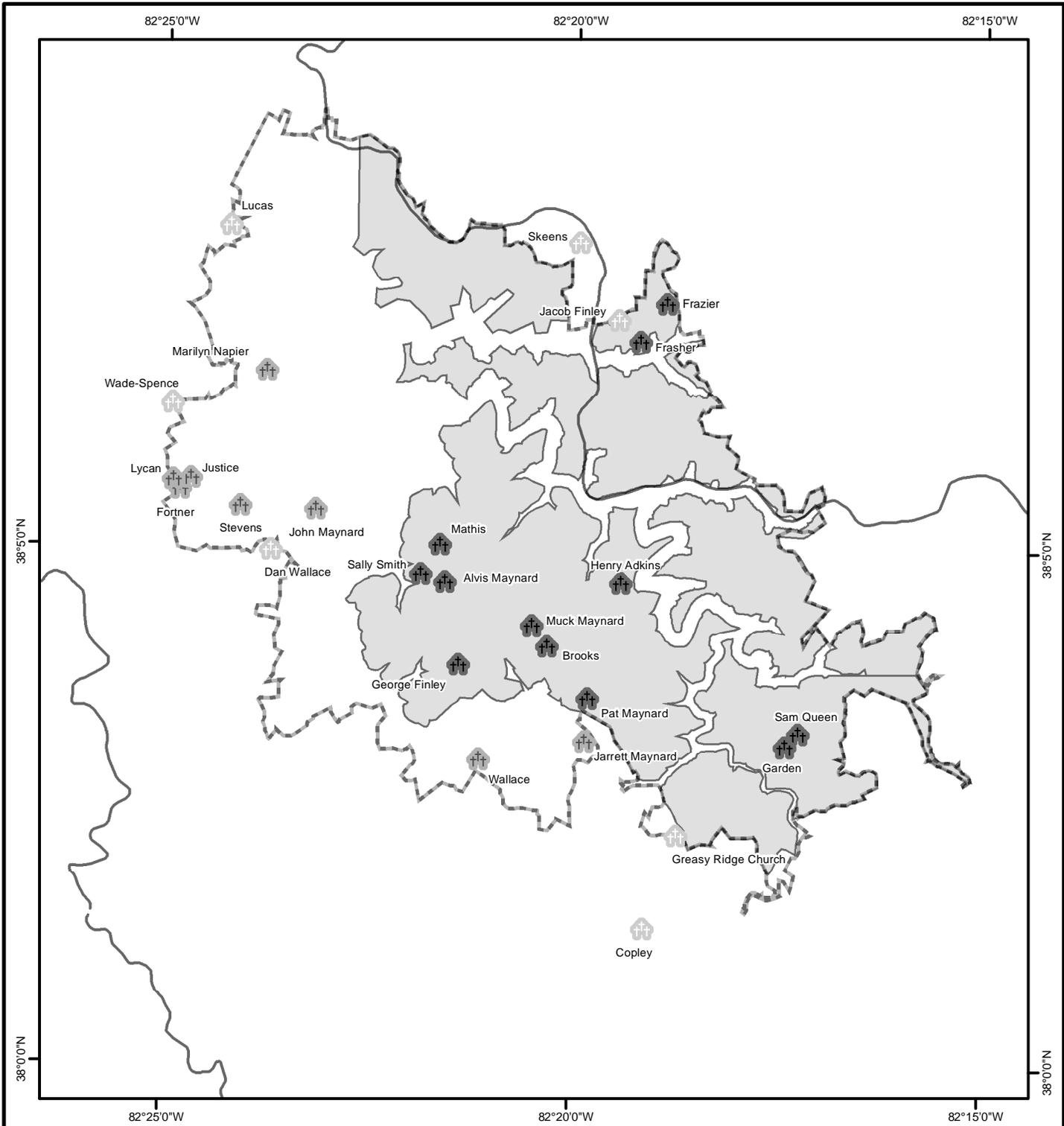


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

RFDS PROPOSED ROOM-AND-PILLAR MINING

FILE 11x17_ELL_RoomPillar.mxd
DATE AR 02/06/2009

FIGURE 2.1-2



LEGEND

- Cemetery Within Lease Tract
- Cemetery Within USACE Proj. Bound
- Cemetery Outside of USACE Proj. Bound
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Lake
- Stream
- Road

N

1 0.5 0 1 Miles

SCALE 1:100,000
WHEN PRODUCED AT 8-1/2X11IN

REFERENCES

Cemeteries: Anslinger and Others (2007), USACE ELL Recreation Map (USACE) (2007), Argus Energy LLC (2006)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

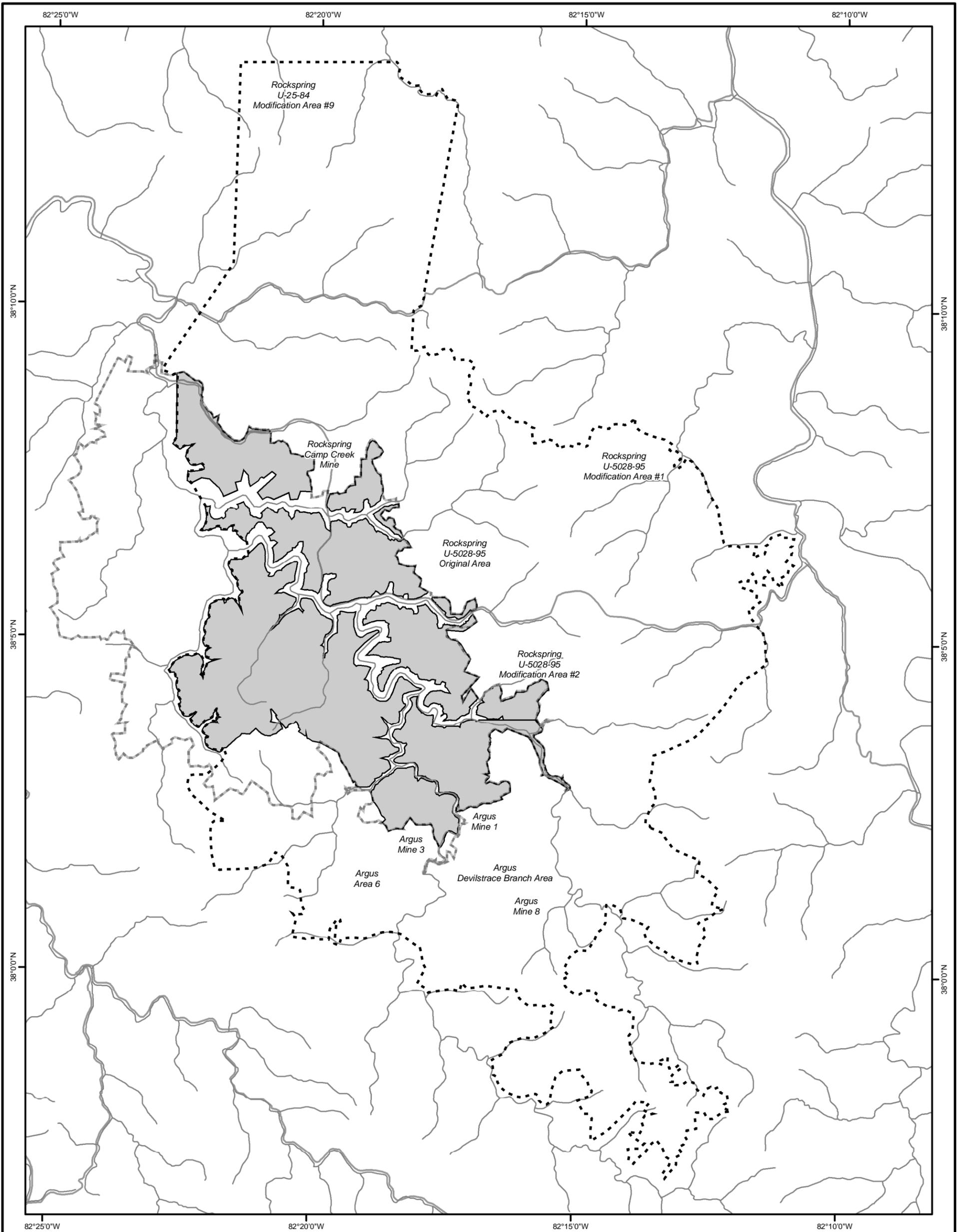
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

CEMETERIES

FILE: 8-5x11_ELL_EIS_Cemeteries.mxd
 DATE: AR 02/09/2009

FIGURE 3.10-1



LEGEND

-  Existing and Proposed Mine Permit Area Boundary
-  Proposed Lease Area (Geology and Mineral Resources Study Area)
-  USACE East Lynn Lake Project Boundary
-  Lake
-  Stream
-  Road

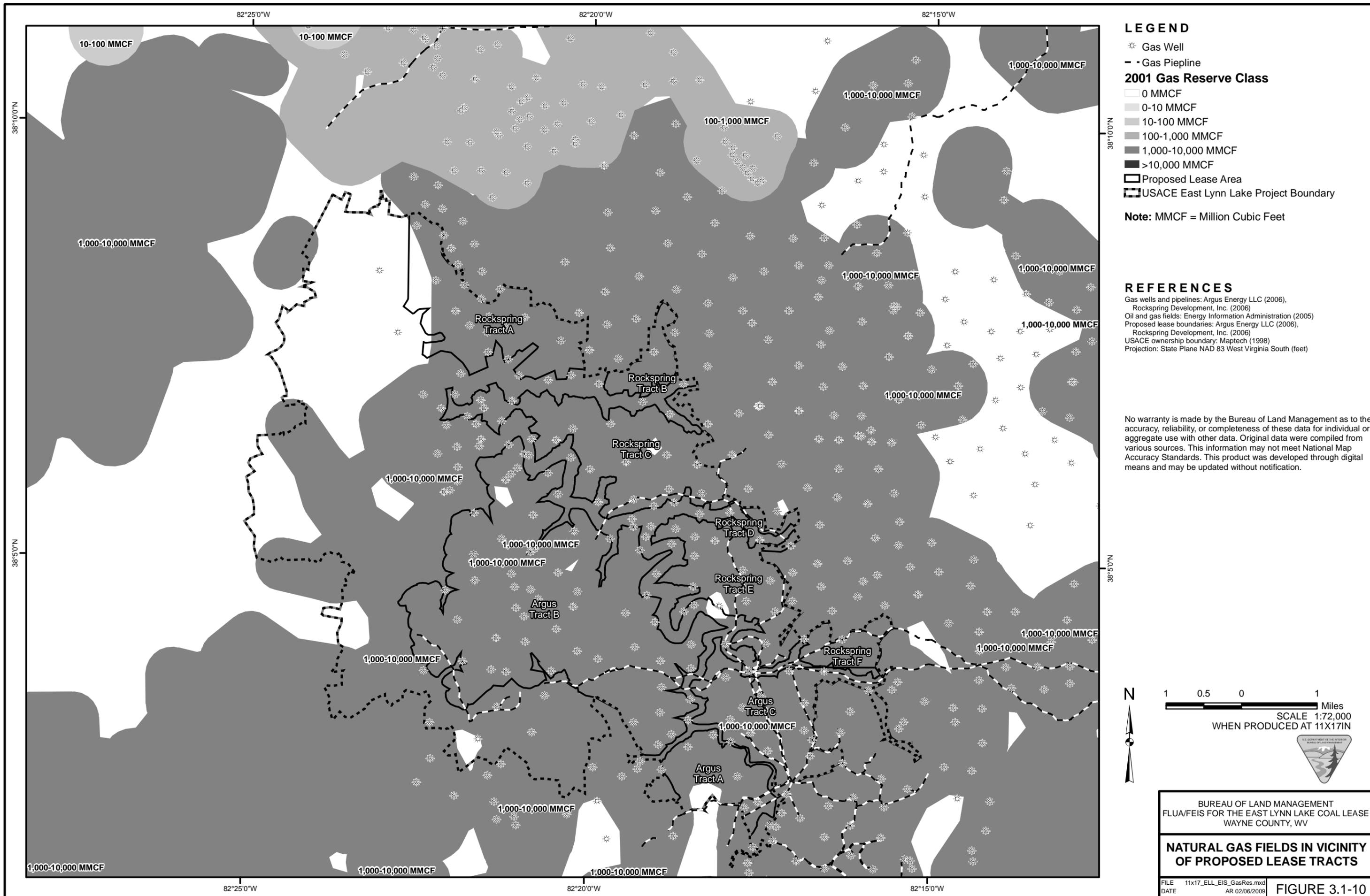
REFERENCES

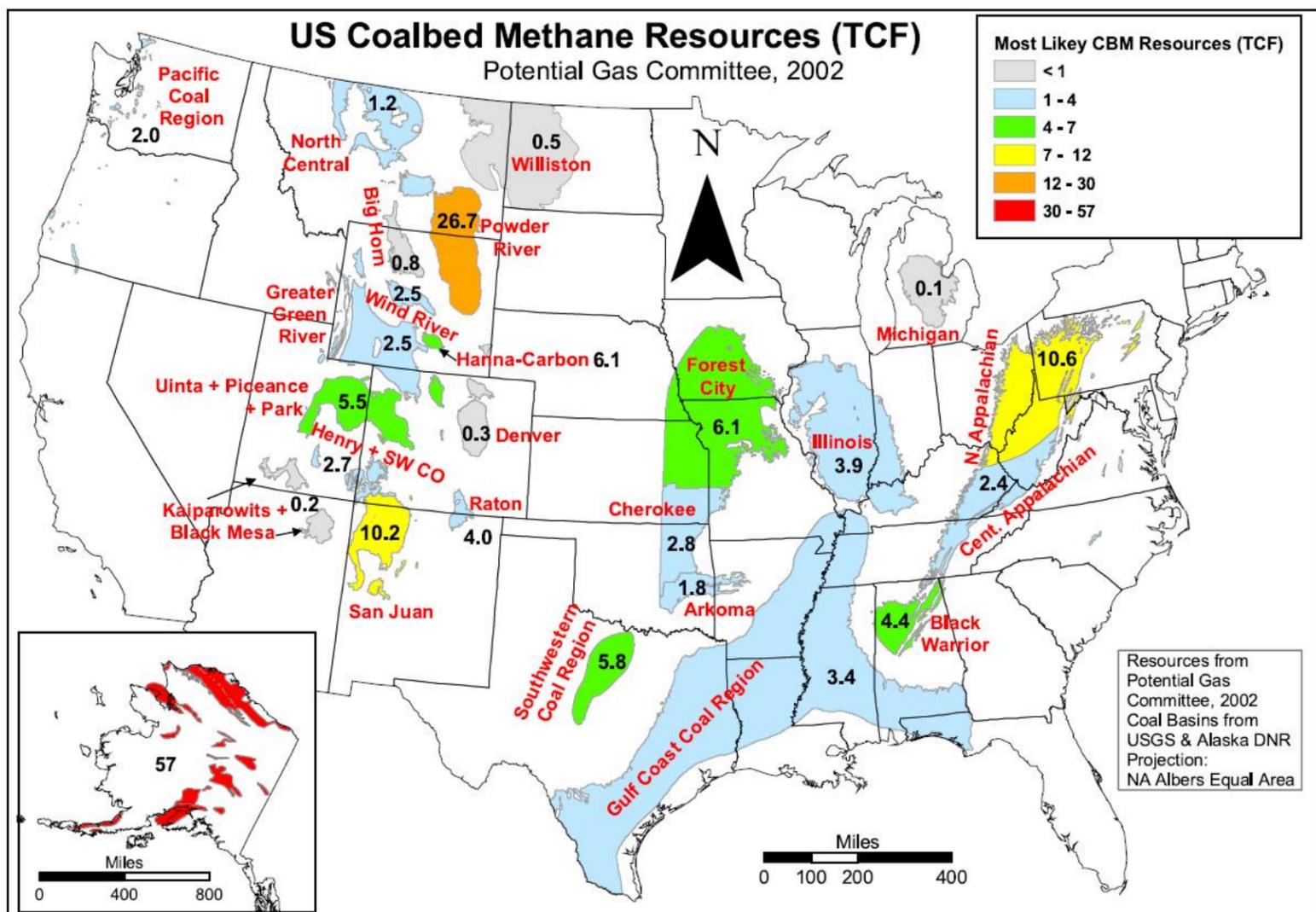
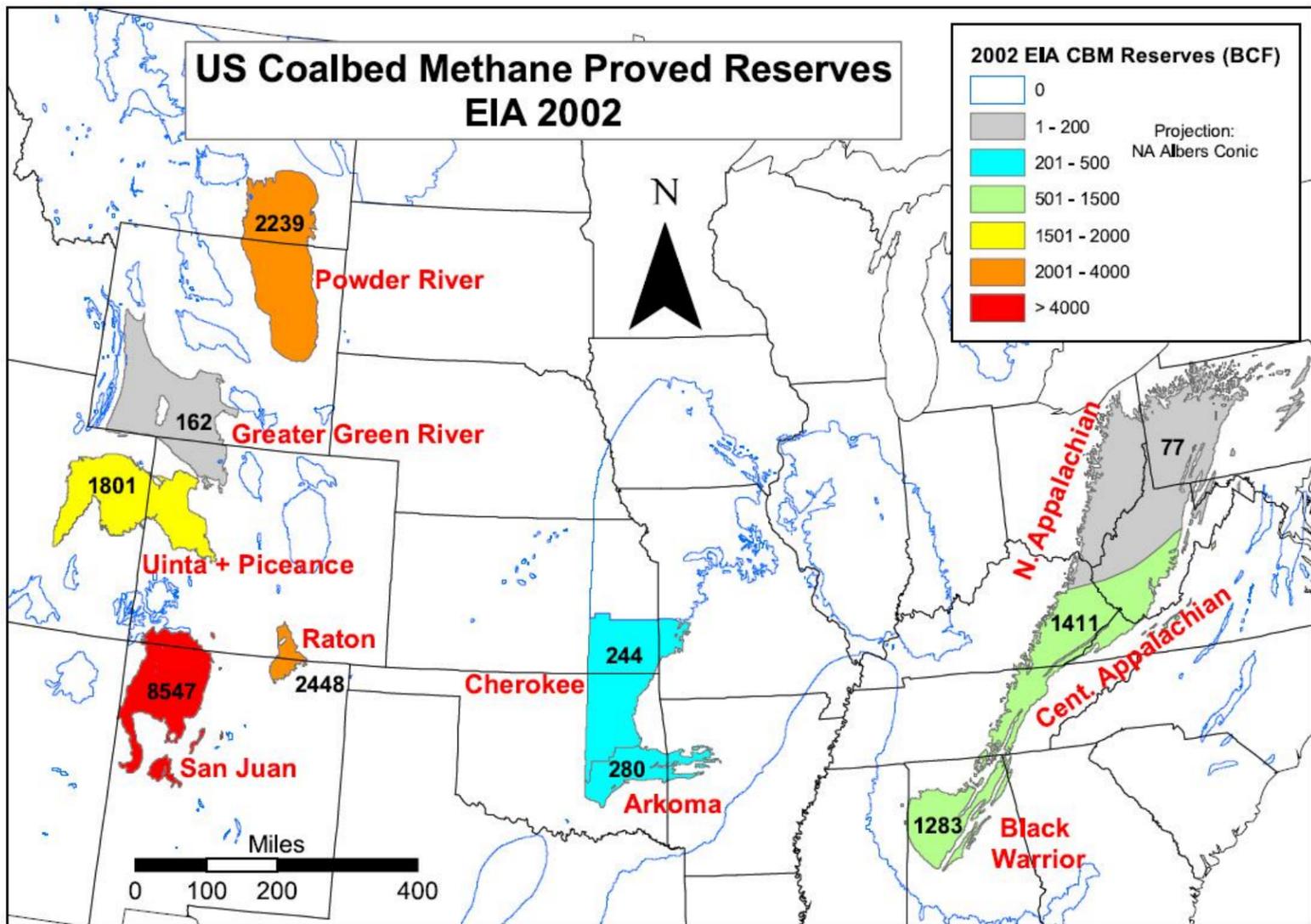
Existing mine areas: Argus Energy LLC (2006), Rockspring Development (2006)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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BUREAU OF LAND MANAGEMENT FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE WAYNE COUNTY, WV	
GEOLOGY AND MINERAL RESOURCE STUDY AREA AND EXISTING AND PROPOSED MINING ACTIVITY	
FILE 11x17_ELL_GeoStudyArea.mxd	FIGURE 3.1-1
DATE AR 02/06/2009	





NOTES

BCF = billion cubic feet
TCF = trillion cubic feet

REFERENCE

Limerick 2004

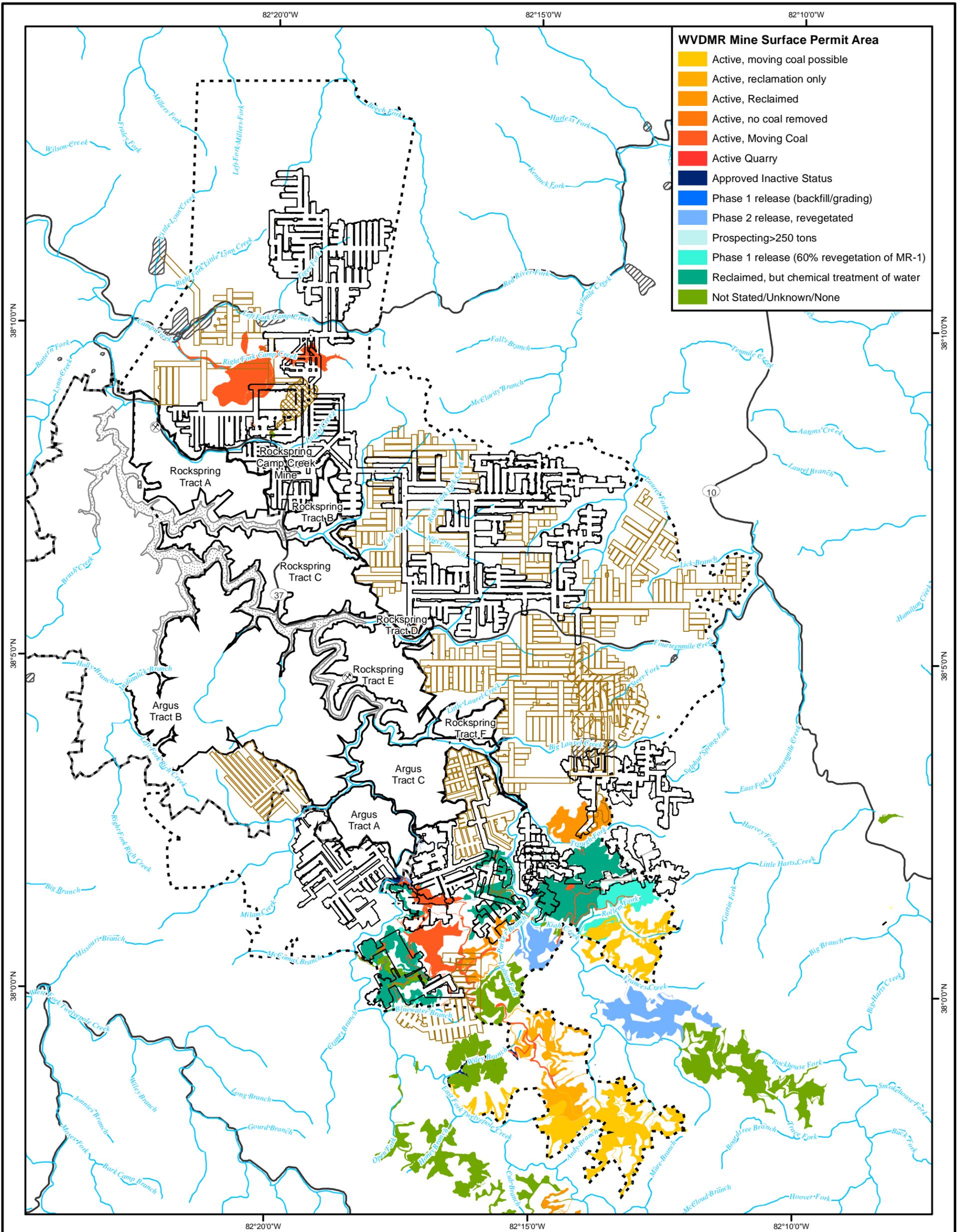


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

Coalbed Methane in the U.S.

FILE 11x17_ELL_EIS_CB
DATE AR 02/06/2009

FIGURE 3.1-11



VVDMR Mine Surface Permit Area

- Active, moving coal possible
- Active, reclaimed
- Active, no coal removed
- Active, Moving Coal
- Active Quarry
- Approved Inactive Status
- Phase 1 release (backfill/grading)
- Phase 2 release, revegetated
- Prospecting >250 tons
- Phase 1 release (60% revegetation of MR-1)
- Reclaimed, but chemical treatment of water
- Not Stated/Unknown/None

LEGEND

- Punch Mine
- Abandoned Mine Lands
- Existing and Proposed Mine Permit Area Boundary
- USACE East Lynn Lake Project Boundary
- Permitted Facility, Not Yet Mined
- Proposed Coal Refuse Pile and Slurry Impoundment Facility
- Underground Mine
- Lake
- Stream
- Road

REFERENCES
 Punch mines: USACE (2007)
 Existing, permitted, and Proposed mine areas: Argus Energy LLC (2006), Rockspring Development (2006)
 Abandoned mine lands: WVAMLR (1996)
 Surface permit areas: VVDMR (2007)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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N

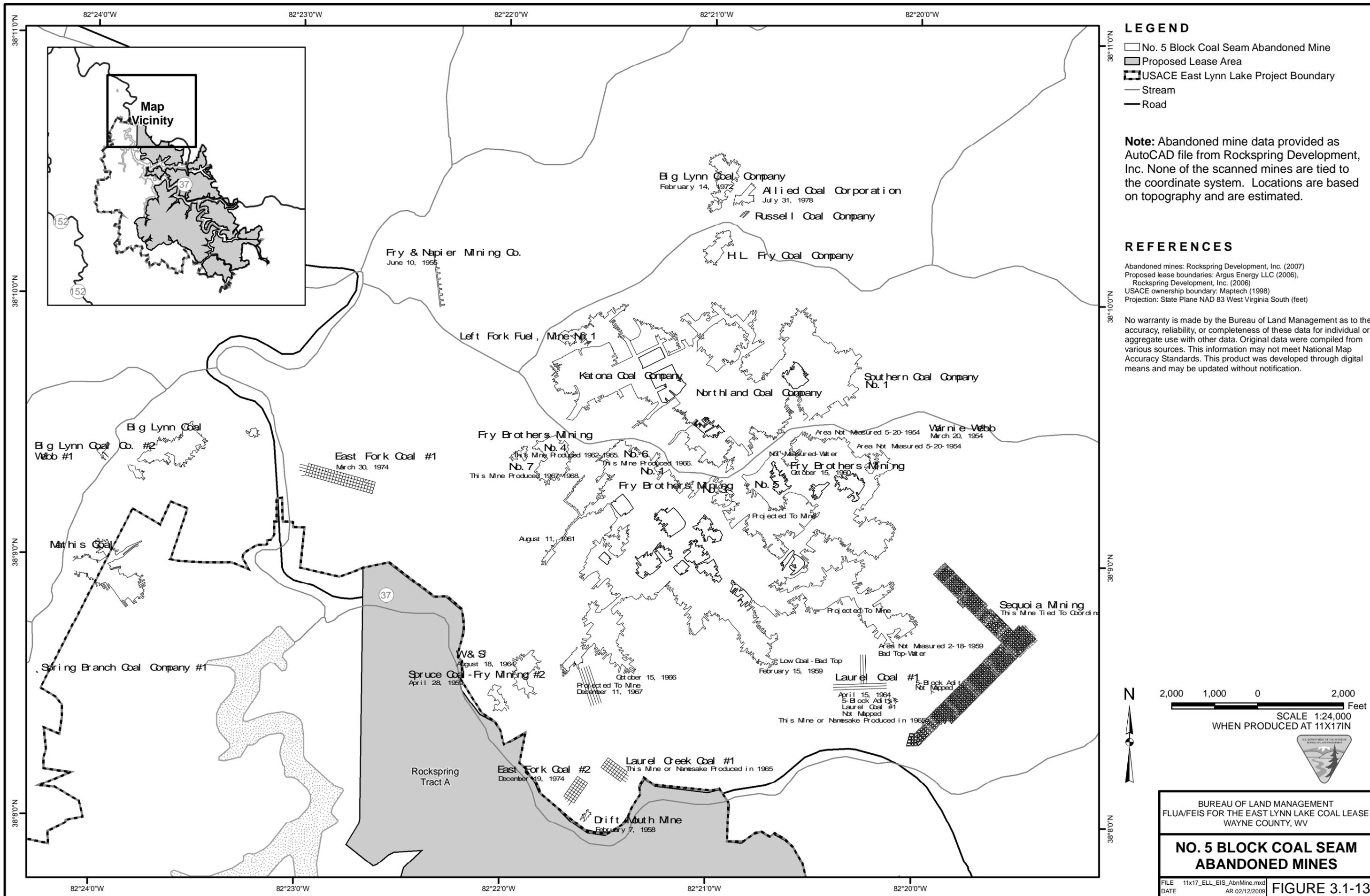
1 0.5 0 1 Miles

SCALE 1:100,000
WHEN PRODUCED AT 11X17IN

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**COMMERCIAL ABANDONED MINE LANDS,
 INACTIVE, ACTIVE AND PROPOSED
 SURFACE AND UNDERGROUND MINES**

FILE 11x17_ELL_EIS_ExistingMines.mxd
 DATE AR 02/12/2009 **FIGURE 3.1-12**



LEGEND

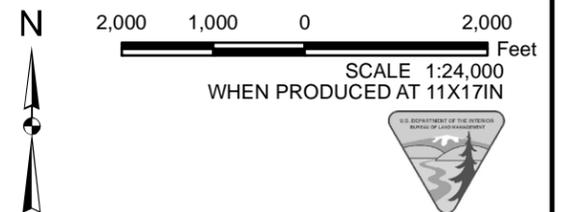
- No. 5 Block Coal Seam Abandoned Mine
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Stream
- Road

Note: Abandoned mine data provided as AutoCAD file from Rockspring Development, Inc. None of the scanned mines are tied to the coordinate system. Locations are based on topography and are estimated.

REFERENCES

Abandoned mines: Rockspring Development, Inc. (2007)
 Proposed lease boundaries: Argus Energy LLC (2006),
 Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

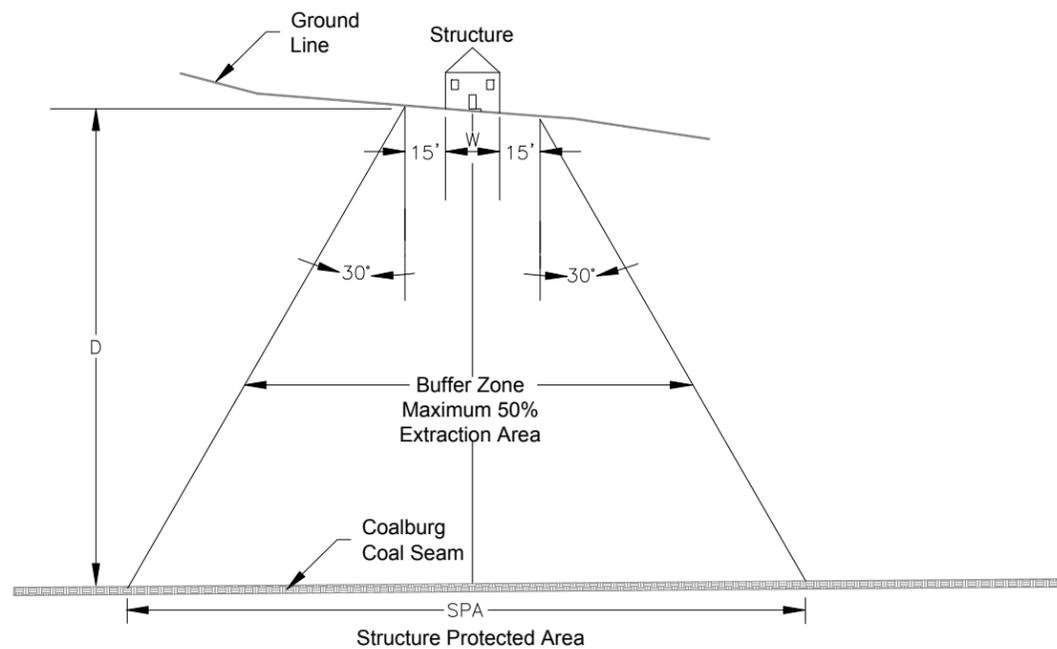
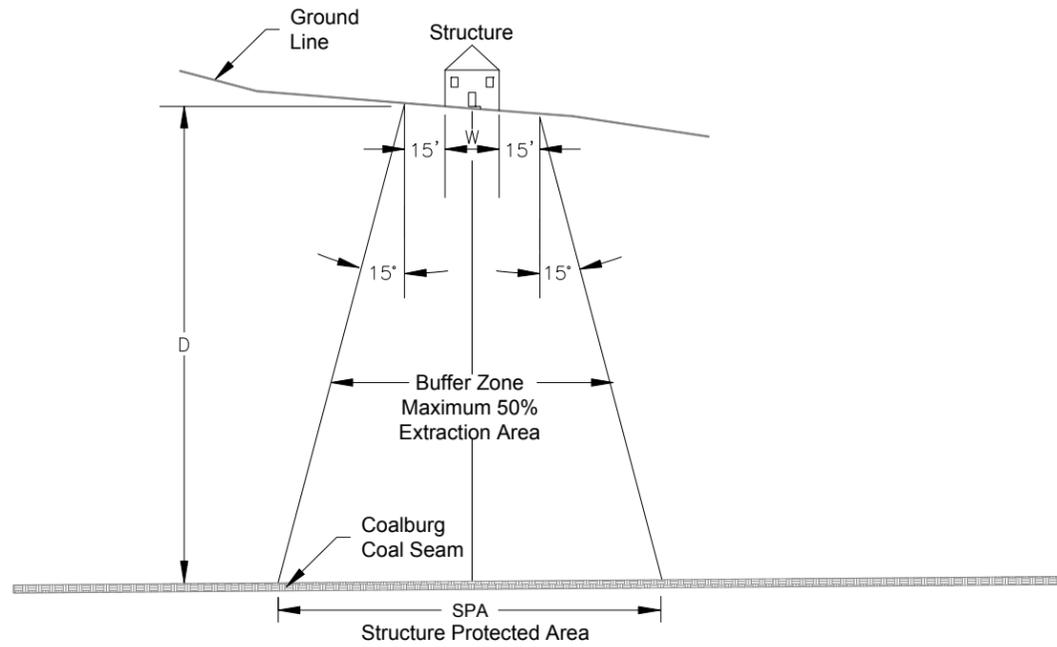
**NO. 5 BLOCK COAL SEAM
 ABANDONED MINES**

FILE 11x17_ELL_EIS_AbnMine.mxd
 DATE AR 02/12/2009

FIGURE 3.1-13

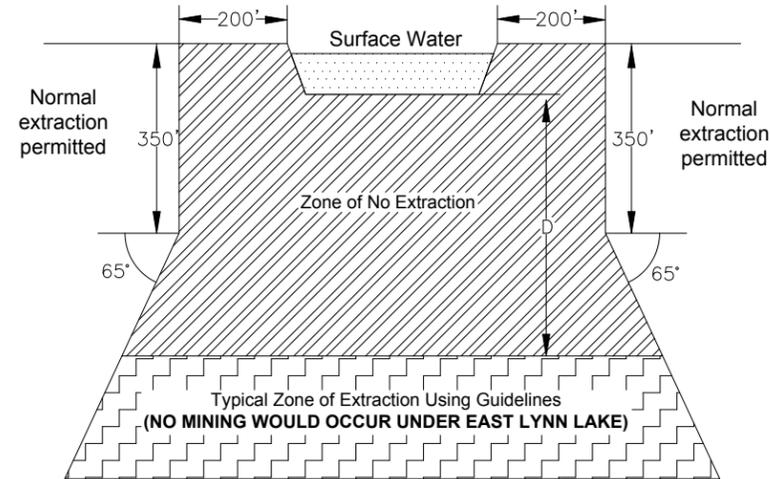
Existing Structure Protection Area Design Currently Used in the Vicinity of Proposed Lease Tracts

Proposed for Use Under Reasonably Foreseeable Development Scenario

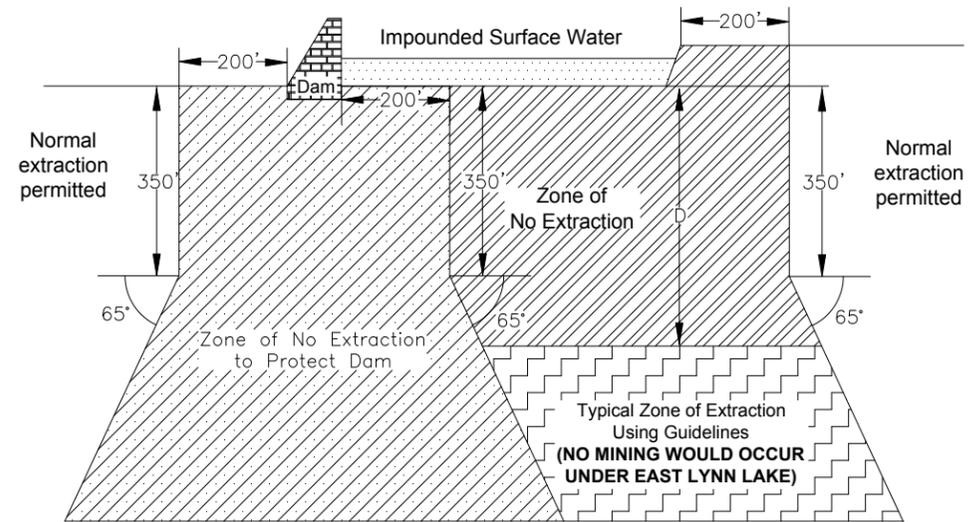


Proposed Surface Water (Lake) Protection Area Design

Proposed for Use Under Reasonably Foreseeable Development Scenario (Babcock and Hooker, 1977)



Typical Dam Protection Area Design (Babcock and Hooker, 1977)



REFERENCES

Babcock and Hooker, 1977.
BLM 2007a
MM&A nd, 1995, 2001
Peng, 1992
P&A, 1999

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SCALE: N.T.S.

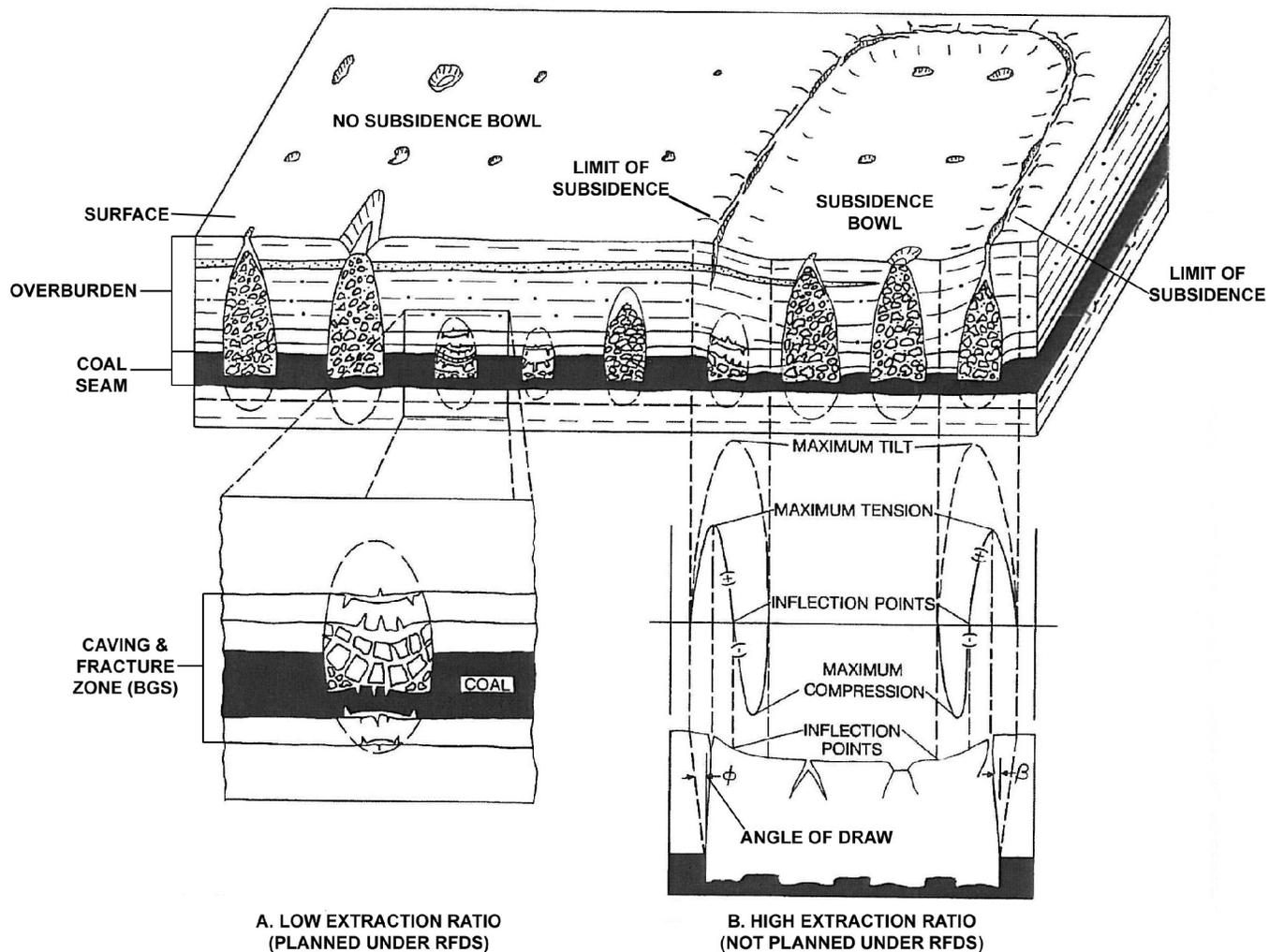


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**EXISTING AND PROPOSED
TYPICAL PROTECTIVE AREA
DESIGNS**

FILE 11x17_ELL_ProtectiveBarrier.mxd
DATE AR 02/06/2009

FIGURE 3.1-14



REFERENCE

WVGES 2005b

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SCALE: N.T.S.

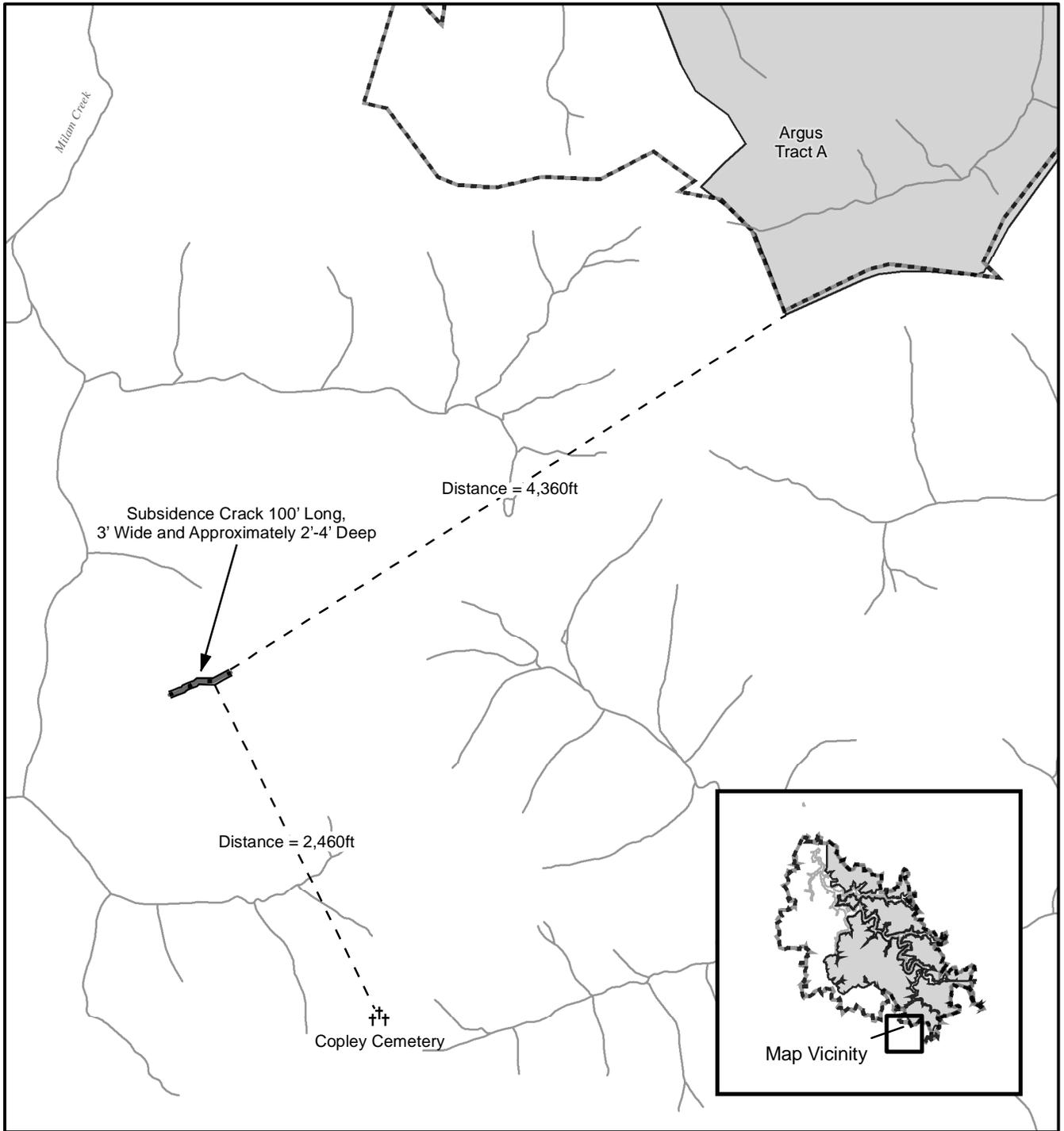


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

CONCEPTUAL SUBSIDENCE DIAGRAM

FILE8-5x11_ELL_EIS_Subsidence.mxd
DATE AR 02/06/2009

FIGURE 3.1-15



LEGEND

- Subsidence Crack Location
- Stream
- Copley Cemetery
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary

REFERENCES

Subsidence crack location: Argus Energy LLC (2007)
 Cemetery: Argus Energy LLC (2007)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Streams: USGS (2007a)
 Projection: State Plane NAD 83 West Virginia South (feet)

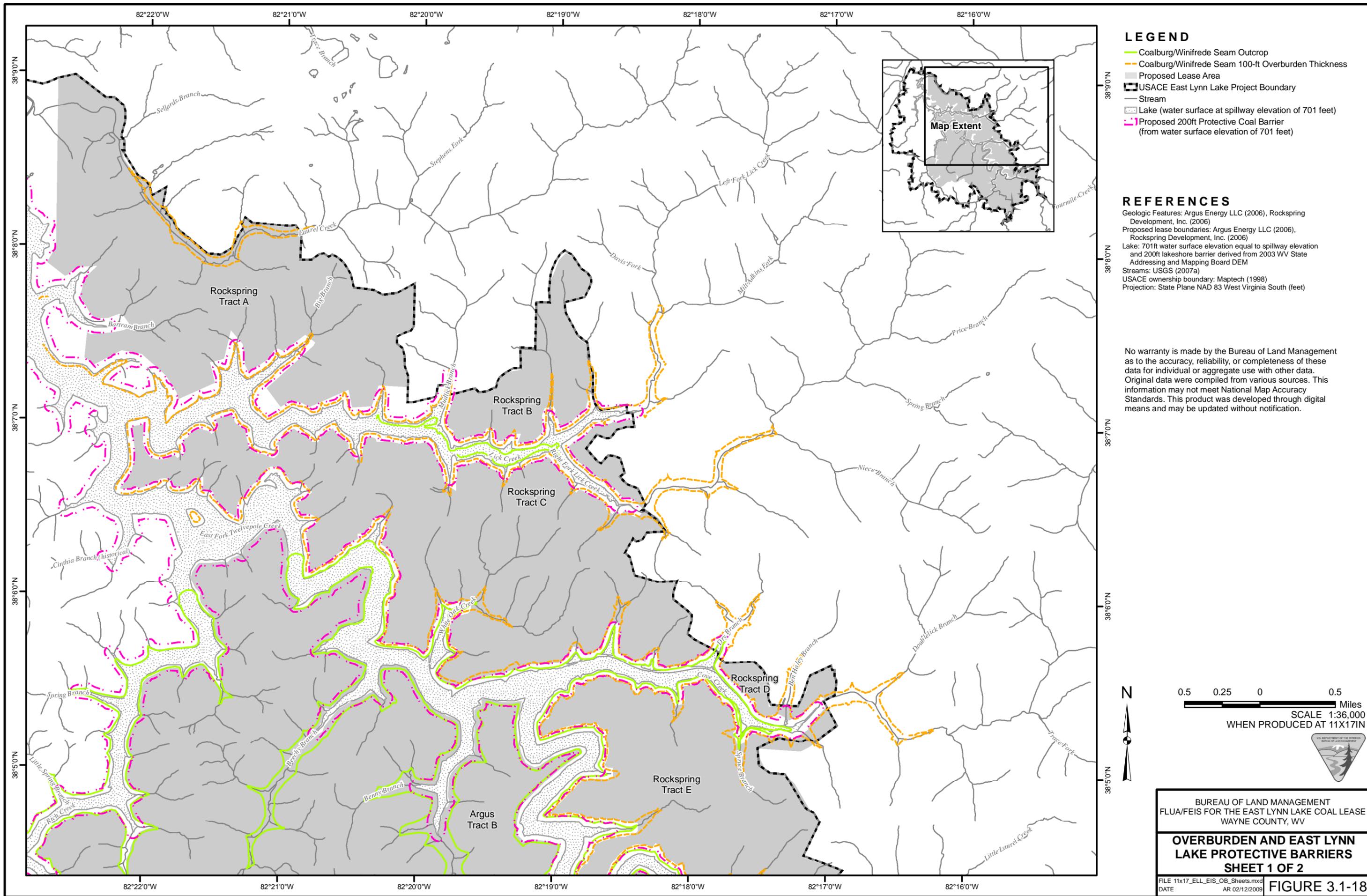
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BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

SUBSIDENCE CRACK LOCATION

FILE 8-5x11_ELL_EIS_SubCrack.mxd
 DATE AR 02/09/2009 **FIGURE 3.1-16**



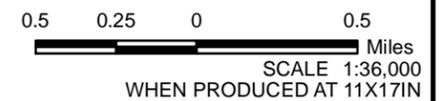
LEGEND

- Coalburg/Winifrede Seam Outcrop
- - - Coalburg/Winifrede Seam 100-ft Overburden Thickness
- ▒ Proposed Lease Area
- ▬ USACE East Lynn Lake Project Boundary
- Stream
- ▒ Lake (water surface at spillway elevation of 701 feet)
- - - Proposed 200ft Protective Coal Barrier (from water surface elevation of 701 feet)

REFERENCES

Geologic Features: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 Lake: 701ft water surface elevation equal to spillway elevation and 200ft lakeshore barrier derived from 2003 WV State Addressing and Mapping Board DEM
 Streams: USGS (2007a)
 USACE ownership boundary: Maptch (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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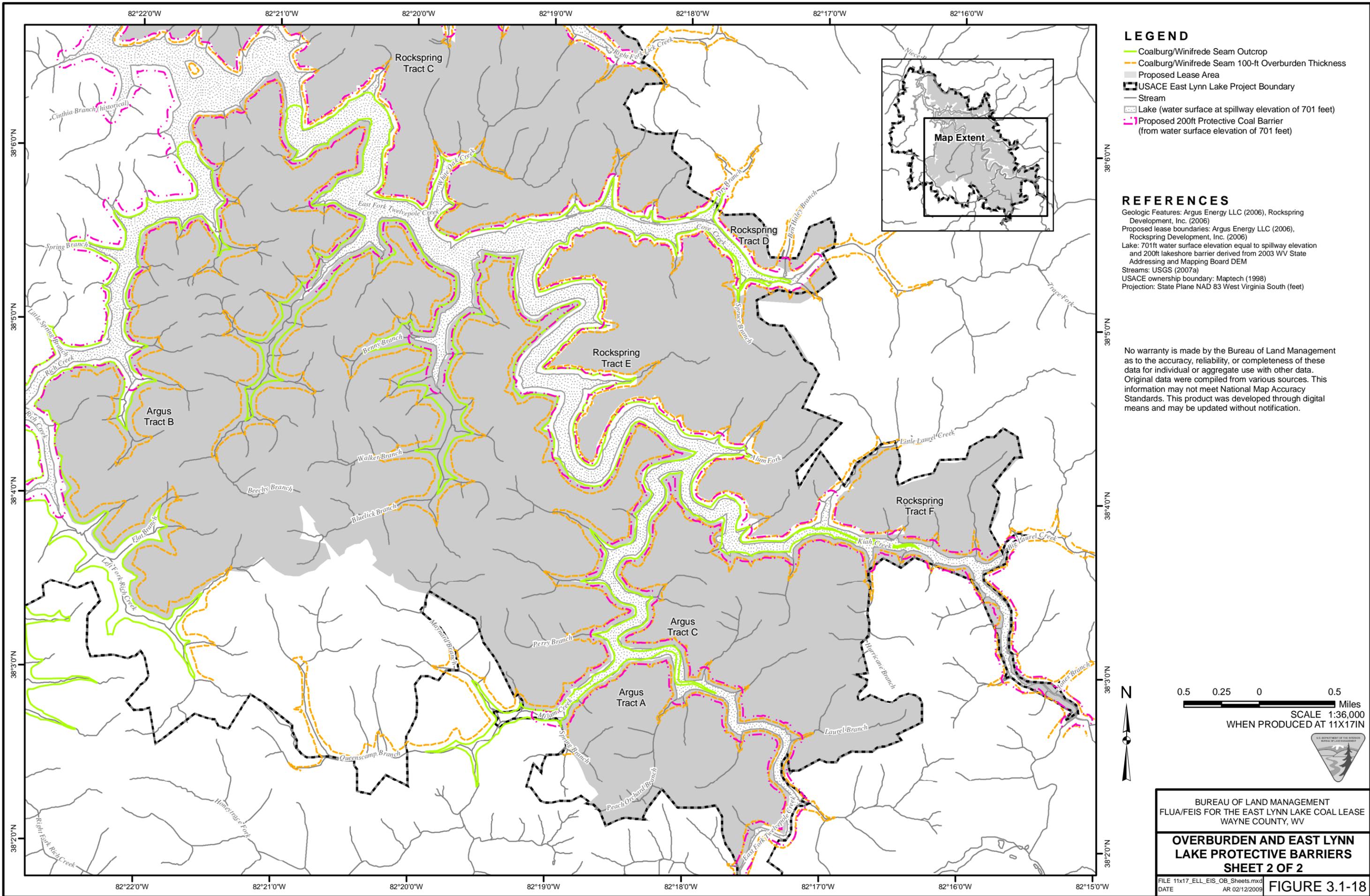


BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

OVERBURDEN AND EAST LYNN LAKE PROTECTIVE BARRIERS
SHEET 1 OF 2

FILE 11x17_ELL_EIS_OB_Sheets.mxd
 DATE AR 02/12/2009

FIGURE 3.1-18



LEGEND

- Coalburg/Winifrede Seam Outcrop
- Coalburg/Winifrede Seam 100-ft Overburden Thickness
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Stream
- Lake (water surface at spillway elevation of 701 feet)
- Proposed 200ft Protective Coal Barrier (from water surface elevation of 701 feet)

REFERENCES

Geologic Features: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 Lake: 701ft water surface elevation equal to spillway elevation and 200ft lakeshore barrier derived from 2003 WV State Addressing and Mapping Board DEM
 Streams: USGS (2007a)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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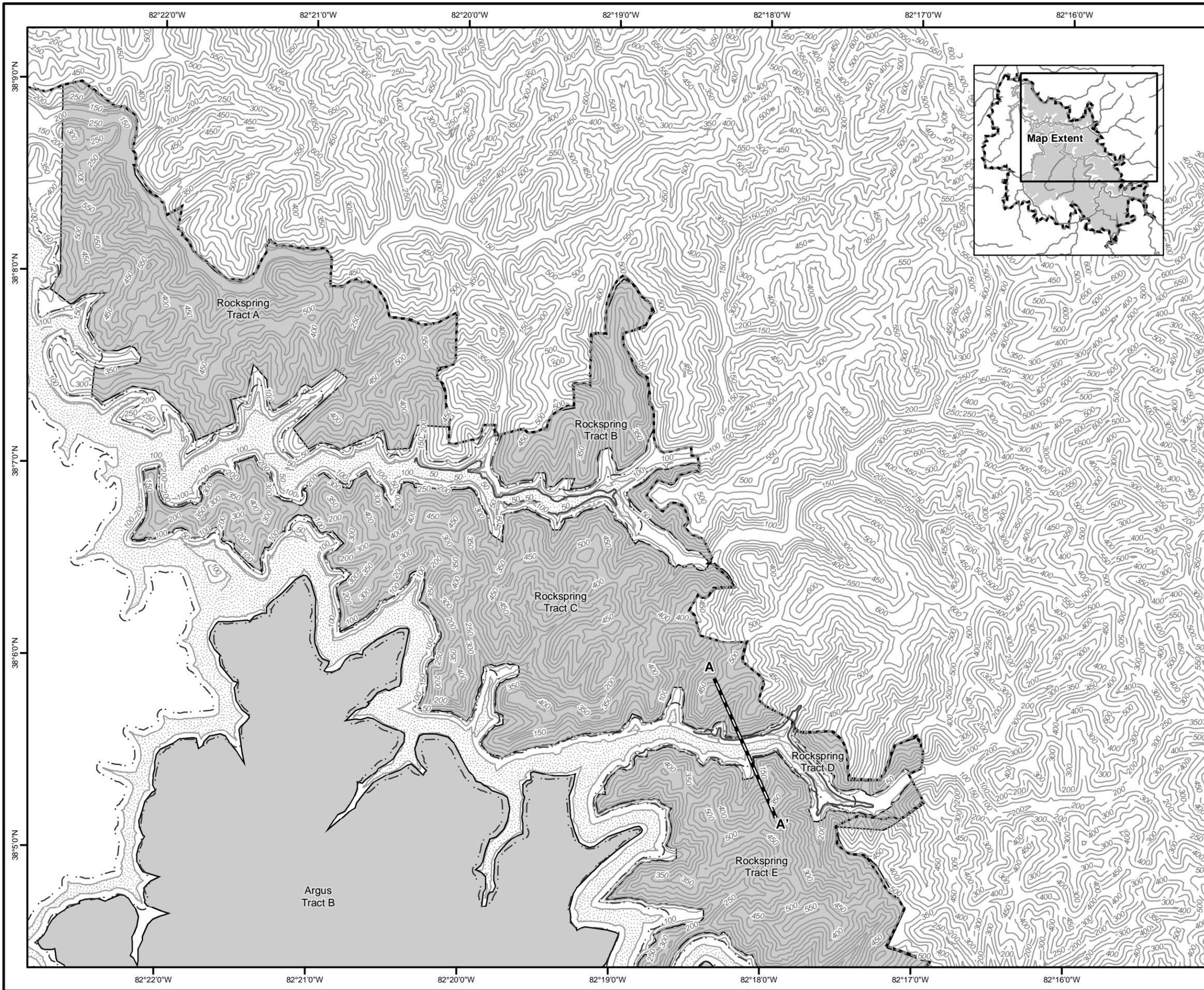
0.5 0.25 0 0.5 Miles
 SCALE 1:36,000
 WHEN PRODUCED AT 11X17IN

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

OVERBURDEN AND EAST LYNN LAKE PROTECTIVE BARRIERS
SHEET 2 OF 2

FILE 11x17_ELL_EIS_OB_Sheets.mxd
 DATE AR 02/12/2009

FIGURE 3.1-18



LEGEND

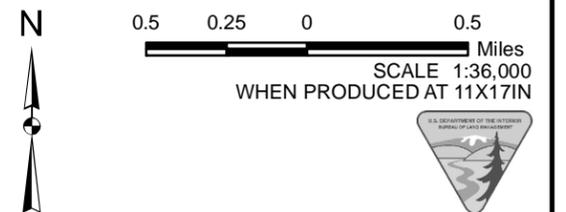
- Cross-Section Location
- Overburden Thickness Contour Line (Contour Interval = 50ft)
- Coalburg/Winifrede Seam Outcrop
- ▭ Proposed Lease Area
- ▭ USACE East Lynn Lake Project Boundary
- ▨ Lake (water surface at spillway elevation of 701 feet)
- - - Proposed 200ft Protective Coal Barrier (from water surface elevation of 701 feet)

Note: Cross Section A-A' shown on figure 3.1-21.

REFERENCES

- Geologic Features: Rockspring Development, Inc. (2006)
- Surface Elevations: WV Statewide Addressing and Mapping Board, WVSAMB (2003)
- Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
- USACE ownership boundary: Maptch (1998)
- Lake: 701ft water surface elevation equal to spillway elevation and 200ft lakeshore barrier derived from 2003 WV State Addressing and Mapping Board DEM
- Projection: State Plane NAD 83 West Virginia South (feet)

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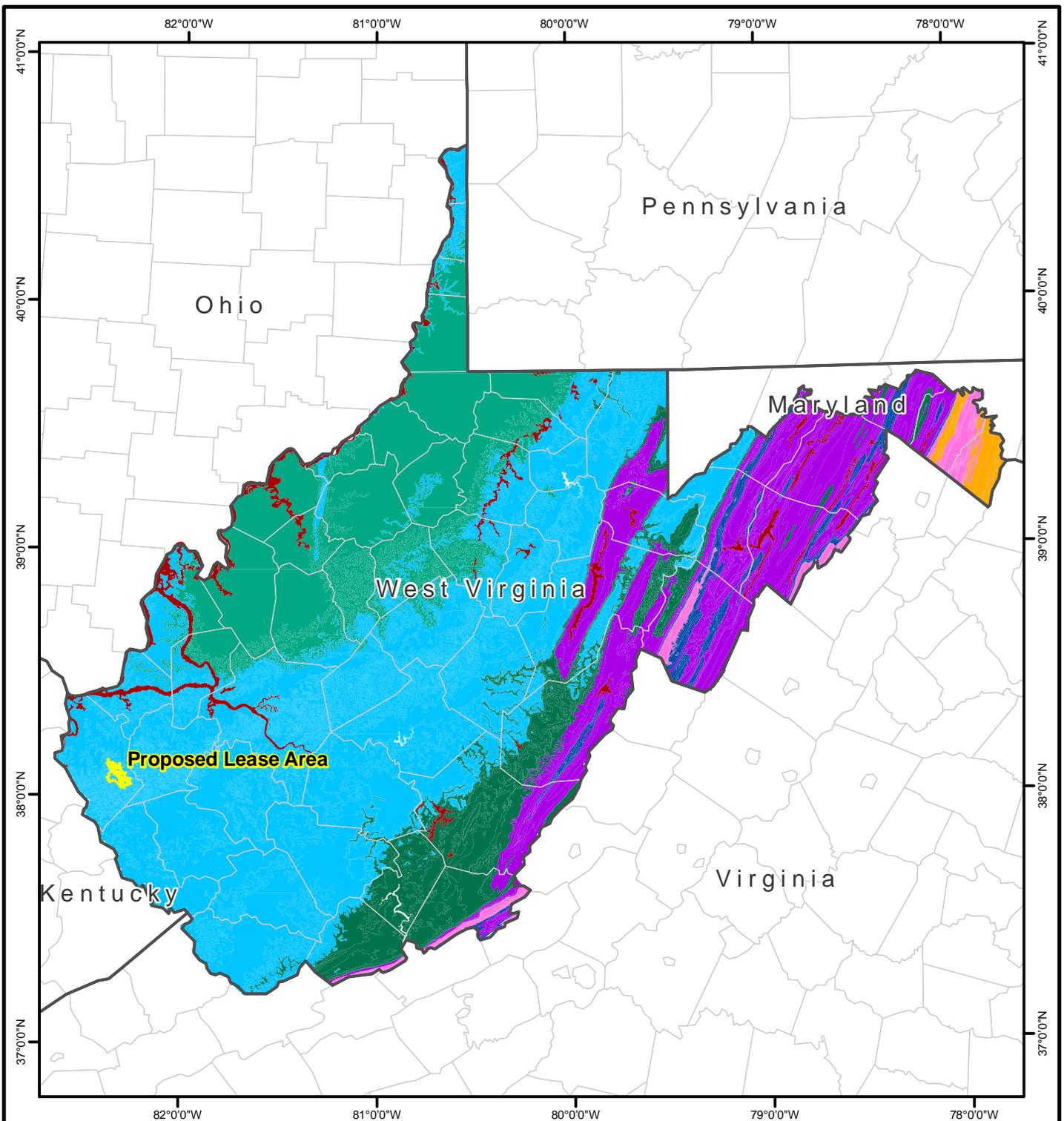


BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

COALBURG/WINIFREDE COAL SEAM OVERBURDEN THICKNESS
ROCKSPRING DEVELOPMENT, INC.

FILE: ELL_EIS_Seam_Rockspring.mxd
 DATE: AR 02/09/2009

FIGURE 3.1-19



LEGEND

- Quaternary
- Permian or Pennsylvanian, 230+ mya
- Pennsylvanian, 280-310 mya
- Mississippian, 310-345 mya
- Devonian, 345-405 mya
- Silurian, 405-425 mya
- Ordovician, 425-500 mya
- Cambrian, 500-600 mya
- Proposed Lease Area

REFERENCES

Geology: WVGES 1968
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)

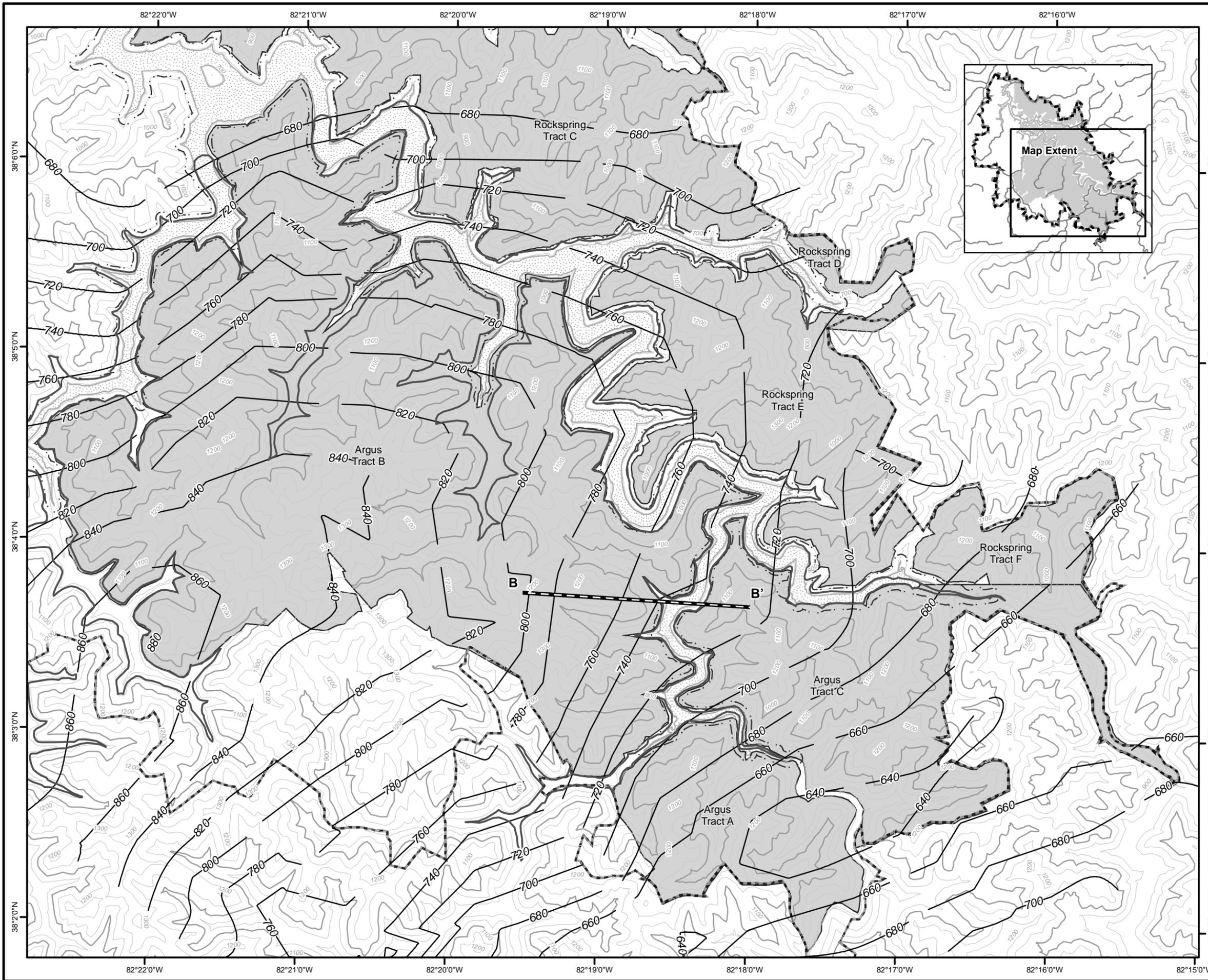
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.



BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**GENERAL WEST VIRGINIA
 GEOLOGY & STRATIGRAPHY**

FILE	8-5x11_ELL_WVGeo.mxd	FIGURE 3.1-2
DATE	AR 02/12/2009	

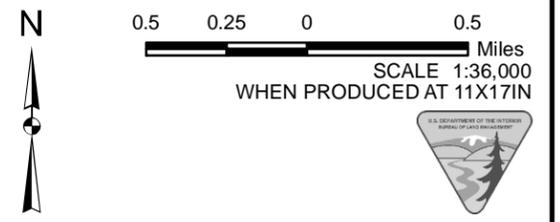


- LEGEND**
- Cross-Section Location
 - Coalburg/Winifrede Seam Structure Contour Line (Contour Interval = 20ft)
 - Coalburg/Winifrede Seam Outcrop
 - 100-ft Surface Contour
 - 500-ft Surface Contour
 - ▭ Proposed Lease Area
 - ▭ USACE East Lynn Lake Project Boundary
 - ▭ Lake (water surface at spillway elevation of 701 feet)
 - ▭ Proposed 200ft Protective Coal Barrier (from water surface elevation of 701 feet)

Note: Cross Section B-B' shown on figure 3.1-22.

- REFERENCES**
- Geologic Features: Rockspring Development, Inc. (2006)
 - Surface Elevations: WV Statewide Addressing and Mapping Board, WVSAMB (2003)
 - Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 - USACE ownership boundary: Maptch (1998)
 - Lake: 701ft water surface elevation equal to spillway elevation and 200ft lakeshore barrier derived from 2003 WV State Addressing and Mapping Board DEM
 - Projection: State Plane NAD 83 West Virginia South (feet)

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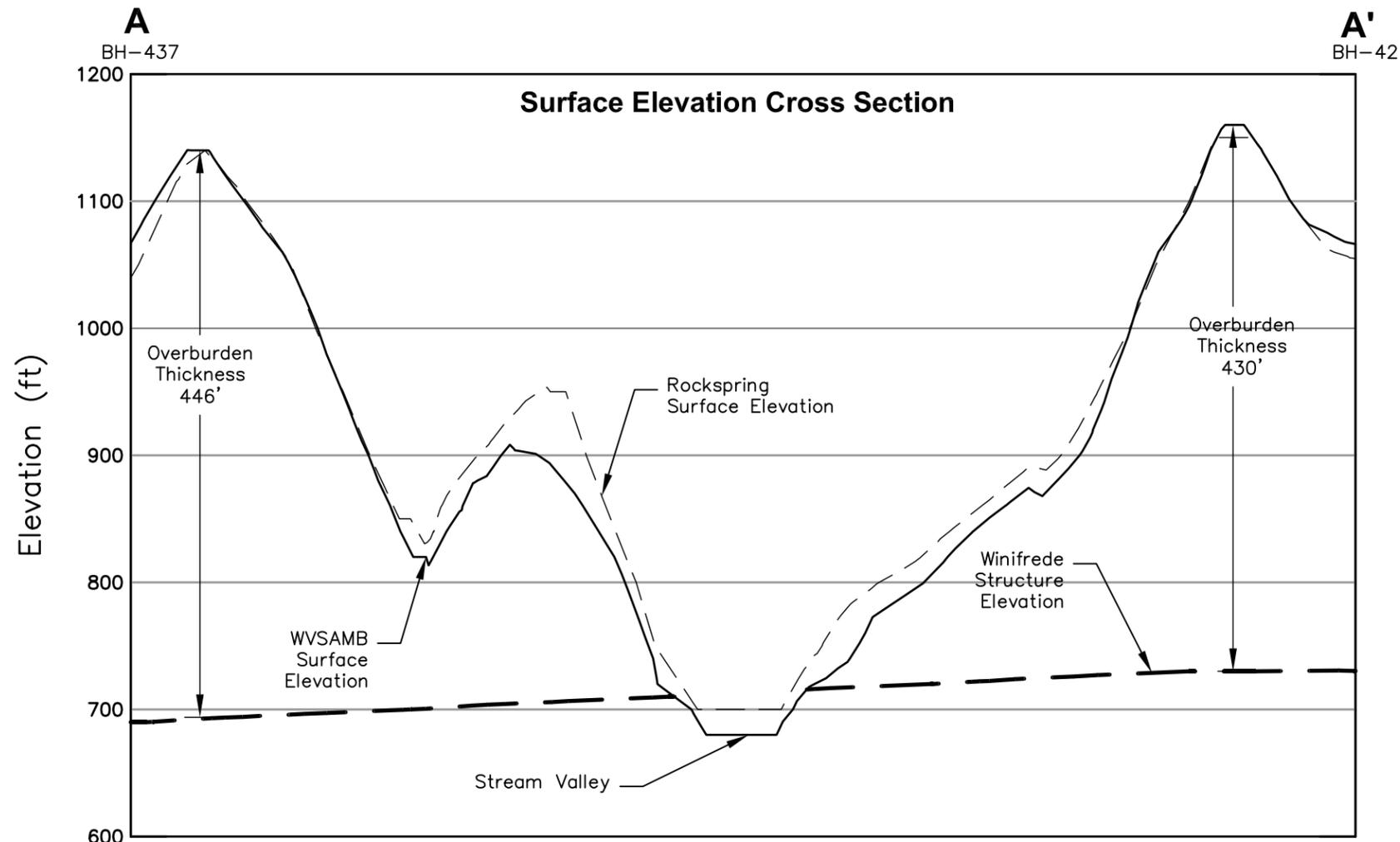


BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

COALBURG/WINIFREDE COAL SEAM STRUCTURE MAP
ARGUS ENERGY LLC

FILE: 1x17_ELL_EIS_Seam_Argus.mxd
 DATE: AR 02/12/2009

FIGURE 3.1-20



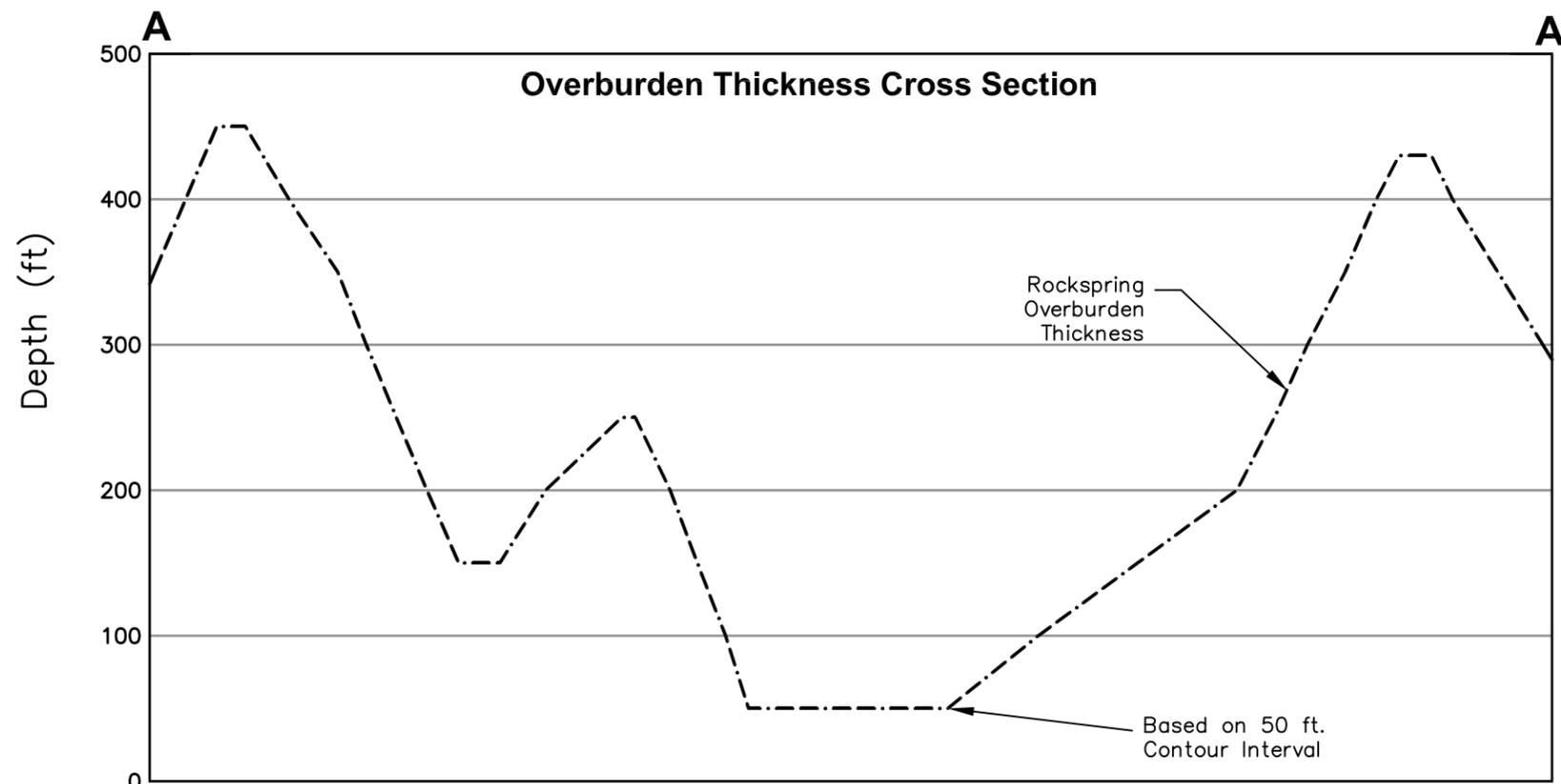
LEGEND

- Rockspring Surface Elevation
- _____ WV State Addressing and Mapping Board Surface Elevation
- Rockspring Coal Seam Structure Elevation
- · - · - Rockspring Overburden Thickness

REFERENCES

Rockspring 2006
WVSAMB 2003

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WHEN REPRODUCED AT 11X17IN



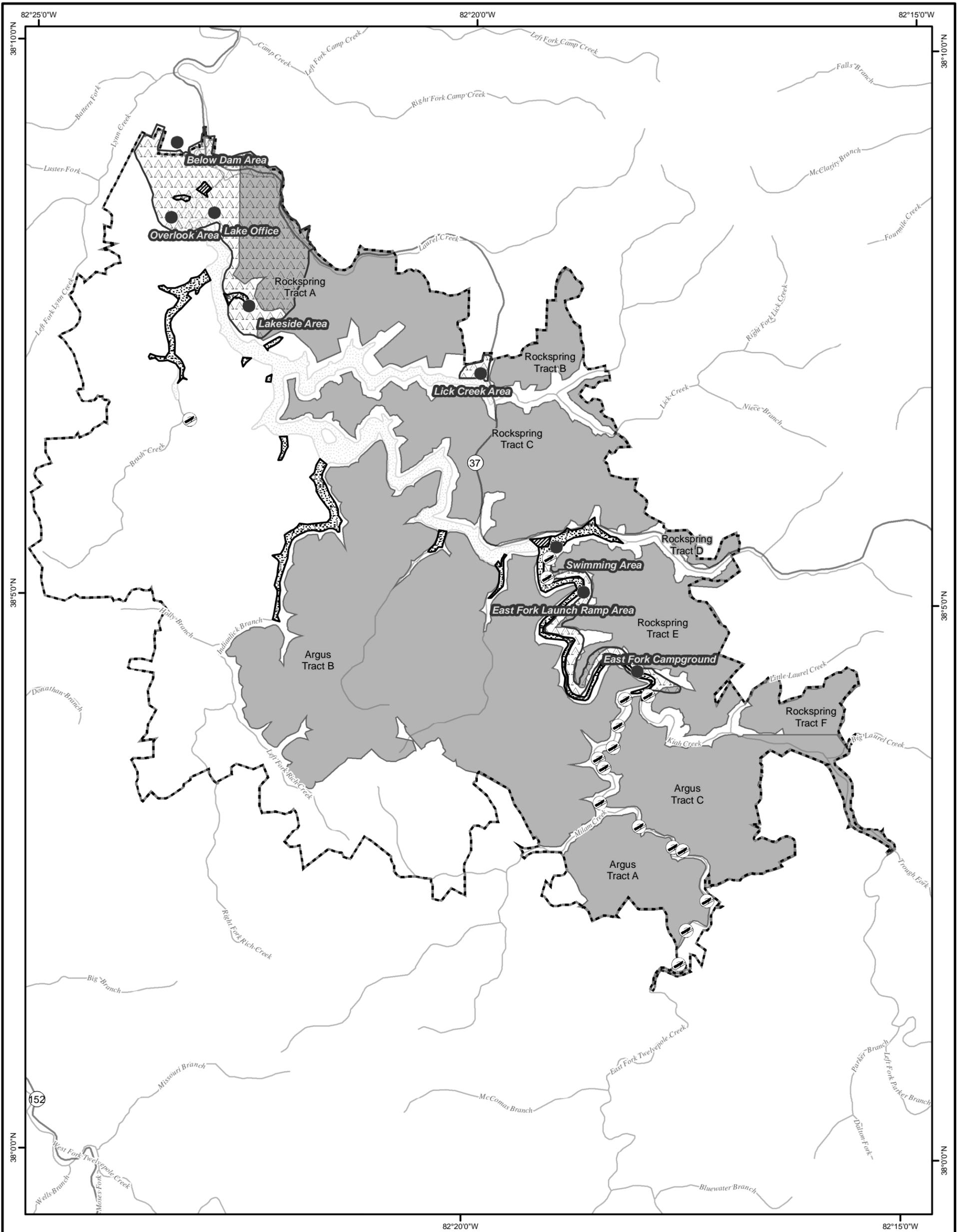
BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

ROCKSPRING OVERBURDEN THICKNESS CROSS SECTION A-A'

FILE 0632239A002.DWG
DATE AR 02/13/2009

FIGURE 3.1-21

Dwg Name: N:\06\063-2239\ANNETTE_SECTIONS\0632239A002.dwg
 Layout Name: 11x17 A-A Machine: DEN-W-ARATKE
 Last Update: Feb 11, 2009 11:06 By: jroberts
 Last Plot: Feb 13, 2009 09:05 By: Arctur



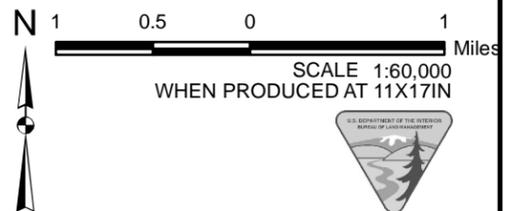
LEGEND

- Recreation Facility
- Small Craft Access
- Stream
- ⦿ Road
- ▨ Recreation Area
- ▩ Boat Exclusion Area
- ▧ Controlled Area
- ▦ Proposed Lease Area
- ▤ USACE East Lynn Lake Project Boundary
- ▧ Lake

REFERENCES

Recreation facilities: USACE ELL Recreation Map (USACE, 2007)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Roads: Digitized from 2003 WB SAMB orthophotography
 Streams: USGS (2007a)
 Projection: State Plane NAD 83 West Virginia South (feet)

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BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**RECREATION FACILITIES
 AND RECREATION AREAS**

FILE 11x17_ELL_EIS_Recreation.mxd
 DATE AR 02/06/2009

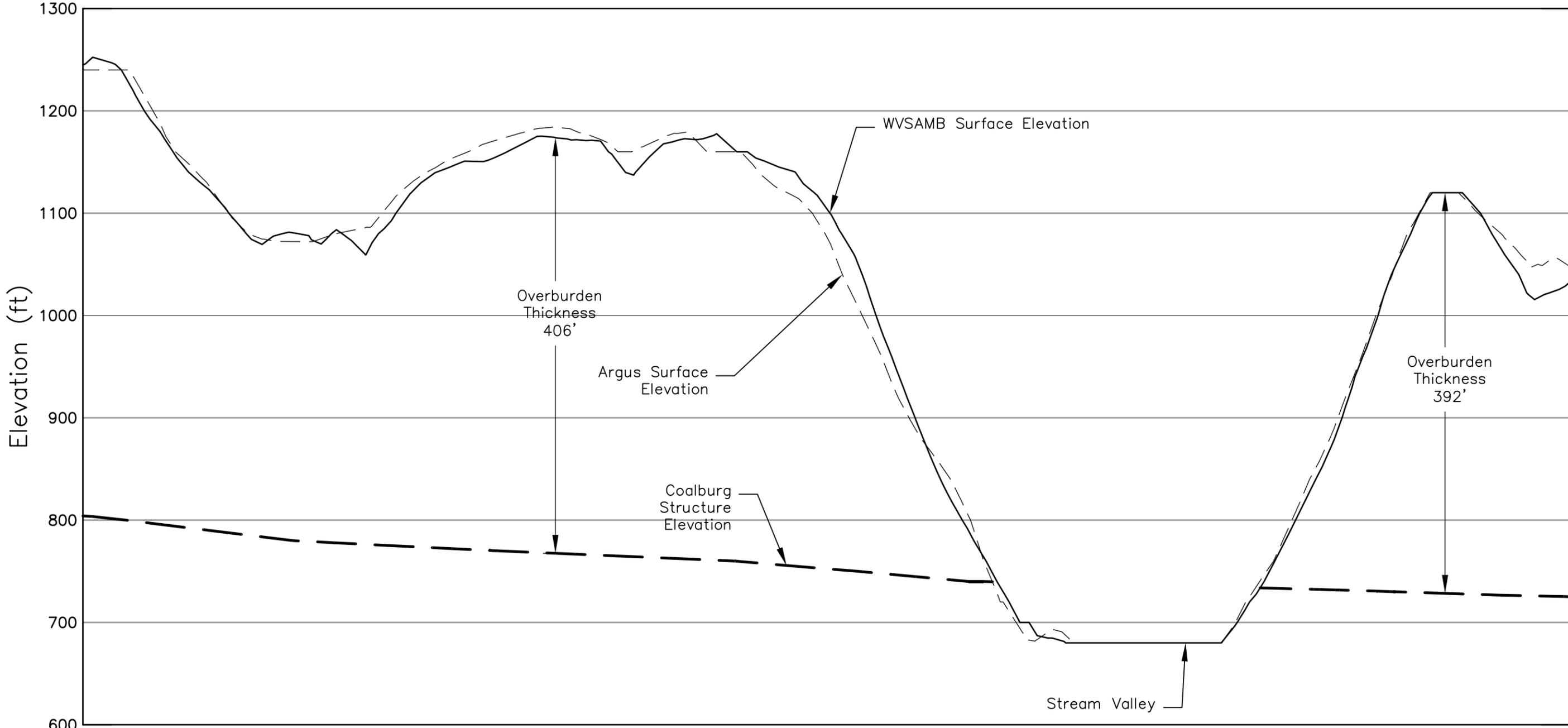
FIGURE 3.12-1

B

BH-5-27

B'

ARG-WV-03-16



REFERENCES

Argus Energy LLC 2206
WVSAMB 2003

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LEGEND

- — — — — Argus Surface Elevation
- WV State Addressing and Mapping Board Surface Elevation
- · - · - · - Argus Coal Seam Structure Elevation



WHEN REPRODUCED AT 11X17IN



BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**ARGUS OVERBURDEN THICKNESS
CROSS SECTION B-B'**

FILE 0632239A002.DWG	FIGURE 3.1-22
DATE AR 02/13/2009	

Dwg Name: N:\0632239\ANNETTE SECTIONS\0632239A002.dwg
 Layout Name: 11x17 B-B Machine: DEN-W-ARATKE
 Last Update: Feb 11, 2009 11:06 By: roberts
 Last Plot: Feb 13, 2009 09:07 By: Reiche

Period	Formation	Member	Thickness	Lithologic Description
Quaternary	Alluvium/ Colluvium		Up to 30 feet	<ul style="list-style-type: none"> - Extends visible along stream valleys - Sand and gravel with minor amounts of clay and siltstones
Upper Pennsylvanian	Conemaugh	Mahoning Sandstone		<ul style="list-style-type: none"> - Base of formation in proposed lease area - Mahoning sandstone present on highest ridge tops in proposed lease area
Middle Pennsylvanian	Allegheny	Upper and Lower Freeport Coal Seam	Upper max: 2.6 feet Lower max: 2.75 feet	<ul style="list-style-type: none"> - Varies from boney coal to carbonaceous shale
		East Lynn Sandstone	50-150 feet	<ul style="list-style-type: none"> - Exhibits channel characteristics - Weathered zone - Coarse grained, massive, gray, and contains quartz pebble - Forms massive cliffs along many ranges
		No. 5 Block Coal Seam	5+ feet	<ul style="list-style-type: none"> - Consists of 5 mappable coal beds: splits range from 0.65 to 8.7 feet - Sandy shale, silty shales, homogeneous layered shales and fireclays may cap or underlie the coal benches
Lower Pennsylvanian	Kanawha	Homewood Sandstone	30-100 feet	<ul style="list-style-type: none"> - Massive, gray and cross-bedded - Sometimes forms massive coarse grained cliffs along ridge tops
		Stockton Coal Seam	2-5 feet	<ul style="list-style-type: none"> - Two benches: sporadically present and poorly developed - Separated by shale
		Upper Coalburg Sandstone	Approx. 55 feet	<ul style="list-style-type: none"> - Occurs 0-10 feet below Stockton Coal Seam - Massive, coarse-grained, and gray - Shales and fireclays exist between intervals
		Coalburg Coal Seam	4-8 feet, avg. 4.75 feet	<ul style="list-style-type: none"> - Six coal benches separated by bone or shale partings. - May exhibit rolls or undulations - Sulfur concentrations average 0.56%

SCALE: N.T.S.

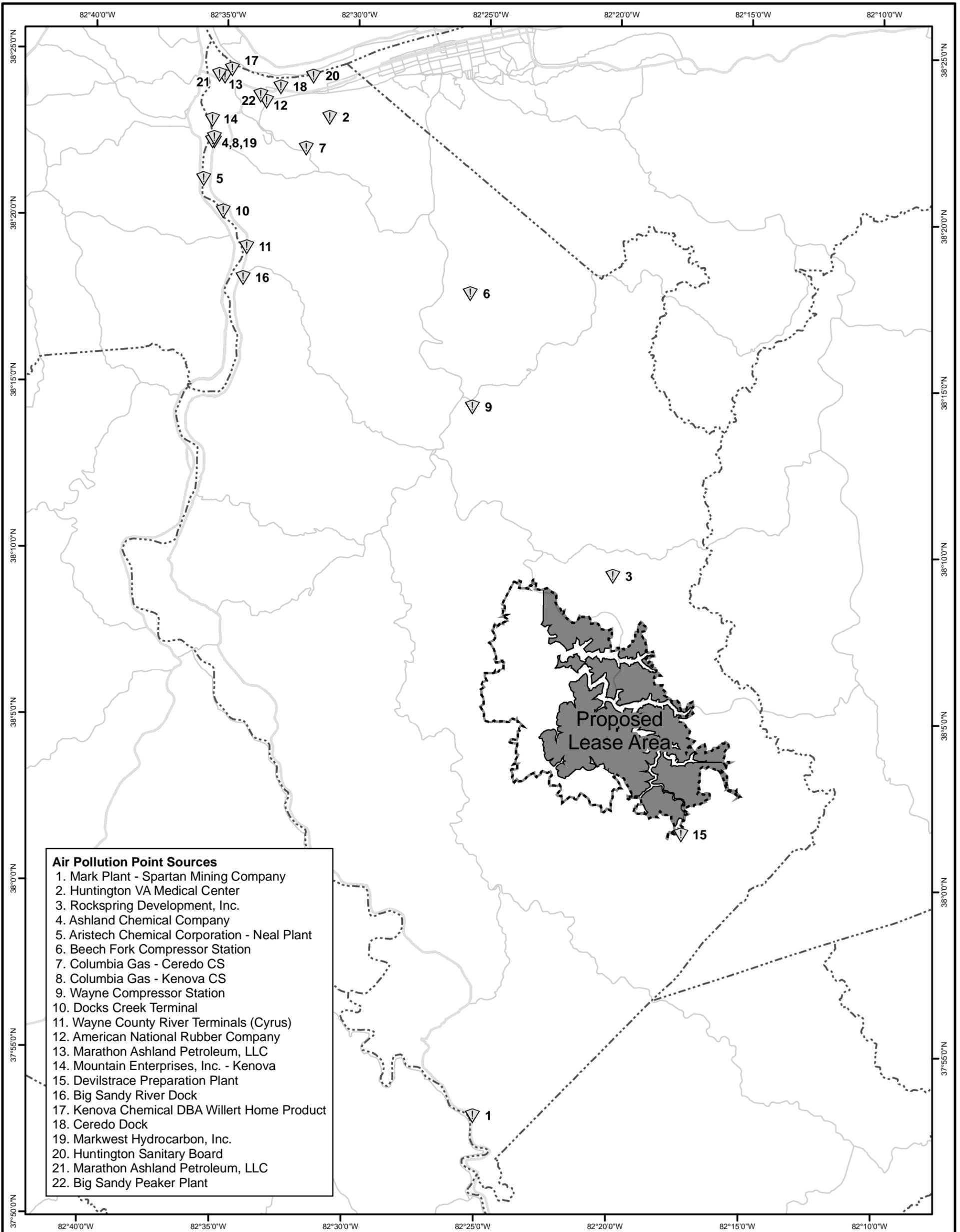


REFERENCES

MM&A 2002
MM&A 2001
MM&A 1995
P&A 2000
P&A 1995

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BUREAU OF LAND MANAGEMENT FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE WAYNE COUNTY, WV	
STRATIGRAPHIC COLUMN	
FILE11x17_ELL_EIS_StratColumn.mxd DATE	AR 03/20/2009 FIGURE 3.1-3



- Air Pollution Point Sources**
1. Mark Plant - Spartan Mining Company
 2. Huntington VA Medical Center
 3. Rockspring Development, Inc.
 4. Ashland Chemical Company
 5. Aristech Chemical Corporation - Neal Plant
 6. Beech Fork Compressor Station
 7. Columbia Gas - Ceredo CS
 8. Columbia Gas - Kenova CS
 9. Wayne Compressor Station
 10. Docks Creek Terminal
 11. Wayne County River Terminals (Cyrus)
 12. American National Rubber Company
 13. Marathon Ashland Petroleum, LLC
 14. Mountain Enterprises, Inc. - Kenova
 15. Devilstrace Preparation Plant
 16. Big Sandy River Dock
 17. Kenova Chemical DBA Willert Home Product
 18. Ceredo Dock
 19. Markwest Hydrocarbon, Inc.
 20. Huntington Sanitary Board
 21. Marathon Ashland Petroleum, LLC
 22. Big Sandy Peaker Plant

LEGEND

- Air Pollution Point Source
- Proposed Lease Area (Air Resources Study Area)
- USACE East Lynn Lake Project Boundary
- County Boundary

REFERENCES

Air pollution point sources: EPA (2007k)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Roads, county boundaries: ESRI (2006)
 Projection: State Plane NAD 83 West Virginia South (feet)

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N

2 1 0 2 Miles

SCALE 1:200,000
WHEN PRODUCED AT 11X17IN

BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**AIR RESOURCES STUDY
AREA AND AIR POLLUTION
POINT SOURCES**

FILE 11x17_ELL_EIS_AirWayne.mxd
DATE AR 02/10/2009

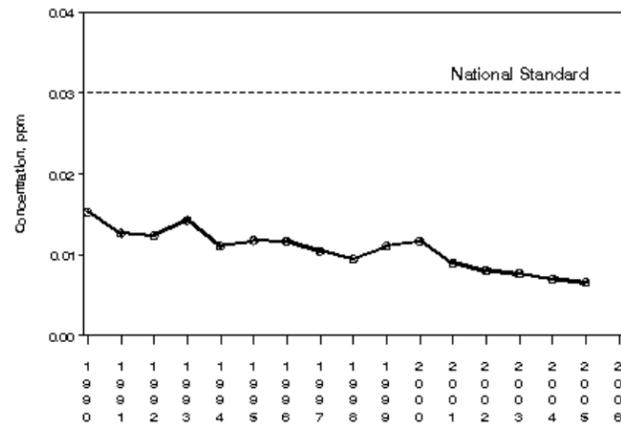
FIGURE 3.13-1

REFERENCE

USEPA (2007)

SO₂ Air Quality, 1990 – 2006

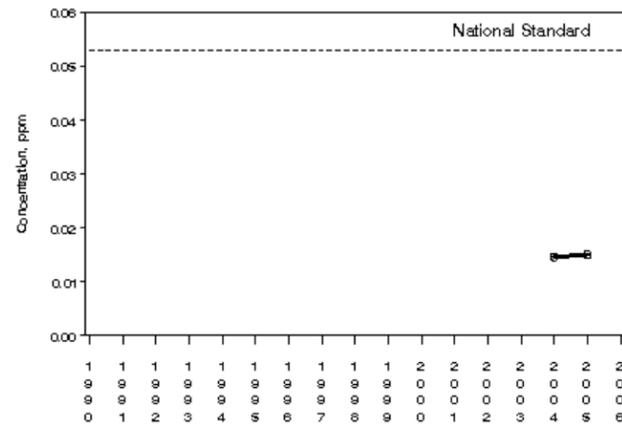
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SITE= 540990005 POC= 1



a. SO₂ Air Quality, 1990-2006

NO₂ Air Quality, 1990 – 2006

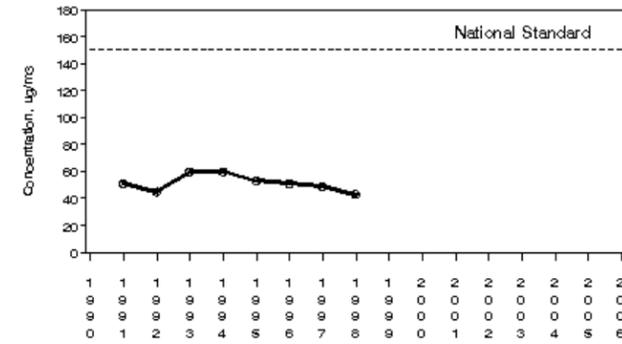
(Based on Annual Arithmetic Average)
Huntington—Ashland, WV—KY—OH
SITE= 540990003 POC= 1



b. NO₂ Air Quality, 1990-2006

PM₁₀ Air Quality, 1990 – 2006

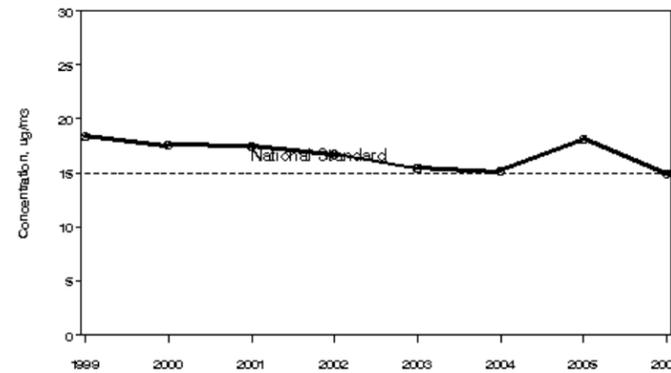
(Based on Annual 2nd Maximum 24—Hour Average)
Huntington—Ashland, WV—KY—OH
SITE= 540990002 POC= 1



c. PM₁₀ Air Quality, 1990-2006

PM_{2.5} Air Quality, 1999 – 2006

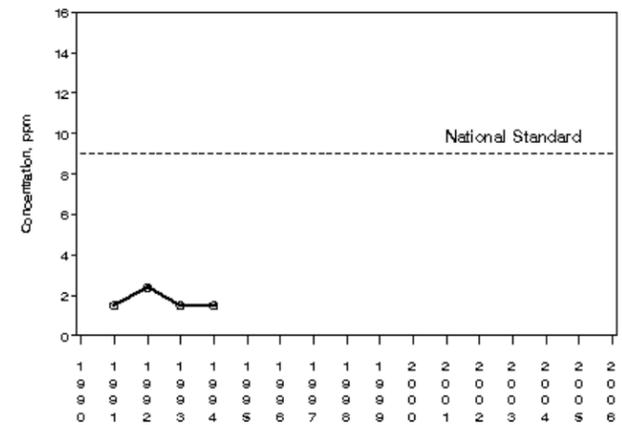
(Based on Seasonally—Weighted Annual Average)
Huntington—Ashland, WV—KY—OH
SITE= 540110006 POC= 1



d. PM_{2.5} Air Quality, 1990-2006

CO Air Quality, 1990 – 2006

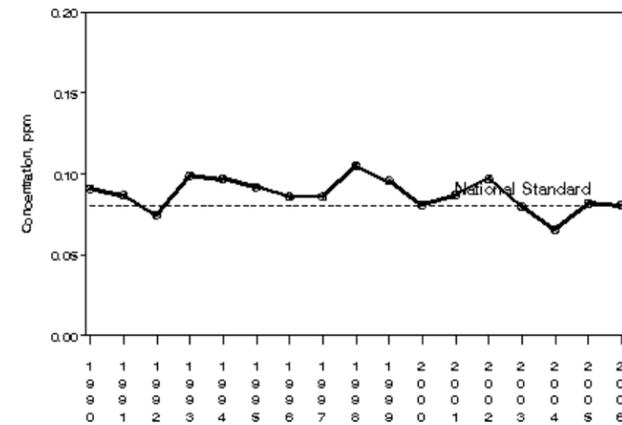
(Based on Annual 2nd Maximum 8—hour Average)
Huntington—Ashland, WV—KY—OH
SITE= 540990001 POC= 1



e. CO Air Quality, 1990-2006

Ozone Air Quality, 1990 – 2006

(Based on Annual 4th Maximum 8—Hour Average)
Huntington—Ashland, WV—KY—OH
SITE= 540110006 POC= 1



f. Ozone Air Quality, 1990-2006

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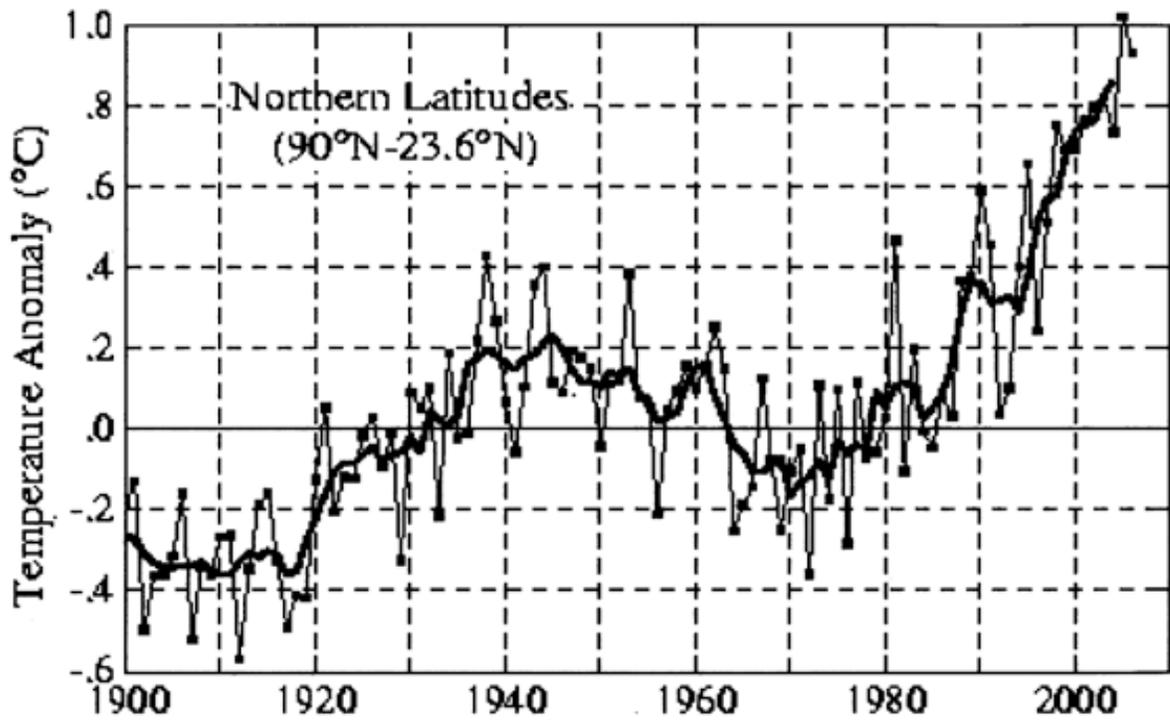
SCALE: N.T.S.



BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**AIR QUALITY TRENDS, 1990-2006
HUNTINGTON-ASHLAND, WV-KY-OH**

FILE 11x17_ELL_EIS_Air.mxd
DATE AR 02/06/2009 **FIGURE 3.13-2**



REFERENCES

Goddard Institute for Space Studies (2007).

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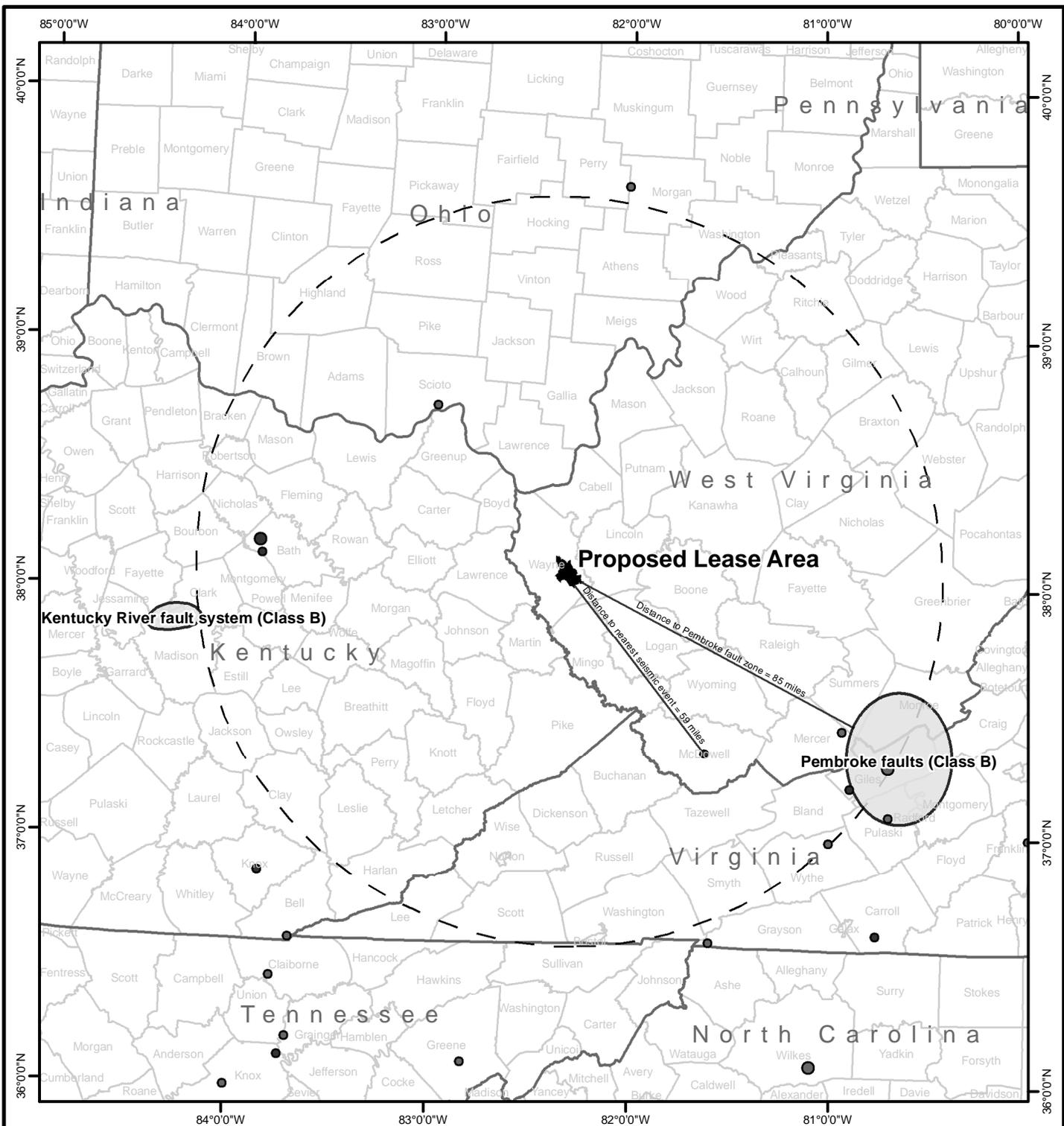


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

ANNUAL MEAN TEMPERATURE CHANGE FOR NORTHERN LATITUDES

FILE 8-5x11_ELL_FEIS_MeanTemp.mxd
DATE AR 02/12/2009

FIGURE 3.13-3



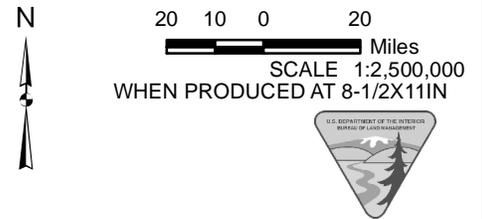
LEGEND

- | | |
|--------------------------------|-----------------------------|
| ● Seismic Event, Pre-1970 | Earthquake Magnitude |
| ● Seismic Event, Post-1969 | ● 4.0-4.9 |
| ▭ Quaternary Fault Zone | ● 5.0-5.9 |
| ▬ Proposed Lease Area | ● 6.0-6.9 |
| ▭ Lease Area - 100 Mile Buffer | ● >7.0 |

REFERENCES

Earthquakes, Quaternary Faults: USGS (2005)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

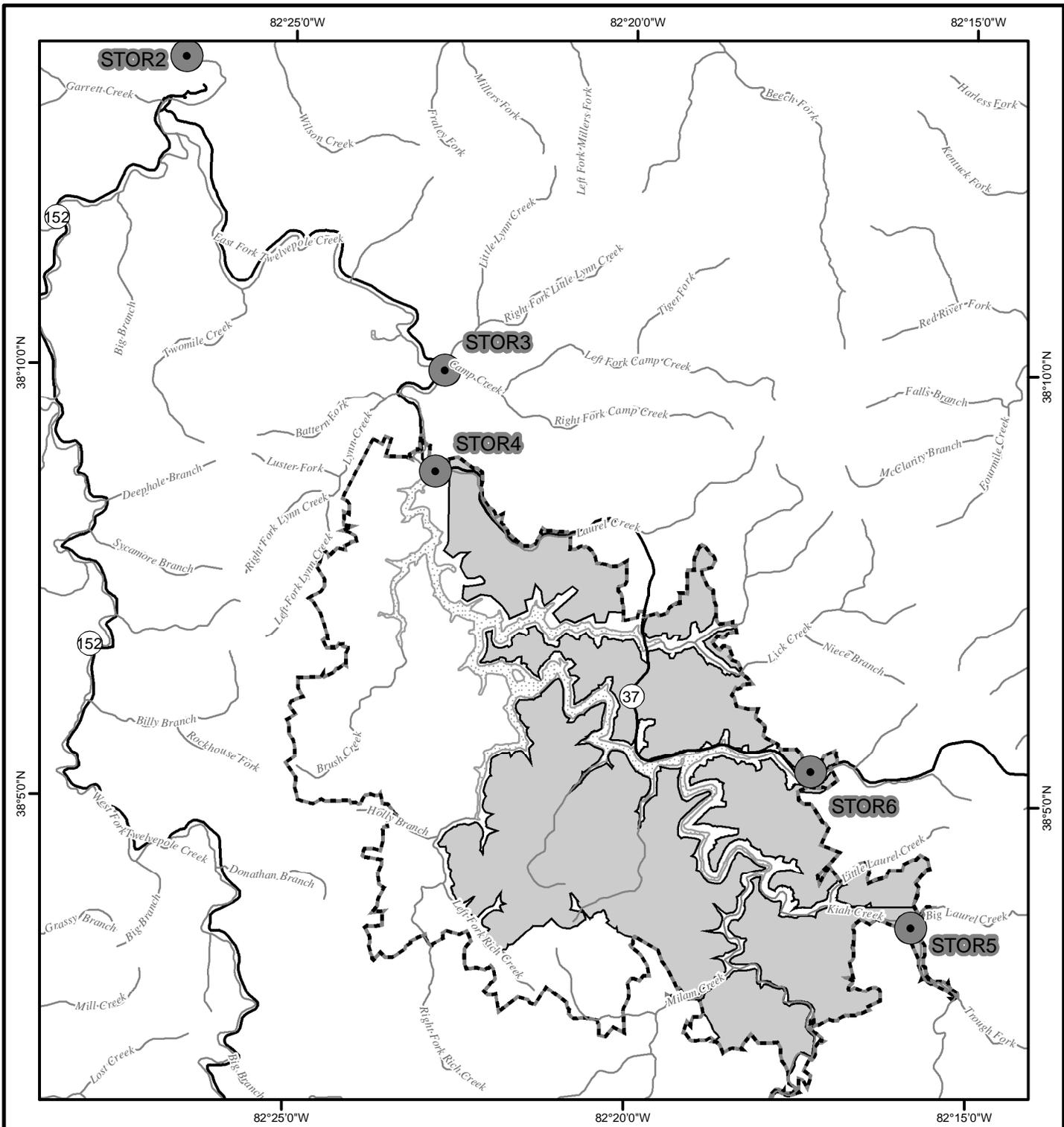
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BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

EARTHQUAKE HAZARDS

FILE 8-5x11_ELL_EIS_Seismic.mxd
 DATE AR 02/09/2009 **FIGURE 3.1-4**



LEGEND

- Sound Meter Sample Location (STOR# = Sample Identification Number)
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Lake
- Stream
- Road

REFERENCES

Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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NOTES

- (1) Sound samples were collected on March 29, 2007 by Golder Associates Inc. staff, using a Type 1 (ANSI 1983) integrating sound meter in accordance with ANSI S12.9 Part 3.
- (2) Sample results are presented in table 3.14-1.



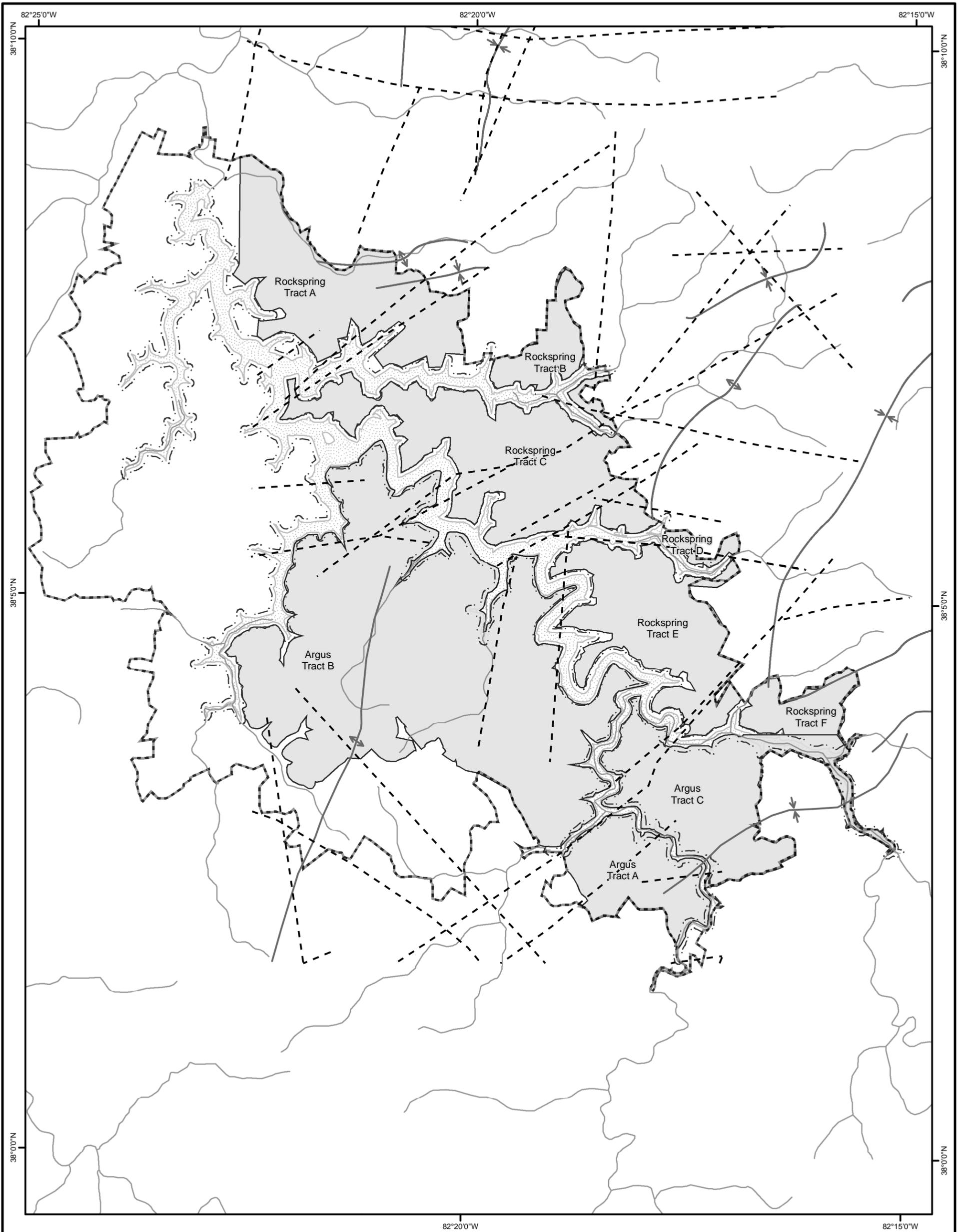
1 0.5 0 1 Miles
 SCALE 1:120,000
 WHEN PRODUCED AT 8-1/2X11IN



BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**NOISE STUDY AREA AND
 SOUND MONITORING
 SAMPLE LOCATIONS**

FILE 11x17_ELL_EIS_Noise.mxd
 DATE AR 02/12/2009 **FIGURE 3.14-1**



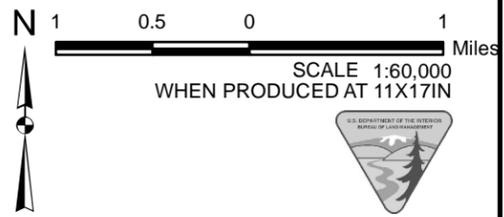
LEGEND

- Lineament
- Anticline
- Syncline
- Stream
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Lake (water surface at spillway elevation of 701 feet)
- Proposed 200ft Protective Coal Barrier (from water surface elevation of 701 feet)

REFERENCES

Geologic structures: Argus Energy LLC (2006), Rockspring Development Inc. (2006)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development (2006)
 USACE ownership boundary: Maptch (1998)
 Lake: 701ft water surface elevation equal to spillway elevation and 200ft lakeshore barrier derived from 2003 WV State Addressing and Mapping Board DEMBoard DEM
 Streams: USGS (2007a)
 Projection: State Plane NAD 83 West Virginia South (feet)

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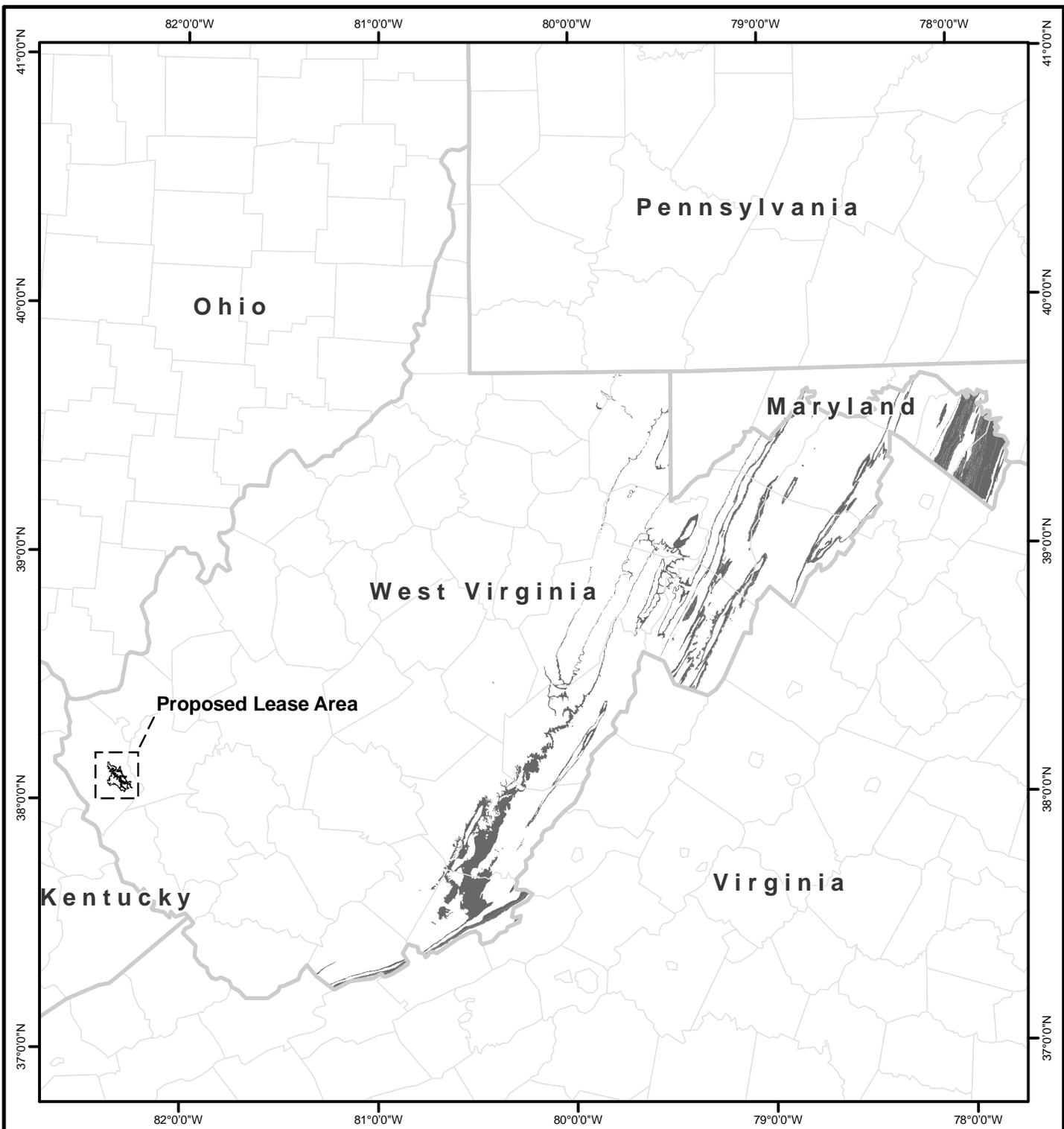


BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

STRUCTURAL FEATURES

FILE 11x17_ELL_EIS_StructFeat.mxd
 DATE AR 02/12/2009

FIGURE 3.1-5



LEGEND

-  Karst area
-  Proposed Lease Area

REFERENCES

Geology: WVGES 1968
 Proposed lease boundaries: Argus Energy LLC (2006),
 Rockspring Development, Inc. (2006)

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20 10 0 20
 Miles
 SCALE 1:2,500,000
 WHEN PRODUCED AT 8-1/2X11IN



BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**WEST VIRGINIA
 KARST MAP**

FILE 8-5x11_ELL_EIS_WVKarst.mxd
 DATE AR 02/06/2009

FIGURE 3.1-6

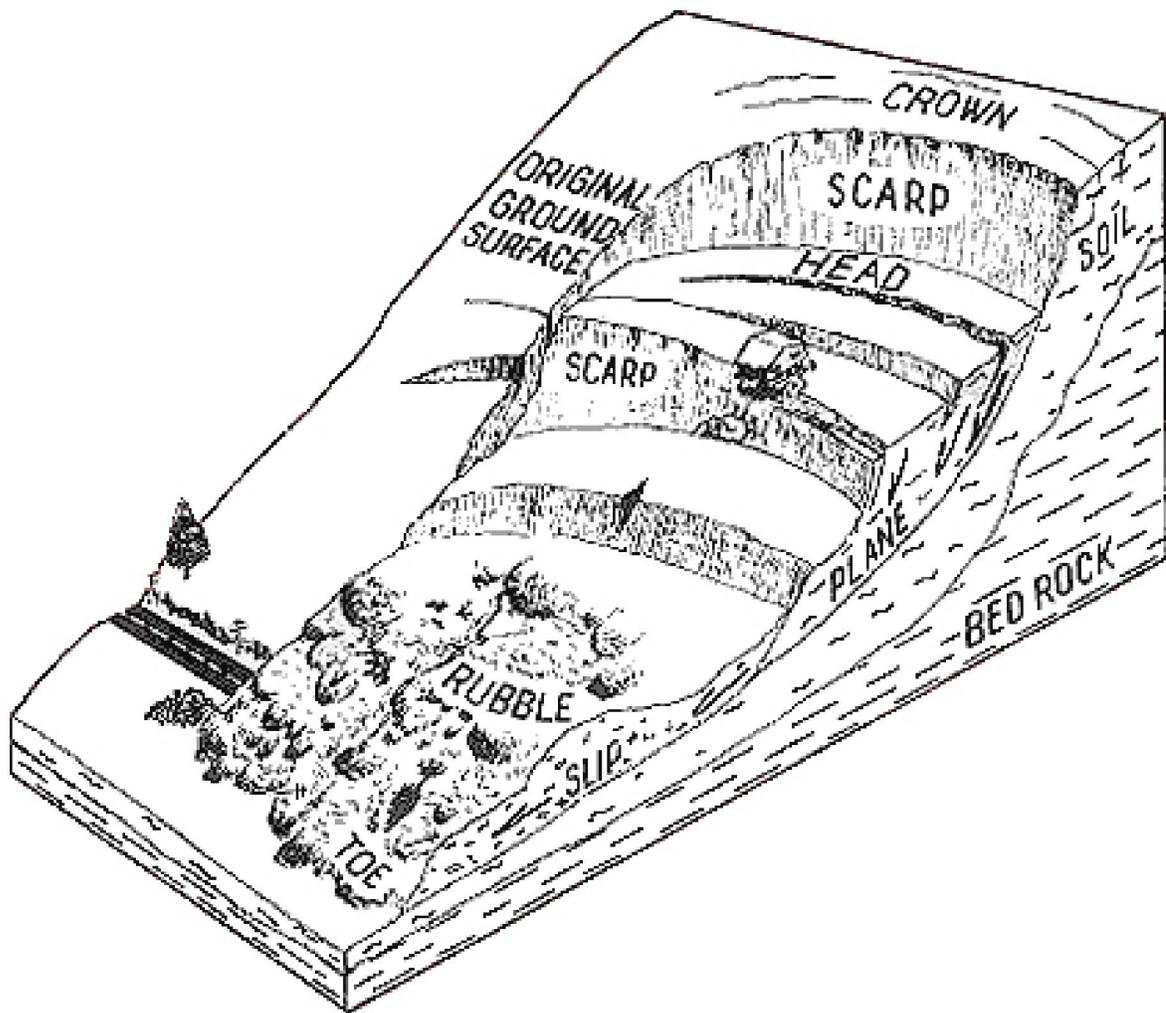


Illustration by Paul Queen

NOTE: Slumps scarp is at the head, and earth flow is at the toe.

SCALE: N.T.S.



REFERENCES

WVGES 2005b

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 WAYNE COUNTY, WV

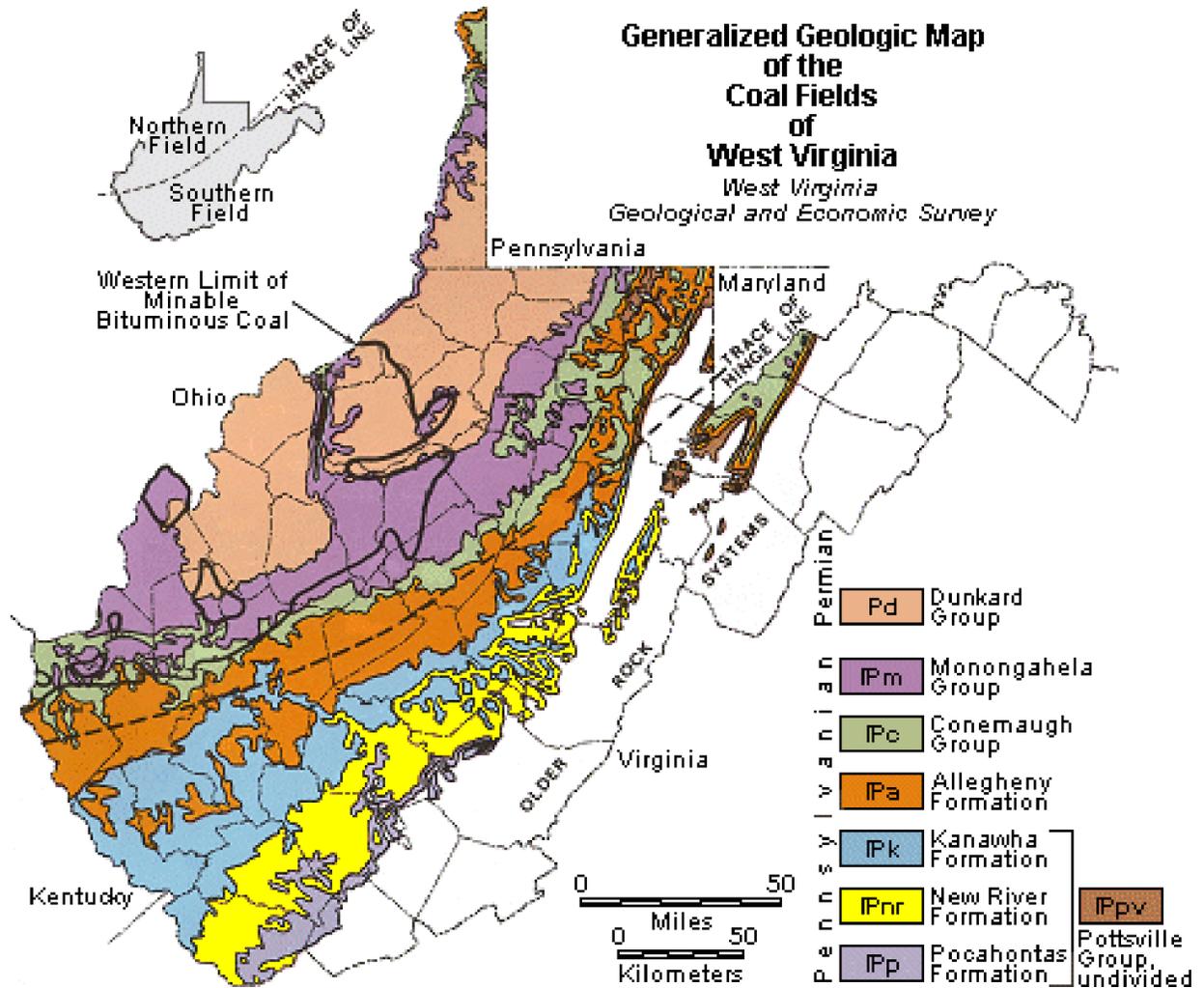
**CONCEPTUAL
 LANDSLIDE DIAGRAM**

FILE 8-5x11_ELL_EIS_Landslide.mxd
 DATE AR 02/06/2009

FIGURE 3.1-7

Generalized Geologic Map of the Coal Fields of West Virginia

West Virginia
Geological and Economic Survey



SCALE NTS



REFERENCES

WGES (1968)

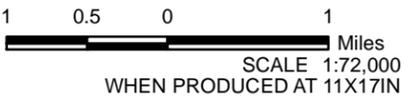
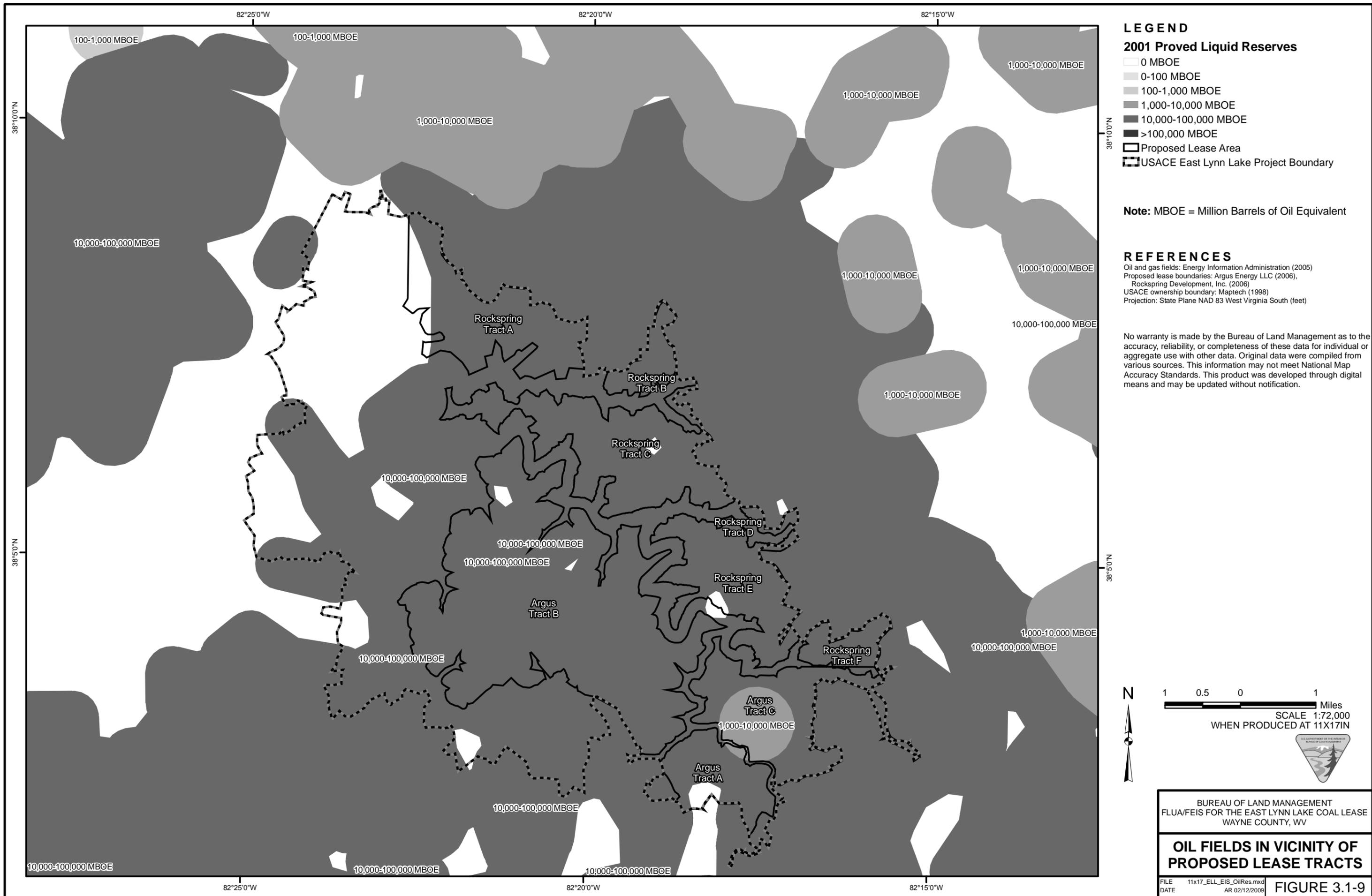
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BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

WEST VIRGINIA COAL FIELDS

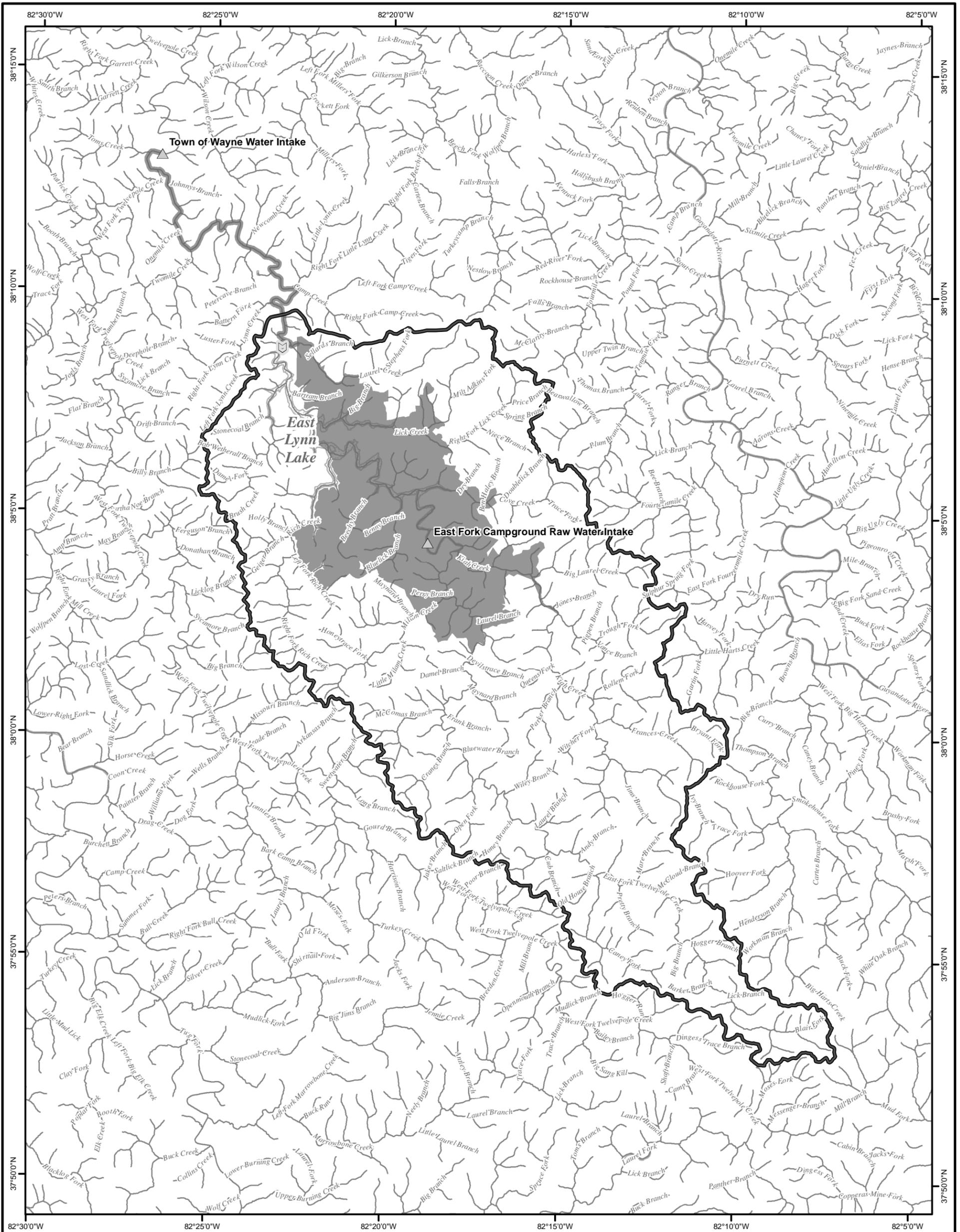
FILE 8-5x11_ELL_CoalFields.mxd
DATE AR 02/06/2009

FIGURE 3.1-8



BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**OIL FIELDS IN VICINITY OF
 PROPOSED LEASE TRACTS**



LEGEND

- Water Intake
- East Lynn Lake Dam
- Stream
- Surface Water Study Area
- East Fork of Twelvepole Creek Watershed Above USGS Gauging Station at East Lynn Lake
- Lake

REFERENCES

Watershed boundary: Delineated from 30m DEM, USGS National Elevation Dataset
 Streams: USGS (2007a)
 Projection: State Plane NAD 83 West Virginia South (feet)

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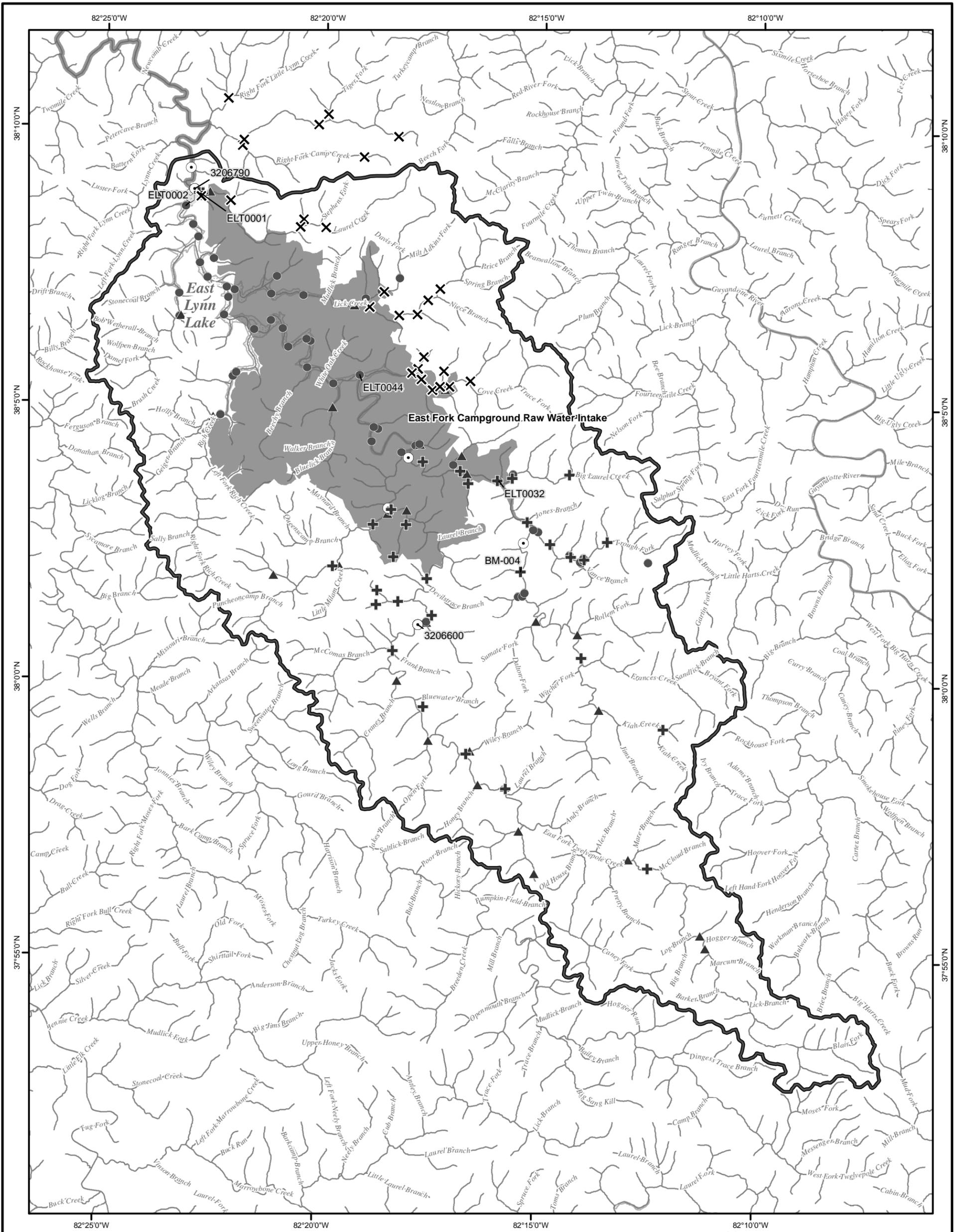
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Miles

SCALE 1:150,000
WHEN PRODUCED AT 11X17IN

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

SURFACE WATER STUDY AREA

FILE: x17_ELL_EIS_SWStudyArea.mxd
FIGURE 3.2-1



LEGEND

- Surface Water Monitoring Locations (Agency)
- Argus Energy LLC
- Rockspring Development, Inc.
- USACE
- USGS
- WVDEP
- East Lynn Lake Dam
- Stream
- Surface Water Study Area
- East Fork of Twelvepole Creek Watershed Above USGS Gauging Station at East Lynn Lake
- Lake

REFERENCES

Surface water monitoring locations: Argus Energy LLC (2006), Rockspring Development, Inc. (2006), USACE (2006), USGS (2006), WVDEP (2006)
 Watershed boundary: Delineated from 30m DEM, USGS National Elevation Dataset
 Streams: USGS (2007a)
 Projection: State Plane NAD 83 West Virginia South (feet)

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N

1 0.5 0 1 Miles

SCALE 1:120,000
WHEN PRODUCED AT 11X17IN

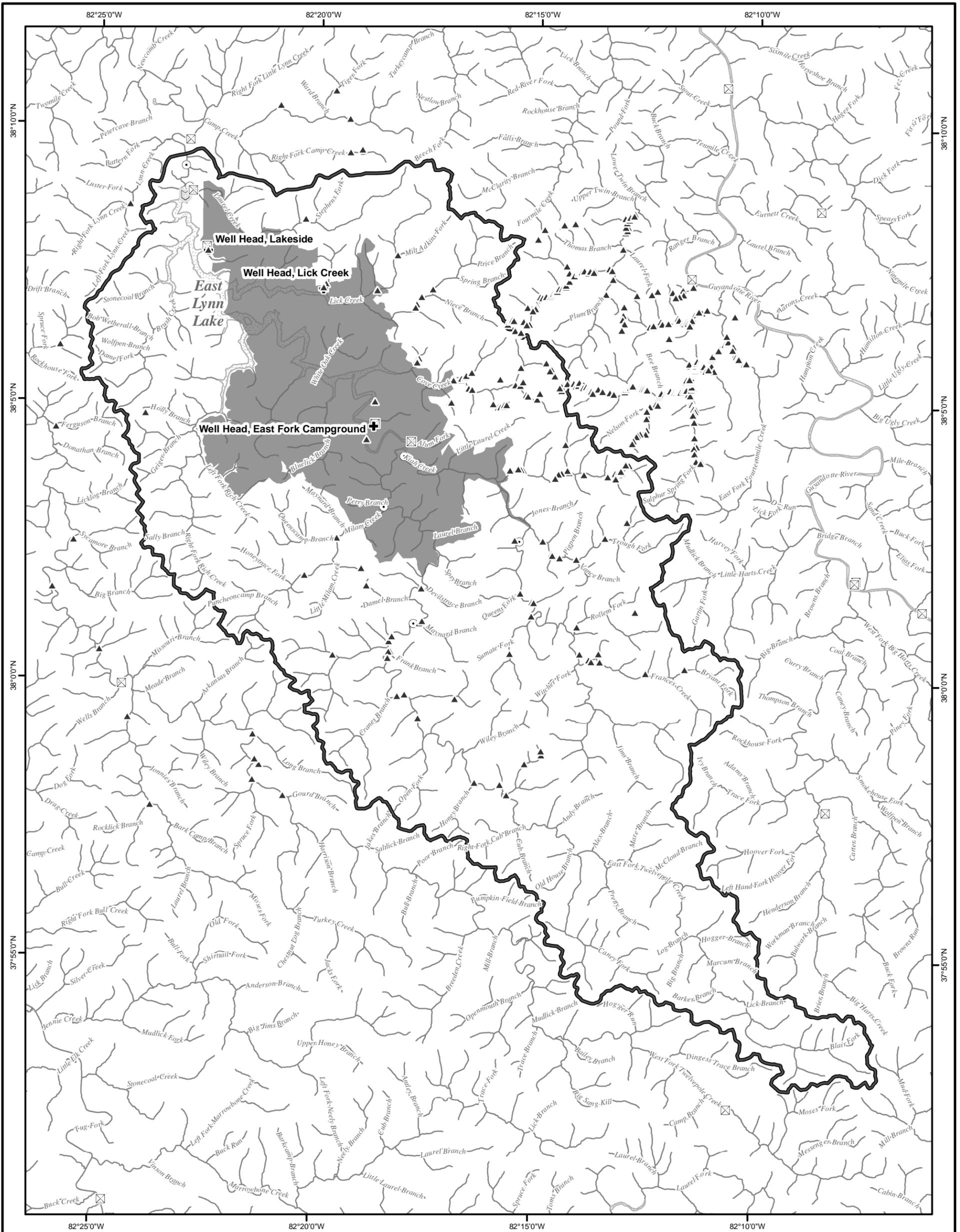


BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**SURFACE WATER
MONITORING LOCATIONS**

FILE: 1x17_ELL_EIS_SW_Sampling.mxd
 DATE: AR 02/11/2009

FIGURE 3.2-2



LEGEND

- ▲ Well Location
- USGS Gauging Station
- ⊕ Water Treatment Plant
- ⊠ Sewage Treatment Plant
- ▭ East Lynn Lake Dam
- Stream
- Groundwater Study Area
- ▭ East Fork of Twelvepole Creek Watershed Above USGS Gauging Station at East Lynn Lake
- ▭ Lake

REFERENCES

Gauging stations: USGS (2006)
 Water treatment plants: USACE (2006)
 Sewage treatment plants: WV Dept. of Env. Protection (2002)
 Dams: WV Department of Environmental Protection
 Wells: Argus Energy LLC (2006), Rockspring Development, Inc. (2006), USGS (2006), USACE (2007)
 Watershed boundary: Delineated from 30m DEM, USGS (2006)
 Streams: USGS (2007a)
 Projection: State Plane NAD 83 West Virginia South (feet)

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N

1 0.5 0 1 Miles

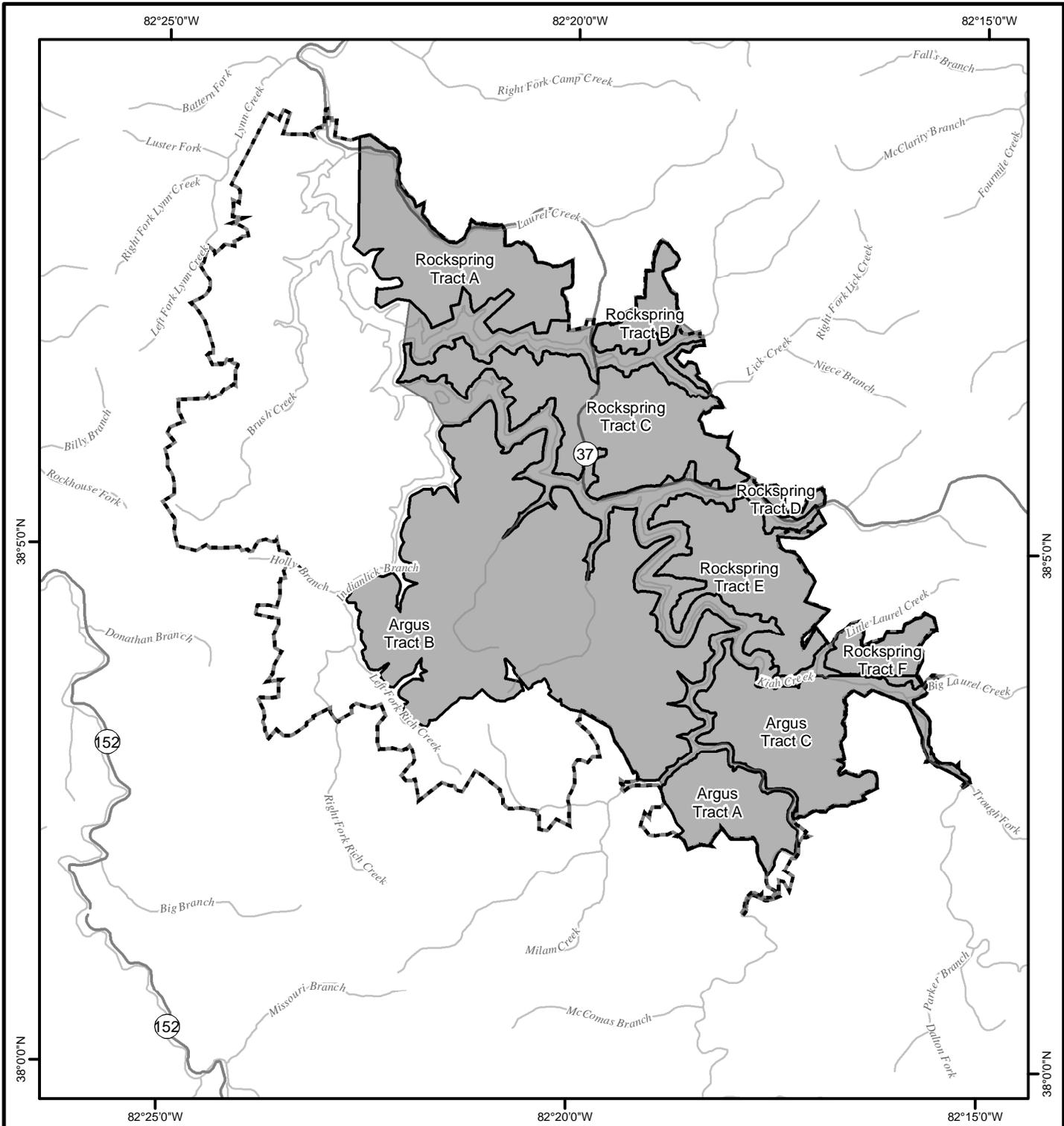
SCALE 1:120,000
WHEN PRODUCED AT 11X17IN

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**GROUNDWATER STUDY AREA
 AND EAST FORK OF TWELVEPOLE
 CREEK WATERSHED**

FILE 11x17_ELL_EIS_Watershed.mxd
 DATE AR 02/12/2009

FIGURE 3.3-1



LEGEND

- Vegetation, Soils, Fish, and Wildlife Study Area
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Stream
- 37 Road

REFERENCES

Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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N

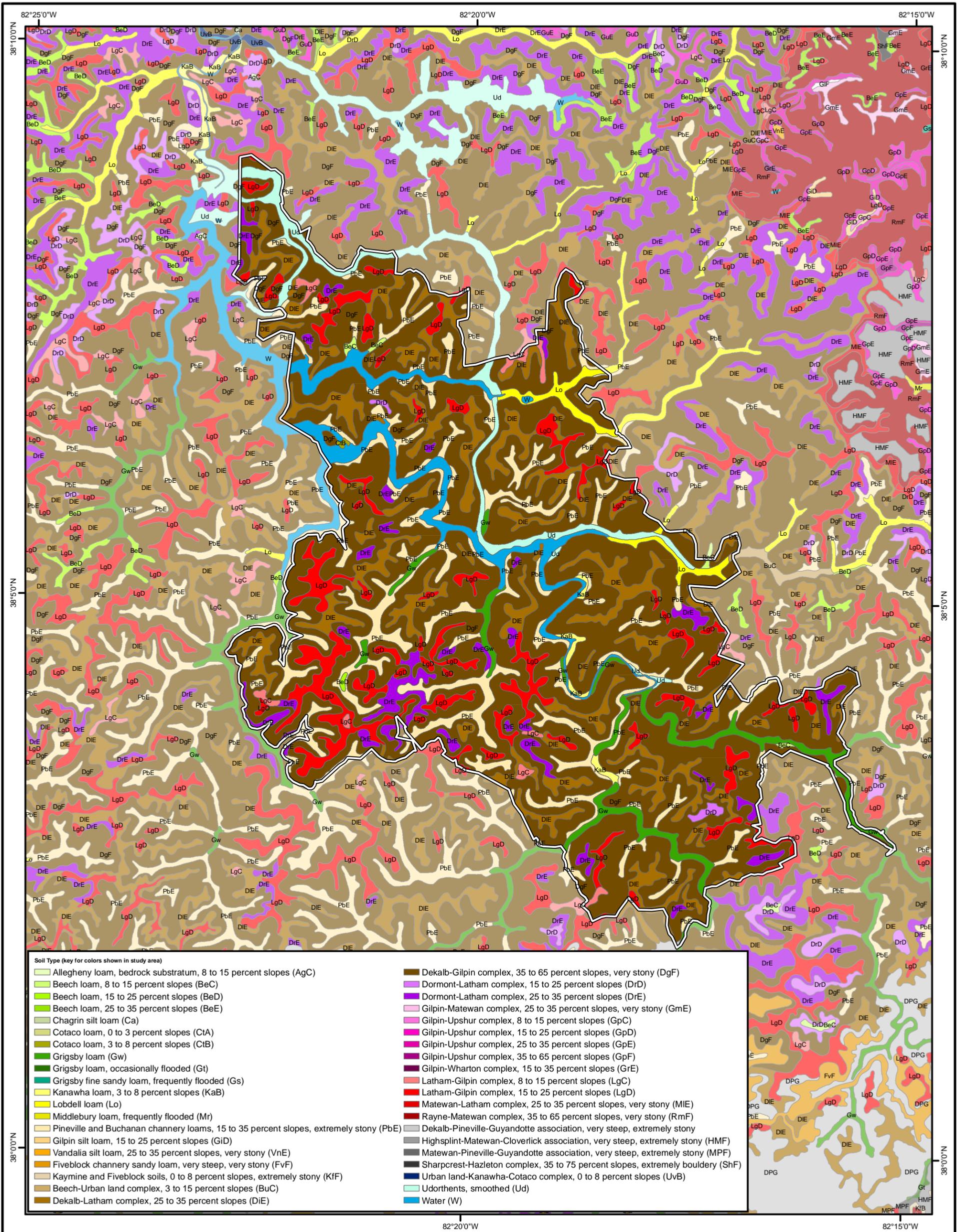
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SCALE 1:100,000
WHEN PRODUCED AT 8-1/2X11IN

BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**VEGETATION, SOILS, FISH,
AND WILDLIFE STUDY AREA**

FILEB-5x11_ELL_EIS_VSFWStudy.mxd	FIGURE 3.4-1
DATE	AR 02/06/2009



Soil Type (key for colors shown in study area)	
Allegheny loam, bedrock substratum, 8 to 15 percent slopes (AgC)	Dekalb-Gilpin complex, 35 to 65 percent slopes, very stony (DgF)
Beech loam, 8 to 15 percent slopes (BeC)	Dormont-Latham complex, 15 to 25 percent slopes (DrD)
Beech loam, 15 to 25 percent slopes (BeD)	Dormont-Latham complex, 25 to 35 percent slopes (DrE)
Beech loam, 25 to 35 percent slopes (BeE)	Gilpin-Matewan complex, 25 to 35 percent slopes, very stony (GmE)
Chagrins silt loam (Ca)	Gilpin-Upshur complex, 8 to 15 percent slopes (GpC)
Cotaco loam, 0 to 3 percent slopes (CtA)	Gilpin-Upshur complex, 15 to 25 percent slopes (GpD)
Cotaco loam, 3 to 8 percent slopes (CtB)	Gilpin-Upshur complex, 25 to 35 percent slopes (GpE)
Grigsby loam (Gw)	Gilpin-Upshur complex, 35 to 65 percent slopes (GpF)
Grigsby loam, occasionally flooded (Gt)	Gilpin-Wharton complex, 15 to 35 percent slopes (GrE)
Grigsby fine sandy loam, frequently flooded (Gs)	Latham-Gilpin complex, 8 to 15 percent slopes (LgC)
Kanawha loam, 3 to 8 percent slopes (KaB)	Latham-Gilpin complex, 15 to 25 percent slopes (LgD)
Lobdell loam (Lo)	Matewan-Latham complex, 25 to 35 percent slopes, very stony (MIE)
Middlebury loam, frequently flooded (Mr)	Rayne-Matewan complex, 35 to 65 percent slopes, very stony (RmF)
Pineville and Buchanan channery loams, 15 to 35 percent slopes, extremely stony (PbE)	Dekalb-Pineville-Guyandotte association, very steep, extremely stony
Gilpin silt loam, 15 to 25 percent slopes (GiD)	Highsplint-Matewan-Cloverlick association, very steep, extremely stony (HMF)
Vandalia silt loam, 25 to 35 percent slopes, very stony (VnE)	Matewan-Pineville-Guyandotte association, very steep, extremely stony (MPF)
Fiveblock channery sandy loam, very steep, very stony (FvF)	Sharpcrest-Hazleton complex, 35 to 75 percent slopes, extremely bouldery (ShF)
Kaymine and Fiveblock soils, 0 to 8 percent slopes, extremely stony (KfF)	Urban land-Kanawha-Cotaco complex, 0 to 8 percent slopes (UvB)
Beech-Urban land complex, 3 to 15 percent slopes (BuC)	Udorthents, smoothed (Ud)
Dekalb-Latham complex, 25 to 35 percent slopes (DIE)	Water (W)

LEGEND

Vegetation, Soils, Fish, and Wildlife Study Area

NOTE: The colors shown outside of the study area have been faded to contrast with the study area itself. These faded colors do not match the NRCS legend.

REFERENCES

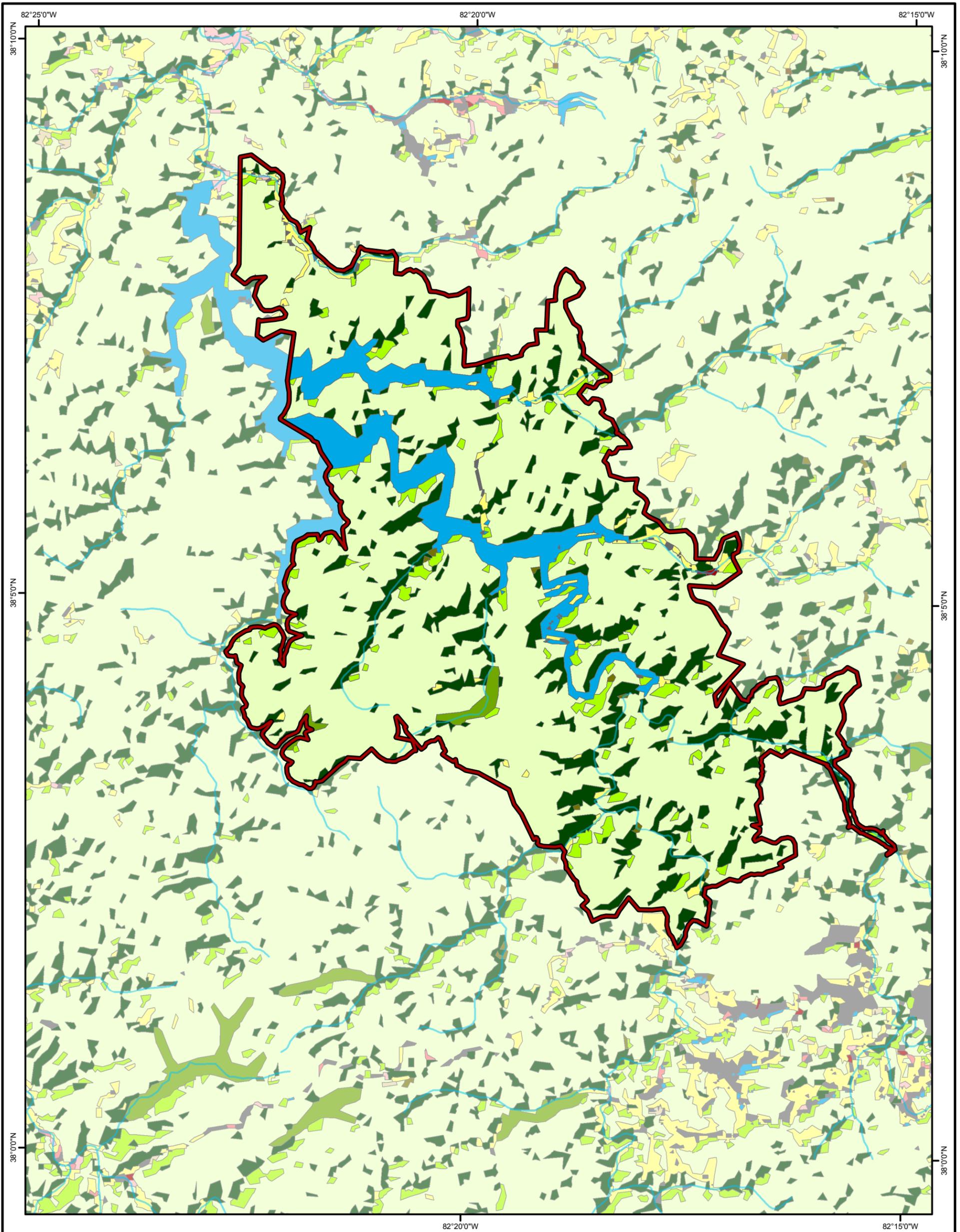
Soil Units: USDA NRCS SSURGO (2006)
 Orthophotography: WV Statewide Addressing and Mapping Board, 2003
 Projection: State Plane NAD 83 West Virginia South (feet)

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 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

AREA SOIL UNITS	
FILE	11x17_ELL_EIS_Soils.mxd
DATE	AR 02/06/2009
FIGURE 3.4-2	



LEGEND

Landcover Type (key for colors shown in study area)

- | | | |
|------------------------------------|------------------------------------|--|
| Cove hardwood forest | Row crop agriculture | Stream |
| Diverse mesophytic hardwood forest | Light intensity urban | Vegetation, Soils, Fish, and Wildlife Study Area |
| Hardwood/conifer forest | Moderate intensity urban | |
| Mountain hardwood forest | Intensive urban | |
| Oak dominant forest | Barren land – mining, construction | |
| Shrubland | Herbaceous wetland | |
| Pasture/grassland | Surface water | |

REFERENCES

Landcover: WV-GAP USGS Biological Resources Division (Data shifted 70m east and 280m North from original to match surface water polygons with known coordinates of East Lynn Lake)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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NOTE: The colors shown outside of the study area have been faded to contrast with the study area itself. These faded colors do not match the WVDEP legend.

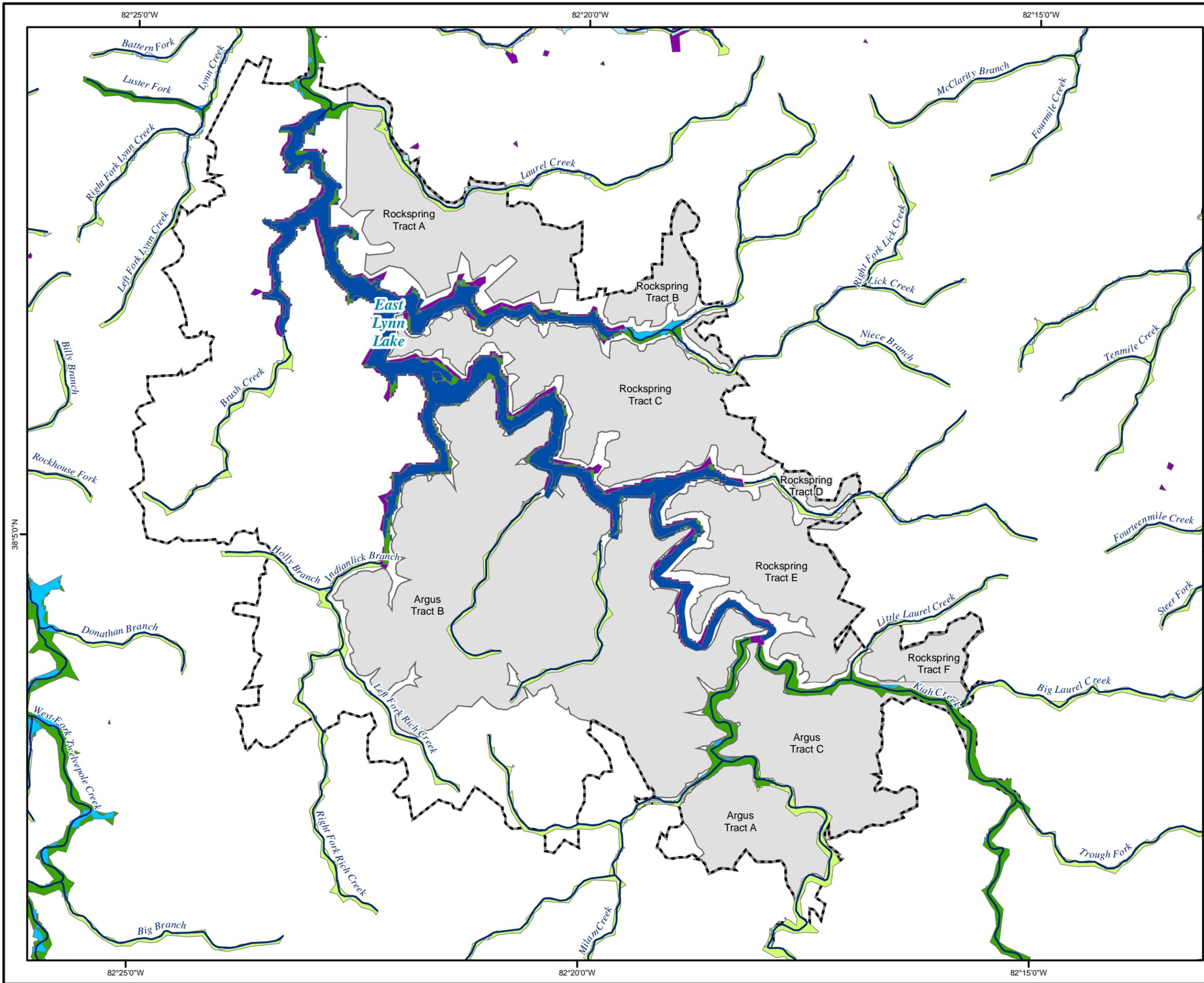


BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**WEST VIRGINIA GAP
 LAND COVER TYPES**

FILE 11x17_ELL_EIS_Vegetation.mxd
 DATE AR 02/12/2009

FIGURE 3.5-1



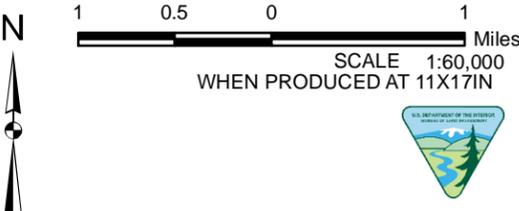
LEGEND

- Headwater stream riparian area (non-forested)
- Small stream riparian area (non-forested)
- Headwater stream riparian area (forested)
- Small stream riparian area (forested)
- Lake (LAC)
- Open water wetland (POW, PUB, PUS, PML)
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Stream

REFERENCES

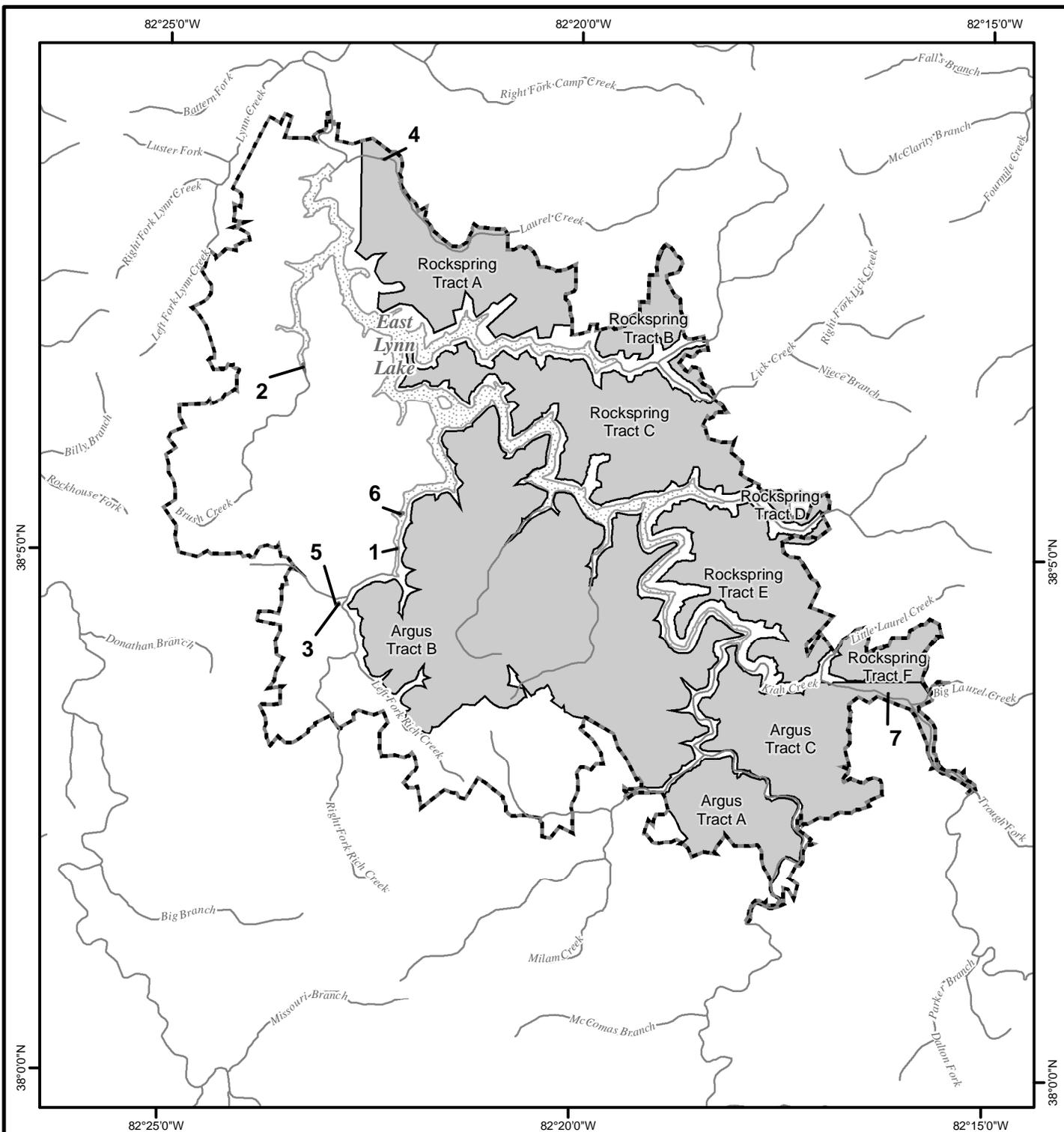
Riparian Areas: Strager and Others (2000)
 Streams: USGS (2007a)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

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BUREAU OF LAND MANAGEMENT
 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**WEST VIRGINIA GAP
 MAPPED RIPARIAN AREAS**



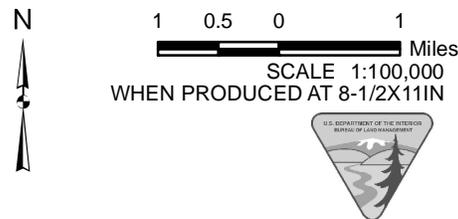
LEGEND

- 1 Wetland Area Location
- Wetland
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Stream
- Lake

REFERENCES

Wetlands: USFWS (2007)
 Streams: USGS (2007a)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

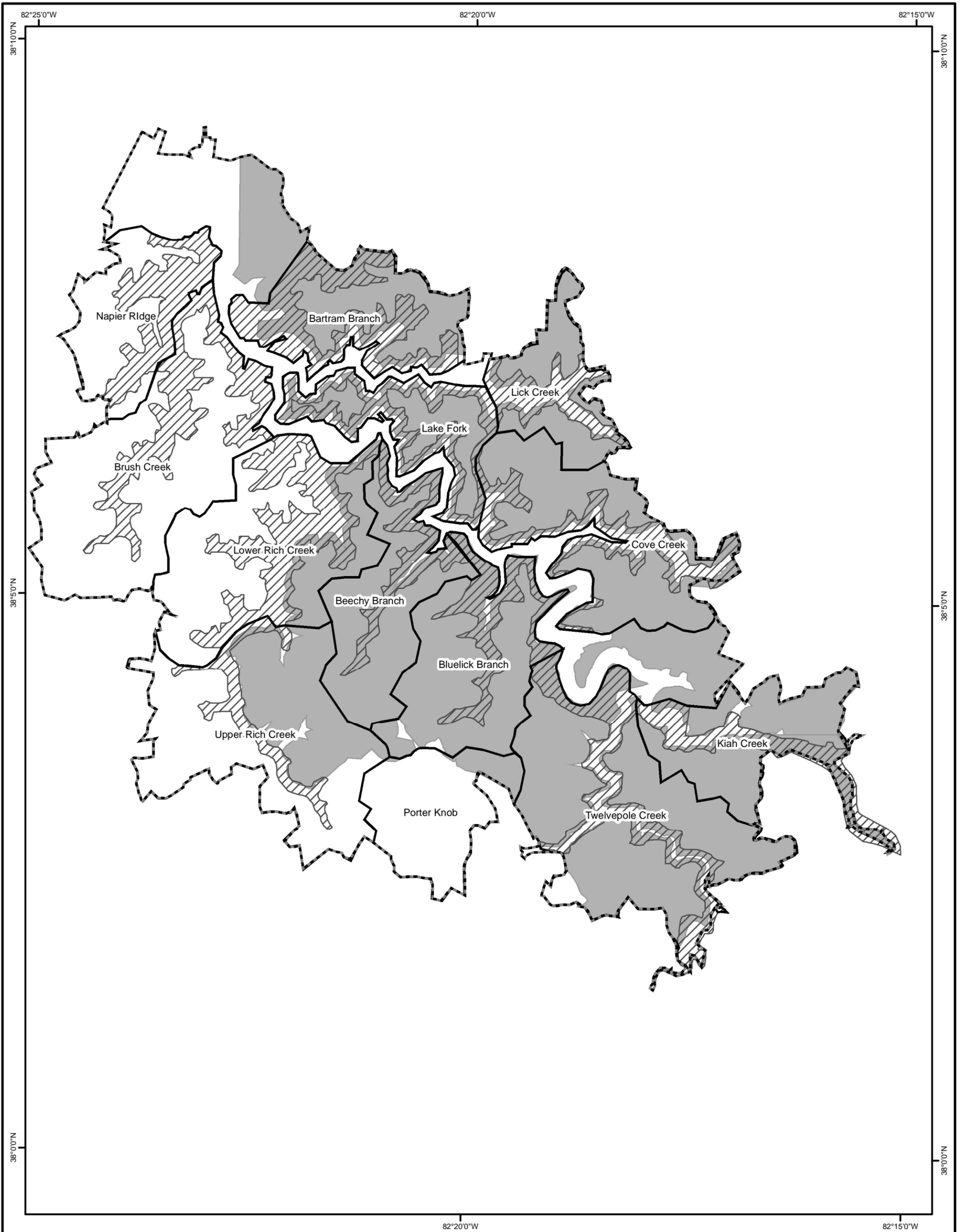
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 WAYNE COUNTY, WV

**NWI MAPPED WETLANDS
 AND NHD MAPPED STREAMS**

FILE 8-5x11_ELL_EIS_Wetlands.mxd
 DATE AR 02/09/2009 **FIGURE 3.5-3**



LEGEND

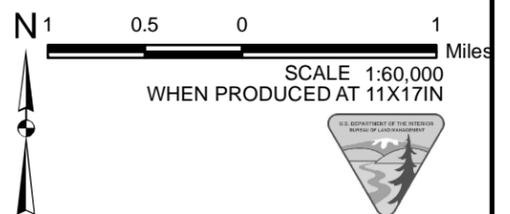
- WVDNR Timber Compartment
- Proposed Lease Area
- Non-Commercial Timber Land
- USACE East Lynn Lake Project Boundary

NOTE: See Figure 1.1-2 for names and locations of individual proposed lease tracts.

REFERENCES

Timber Compartments: Dotson (1992)
 Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Projection: State Plane NAD 83 West Virginia South (feet)

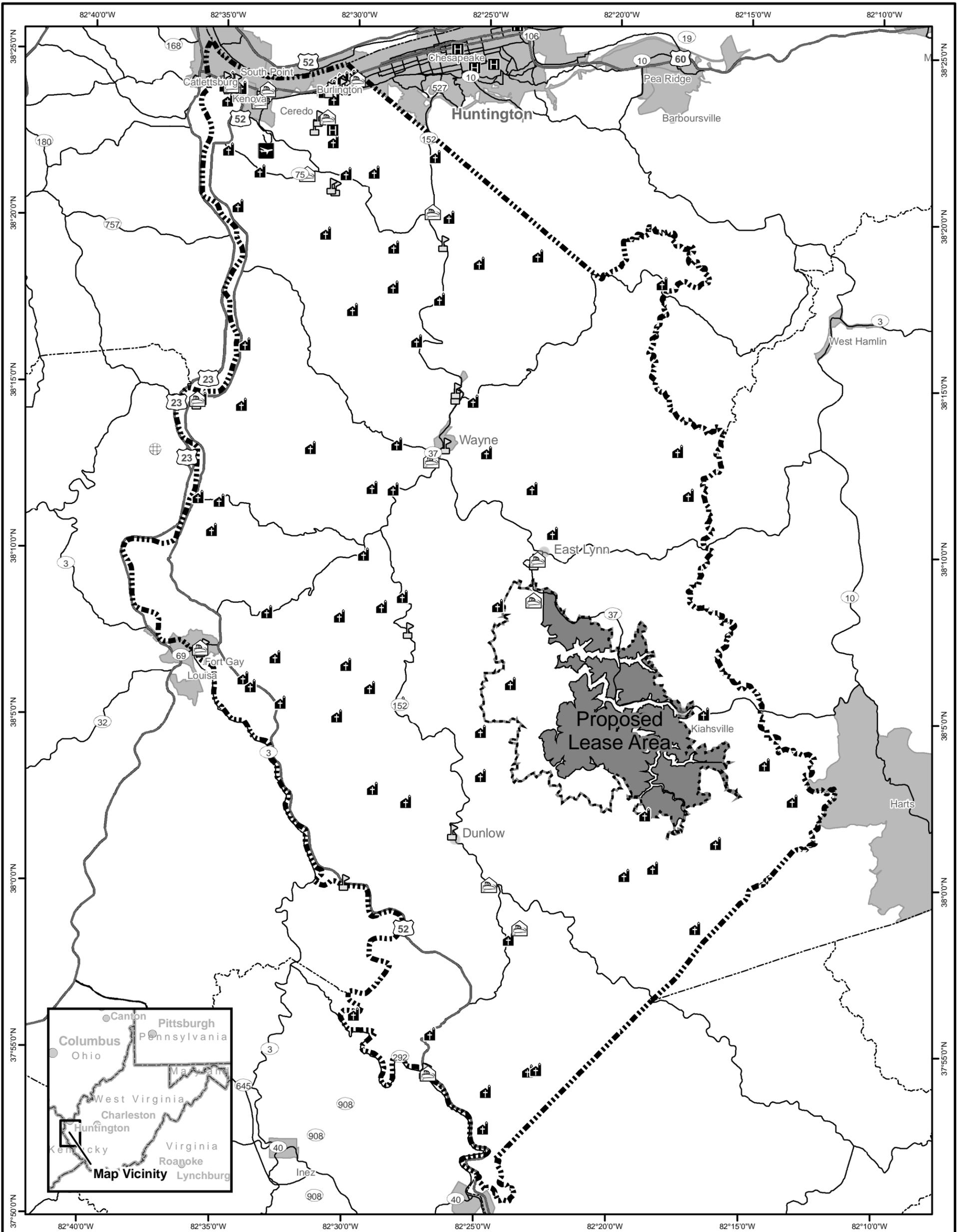
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 WAYNE COUNTY, WV

**WVDNR TIMBER
 COMPARTMENTS**

FILE 11x17_ELL_EIS_Forestry.mxd
 DATE AR 02/06/2009 **FIGURE 3.5-4**



LEGEND

- Airport
- School
- Church
- Fire Department
- Landfill
- Proposed Lease Area
- USACE East Lynn Lake Project Boundary
- Socio-economic study area boundary (Wayne County)
- County Boundary

REFERENCES

Airports: USDOT (1998)
 Hospitals: WV Health Care Authority (2004)
 Schools: WV Army National Guard (2005)
 Churches: GNIS (1981)
 Fire Departments: WV Div. of Forestry (2002)
 Landfills: WVDEP (2002)

Proposed lease boundaries: Argus Energy LLC (2006), Rockspring Development, Inc. (2006)
 USACE ownership boundary: Maptech (1998)
 Roads, streams, cities, county boundaries: ESRI (2006)
 Projection: State Plane NAD 83 West Virginia South (feet)

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2 1 0 2 Miles
 SCALE 1:200,000
 WHEN PRODUCED AT 11X17IN

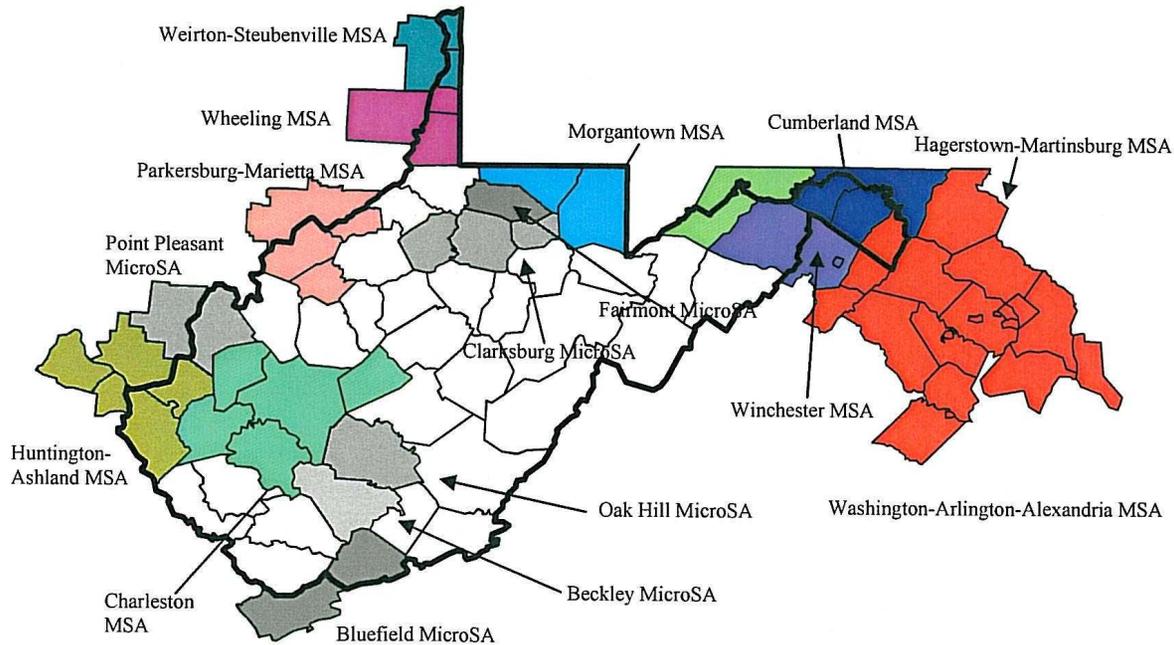
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 FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
 WAYNE COUNTY, WV

**SOCIOECONOMIC
 STUDY AREA**

FILE 11x17_ELL_EIS_Socio.mxd
 DATE AR 02/13/2009

FIGURE 3.8-1

WEST VIRGINIA'S STATISTICAL AREAS CENSUS 2000



Source: Office of Management and Budget (OMB)

REFERENCE

WVDO, 2005.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

SCALE N.T.S.
TO BE PRODUCED AT 8-1/2X11IN



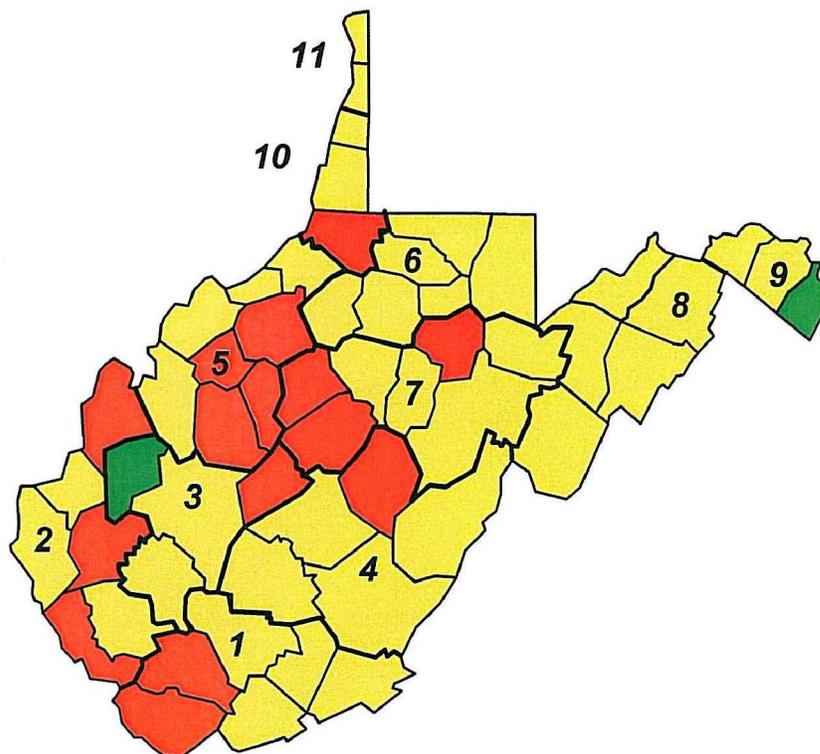
BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

WEST VIRGINIA'S METROPOLITAN STATISTICAL AREAS

FILE 8-5x11_ELL_WVMetro.mxd
DATE AR 02/10/2009

FIGURE 3.8-2

West Virginia Distressed Counties FY 2005-06



ARC County



Distressed



Competitive



Transitional



Regional Planning District Number

SCALE N.T.S.

TO BE PRODUCED AT 8-1/2X11IN



REFERENCE

WVDO, 2005.

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BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

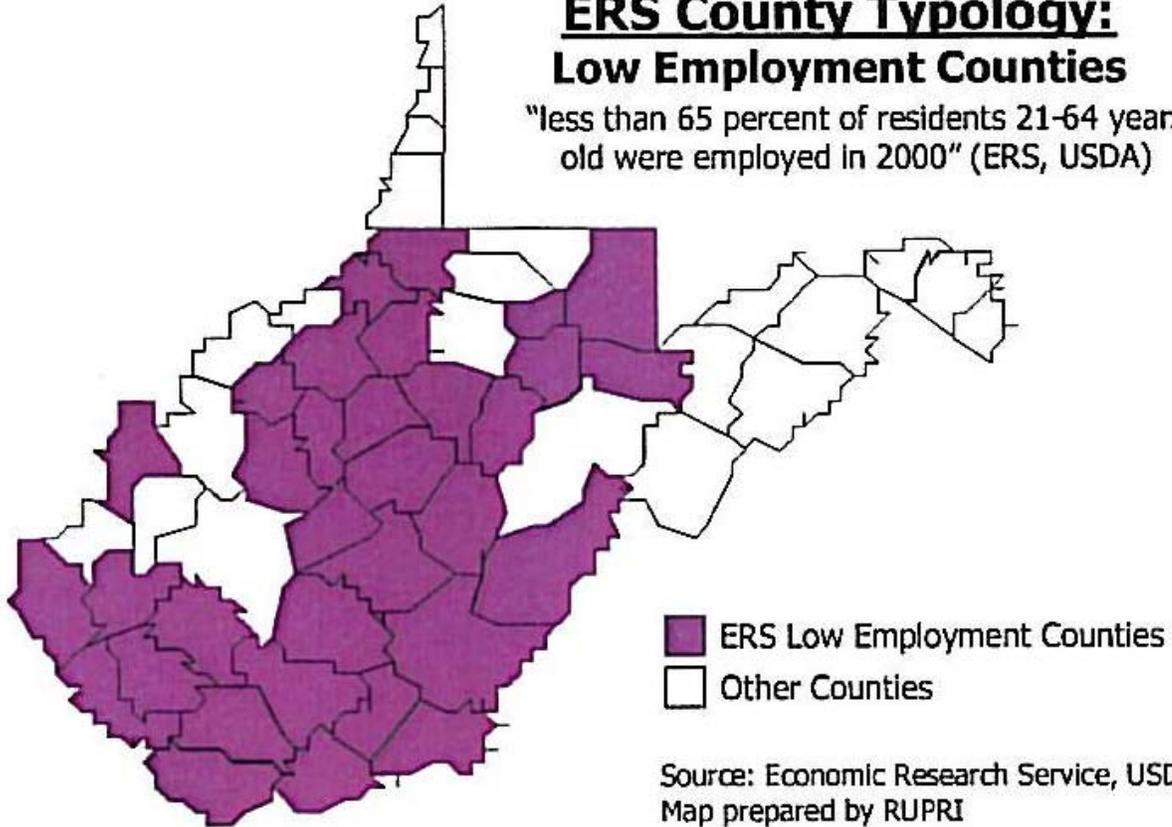
**APPALACHIAN REGIONAL
COMMISSION DISTRESSED COUNTIES
IN WEST VIRGINIA 2005-2006**

FILE 8-5x11_ELL_WVDistCnty.mxd
DATE AR 02/10/2009

FIGURE 3.8-3

ERS County Typology: Low Employment Counties

"less than 65 percent of residents 21-64 years old were employed in 2000" (ERS, USDA)



SCALE N.T.S.

TO BE PRODUCED AT 8-1/2X11IN



REFERENCE

RUPRI, 2006.

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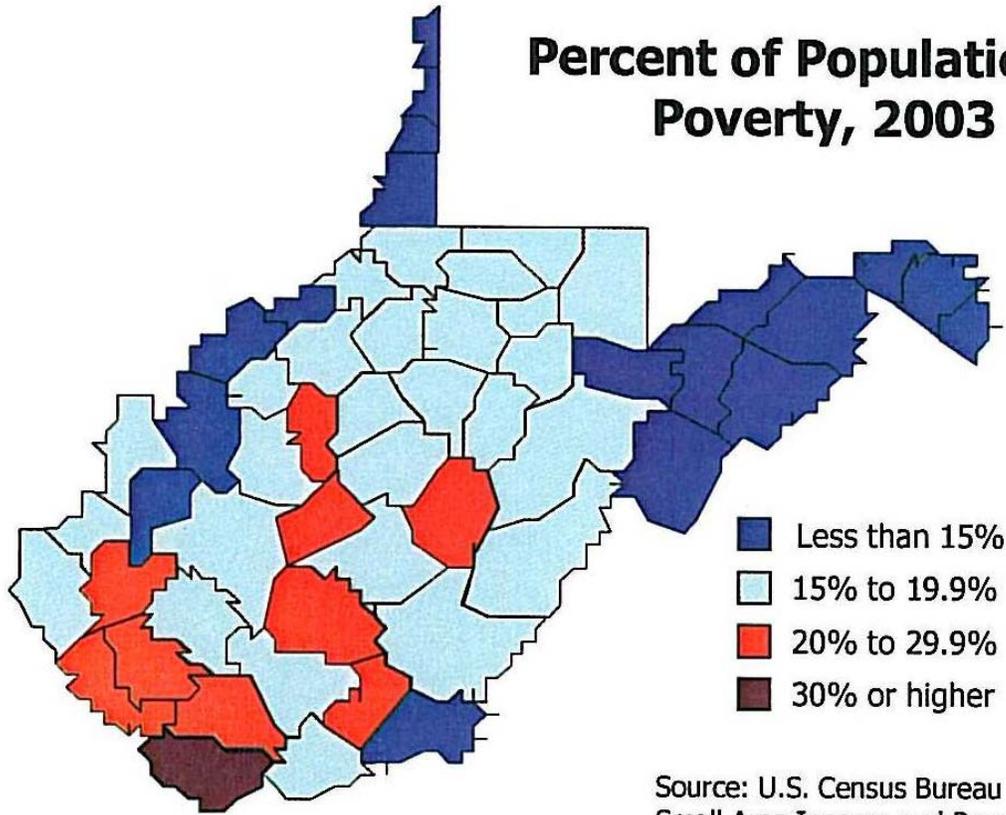
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FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

LOW-EMPLOYMENT COUNTIES IN WEST VIRGINIA, 2000

FILE 8-5x11_ELL_WVEmploy.mxd
DATE AR 02/10/2009

FIGURE 3.8-4

Percent of Population in Poverty, 2003



Source: U.S. Census Bureau
Small Area Income and Poverty Estimates
Map prepared by RUPRI

SCALE N.T.S.

TO BE PRODUCED AT 8-1/2X11IN



REFERENCE

RUPRI, 2006.

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BUREAU OF LAND MANAGEMENT
FLUA/FEIS FOR THE EAST LYNN LAKE COAL LEASE
WAYNE COUNTY, WV

**PERCENT OF POPULATION IN
POVERTY FOR THE STATE OF
WEST VIRGINIA, 2003**

FILE 8-5x11_ELL_WVPoverty.mxd
DATE AR 02/10/2006

FIGURE 3.8-5

