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ENVIRONMENTAL ASSESSMENT
BURNOUT CREEK SUBSIDENCE
AND
UPPER HUNTINGTON CANYON ENHANCEMENT
MANTI-LA SAL NATIONAL FOREST
PRICE RANGER DISTRICT
EMERY COUNTY, UTAH

RECEIVED

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DIVISION OF
OIL, GAS & MINING

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CHAPTER I

PURPOSE OF AND NEED FOR ACTION

PROPOSED ACTION

Pursuant to Special Coal Lease Stipulation # 9 of Appendix B of the Manti-La Sal National Forest Land and Resource Management Plan (Forest Plan), the Forest Service is considering approval of underground mining operations that could result in subsidence of a perennial stream. More Specifically, the proposed action for this analysis is that Utah Fuel Company proposes to longwall mine two coal seams which underlie perennial reaches of the Burnout Creek drainage on Federal Coal Lease U-044076. The mining would be full extraction, thereby subsidizing the drainage. This proposed action would include the study, mitigation, and contingency plan as outlined by Utah Fuel in their letter (see Appendix A) of June 15, 1992, and later amended.

The proposed activity is located approximately 23 air miles west northwest of Price, Utah, or about 6 miles southwest of Scofield Reservoir on the Wasatch Plateau, in reaches of Sections 26, 34, and 35, T.13S., R.6E., Salt Lake Meridian, Emery County, Utah (see Figures I-1 and I-2, Project Vicinity Maps).

The initial Mining and Reclamation Plan for Utah Fuel's Skyline Mine was approved in 1979 Based on and Environmental Assessment prepared by the Forest Service and an EIS for the Federal Coal Management Program prepared by the Department of Interior in 1979. Since that time, Utah Fuel has been planning to longwall mine under Burnout Creek. The company planned their mine sequencing, personnel, equipment, and cost amortization based on those reserves. At that time, the Burnout drainage was not considered to be perennial. The Manti-La Sal National Forest Land and Resource Management Plan and Final Environmental Impact Statement (Forest Plan and FEIS) completed in 1986, requires specific measures for the protection of perennial drainages. Those specific measures have been made a part of Utah Fuel's Federal Coal Lease U-044076 and their Mining and Reclamation Plan. In 1990, a riparian survey, conducted in support of a FEIS to reroute Questar Pipeline Company's Mainline No. 41 at the Skyline Mine, determined that the lower mile or so of Burnout Creek was perennial.

The upper 2 coal seams beneath perennial reaches of Burnout Canyon are currently planned to be longwall-mined starting this year continuing for up to 10 years (see Figure I-2, Longwall Panel Projections Under Burnout Creek). The upper 2 seams average a combined total of 20 feet in thickness. At a maximum subsidence rate of 70%, the land surface could drop or subside up to 14 feet.

The proposed action would include the following associated components:

Enhancement (Mitigation) - The value of the fishery habitat in Burnout Creek would be quantified. Then another undeveloped or underdeveloped, fishery habitat, within the Upper Huntington Canyon (UHC) drainage, of potentially equal value would be identified and improved. Utah Fuel Company would develop, fund, and implement this enhancement, after review and approval of enhancement activities by the Forest Service.

Study - An intensive stream monitoring program would be conducted before and during the subsidence activity along Burnout Creek. This study would

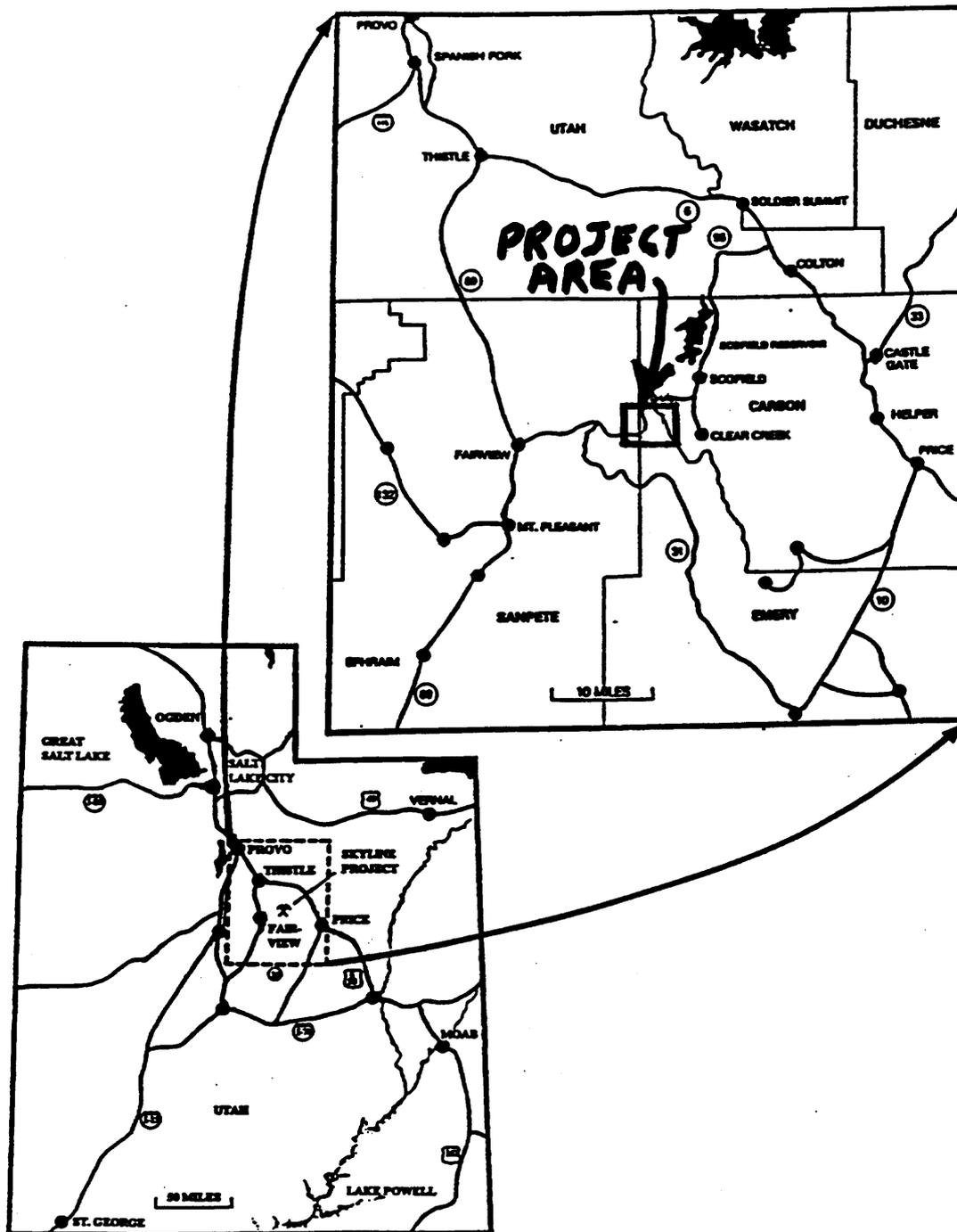
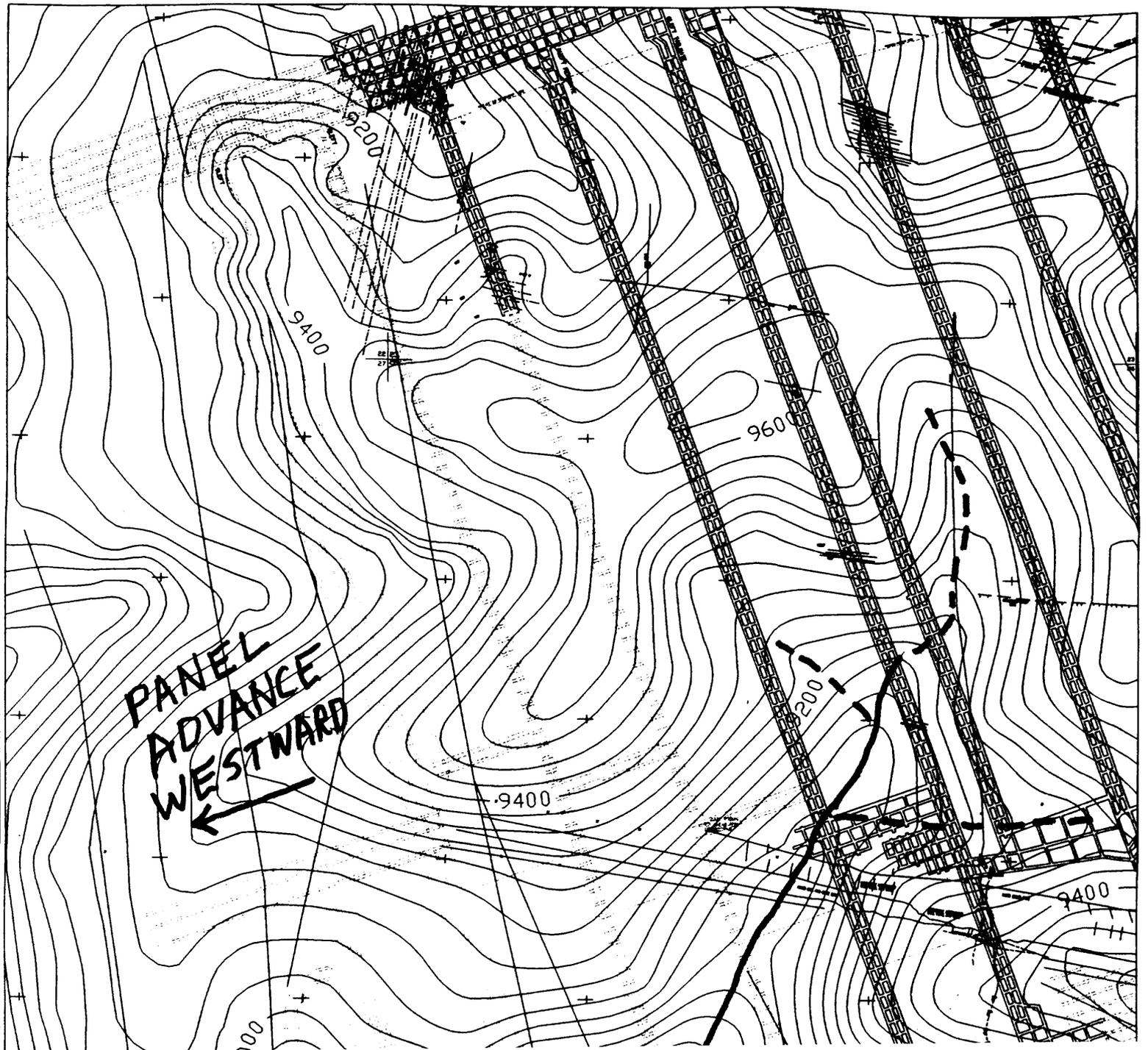


Figure I-1 Project Vicinity Map



PANEL
ADVANCE
WESTWARD
←

9200

9400

9600

9400

200

9400

100

27

include thorough documentation of the areas subsided and amount of subsidence which occurred. The effect of subsidence on flow, stream morphology and spawning habitat would be monitored. Skyline Mine would work with the Forest Service Intermountain Research Station to develop, fund, and implement this study.

Mitigation (Contingency Plan) - Timely mitigate or repair notable damage which does occur from subsidence. These mitigation measures would include means to control sediment and reestablish stream flow that may be affected.

If the proposed action is implemented, longwall mining and enhancement activities would occur within 18 months. The proposed management activities would be administered by the Price Ranger District of the Manti-La Sal National Forest.

PURPOSE AND NEED

The proposed action will conform to the overall guidance of the Forest Plan approved in 1986. The guidance is provided within the goals, objectives, standards and guidelines, and management area direction of the Forest Plan. The Forest Plan and its accompanying Environmental Impact Statement (EIS), to which this document is tiered, are on file and available for review at the Price Ranger District's Office, Manti-La Sal National Forest Supervisor's Office, and the Forest Service Intermountain Regional Office.

More specifically, the proposal has the following purpose:

- * To maximize resource (coal) recovery while maintaining or improving water quality, sediment threshold limits, instream flow standards, vegetation, fish and wildlife habitat.
- * To gain a better understanding of the surface effects of mining-induced subsidence which can be used by the Forest Service (Manti-La Sal National Forest) and others in future planning and decision making.

SCOPE OF THE ANALYSIS

In determining the scope of action, the alternatives and the impacts to consider in this Environmental Assessment (EA), the Interdisciplinary Team (IDT) applied the principles of the regulations implementing the National Environmental Policy Act (NEPA), 40 CFR 1508.25.

An EA is not a decision document. It is a document disclosing the environmental consequences of implementing the alternatives being considered, including the No Action Alternative. After completion of the EA, the Deciding Official will issue a Decision Notice. If the Deciding Official selects an action alternative, implementation of the activities specifically identified would begin within the next 3 years without further NEPA documentation.

The scope of this analysis includes two types of actions, two types of alternatives, and three types of impacts. They include actions which may be:

Connected Actions. These actions are closely related and therefore should be discussed in the same disclosure document. Actions are connected if they: automatically trigger other actions which may require environmental impact statements (EIS'S); cannot or will not proceed unless other actions

are taken previously or simultaneously; or, are interdependent parts of a larger action and depend on the larger action for justification.

The proposed action includes those activities necessary to fulfill the identified purpose and need, as well as all connected actions as identified in the alternatives described in Chapter II. Actions necessary to meet the purpose and need include approval, longwall mining, and subsidence. Connected actions as defined above include enhancement and study, as well as all management requirements, Best Management Practices, and mitigation measures described in the alternatives. We are not aware of any other connected actions.

Cumulative Actions. These actions, when viewed with other proposed actions, have cumulatively significant impacts and should therefore be discussed in the same document. The scope of the analysis includes past, present, and reasonably foreseeable future actions, which may be cumulative in nature, and also includes cumulative actions occurring or proposed on other lands.

Similar Actions. These actions, when viewed with other reasonably foreseeable or proposed actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.

Mining and its effects are being analyzed across the Manti-La Sal National Forest in several areas; however, approval to subside in accordance with Special Stipulation No. 12 (Stipulation # 9 from the Forest Plan mentioned above) of Federal Coal Lease U-044076 has only been requested in this specific area. Therefore the effects of these mining activities are specific to this action and are not cumulative in nature. Combining unrelated mining analyses is unnecessary and would reduce our ability to fully address the specific impacts and alternatives relevant to the proposed action.

Two types of alternatives were considered in the analysis, including a no action and other reasonable action alternatives. Site-specific mitigation measures are discussed for each action alternative in Chapter II.

Three types of impacts are considered in the analysis, including those which are direct, indirect, and cumulative, pursuant to 40 CFR 1508.7 and 40 CFR 1508.8. These impacts are described below and are discussed in Chapter IV.

Direct effects are caused by the action and occur at the same time and place.

Direct effects on all resources were analyzed for all proposed actions and connected actions described in the alternatives, Chapter II.

Indirect effects are caused by the proposed action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Indirect effects on all resources were analyzed for the proposed actions and connected actions described in the alternatives, Chapter II. Direct and indirect effects are considered equally in the analysis and are not specifically identified or disclosed separately.

Other management activities, including timber harvest, road construction, and permitted livestock grazing have occurred in the area on the National Forest as well as private lands.

Each aspect of a resource can be affected by activities occurring within a period of time or area of influence. This area of influence, or area of potential **cumulative effect**, is different for each resource. Chapter II describes the spatial and temporal scope of the cumulative effects area. The effects of all past, present, and reasonably foreseeable future actions occurring within these areas were considered. Past, present, and reasonably foreseeable future actions occurring on all ownerships are considered in the effects analysis.

CHAPTER II

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

Three alternatives are considered in detail: a no action alternative (A) and two other action alternatives (B and C). Action alternatives would allow the mining to occur with or without the implementation of the study, enhancement, and mitigation. These alternatives present the Deciding Officer with a reasonable range of alternatives from which to choose.

MANAGEMENT HISTORY OF PROJECT AREA

The character of the area is derived from the influence of past wildfires, timber harvest, wildlife and livestock grazing, and natural gas pipeline construction.

Management emphasis units within the project area include: RNG (Range Forage Production), TBR (Wood Fiber Production and Utilization), RPN (Riparian), WPE (Watershed Protection and Improvement), and UDM (Undeveloped Motorized Recreation Sites). The requirements for each management unit as defined in the Forest Plan, consist of a prescription summary and a set of management requirements. The prescription summary identifies the primary emphasis of the prescription. All prescriptions allow for multiple-use with the application of management requirements for non-emphasis activities.

The project area occurs within the Burnout S&G, the Boulger S&G, and the Bear Canyon S&G Allotments. The Burnout S&G Allotment has 1,934 sheep permitted to graze from 7/1 to 9/25. The Boulger S&G Allotment has 826 head permitted to graze from 7/6 to 9/25. The Bear Canyon S&G Allotment has 1,024 head permitted to graze from 7/1 to 9/30. Based on recent studies, the grazing capacity on Bear Canyon and Burnout allotments appear to be in equilibrium with permitted use while Boulger is slightly overstocked. The area has been grazed by livestock for well over a century.

Coal exploration and leasing have occurred in the area over the past 30 years while oil and gas leasing, exploration and development have occurred since the early '50s. Gas transmission pipelines cross the area which is mostly underlain by mineable seams of coal. Utah Fuel Company acquired the coal leases and began development in the early '80s. Dozens of environmental analyses documents have been prepared for these activities over the years. At Utah Fuel's request, Questar Pipeline Company (Mountain Fuel's parent company) submitted an application in 1989 to relocate a portion of their Mainline No. 41

to areas underlain by mostly unmineable coal. An EIS was prepared, Questar's application was approved, and the pipeline was moved the following year.

The ID Team has reviewed these environmental analyses for relevancy to the proposed action. It was decided to conduct a new analysis based on the need for updated information to make a sound resource decision.

PUBLIC PARTICIPATION

Before the alternatives were developed, public issues were identified by a public participation process, required by NEPA. As a part of this effort, the Forest Service invited participation from other agencies, interested groups, and individuals. The ID Team then determined the scope of the issues to be addressed and identified the significant issues related to the proposed action.

The scoping process began on June 23 of 1992 with a legal notice published in the Price Sun Advocate that described the proposed action, objectives, and need for the Forest Service to conduct an environmental analysis. A scoping letter was sent by Charles J. Jankiewicz, Price District Ranger, on July 1, 1992 to 21 individuals, groups and other agencies believed to be interested in this project. On November 19, 1992, the proposal was included in an "Environmental Status Report" that was mailed to 75 addressees on our mailing list. This report listed projects being planned, an overview of each project, and the contact person serving as the Interdisciplinary Team Leader for this analysis, Walt Nowak.

The scoping letter received 5 responses from: the Utah Division of Wildlife Resources, the Utah Division of Water Rights, Sanpete County Commissioners, Huntington-Cleveland Irrigation Company, and Questar Pipeline Company. The ID Team analyzed the proposed action and with the comments developed the issues.

ISSUES

The five responses received from the public scoping process, along with issues identified by the Forest Service, the Bureau of Land Management, and Utah Fuel Company were used by the ID Team in determining the following issues relative to the proposed action. The content of the comments was analyzed for the identification and/or verification of environmental issues. Issues raised but not identified as key issues will be categorized as either issues resolved through normal mitigation practices, or issues which would be common to all alternatives.

Issue: Mining Economics

This issue includes loss of Federal coal, loss of royalty, loss of jobs, and shortening of mine life if the upper 2 seams of coal are not longwall-mined.

The mining economics issue will be measured in tons of available coal, revenue to Federal, State and local governments, number of jobs, and projected mine life in comparing alternatives.

Issue: Fish Habitat and Water Quality

This issue includes spawning and rearing habitat for the Yellowstone Cutthroat Trout and sediment load and movement.

Alternatives would be compared by measuring amount of available habitat and evaluating changes in channel morphology, changes in sediment load, water loss, and loss of fish production.

Issue: Information on Subsidence

There currently exist a lack of data to determine the effects to perennial drainages caused by longwall mining-induced subsidence. As a result, all potentially-impacted, perennial waters are currently given blanket protection by allowing only full-support coal mining to occur in these areas. The hydrologic study would provide these data for posterity, regarding loss or diversion of water and changes to channels and riparian vegetation which could affect fish and wildlife habitat and forage for livestock, so that more informed decisions can be made about future allowable mining.

Evaluation will include whether or not information will be gathered to make future decisions to allow subsidence to occur under other perennial stream reaches.

ISSUE COMMON TO BOTH ACTION ALTERNATIVES

Mining-induced subsidence could cause cracking of the ground surface and unstable slopes which could pose safety hazards to humans and animals.

Evaluation would recognize whether or not safety hazards could occur by alternative.

ISSUES RESOLVED THROUGH EXISTING MITIGATIONS

Issue: Water Rights

The Utah Division of Water Rights has stated that they should be contacted prior to developing any replacements for the existing 12 Forest Service water rights for developments in Burnout Canyon. This is standard Forest Service operating procedure and is further supported by the terms and conditions of Skyline Mine's existing Federal coal leases and their approved Mining and Reclamation Plan.

Issue: Wildlife Resources

In the Utah Division of Wildlife Resources' scoping response letter dated 7/14/92, they raised several concerns: stream channel stability and morphology, water abundance, impacts to fish and other aquatic organisms, water quality, riparian community, monitoring, and mitigation. These concerns have mostly been covered by the 3 Issues mentioned above, and with the terms and conditions of Skyline Mine's Federal coal leases and their approved Mining and Reclamation Plan, are fully covered.

Issue: Transbasin Diversion of Water

Huntington-Cleveland Irrigation Company has raised the concern about water within the Burnout drainage (that would normally flow into Huntington Creek) being diverted into the Skyline Mine workings that could eventually be discharged into the Price River drainage. Standard terms and conditions of Skyline Mine's Federal coal lease terms and their approved Mining and Reclamation Plan mandate full replacement in quality and quantity of any water affected by their mining operations.

Issue: Impacts to Mainline no. 41

Questar Pipeline Company is concerned about the integrity of their Mainline no.41. In their letter dated 7/20/92 they later recognize that after they had contacted Utah Fuel Company, there would be no effect. Also, full protection of their pipeline is covered by the terms and conditions of Skyline Mine's Federal coal leases and their approved Mining and Reclamation Plan.

FORMULATION OF THE ALTERNATIVES

In developing alternatives, the ID Team considered issues identified during public scoping while addressing the objectives of the proposed mining.

ALTERNATIVES CONSIDERED IN DETAIL

The following is a brief narrative of each alternative. These narratives define and show the focus of each alternative.

ALTERNATIVE A

NO ACTION

The proposed action would not be implemented with Alternative A. In addition to being a viable choice for the decision-maker, this alternative provides a baseline for estimating the relative effects of other alternatives. It allows the decision-maker and the public to compare the overall effects of the action alternatives against the effects of allowing only full-support mining with no subsidence to perennial reaches of the Burnout drainage.

The existing conditions of Upper Huntington Canyon area would continue. Changes would occur in the area, slowly over time, and would be influenced primarily by natural forces; barring any notable events (e.g. major fires, extreme weather conditions).

Up to 2 million tons of coal would be excluded from future recovery and approximately \$4 million in lost royalty would not benefit Federal, State, and local governments. The life of the Skyline Mine would be shortened by approximately one half year and approximately 125 work-years would be lost. The hydrologic study would not be conducted and Forest Service management practices regarding future protection of perennial waters would remain unchanged. Enhancement of the fishery and riparian values would not occur in the Upper Huntington Canyon area.

KEY POINTS

- * Loss of: \$4 million in royalty, up to 2 million tons of coal, and 125 work-years. Mine life would be shortened by about one half year.
- * Existing conditions maintained: no subsidence, protection of perennial waters, no enhancement of Upper Huntington Canyon.
- * Management practices remain unchanged without analysis of hydrology study data that may indicate that practices could be changed.

Under this alternative, no new mitigation measures would be developed. Existing measures contained in Federal Coal Lease U-044076 and the approved Skyline Mining and Reclamation Plan would suffice to protect the environment.

ALTERNATIVE B PROPOSED ACTION: LONGWALL MINE UNDER AND SUBSIDE PERENNIAL REACHES OF BURNOUT CREEK WITH THE HYDROLOGIC STUDY, ON-SITE MITIGATION, AND OFF-SITE ENHANCEMENT.

Under this alternative, approval would be granted to Utah Fuel Company to longwall mine under and subside perennial reaches of Burnout Creek pursuant to Special Stipulation 9 from Appendix B of the Forest Plan. Mining would begin this year and last for up to 10 years. Full-extraction mining would occur in 2 seams, recovering up to 2 million tons of coal. Approximately \$4 million dollars in royalty would be paid by Utah Fuel, benefitting Federal, State and local governments. Mine life would not be shortened nor would jobs be lost.

An associated component of the proposed action is a hydrologic study of Burnout Creek which would be conducted during subsidence activity. This study would include thorough documentation of the areas subsided and the amount of subsidence which occurred. The effect of subsidence on flow, stream morphology and spawning habitat would be monitored. Utah Fuel has been working with the Forest Service Intermountain Research Station to develop, fund, and implement this study. The research proposal developed by Dr. Roy Sidle of the Station is included as Appendix A. The results of this study would help the Forest Service and other land management agencies make future decisions regarding subsiding perennial waters.

Another component of the proposed action would include off-site mitigation or enhancement elsewhere in the Upper Huntington Canyon drainage. The value of the fishery habitat in Burnout would be quantified. Then another undeveloped or underdeveloped habitat in the Upper Huntington drainage of equal or greater value than Burnout would be identified and improved. Utah Fuel would develop, fund, and implement this enhancement after review and approval by the Forest Service. Utah Fuel has already hired a consultant, Dr. Richard Valdez, who developed a plan for fish passageability in Boulger Creek. This plan, as amended, is Utah Fuel's proposal for this component and is included in Appendix B (also see Figure II-1).

The last component of the proposed action is on-site mitigation of subsidence caused damage in Burnout. This would be in the form of a contingency or emergency response plan with the Intermountain Research Station, Utah Fuel Company, and the Manti-La Sal as partners. This plan is included in Appendix C in the form of a memorandum of understanding. Basically, the plan calls for regular inspections of the Burnout drainage by any of the 3 partners, immediately notifying the other partners if notable damage is detected, agreeing to meet on-site within 24 hours, and mutually determining, using Best Management Practices, what, if any, mitigation measures should be employed. It is not now known if the existing conditions in Burnout would change.

KEY POINTS

- * Longwall mining would occur, subsiding the Burnout drainage. It is not known if existing conditions in Burnout would be maintained.
- * Up to 2 million tons of coal would be recovered for which Utah Fuel would pay approximately \$4 million in royalties benefitting Federal, State and local governments.
- * A hydrologic study of subsidence effects in the Burnout drainage would be completed. The results of this study would help guide future decisions regarding mining under perennial waters.

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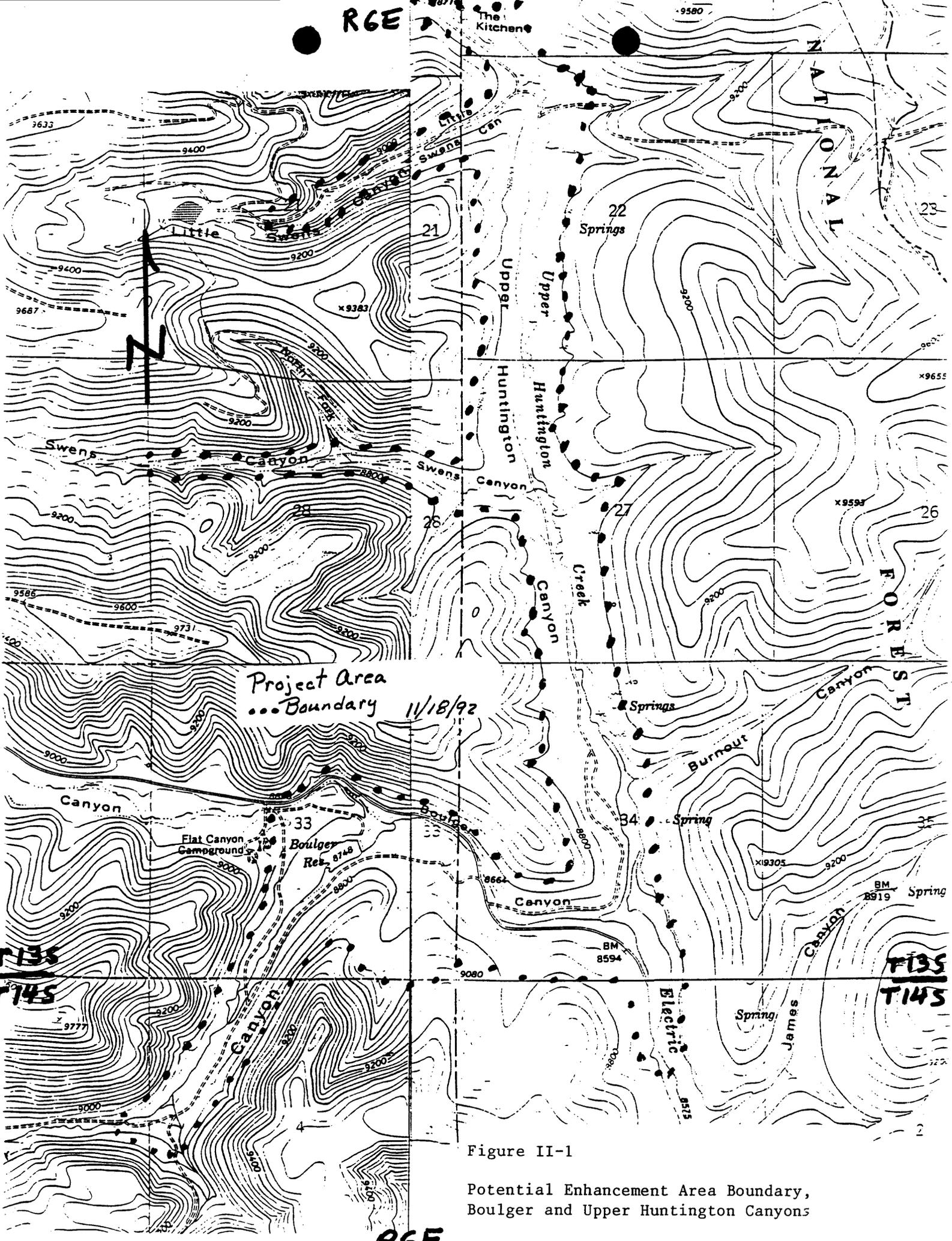


Figure II-1
 Potential Enhancement Area Boundary,
 Boulger and Upper Huntington Canyons

R6E

- * The enhancement proposed by Utah Fuel would provide a net benefit to the Upper Huntington Canyon hydrological and fishery values.
- * The memorandum of understanding covering the contingency plan would provide on-site mitigation in Burnout Canyon using Best Management Practices in a much more timely and responsive fashion than that required by existing mitigations.

Providing that the hydrologic study is completed and the enhancement and contingency plans are implemented (Appendices A, B, and C), no additional mitigation measures are required for this alternative. Existing measures contained in the Mining and Reclamation Plan and Skyline's coal lease are sufficient to protect the environment.

ALTERNATIVE C LONGWALL MINE UNDER AND SUBSIDE PERENNIAL REACHES OF BURNOUT CREEK WITHOUT THE HYDROLOGIC STUDY, ON-SITE MITIGATION, OR OFF-SITE ENHANCEMENT.

This alternative was developed by the ID Team to provide a comparison of the relative effects of the other alternatives. It does not completely fulfill the Purpose and Need described in Chapter 1; in that it doesn't fully provide for maintenance or improvement of water quality, sediment threshold limits, instream flow standards, vegetation, nor fish and wildlife habitat. It does not respond to the overall guidance of the Forest Plan. It allows the decision maker and the public to compare the no action and proposed action alternatives with not having the hydrologic study nor the enhancement and contingency plans, yet still allowing longwall mining under perennial reaches of Burnout.

Like Alternative B, this alternative would grant approval to Utah Fuel to longwall mine under and subside perennial reaches of the Burnout drainage pursuant to Special Stipulation No. 9 from Appendix B of the Forest Plan. Mining would begin this year and last for up to 10 years. Recovery of up to 2 million tons of coal would occur in 2 seams using longwall mining methods. Approximately \$4,000,000 in coal royalty paid by Utah Fuel would benefit Federal, State, and local governments. Mine life would not be shortened and jobs would not be lost.

The hydrologic study in Burnout would not be conducted and Forest Service management practices would be changed to allow longwall mining under perennial waters. Enhancement of the riparian and fishery values would not occur in the Upper Huntington Canyon area. Currently unknown environmental impacts could occur in Burnout Canyon. When discovered, any notable changes in Burnout would be mitigated using the standard practices contained in Skyline's Mining and Reclamation Plan and their Federal Coal Lease.

KEY POINTS

- * Longwall mining would occur, subsiding the Burnout drainage. It is not known if existing conditions in Burnout would be maintained.
- * Up to 2 million tons of coal would be recovered for which Utah Fuel would pay approximately \$4 million in royalties benefitting Federal, State, and local governments.
- * There would be no enhancement of fishery and riparian values in Upper Huntington Canyon.

- * Management Practices remain unchanged without analysis of hydrologic data from the study that may indicate practices could be changed.

Under this alternative, no new mitigation measures would be developed. The existing measures contained in Federal Coal Lease U-044076 and the approved Skyline Mining and Reclamation Plan (M&RP) would be sufficient to protect the environment with the possible exception of the fishery and water quality values in the Burnout drainage. Mitigation measures contained in the M&RP and the lease that protect perennial waters in Burnout would be relaxed to allow longwall mining to occur.

MONITORING COMMON TO BOTH ACTION ALTERNATIVES

Project implementation of activities and their effects would be monitored in accordance with the monitoring and evaluation requirements identified in Table IV-1, Forest Plan Monitoring and Evaluation Program on pages IV-3 through IV-13 of the Forest Plan. Project preparation is monitored to ensure appropriate Forest Plan standards and guidelines are being met and that project-specific mitigation measures are being incorporated. During and after project implementation, monitoring and evaluation continually occurs to determine if any adjustments are necessary. Outputs, environmental effects, and costs are all considered in monitoring and evaluation. Project-specific monitoring and evaluation records are maintained.

ALTERNATIVE CONSIDERED, BUT NOT GIVEN DETAILED STUDY

The ID Team evaluated one alternative which was eliminated from detailed study.

Staged approval of longwall mining under perennial reaches of the Burnout drainage with the hydrologic study, the enhancement plan, and the contingency plan. This would allow longwall mining on a panel-by-panel, seam-by-seam basis depending on whether or not notable damage occurred in Burnout Canyon. This alternative was initially considered before the contingency plan was in place or fully understood. Since the contingency plan is, in essence, staged approval; this alternative was eliminated from further detailed analysis.

COMPARISON OF THE ALTERNATIVES CONSIDERED IN DETAIL

This section briefly compares how each of the alternatives responds to the issues. A comparison of activities and environmental effects can be found in Table II-1 at the end of this chapter.

Issue: Mining Economics

Alternative A: would not make available for mining up to 2 millions tons of recoverable coal. Approximately \$4,000,000 in coal royalty would not be collected, thereby not benefitting Federal, State, and local governments. Life of the Skyline Mine would be shortened by almost one half year and there would be a loss of 125 work years.

Alternatives B and C: would allow recovery of up to 2 million tons of coal for which the Skyline would pay about \$4,000,000 in royalties benefitting Federal, State, and local governments. Life of the Skyline Mine would not be shortened by almost one half year and 125 years of labor would not be lost.

Issue: Fish Habitat and Water Quality

Alternative A: This alternative would allow for full protection of surface resources with no impacts in Burnout Canyon caused by mining. Fish habitat, stream morphology, sediment load, stream flow, and fish production in the Upper Huntington Canyon drainage would not be affected under this alternative. The Upper Huntington drainage would not be enhanced and the on-site mitigation or contingency plan for Burnout drainage would not be needed.

Alternative B: This alternative would allow for longwall mining to occur in Burnout Canyon with on-site mitigation and off-site enhancement in the Upper Huntington Canyon drainage. With enhancement in the Boulger drainage, about 15,000 feet of stream and tributary habitat would be made available to fish from Electric Lake for spawning and rearing. About 4,000 feet of habitat in Burnout within the area to be subsided could be adversely impacted with an additional one half to one mile below the subsided area (down to Electric Lake) also potentially being impacted, depending on Electric Lake's level. This would mean a net beneficial impact of from about 5,700 to 8,400 feet of new spawning and rearing habitat made available to the Yellowstone Cutthroat Trout. Stream morphology could change in Burnout Creek and would change in Boulger Creek with enhancement. Sediment load could increase in Burnout, but could possibly be mitigated by a timely and responsive implementation of the contingency plan. A short-term increase in sediment in the Boulger drainage would occur during surface-disturbing, enhancement activities, but in the long-term, a decrease in sediment would occur throughout the Upper Huntington Canyon drainage. Stream flow could be interrupted in subsided areas of Burnout which would eventually be restored through mitigation. An interruption to flow could cause loss of an entire year's fish production with a replacement cost valued at \$5,286. If all of the habitat made available in Boulger through enhancement were to be used by Yellowstone Cutthroat Trout, the gain in fish production value could equal or exceed this amount; however those fish within Burnout Creek would still need to be replaced once conditions would support the fish.

Alternative C: This alternative would allow for longwall mining to occur in Burnout Canyon without on-site mitigation and without off-site enhancement in the Upper Huntington Canyon drainage. Total fish habitat in Upper Huntington Canyon could decrease by 4,000 feet in the area to be subsided in Burnout with an additional one half to one mile downstream potentially being adversely impacted, depending on the level of Electric Lake. This approximates a range of 6,700 to 9,300 feet of spawning and rearing habitat for the Yellowstone Cutthroat Trout that could be adversely impacted. Stream morphology in Burnout could change. Sediment load could increase in Burnout which would be mitigated by existing stipulations if Skyline's existing hydrologic monitoring were to show that it was caused by mining. Stream flow could be interrupted in subsided areas of Burnout which would be restored through existing mitigation but would be less timely without the contingency plan. An interruption to flow could cause loss of an entire year's fish production with a replacement cost valued at \$5,286.

Issue: Information on Subsidence

Alternatives A and C: With these alternatives, standard hydrologic and subsidence monitoring would continue as currently required by Skyline's M&RP and Federal coal lease stipulations. Although the data gathered from

monitoring is helpful, it is currently insufficient to determine the effects of mining-induced subsidence on the hydrologic regime. Without knowing these effects, the Forest Service would not be able to make future decisions that would allow subsidence under perennial waters.

Alternative B: With this alternative, the hydrologic study would be conducted in Burnout Canyon. The data from the study would be analyzed and conclusions would be made as to the effects of subsidence on the hydrologic regime. These conclusions on effects would then be coupled with the data from the standard hydrologic and subsidence monitoring that would provide a basis for future decisions that could possibly allow subsidence to occur under perennial waters.

Issue: Geologic Hazards

Alternative A: Under this alternative, the stability of existing slopes and the integrity of the ground surface will remain unchanged in the Upper Huntington Canyon area.

Alternatives B and C: With these action alternatives, Burnout Canyon will be undermined by longwall mining methods possibly causing failure of unstable slopes and cracking of the ground surface. This could pose safety hazards to humans and animals.

SUMMARY COMPARISON OF ALTERNATIVES

A detailed analysis of the environmental consequences or impacts is provided in Chapter IV. Table II-1 on the following page is intended to be a summary to use in relatively comparing alternatives.

**TABLE II - 1
COMPARISON OF ALTERNATIVES BY ISSUES**

ISSUES * Indicators	ALTERNATIVE A NO ACTION: Full Protection	ALTERNATIVE B PROPOSED ACTION: Longwall Mine, Subside Hydrologic Study, Enhancement, and Contingency Plans	ALTERNATIVE C Longwall Mine, Subside, No Hydrologic Study, Enhancement, Nor Contingency Plans
MINING ECONOMICS * Tons of Coal * Royalty to Governments * Planned Mine Life * Jobs	2 Million not available No benefit Shortened by up to 1/2 year Loss of 125 work years	2 Million recovered 4 Million realized No effect No effect	2 Million recovered 4 Million realized No effect No effect
FISH HABITAT AND WATER QUALITY * Available Spawning * Stream Morphology * Sediment Load * Stream Flow * Fish Production	No effect No effect No effect No effect No effect	5,700 to 8,400 feet of new habitat made available Could change in Burnout, would change in Boulger. Short-Term increase in Boulger and Burnout, long-term decrease in Upper Huntington Canyon with contingency and enhancement plans. Short-Term interruption could occur in Burnout. Could equal or exceed existing production in Upper Huntington Canyon.	6,700 to 9,300 feet of habitat could be lost Could change in Burnout Short-to-mid term increase in Burnout. Short-to-mid term interruption could occur in Burnout. Loss of an entire year's production could occur in Burnout.
INFORMATION ON SUBSIDENCE	Effects of subsidence on the hydrologic regime would not be determined.	Effects of subsidence on the hydrologic regime would be determined through the hydrologic study.	Effects of subsidence on the hydrologic regime would not be determined.
GEOLOGIC HAZARDS	No effects	Could cause failure of unstable slopes and ground cracking.	Could cause failure of unstable slopes and ground cracking.

CHAPTER III

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter summarizes Forest Plan management direction for lands within the project area and describes the existing physical, human, and biological components of the environment that may be affected by implementation of any of the alternatives. The discussion focuses on the resources related to issues identified in the scoping process and other potentially affected resources.

FOREST PLAN MANAGEMENT DIRECTION

The Forest Plan guides all natural resource management activities and establishes management standards for the lands administered by the Manti - La Sal Forest Supervisor. This document is tiered to the Forest Plan and Forest Plan EIS. Forest-wide goals, objectives, and standards are found in Chapter III of the Forest Plan, pp-1 to pp-97.

Forest-wide management goals most applicable to this proposal include:

- * Provide for the interpretation of surface and subsurface geologic conditions and processes such as landsliding.
- * Manage geologic resources, common variety minerals, ground water, and underground spaces (surficial deposits, bedrocks, structures, and processes) to meet resource needs and minimize adverse effects.
- * Provide appropriate opportunities for and manage activities related to locating, leasing, exploration, development, and production of mineral and energy resources.
- * Ensure that adequate reclamation of disturbed areas is accomplished.
- * Generally place priority on restoration of existing facilities (recreational) presently below standards.
- * Maintain or improve fisheries habitat.
- * Maintain satisfactory watershed conditions.
- * Provide favorable conditions of water flow (quality, quantity, timing).
- * Protect soil and water productivity so that neither will be significantly or permanently impaired.
- * Protect and enhance riparian areas including dependent sources.
- * Provide opportunities for public participation in the evaluation of proposed Forest activities.
- * Manage to provide public (user) health and safety.

DESIRED FUTURE CONDITION

Chapter III of the Forest Plan establishes specific Desired Future Conditions for wildlife and fish, soil and water, and coal that are appropriate for this proposed action. They are:

Wildlife and Fish Appropriate habitat management would maintain viable populations of existing vertebrate species.

Fisheries habitat would gradually increase by improving habitat in suitable marginal and unsuitable lakes and reservoirs, and completing stream and riparian improvement projects. Riparian habitat could be maintained and its condition improved.

Soil and Water Water quality and soil productivity would be maintained or improved. Other identified watershed improvement needs would be completed at a reasonable rate throughout the planning period, which would reduce soil erosion and stream sedimentation. Future resource uses or activities would be executed so as to minimize impacts to soil and water quality. The soil and water resource inventory and monitoring would be used in activity design and implementation.

Coal Subsidence and the resource monitoring programs, required for approval of mine plans, would provide the necessary data to create models for predicting subsidence and the related impacts for evaluating future leases and/or mining operations.

MANAGEMENT AREA DIRECTION

Chapter III of the Forest Plan establishes specific goals and standards for each of the 15 Management Units (MU's) that have been categorized on the Forest. MU's are geographic sub-units of the Forest with different management emphases. The project area in Upper Huntington Canyon contains 5 MUs: Range Forage Production (RNG), Wood Fiber Production and Utilization (TBR), Riparian (RPN), Watershed Protection and Improvement (WPE), and Undeveloped Motorized Recreation Sites (UDM). General direction for minerals activities in these MUs as defined in the Forest Plan is:

RNG - Provide appropriate mitigation measures and to assure continued livestock access and use.

RNG - Those authorized to conduct developments will be required to replace losses through appropriate mitigations, where a site-specific development adversely affects long-term products or management.

TBR - None.

RPN - Avoid and mitigate detrimental disturbance to riparian by mineral activities. Initiate timely and effective rehabilitation of disturbed sites.

RPN - No surface occupancy or use is allowed in riparian units, or within 200 feet of riparian units, unless it can be demonstrated that operations

can be conducted without causing unacceptable impacts, in which case, the restriction can be waived, accepted, or modified on a site-specific basis.

WPE - Restore structural watershed improvements impacted by mineral activities, where appropriate.

UDM - Manage mineral activities to be compatible with recreation uses and visual quality objectives.

PHYSICAL AND HUMAN ENVIRONMENT

Geology and Mining

The Upper Huntington Canyon area is centrally located on the Wasatch Plateau, which is a transition zone between the Basin and Range Physiographic Province to the west and the Colorado Plateau Physiographic Province to the east. Elevations in the project area range from 8,575 to a little over 9,500 feet above mean sea level. The topography ranges from narrow ridges having gentle to steep sideslopes with alluvium-covered, flat canyon floors that dissect the plateau.

Strata exposed within the project area consist entirely of the Blackhawk Formation; which is composed of sandstones with intervening beds of shale, siltstone, and limestone that dip gently to the west. The Blackhawk Formation is about 1,300 feet thick in the Scofield area and contains several thick coal seams.

Many of the steep or wet areas within the project area show evidence of slope instability. When the beds within a formation dip in the same direction as the topography (adverse dip), the potential for slope failure increases. The upper reach of Burnout was classified by Dr. Sidle as having moderately unstable slopes. He also classified lower Burnout and all of James Canyons as being slightly unstable.

The project area is located in the Wasatch Plateau Coal Field. Up to 4 mineable coal seams occur beneath Burnout Canyon within the Skyline Mine permit area. Currently Skyline Mine plans to mine the upper 2 seams using longwall mining methods over the next 10 years, and the lower 2 seams by room and pillar methods, if feasible. Using longwall mining methods in the upper 2 seams makes available for extraction up to 2 million additional tons of coal over using full support (room and pillar) methods. The current royalty rate for coal is about \$2.00 per ton. The upper 2 seams average 9 and 11 feet in thickness and lie about 500 to 600 feet beneath perennial reaches of Burnout Creek. The maximum subsidence rate of overburden using longwall mining methods is 70% of the seam thickness removed.

Skyline mine currently employs about 250 workers. Their rate of mining coal is about 5 million tons per year. As of January, 1993, they estimated their approximate recoverable reserves at 70 million tons, including the aforementioned 2 million tons.

Soils

Burnout Canyon Area

The soils in the area are on mountain ridges, gentle to steep sideslopes, and in valley drainages with flat bottoms, at mid-to-high elevations. On the

higher mountain ridges, the soils range from deep to shallow, with the deep soils comprising about 40% of the surface area. The shallow soils (less than 20 inches to bedrock) occupy about 25% of the ridge areas. The soils are loamy, with a high content of coarse fragments in the shallow soils. The deep soils have loamy surfaces over clay loam subsoils.

The soils on the north-facing sideslopes have a dense conifer cover with litter layers on the surface. About half of these north slope soils have loamy surfaces over very cobbly, loam subsoils. The surface layers of most of the soils have been leached and are grayish to white in color. All the soils are deep or very deep. About 20% have thick dark colored surfaces. These soils are well adapted to growing conifer trees.

Soils on the dominantly south-facing sideslopes have a mixture of aspen, conifer, and mountain brush covers. About half of the soils have white to grayish surfaces over very cobbly subsoils and are deep. About half of the soils have thick dark colored loamy surfaces over clay loam subsoils. Rock fragments, gravel, stones, or boulders occur on the surface of most of the soils.

The soils in the valley bottoms are deep loams over clay loams, some with gravels, cobbles, and some boulders. The water table varies from a few inches to two or three feet in depth. These soils are very productive with water-loving plants, such as sedges and rushes. Disruption of the permanent water table could significantly change the riparian vegetation if the water table is lowered or eliminated.

Boulger Canyon Area

The soils in the riparian zone are very deep and poorly to very poorly drained. Water table depth varies from standing water on the surface to about two feet. About half of the bottomland soils have thick organic layers on the soil surface. About half of the soils have surface soil layers that are loamy and very dark colored. They have subsurface layers that are clay loam over gravelly sands containing gravel and cobble. Half of the soils have clay loam surface layers that are light colored, and have subsurface layers that are clay loam over gravelly sandy loam and gravel.

Hydrology

The freeze free Season approximates 20 to 60 days per year in the Upper Huntington Canyon area. Burnout is tributary to Upper Huntington Creek above Electric Lake in most years. When the lake is full, then Burnout Canyon flows directly into the Lake. James and Boulger Canyons flow directly into Electric Lake. Electric Lake is within the Right Fork of Huntington Creek, tributary to the San Rafael River, tributary to the Green River, which is tributary to the Colorado River.

Burnout, James, Boulger, Swens and Upper Huntington Creeks are perennial. Several perennial springs are being monitored by the mining company. Bedrock dips to the west and many springs emerge from the west facing slopes of Burnout and James Canyons.

Dr. Sidle determined the mean baseflow at the mouth of Burnout Creek to be 0.43 cfs. About 32 pre-mining baseflow readings are available in Burnout Creek. In a 1984 Forest report, the following mean annual water yields were determined:

Subwatershed name	area (acres)	water yield	
		inches/yr	ac.ft.
450 Electric Lake	19,716	12.1	19,839
400 Head of Huntington Cr.	1,913	12.6	1,850
401 Unnamed tributary to Huntington Cr.	897	11.8	884
402 Boulger Creek (including Flat Can.)	3,767	12.3	1,317

Burnout and James Canyons were not identified in the 1984 report but extrapolating from the existing available data:

Burnout Canyon	1,160 acres	1,170 ac.ft.
James Canyon	1,075 acres	1,084 ac.ft.

Largely water quality is excellent when it first appears on the surface on the higher elevations. The streams characteristically gain TDS as they flow downslope but remain of high quality. The TDS ranges about 200 to 400 mg/l. Where the Blackhawk formation is on the surface, high values of phosphate have been found in the water samples. Below the Forest Boundary, in another drainage, the phosphate values are causing high rate of eutrophication in Scofield Reservoir. Sulfate values range up to about 300 mg/l. High values of suspended sediment have been measured during thunderstorms, but the fair weather values are less than 50 mg/l. Sampling above Electric Lake, occasionally finds high values of Total and Fecal Coliform. These values are caused by human pollution -- possibly by recreation use of the riparian zones for camping.

The State of Utah has declared all streams within Utah National Forest boundaries to be anti-degradation segments. In addition they have established the following water quality standards for Huntington Creek from the city of Huntington to the headwaters:

- * Protected for domestic purposes with prior treatment by standard complete treatment processes as required by the Utah Department of Health.
- * Protected for cold water fisheries.
- * Irrigation

From the 1984 Forest report, the following mean annual sediment yields were identified:

Subwatershed name	area (acres)	sediment yield	
		t/sq.mi.	tons
450 Electric Lake	19,716	41	1,260
400 Head of Huntington Creek	1,913	30	90
401 Unnamed tributary to Huntington Cr.	897	25	35
402 Boulger Creek	3,767	69	400

Burnout and James Canyons were not identified in the 1984 report but extrapolating from available data:

Burnout Canyon	1,160 acres	74 tons
James Canyon	1,075 acres	69 tons

Additional information on stream gradient, unit stream power, and riparian community types in Burnout and James Canyons is contained in Dr. Sidle's 1993 report which is available for review at the Forest Service office in Price and at the Intermountain Research Station offices in Odgen and Logan.

Recreation Setting

Possible recreation enhancement work in the Boulger Reservoir Area includes improvement of the access road, parking area, and sanitation facilities around Boulger Reservoir itself and improvements to the road above Boulger Reservoir to the Forks of Boulger Creek.

The area surrounding Boulger Reservoir is currently managed under the Forest Plan as a UDM management unit. UDM areas characteristically receive moderate to heavy levels of use. The Visual Quality Objective (VQO) maintained in the area is for Partial Retention, with a high sensitivity level. This means that man's activities should remain visually subordinate or not evident. The ROS (Recreation Opportunity Spectrum) maintained for the area is Roaded Natural Appearing. Facilities such as Level I or Level II campgrounds, trailheads, local roads, parking lots, and signing may be developed as appropriate.

The area from Boulger Reservoir south along Boulger Creek to the Forks of Boulger Creek is within a TBR management unit. Semiprimitive nonmotorized, semiprimitive motorized, roaded natural, and rural recreation opportunities may be provided. Transportation system management in a TBR unit is directed towards location, design, and construction of the minimum FDR necessary to provide a stable road base to serve short and long term timber needs under the timber sale program. The ROS for this area is also Roaded Natural Appearing. The VQO maintained for this area is Partial Retention, with a medium sensitivity level.

Boulger Reservoir and the Boulger Creek area is currently accessed by FDR 50056. This road is extremely rocky and rough from its junction with SR 264 past the reservoir to the forks of Boulger Creek. Erosion from this road is entering Boulger Creek and being carried into the reservoir or lower down into Electric Lake.

Dispersed recreation use in the area primarily consists of camping and fishing during the summer months, big game hunting/camping in the fall, and cross country skiing and snow machine use in the winter. Campers from Flat Canyon Campground which is located approximately 1/4 mile west of the reservoir commonly hike down to fish and play in the reservoir. Parking is not well defined in the reservoir area and vehicles commonly park near the waters edge to fish. This is resulting in resource damage to soils, vegetation, and water quality.

Two toilet facilities are provided near the reservoir. These are chemical type one-person toilets set over 500 gallon fiberglass vaults. Neither toilet incorporates SST technology or is accessible to disabled users. No other improvements exist at the site.

BIOLOGICAL ENVIRONMENT

Range Resource

The Burnout Canyon area is within the Burnout S&G Allotment. The Burnout S&G Allotment has two permittees with a total of 1139 permitted sheep for the

permitted season of 7/1-9/25 for 3,227 head month use. The grazing capacity on the allotment is in the process of being firmed up.

The area has been grazed by sheep since the late 1800's. Animal numbers and allotment boundaries have been changed several times between then and the present. The allotment has an approved Allotment Management Plan for grazing use (see District 2210 Allotment Folders in District File).

The Boulger S&G allotment has one permittee with 826 head of sheep permitted for the season 7/6-9/25 for 2206 head months use. The allotment has an allotment management plan and the grazing capacity is not firmed up. In 1992 there was about 600 acres of rangeland revegetation accomplished to improve vegetative cover and herbage production. The allotment has 4 grazing units used in a deferred rotation system of grazing. The revegetated reaches of the project, if approved, will be rested for at least the next 2 growing seasons. During this time the useable reaches of the allotment will be used with the adjacent Beaver Dams S&G allotment in a rotation grazing sequence. Additional range improvement is scheduled on the north side of Boulger Creek in 1995.

There were 5 stream structures constructed in Boulger Creek below the forks to stabilize streambanks and improve fish habitat. There was also some riparian enhancement done by planting carex along the streambank.

Fisheries Resource

The affected environment for the project would include Electric Lake, the Upper Huntington Creek watershed, and the Boulger Creek watershed. Burnout Creek is a small stream with approximately 1.5 miles of perennial flow. Its a spawning and rearing tributary for Yellowstone cutthroat trout (Oncorhynchus clarki bouvieri) from Electric Lake. Boulger is also suitable spawning and rearing habitat, but the current dam and spillway block this use. Upper Huntington Canyon is currently the only source in Utah of certified "disease free" Yellowstone cutthroat trout for the State of Utah which widely uses this species in their stocking program. Reaches of the watershed affected may include unstable stream banks, roads and trails, road cut and fill slopes, and fish passage barriers (see Biological Evaluations in Appendix D).

Terrestrial Wildlife Resource

The project area provides habitat for numerous species of wildlife. Several species of woodpeckers, raptors, big-game and,, small-game animals are found in the project area. Species of special interest known to inhabit the area include the following Management Indicator Species: Elk, Mule Deer, Blue Grouse, and Golden Eagle. Also found in the area are the following Sensitive Species: Northern Goshawk and Northern Three-toed woodpecker.

Management Indicator Species are species whose conditions can be used to assess the impacts of management actions on a particular area. These species are used to represent many other species when evaluating potential impacts. Elk and mule deer use the project area for calving/fawning, foraging, and security during the spring, summer and fall. The vegetation found on the area is very well suited to meeting these requirements. Blue Grouse utilize the area as year round habitat. During the summer they can be found near the many riparian areas and in the winter they find food and cover in the numerous stands of conifers. No Golden eagle nests are known to occur in the area, however, they have been observed foraging there, especially along the ridge tops.

Sensitive species are designated as such by the Regional Forester. They are species for which population viability is a concern, as evidenced by: A) significant current or predicted downward trends in population numbers or density, B) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Northern Goshawks and Northern Three-toed woodpeckers have been found nesting and foraging in the forests found on the project area.

Bald eagles have been observed in the general area during the late fall and early winter. In the project area, these observations have been of single birds flying over. Bald eagles are attracted to the general area because of the open water found in Scofield and Lower Gooseberry Reservoirs where they forage primarily upon fish. They have not been known to forage in the project area. No other Endangered or Threatened species are known to utilize the project area.

The Forest Plan contains additional information concerning wildlife for the Forest in general. Also see Biological Evaluations in Appendix D.

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter includes the analytical and scientific basis for comparison of the alternatives, including the proposed action (40 CFR 1502.16). Measures to mitigate adverse environmental impacts (40 CFR 1502.16 (h)) through compliance with Forest Plan standards (36 CFR 219.13) is emphasized. It also summarizes monitoring programs required by NEPA (40 CFR 1502.2 (c)) and (36 CFR 219.5 (K)).

The Forest Plan and FEIS disclosed direct, indirect, and cumulative environmental impacts of coal leasing, exploration, and development, and the Plan itself presented standards designed to mitigate them. This chapter incorporates Chapter III, Environmental Consequences, of the Forest Plan by reference (40 CFR 1502.21), summarizes relevant sections, and points out any significant differences between Forest-wide impacts and those specific to this proposal and alternatives.

MITIGATION

Over the past 10 years, public understanding of forest management issues and the impacts of various management activities has increased dramatically. In recent years, public, agency, and organizational concerns have been focused less on identification of specific, significant impacts than on the application and effectiveness of mitigation measures.

As defined by 40 CFR 1508.20, mitigation includes:

- * **Avoiding the impact** altogether by not taking a certain action or parts of an action.
- * **Minimizing impacts** by limiting the degree or magnitude of the action and its implementation.

- * **Rectifying the impact** by repairing, rehabilitating, or restoring the affected environment.
- * **Reducing or eliminating the impact** over time by preservation and maintenance operations during the life of the action.
- * **Compensating for the impact** by replacing or providing substitute resources or environments.

Forest Plan standards employ the above measures. Thus, this chapter is a site-specific tie between effects identified in Chapter IV of the Forest Plan EIS and Forest Plan standards for mitigating those effects. In addition to the standards of the Forest Plan, mitigation is provided for in specific situations in this EA.

MONITORING

NFMA requires that Forest Plan implementation be monitored (36 CFR 219.11 (d)). This is done on a sample basis. The results may demonstrate needed changes in management direction (36 CFR 219.12 (k)). Forest-wide and site specific monitoring elements are listed in Table IV-1 on pages IV-3 to IV-13 of the Forest Plan. Included are three types of monitoring:

- * **Implementation monitoring** is used to determine if goals, objectives, standards, and management practices are implemented as detailed in the Plan and the project specifications;
- * **Effectiveness monitoring** is used to determine if management practices as designed and executed are effective in meeting Forest Plan standards, goals, and objectives;
- * **Validation monitoring** is used to determine whether the data, assumptions, and coefficients used in the development of the plan are correct.

Forest-wide monitoring of the application and effectiveness of mitigation measures will be briefly summarized in this chapter. Additional mitigation specified in this EA will be monitored for effectiveness either continuously or when specific measures are completed.

In conclusion, Forest Plan standards mitigate direct, indirect, and cumulative impacts identified in the Forest Plan EIS. Also, the Forest Plan and project monitoring program measures the effectiveness of that mitigation.

CONSEQUENCES OF IMPLEMENTATION

This section provides a description of the consequences, or potential impacts, to the physical, human, and biological environments of implementing each alternative. It is the scientific and analytic basis for comparison of alternatives (Table II-1 in Chapter II). It also describes the consequences of implementing each alternative in terms of issues.

PHYSICAL AND HUMAN ENVIRONMENT

Geology and Mining

ALTERNATIVE A

Under this alternative, only full support mining with no subsidence of perennial reaches of Burnout Creek being allowed, pursuant to current coal lease and mine permit terms. Up to 2 million tons of coal would be excluded from future recovery and about \$4 million in lost royalty would not benefit Federal, State and local governments. The life of the Skyline Mine would be shortened by about one half year. About 125 work-years would be lost, impacting the socioeconomics of local communities already impacted by high unemployment rates.

ALTERNATIVES A AND C

With these 2 alternatives, the hydrologic study would not be conducted in Burnout Canyon. Without this study, the effects of subsidence on perennial waters would not be determined; thereby, not potentially allowing subsidence if any effects were determined to be acceptable. Current management practices regarding protection of perennial waters would remain the same, allowing no subsidence to occur. Many perennial stream underlie areas leased for coal on the Forest; thereby affecting a large tonnage of coal that potentially could be longwall-mined if the effects of subsidence were considered to be acceptable.

ALTERNATIVES B AND C

Under these alternatives, longwall mining would be allowed in perennial reaches of Burnout Creek, thereby subsidizing it. They would allow recovery of up to 2 million tons of coal and collection of about \$4,000,000 in royalties; thereby benefitting Federal, State, and local governments. The life of the Skyline Mine would not be shortened by about one half year, and 125 workyears would not be lost; thereby benefitting the socioeconomics of local communities.

Surface disruption in the form of cracks and landslides could occur from subsidence-caused displacements. The most significant of which would be surface cracks which could divert water or be a safety hazard to humans and animals. It is anticipated that these openings would only last for several weeks to several months in duration, and would, in time slough in and fill by rain, snow or gravity. If the damage is notable, mitigation measures would be employed, but in a more timely and responsive fashion with Alternative B, than with Alternative C. Also, Alternative B would provide data from the hydrologic study to help make better informed decisions regarding mining under perennial water that Alternative C would not.

Soils

ALTERNATIVE A

Implementation of this alternative would cause no new effects to the soil resources in the project area.

ALTERNATIVE B

Boulger Reservoir

These soils in this area are highly erosive and easily compacted. Surface water and water tables at shallow depths present many unique problems to construction equipment that would be working within this area. Long term impacts could result from heavy equipment working on, in, or around the dam or spillway, or in the creek bottom itself, unless mitigated using Best Management Practices. The impacts could include erosion, sedimentation, damage to the surface organic layer, displacement, and compaction of the soils by equipment.

A high level of impact could result from any construction activities such as changing the stream channel within the riparian zone. Loss of productivity, to the extent that the existing vegetation is difficult to reestablish and grow, is considered a high impact.

Surface water and/or high water tables would be encountered and could be altered within the stream bottomland. High impacts could result downstream even with the ultimate in mitigation measures during construction disturbances.

ALTERNATIVES B AND C

Burnout Creek

No significant issues pertaining directly to soils have been identified. The sensitivity of the upland or sideslope soils to possible subsidence impacts was considered to be very low.

There is the possibility of some impacts in the riparian area, if the water regime is altered. Lack of perennial subsurface and surface water for an extended length of time could severely impact the wet soils and dry them to the point of non-riparian status. It is anticipated that any notable event such as this would be mitigated to restore the water to the creek bottom.

No significant loss of soil productivity or vegetative loss or reduction is expected. Therefore, most impacts to the soil resource resulting from subsidence would be short term.

Hydrology

ALTERNATIVE A

No subsidence would occur under Burnout Creek. The existing management would continue. The conditions in Burnout Creek and other reaches of the Upper Huntington drainage would continue to respond to existing activities and natural events.

No new information would be gained. Evaluations of potential effects of subsidence are largely subjective and based on the experience of the Hydrologist. Limited quantitative data is available.

ALTERNATIVE B

The hydrologic study would be conducted to monitor and evaluate the changes in the stream channel and riparian conditions along Burnout and James Creeks. Fisheries and watershed enhancement would be developed at other locations within the Upper Huntington drainage. If, as a result of mining, a notable event occurred that greatly affected the fisheries and riparian function of Burnout Creek, then the effects would at least be mitigated by the enhancement of the conditions at other locations within the Upper Huntington Creek drainage.

If subsidence occurs, the topography would be changed in Burnout Canyon. The watershed would adjust by changing the amount of erosion and sediment produced. The slopes would adjust until a new equilibrium is achieved. There may be accelerated erosion throughout the watershed. The adjustments would create new sources and accumulations of sediment. Water quality may be impacted by increased sediment production. We do not know to what extent this process would occur. The study by Dr. Sidle would measure and describe these effects. The findings of the research would provide a basis for future decisions about subsiding perennial waters. The fisheries enhancement work could reduce erosion and sediment yields within the Upper Huntington drainage.

New information would be gained about the effects of subsidence on waterflow and the stream channel conditions. The current state of the art is a qualitative evaluation of possible effects. The quantitative data is limited and unevaluated. This research would constitute effectiveness monitoring of the Best Management Practices that have been applied to other projects. The results would be useful in developing new guidelines for Best Management Practices.

Surface and subsurface cracking could affect interconnectivity and flow paths of surface and groundwater. Additionally, changes in channel and basin morphology could affect sediment delivery and routing. While speculation exists concerning hydrologic and morphologic changes associated with subsidence, these impacts have not been substantiated in controlled studies. Since mining companies are required by law to "restore" any flow depletions and "mitigate" damages to fish habitat, these questions would be addressed.

One of the potential effects of mining is the diversion of water through the soil and rock matrix. Subsidence could alter the matrix by changing the permeability and possibly creating new directions of flow for both surface and groundwater. If it could be proved that mining diverted water from the surface into the mine, then it might be construed as a violation of water rights. However, there are no Utah water rights to groundwater encountered in mining. Until the water reaches the surface by discharge from the mine, no water user on the surface can hold a right to it. A part of Dr. Sidle's research would be to evaluate the changes in surface flows and determine whether or not they can be attributed to subsidence.

The Skyline Mine has portals in the Price River Drainage. Mining has crossed under the watershed divide into the headwaters of Huntington Creek. If mining intercepts surface water on the Huntington side of the divide and discharges that water from the portals in the Price River Drainage, then there would be a transmountain diversion. With this

alternative the likelihood of encountering water is increased because of the shallow depth of overburden under the stream channel in Burnout.

ALTERNATIVE C

Under this alternative the adverse effects to the Burnout drainage would be the same as for Alternative B. The new information on subsidence would be limited to the normal lease and operational monitoring requirements. The findings of this monitoring are usually limited to assuring that standards and laws have not been violated.

Recreation

ALTERNATIVES A AND C

No effect

ALTERNATIVE B

There would be a net beneficial impact to recreational resources if the enhancement plan is implemented in the Boulger Canyon area.

BIOLOGICAL ENVIRONMENT

Range Resource

ALTERNATIVE A

No effect.

ALTERNATIVE B

Enhancement projects would have varying effects depending on whether grazing livestock amounts remained the same or were reduced due to the projects initiated.

ALTERNATIVES B AND C

The affect on grazing livestock in Burnout Canyon would depend on the amount and kind of subsidence which would occur. Sheep use of the land surface would be affected very little unless there were cracks and holes which developed which could entrap the animals. Any changes in the location or amount of water available for sheep use would alter the distribution of livestock and change the use patterns on the allotment. If water sources on the upper parts of the ridge are dried up, replacement of water would be required.

Fisheries Resource

ALTERNATIVE A

If this alternative is selected then the fish habitat and populations should not change from present conditions provided that other conditions remain constant (i.e., management direction, other unrelated improvement projects, climatic conditions). Cutthroat trout would continue to spawn, rear, and overwinter in some areas of Burnout Creek. However, the enhancement plan agreement between the Forest and Utah Fuel and the

hydrology study with Intermountain Research Station would not occur. The possibility of cutthroat trout moving from Electric Lake to Boulder Reservoir and the associated tributaries (approximately 15,000 feet of useable stream habitat), during their spawning migration by providing fish passagability, would not occur in association with this activity. Also areas of concern, such as sediment producing roads and raw stream bank areas, in the Upper Huntington Creek and Boulder Creek watersheds would not be enhanced.

ALTERNATIVE B

If the proposed action alternative is selected, then subsidence will occur in Burnout Canyon. Associated with subsidence is the possibility of water loss due to fracturing of the soil/rock layers. One stipulation in the coal lease requires that any water lost will be replaced in-kind, meaning the same quantity and quality of water. Therefore water loss would be a short-term event and effects of this short-term loss would be limited to Burnout Creek, Upper Huntington Creek and Electric Lake. A short-term loss of water could result in the loss of a year of fish production from Burnout Creek especially if the water loss occurred during the period the eggs were in the gravels of the streambed. In 1988, the Utah Division of Wildlife Resources (DWR) conducted a survey of the Upper Huntington Creek watershed. In Burnout Creek 83 fish were captured, of which 43 were females. The average production from one female was 1,097 eggs. Therefore, the production of eggs in Burnout Creek would be approximately 47,200 eggs. If 70% of the eggs survived they would produce 33,040 fry. The estimated value of a 2 inch fry is about \$.16 (AFS 1992). Therefore the loss of production for one year from Burnout Creek would be approximately \$5,286. Additionally we must realize that the replacement of these fry would not be until the following year, due to the constraints of the stocking program. Hence, one year-class of fish from Burnout Creek would be lost thereby affecting production when that year-class would have entered the reproducing stage of maturity. It is possible that the loss of production could impact the recreational use of Electric Lake although the impact would be expected to be minor.

Realize that this monetary loss is just for the replacement of the fish. This sum does not account for lost recreation use in Huntington Creek and Electric Lake. Currently a Fishery User Day (FUD) is estimated to be worth \$17.85. It is difficult to estimate the number of FUD's lost if 1 year class of fish is lost, however an estimate may be near 1,000 if you consider the impacts that a poor day or two of fishing can have on the average angler and how it influences where the angler will go fishing for future years. Other losses such as the invertebrates and the riparian community, if it is damaged, do not have standard values associated with their existence. Therefore, total monetary loss from the water loss could be 5 or even 10 times the amount provided for the fish loss.

Another impact that may occur from a short-term water loss would be to macroinvertebrate populations. If there is a total water loss in Burnout Creek, it is expected that within 3-4 hours the invertebrates would begin to perish from dessication and suffocation and most species would be dead within 24 hours of loss of flow (Fred Mangum, FS, personal communication). Once flow has been returned, the macroinvertebrates would begin to recolonize the area, but the area that was dewatered would not be able to support a fish population until the recolonization has taken place. It is likely that in the worst case scenario, the recolonization would have begun

within one year. A short term water loss may adversely impact Upper Huntington Creek and Electric Lake aquatic life by reducing drift of invertebrates from Burnout Creek which may reduce recruitment of these invertebrates and reduce the prey base available for the fish.

Another associated impact from subsidence of Burnout Canyon may be increased sediment transport into Burnout Creek, Upper Huntington Creek between Burnout Creek and Electric Lake, and Electric Lake itself. Increased sediment transport may result from gradient changes within Burnout Creek which could cause the creek to attempt to modify the channel to conform to this change in gradient. Increased sediment transport could also result from surface cracking in the stream channel, sloughing of the streambanks, or landslides, all of which could be caused by subsidence. The percent of fine sediment present in the streambed is of vital concern to the aquatic community. Many studies have shown the direct connection between percent fines present in the substrate and the survival of eggs. Past monitoring in Burnout Creek (USFS 1991) has shown that percent fines is likely a limiting factor for fish production in Burnout Creek. The percent fines in the substrate was determined to be approximately 27% which would definitely have a negative impact on egg survival. Therefore any increase in percent fine sediment in Burnout Creek will reduce the production of fish in this drainage. Increased sediment transport will also affect Upper Huntington Creek from Burnout Canyon to Electric Lake and would cause Electric Lake to act as a sediment basin and reduce the effective storage area of Electric Lake prematurely.

Additional impacts from subsidence may be from changes in habitat in Burnout Creek from the change in gradient. It is impossible to predict whether changes in the gradient would increase or decrease the amount of available habitat units in Burnout Creek.

Alternative B incorporates several measures that are intended to offset any negative impacts that may occur from subsidence. The first measure is the enhancement plan, which is included as Appendix B, and was developed through negotiations with the Forest Service and Utah Fuel Company, with additional discussion with DWR. The enhancement plan would be implemented within 18 months should the decision be made to proceed with this alternative. The enhancement plan was developed to ensure that if subsidence did have a detrimental affect upon the Upper Huntington Creek watershed that the improvements made before such an effect would more than offset the event. Included in this enhancement plan are improvements to the spillway and dam at Boulger Reservoir and the Boulger Creek culvert to allow cutthroat trout to move from Electric Lake through Boulger Reservoir and into Boulger Creek to utilize additional spawning areas that are not currently being used. Other enhancements could include: closing and revegetating numerous native surface roads that are contributing sediment to the streams within the Boulger Creek watershed and the Upper Huntington Creek watershed; restricting vehicle access to the edge of Boulger Reservoir to allow the riparian areas to recover from overuse by recreationists; and installation of proper sanitation facilities to reduce the chance of human waste contamination within Boulger Reservoir and the areas downstream of the facilities.

The second measure is the Hydrologic study that would be conducted if this alternative is selected. The study would include intense measurement and monitoring of hydrologic characteristics of Burnout Creek including flow, riparian characteristics, substrate compositions, thalweg mapping, bank

stability, and fish habitat including pool measurements and assessment of conditions. The study would be funded by Utah Fuel Company and the Forest Service Intermountain Research Station in Logan, Utah would do the research. The purpose of this study would be to determine what the effects of subsidence under perennial streams are in this area, and make this data available to the entire scientific community to use as a base to make an informed decisions in similar situations in the future.

The third measure of this alternative that may offset impacts caused from the subsidence is the Contingency (Mitigation) Plan. The Contingency Plan is tied in very closely with the Hydrologic Study. If impacts are seen in Burnout Creek, the Manti-La Sal National Forest, the Research Station and Utah Fuel Company would evaluate the seriousness of the impact. This plan is established in a Memorandum of Understanding (Appendix C). If the damage is determined to be notable, such as a complete loss of water, then immediate action could be taken to remedy the situation. However, if the damage would be determined to be less than notable then the MOU states that the study would continue to proceed and no action, or minor action unaffecting the hydrologic study, would be taken by Utah Fuel or the Forest Service until the completion of the study. The purpose of not taking action immediately on a less than notable event is the study would then be in place to provide information on what the impacts were from subsidence.

ALTERNATIVE C

If this alternative is selected, then mining would occur with the same possible negative impacts listed under Alternative B but the beneficial effects of the study, on-site mitigation, and enhancement plan would not occur.

Terrestrial Wildlife Resource

ALTERNATIVE A

No effect.

ALTERNATIVE B

Under this alternative only very minor, localized, short-term effects to terrestrial wildlife would be expected to occur as a result of subsidence-induced surface cracks, loss of water, and landslides. Notable water loss would be mitigated, thus reducing impacts to terrestrial wildlife.

ALTERNATIVE C

With this alternative, minor, mid-term effects to terrestrial wildlife would be expected to occur for the same reasons mentioned above in Alternative B.

CHAPTER V

PREPARERS AND PUBLIC INVOLVEMENT

LIST OF PREPARERS

The following individuals from the Manti-La Sal National Forest formulated the three alternatives considered in this document in response to the issues and the expected environmental effects:

SPECIALIST	SPECIALTY	ID TEAM ROLE
Norm Baer	Soils Science	Consultant
Bill Broadbear	Forester/Recreation	Consultant
Paul Burns	Fisheries Biology	Member
Charlie Jankiewicz	Price District Ranger	Member
Dennis Kelly	Hydrology	Member
Leland Mathesson	Range Conservation	Consultant
Walt Nowak	Geology	Team Leader
Rod Player	Wildlife Biology	Consultant
Carter Reed	Geology	Consultant
Steve Romero	Wildlife Biology	Consultant
Roy Sidle	Research Hydrology	Consultant
Bob Thompson	Range Conservation/T&E Plants	Consultant
Glen Zumwalt	Mining Engineering	Consultant

PUBLIC INVOLVEMENT

Public involvement is discussed in detail on page 6 in Chapter II under Public Participation. This section lists the agencies, groups, and individuals consulted during the EA process.

Mark Page Utah Division of Water Rights	Emery County Commissioners
Sanpete County Commissioners	Carbon County Commissioners
Southeastern Utah Association of Local Governments	Dick Carter Utah Wilderness Association
Chris Sorenson Swens S&G Allotment	Roger Zortman Moab District Manager, BLM
David Ariotti Utah Department of Health	Ken Phippen Utah Division of Wildlife Resources
Varden Willson Huntington-Cleveland Irrigation Co.	Kim Blair Questar Pipeline Company
Glen Zumwalt Utah Fuel Company/Skyline Mine	Jody Williams, Attorney PacifiCorp
James Allred Eccles S&G Allotment	Warren Bailey Burnout/Coal Canyon S&G Allotments

Euray Allred
North Winterquarters S&G Allotment

Daron Haddock
Utah Division of Oil, Gas, and Mining

Phillip Allred, East Gooseberry and
South Winterquarters S&G Allotment

Jack McCallister
Boulger S&G Allotment

Vernal Mortensen
Coastal States Energy Company

Miles Moretti
Utah Division of Wildlife Resources

M. Dean Knighton
Intermountain Research Station

Roy Sidle
Intermountain Research Station

A total of five scoping letters were received. Responses to all except one are contained on pages 7 & 8 in Chapter II under Issues Resolved Through Existing Mitigations. The one letter from the Sanpete County Commissioners expressing support for the proposal, did not require a response.

REFERENCES

USDA, Forest Service, Manti-La Sal National Forest Land and Resource Management Plan and Final Environmental Impact Statement, November, 1986.

USDI, Bureau of Land Management, Final Environmental Impact Statement, Federal Coal Management Program, April, 1979.

USDA, Forest Service, Final Environmental Impact Statement, Questar Pipeline Company's Main Line No. 41 Reroute at Skyline Mine, July, 1990.

USDA, Forest Service, Environmental Assessment, Proposed Skyline Mines and Selection of Corridor for Proposed State Highway From U-96 to U-31, June, 1980.

USDA, Forest Service, Environmental Assessment, Decision Notice and Finding of No Significant Impact for the Readjustment of Federal Coal Lease U-044076, December, 1984.

Coastal States Energy Company, Skyline Mines Mining and Reclamation Plan, 1992.

APPENDICES

Appendix A: Hydrologic Research Proposal, Intermountain Research Station

Appendix B: Off-site Mitigation Plan (Enhancement), Bio/West, Inc.

Appendix C: Memorandum of Understanding, Contingency Plan (On-site Mitigation)

Appendix D: Biological Assessments/Evaluations

Appendix E: Possible Fish Passage Facility Designs and Narrative