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## Specialist Report 1.0 Visual Resources

### Oil and Gas Leasing EIS on Lands Administered by the Dixie National Forest

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## List of Acronyms & Abbreviations

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<b>BLM</b>	Bureau of Land Management
<b>BMP</b>	Best Management Practice
<b>CEA</b>	Cumulative Effects Area
<b>CSU</b>	Controlled Surface Use
<b>EIS</b>	Environmental Impact Statement
<b>GIS</b>	Geographic Information System
<b>IRA</b>	Inventoried Roadless Area
<b>LN</b>	Lease Notice
<b>LRMP</b>	Land and Resource Management Plan
<b>NEPA</b>	National Environmental Policy Act
<b>NL</b>	No Lease
<b>NSO</b>	No Surface Occupancy
<b>OHV</b>	Off-Highway Vehicle
<b>RFDS</b>	Reasonable Foreseeable Development Scenario
<b>RNA</b>	Research Natural Area
<b>SIO</b>	Scenic Integrity Objective
<b>SLT</b>	Standard Lease Terms
<b>SMS</b>	Scenery Management System
<b>TL</b>	Timing Limitation
<b>USFS</b>	US Forest Service
<b>VMS</b>	Visual Management System
<b>VQO</b>	Visual Quality Objective

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# 1.0 Visual Resources

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## 1.1 Introduction

The Dixie National Forest occupies approximately 2 million acres across nearly 170 miles in southern Utah. Elevations vary from 2,800 feet near St. George to 11,307 at Brian Head Peak, Cedar City Ranger District. High altitude forests in gently rolling hills characterize the Markagunt, Paunsaugunt, and Aquarius Plateaus within the Forest boundary. Vegetation varies from sparse desert plants at low elevations, to pinyon pine and juniper forest at mid-elevations. At higher elevations, aspen, pine, spruce, and fir predominate (USFS 2000).

The scenic beauty of the Dixie National Forest is one of the major attractions of this area. Zion National Park, Bryce Canyon National Park, Capitol Reef National Park, and The Grand Staircase-Escalante National Monument are adjacent to the Forest, while Cedar Breaks National Monument lies within the Forest boundaries (USFS 2000). These parks and monuments include scenic overlooks that include views of Dixie National Forest lands.



**Capitol Reef National Park**

Scenic resources are a composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify an area and influence the visual appeal that area may have to people. The opportunity to experience the landscape and interpret scenery and visual change is dependent upon the degree of public access and use of an area (JBR 2004).

Five scenic byways and four scenic backways have been formally designated within the Dixie National Forest since 1986. The Utah State and National Forest Scenic Byways include Highway 14, Highway 143, Highway 148, and Highway 12. Highway 89 from Panguitch to Kanab has been designated a Utah State Scenic Byway. The four Utah State Scenic Backways include Posey Lake Road, Griffin Top Road, the Dry Lakes/Summit Canyon Road, and the East Fork of the Sevier Road (USFS 2000).

Scenic Byway Highway 12 is also part of the National System of America's Byways, a collection of 126 diverse routes designated by the US Secretary of Transportation representing the depth and breadth of scenery in America. Utah's Scenic Byway 12 – A Journey Through Time – received the All-American Road designation from the Federal Highway Administration in 2002. According to the National Scenic Byways Program website, Scenic Byway 12 is an exceptional 124-mile route, which “negotiates an isolated landscape of canyons, plateaus, and valleys ranging from 4,000 feet to 9,000 feet above sea level...a showcase of sandstone sculpted by nature (USDOT 2007).”



**Red Canyon, Dixie National Forest**

It has been shown that high-quality scenery can enhance people's lives and benefit society, particularly natural scenery such as is associated with National Forests (USFS 1995a). It is primarily through their visual sense that most visitors perceive the Forest and its interrelated components. Benefits derived from scenic settings include identity, self-image of communities and individuals, and enhanced quality of life. Sightseeing, driving for pleasure, and outdoor photography are among the nation's leading recreational activities and as demand continues, the need to preserve high quality visual resources will also increase (USFS 2003).

## **1.2 Consideration of Available Science**

The techniques and methodologies used in this analysis consider the best available science. The analysis includes a summary of the credible scientific evidence that is relevant to evaluating reasonably foreseeable impacts. In addition, the analysis also identifies the methods used and references the scientific sources relied on. When appropriate, the conclusions are based on a scientific analysis that shows a thorough review of relevant scientific information, a consideration of responsible opposing views, and the acknowledgment of incomplete or unavailable information,

scientific uncertainty, and risk.

### **1.3 Use of a GIS**

Alternatives were developed by assigning the leasing options described in Chapter 2 of the EIS and summarized in Table 2.3-1 to resource components using geospatial data. Using a geographic information system (GIS), the spatial distribution of each resource component and associated leasing option were overlaid. The most restrictive leasing option (i.e., NL or NSO) assigned to a particular resource component supersedes any less restrictive options (i.e., CSU or SLT) assigned to other resource components that occur in the same area or site-specific location. For example, where NSO was assigned to an area of high erosion potential that coincides with the habitat of a sensitive wildlife species assigned CSU, the NSO option would be applied to the area common to both of these resources. As a result, multiple leasing options may apply to a resource component, depending upon its location, even if only a single leasing option was specified for that resource component under an alternative. A full range of leasing options were incorporated into the development of alternatives so that the different alternatives would insure that differing levels of protection were addressed for each specific resource component.

Leasing options were applied to geographical areas that represent the spatial distribution of a resource component. However, it is important to note that leasing options are applied to the resource component and not simply to specific geographic areas and if unmapped resource components were identified in the future they would be protected by the same leasing option. Furthermore, the geospatial data used in this analysis is the best GIS data available; however, it comes from multiple sources and was created at varying scales. As a result, it is not assumed that these data are 100 percent complete or that they meet the US National Mapping Accuracy Standard of the Office of Management and Budget. Unless otherwise stated, GIS data was provided by the Dixie National Forest.

## **1.4 Description of the Affected Environment**

### **1.4.1 Visual Resources Management on the Dixie National Forest**

The National Forest Scenery Management System (SMS) is the process used for planning and design of the visual elements of multiple use land management. Scenery management is based on the criteria and guidelines in the Landscape Aesthetics Handbook for Scenery Management, US Department of Agriculture (USDA) Handbook Number 701 (USFS 1995a). This system was implemented in 1996, superseding the Visual Management System (VMS). The Visual Management System was first published as a handbook in 1974 - National Forest Landscape Management, Vol. 2, USFS Handbook Number 462 - and provided the direction for the management of scenic resources on National Forests for over 20 years. The Visual Management System was based on a series of Visual Quality Objectives (VQOs) ranging from Preservation to Maximum Modification, according to the mechanics of viewing landscapes, and the importance of aesthetics.

The Scenery Management System began with the basic premises established in the Visual Management System, but has been expanded to better accommodate ecosystem management and the realistic time frames of natural systems. This system also places greater importance on establishing which scenic elements Forest users value most, and identifying ways to maintain or improve on those qualities.

Full implementation of the new Scenery Management System was intended to occur with Forest Plan revision, although case by case application on the project level was directed for instances

where a plan revision was years out. Because the Visual Management System was the basis for the 1986 Dixie National Forest Land and Resource Management Plan (USFS 1986), the Land and Resource Management Plan required an update in order to efficiently apply the Scenery Management System. The Dixie National Forest prepared an amendment to the Land and Resource Management Plan in April 2000 to apply the Scenery Management System Scenic Integrity Objectives (SIOs) “within the context of the goals, objectives, and management direction of the current Forest Plan.” The Environmental Assessment (USFS 2000) prepared to analyze this plan amendment provides a detailed comparison of the Visual Management System and Scenery Management System. Scenery Management System values were preliminarily assigned to Dixie National Forest lands based upon the soils database, bridging to Forest Plan direction. Scenery Management System values include buffers on Concern Level 1 and 2 roads (See Section 1.4.4).

The Scenery Management System Amendment to the Land and Resource Management Plan provides specific direction on SIO in all management areas except for Management Area 1, General Direction. For most of Management Area 1, SIO is unassigned. The Amendment states that, when a specific project is proposed in Management Area 1 with unassigned SIO, a visual analysis will be completed and the project will comply with the SIO that results from this analysis.

Specific Management Areas ranging from ‘1A – Developed Recreation’ to ‘10B – Municipal Watersheds’ (see Table 1.4-2) are assigned a Landscape Theme, and SIO. The General Management Areas fall into the category listed below in Table 1.4-1 as ‘SIO Unassigned’. In these areas, if outside of Concern Level 1 and 2 travelways and use areas, the SIOs are designated during project planning according to the following scenario: Class A scenic attractiveness (distinctive) – minimum of High SIO; Class B scenic attractiveness (common or typical) – minimum of Moderate SIO; Class C scenic attractiveness (indistinctive) – minimum of Low SIO (USFS 2000). In essence, the label of ‘SIO Unassigned’ does not indicate a lack of scenic quality; it merely indicates that SIO will be determined when a specific project is proposed.

## **1.4.2 Scenic Integrity Objectives**

Scenic integrity indicates the current status of a landscape – the degree of intactness and wholeness of the landscape character (USFS 1995a). It is determined on the basis of visual changes that detract from the scenic quality of the area (USFS 1995a). The SIO refers to the degree of acceptable change or alteration of the valued Landscape Theme (USFS 2000). Under the Scenery Management System, higher SIOs represent highly valued natural landscapes where management activities would result in little or no deviation from those values. Greater modification to the landscape is acceptable in low SIO landscapes. According to the 1986 Land and Resource Management Plan, the Dixie National Forest is divided into the visual management categories shown in Table 1.4-1 below. The original VQOs are generally comparable to the SIOs, as noted. The SIOs for the Dixie National Forest are shown on Figure 1.4-1.

Very High Scenic Integrity (Very High SIO) is generally reserved for designated Wilderness and Research Natural Areas, but may apply to additional areas of the Forest as well, where the valued landscape character is intact, and there is no evidence of apparent modification. High Scenic Integrity (High SIO) applies to an area that appears unaltered; where the valued landscape character appears intact, and any structures or surface effects are designed to blend with the natural landscape. Moderate Scenic Integrity (Moderate SIO) may appear slightly altered but alterations are visually subordinate to the overall landscape. In Low Scenic Integrity (Low SIO) areas, deviations may begin to dominate the landscape view.

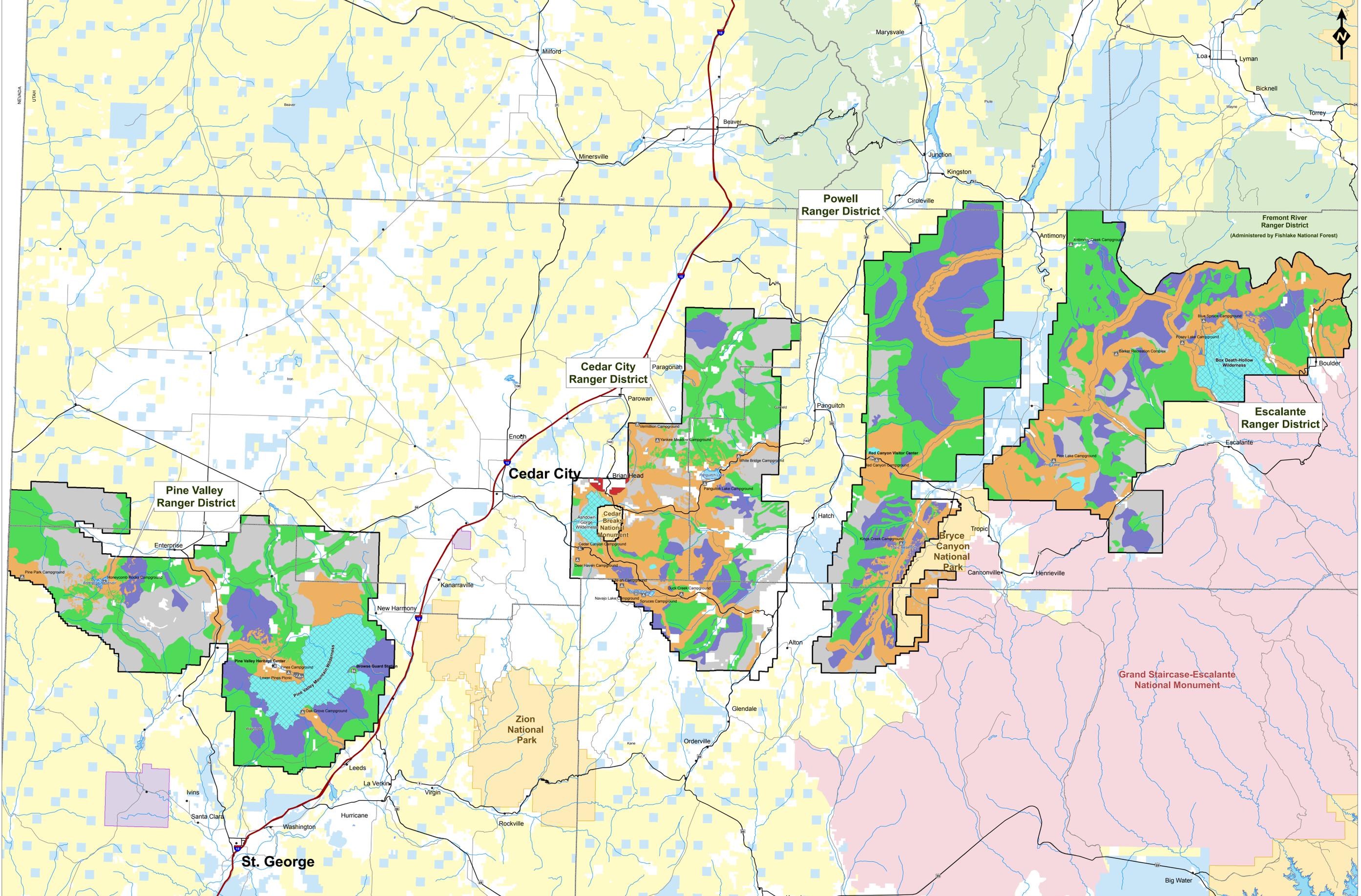
**Table 1.4-1 Acres of SIO categories on the Dixie National Forest.**

Ranger District	SIO Very High	SIO High	SIO Moderate	SIO Low	SIO Unassigned	TOTAL
	VQO Preservation	VQO Retention	VQO Partial Retention	VQO Modification		
Pine Valley	Pine Valley Wilderness: 50,221	53,973	160,607	60,123	136,023	462,921
	Other 1,974					
	<b>Total: 52,195</b>					
Cedar City	Ashdown Gorge Wilderness: 7,022	Brian Head 1,454	99,094	Brian Head: 74	99,870	353,375
	Other: 263	<u>Other:</u> <u>109,241</u>		<u>Other:</u> <u>36,371</u>		
	<b>Total: 7,272</b>	<b>Total:</b> <b>110,695</b>		<b>Total 36,444</b>		
Powell	Red Canyon Natural Area: 531	84,482	138,861	130,342	29,871	384,087
Escalante	Box-Death Hollow Wilderness: 25,479	148,824	140,522	66,171	45,077	430,664
	Antone Bench & Areas 2, 3, 4 & 5: 3,224					
	Other: 1,567					
	<b>Total: 30,070</b>					
Total Acres Per SIO Percent of Forest lands	90,068 6 %	397,974 24 %	539,084 33%	293,080 18 %	310,841 19%	1,631,047

### 1.4.3 Landscape Theme

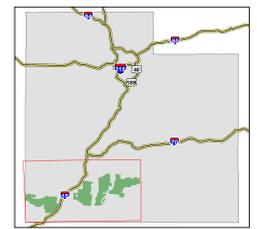
The landscapes of the Dixie National Forest are described according to Landscape Themes.

**Developed Recreation** is a Landscape Theme characteristic of areas with developed recreation facilities such as campgrounds and picnic areas. In these areas, the recreation facilities are a dominant feature in the landscape. The **Natural Appearing** Landscape Theme applies to areas where the existing landscape character has been influenced by human activities, but appears natural to the majority of viewers. Natural elements such as native trees, rock outcrops, and streams or lakes dominate the views. In a **Natural Evolving** Landscape Theme, the natural landscape character originates primarily from natural disturbances and ecological succession, with only subtle changes due to indirect human activities. In these areas, natural events such as forest fires, drought, or deforestation due to insect infestations may dramatically change the views (USFS 2000). The Land and Resource Management Plan Management Areas and associated Landscape Themes and SIOs are listed in Table 1.4-2.



**Oil & Gas Leasing EIS on Lands Administered by the Dixie National Forest**

**FIGURE 1.4-1  
Visual Resources  
Scenery Management System**



**Legend**

- |                   |  |                                   |                                  |
|-------------------|--|-----------------------------------|----------------------------------|
| • Cities          | Major Streams & Rivers                   | <b>Other Land Administration</b>  | <b>Scenery Management System</b> |
| ▣ Campgrounds     | Water Bodies                             | Yellow: Bureau of Land Management | Grey: Unassigned                 |
| ▣ Visitor Centers | County Boundaries                        | Pink: GSENM (2)                   | Blue: Low                        |
| — Minor Roads (1) | State Boundaries                         | Orange: National Park Service     | Green: Moderate                  |
| — Highways        | <b>National Forest System Lands</b>      | White: Private                    | Orange: High                     |
| — Interstates     | Blue: Dixie National Forest              | Light Blue: State of Utah         | Red: Very High                   |
|                   | White with cross-hatch: Wilderness Areas | Purple: Tribal                    |                                  |
|                   | Light Green: Fishlake National Forest    |                                   |                                  |
|                   | Red: Brian Head Ski Resort               |                                   |                                  |



Horizontal Datum = NAD 83  
Coordinate System = Zone 12N

1:220,000

18 August 2008

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. For specific dates and/or additional digital information, contact the Forest Supervisor, Dixie National Forest, Cedar City, Utah. This map has no warranties to its contents or accuracy.

(1) Not all roads are shown. Only some roads are depicted for orientation purposes.  
(2) Grand Staircase-Escalante National Monument. Managed by the Bureau of Land Management.



**Dixie National Forest Road 165 (Concern Level 2) from Highway 12 (Concern Level 1).**

#### **1.4.4 Concern Levels**

Concern Levels categorize the importance to forest visitors of landscapes viewed from travelways and use areas. Concern Level 1 roads and use areas are primary public travel routes through the National Forest including designated scenic highways and byways, or primary recreational areas such as campgrounds, visitor centers, vista points, and others. Highway 12 through the towns of Escalante and Boulder, and through portions of the Dixie National Forest has been formally designated a National Scenic Byway and thus qualifies as a Concern Level 1 road. Concern Level 1 viewsheds adopt the Landscape Theme of the Management Area in which they occur. Outside of Concern Level 1 areas, assignment of SIOs is based upon the Landscape Theme.

Travelways on the Dixie National Forest have been assigned a Concern Level according to the criteria in the Scenery Management System. Concern Level 1 and 2 travelways adopt the Landscape Theme of the management area in which they occur. Concern Level 1 travelways are managed at a level of at least high scenic integrity. Concern Level 2 travelways are managed at a level of at least moderate scenic integrity. The guideline for specific management areas including those listed above states that resource management activities should not be permitted to reduce the scenic integrity levels below the prescribed objectives (JBR 2004).

Concern Level 1 viewsheds include areas seen from: Honeycomb Rocks, Upper and Lower Enterprise Reservoirs, Pine Valley community, Pine Valley Recreation Area, Cedar Breaks National Monument, Brian Head Peak, Panguitch Lake, Navajo Lake, Bryce Canyon National Park, Powell Point, Tropic Reservoir, Hell's Backbone Bridge, Highway 12 overlooks between Teasdale and Boulder, and Capitol Reef National Park. Critical viewsheds are listed as such because they receive intensive recreation use that is sustained in nature and/or there is a very high concern for scenic resources (USFS 2000).



**Bryce Canyon National Park.**

#### **1.4.5 Night Skies**

The night sky views in the vast expanse of southern Utah are recognized as an invaluable resource to many residents and visitors. Under ideal conditions a viewer might observe a night sky with more than 15,000 visible stars plus the Milky Way, which itself contains billions of stars (NPS 2004). The National Park Service has a Night Sky Team that is working in National Parks across the country to measure the effects of light pollution. Several southeastern Utah National Parks are included in the study and were some of the first to be visited by the Night Sky Team. “The amount of light pollution is measured with a camera that is capable of precisely measuring light levels. Mounted on a robotic Meade LX 200GPS telescope, the camera takes 104 images to capture the entire sky. These images are stitched together, and by subtracting the light emitted by known individual stars, researchers generate a value for night sky darkness (NPS 2006a).” Data has been collected since 2001 (NPS 2007). An observation point at Canyonlands National Park is the site closest to the Dixie National Forest. Bryce Canyon National Park includes overlooks with expansive views, and it shares borders on both sides with the Dixie National Forest. The value of most units administered by the National Park Service lies in their continued naturalness, especially as humans increasingly develop lands outside the parks (NPS 2004).



**View from Bryce Canyon National Park east toward Paria River Valley.**

At every park surveyed by the Night Sky Team, artificial light was detected, said Chad Moore, co-investigator and manager of the NPS Night Sky Team. Pristine night skies were once commonplace just a few decades ago, but have become increasingly rare under the advance of glary lights. Visitors are increasingly seeking out dark skies in places like national parks to rediscover the beauty of the night sky. By sharing our telescopes and enthusiasm for the night, we help them celebrate that beauty, said Kevin Poe, Park Ranger at Bryce Canyon National Park, where stargazing programs were attended by 27,000 people last year (NPS 2006b).

#### **1.4.6 Visitor Use and Access to the Forest**

The value and enjoyment of scenic resources is intricately tied to access and use. Levels and types of use may in turn affect visitor experiences. The above described scenic backways and byways are highly accessible. Other scenic areas of the forest are accessible by unimproved roads available to motorized vehicles, or by non-motorized traffic, or by foot or pack animal only.

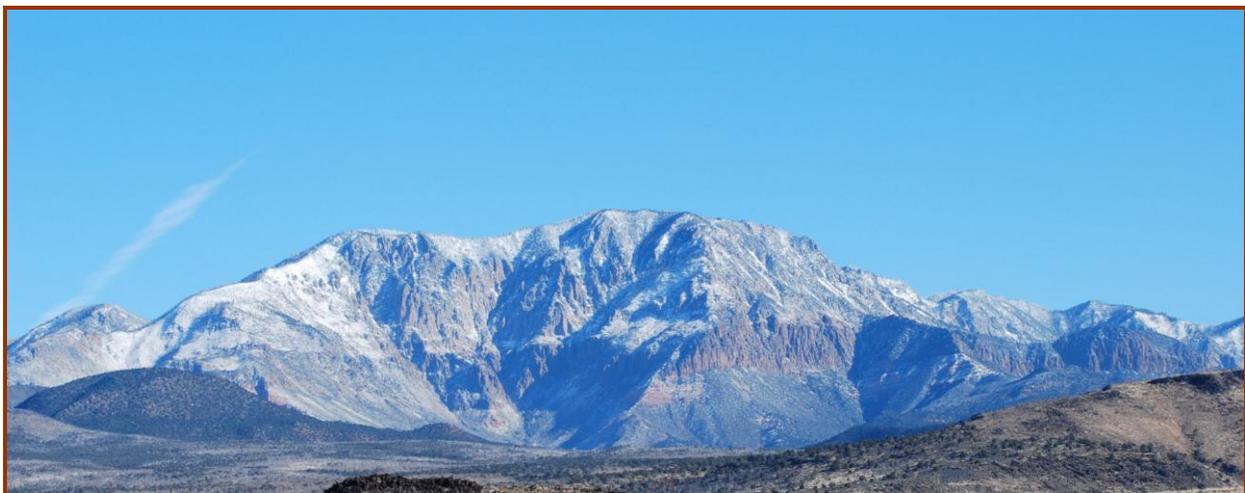
During 2006, the Dixie National Forest monitored 19 non-motorized trails and 5 motorized trails for use. Of the 19 non-motorized sites, 9 indicated increased use, 3 had decreased use, and 1 had no change; the remaining 3 were in first year monitoring. Of the motorized trail sites, 2 indicated increased use, 2 had decreased use, and 1 had no change. Most of the high use trails tend to be either scenic and/or mechanized. Across the Forest, use numbers remain stable: however, increased use is expected due to proximity to the fast growing city of Las Vegas, Nevada. In addition, the Forest provides many opportunities for motorized recreation, which is the fastest growing sport in the United States (USFS 2006b). The Recreation Specialist Report (3.0) further describes recreation uses on the Dixie National Forest. The Transportation Specialist Report (11.0) further describes road systems, traffic, and travel restrictions in place on the Forest.

### 1.4.7 Pine Valley Ranger District

The Pine Valley Ranger District occupies approximately 481,210 acres in Iron and Washington Counties. It is north of the city of St. George, and borders near the communities of Enterprise, Central, Leeds, New Harmony, and Newcastle. Included in this area are the Pine Valley Mountain Wilderness Area, Enterprise Reservoirs, the Bull Valley Mountains, and Pine Park. Rising above the communities of Enterprise and St. George, Utah, the Pine Valley Mountains are a striking compliment to the area's dramatic red rock scenery. There are three physiographic regions that meet in the Pine Valley Mountain area – the Mojave Desert, Basin and Range, and the Colorado Plateau region. The area features sage steppe and mountain brush, pinyon-juniper woodland, and isolated stands of coniferous forest on the wetter north-facing aspects. Scattered patches of ponderosa pine are found in the area. The unique volcanic and rugged scenery provides striking contrasts to the surrounding redrock country.

Several significant geological conditions are found within the Pine Valley Ranger District. A striking formation found in the district, known as the Racer Canyon Tuff, has created dramatic and fascinating white and gray-hued features. Wind and water erosion sculpted the formation in a series of scenic hoodoos, domes, and goblins. The Racer Canyon Tuff feature is most prevalent in the Bull Valley subsection in areas known as Pine Park, Racer Canyon, and Honeycomb Rocks (Utah Forests 2008).

On the south end of the district, landforms fall away to dramatic red, orange, and white sandstone outcrops and canyons, providing a striking contrast to the volcanic features of the main range. Scenic peaks and canyons give visitors a palpable feeling of solitude (Utah Forests 2008). The area contains a Forest Service Research Natural Area (RNA), known as Browse RNA. The entire region is well suited to horseback riding, hiking, backpacking, bird and wildlife watching, photography, and historical tourism.



**View of Pine Mountain from St. George.**

Within this ranger district, 136,023 acres have not been assigned SIOs. The majority (about 50 percent) of the remaining SIO-assigned acreage in the Pine Valley Ranger District is designated Moderate SIO (See Table 1.4-1). The High SIO areas on this District include areas within ½ mile of Forest Service Road 006 (including the Upper Enterprise Reservoir and Honeycomb Campground), Forest Service Road 035 (road to Pine Valley Recreation Area), Cottonwood Road (Forest Service Roads 031 and 033), and Forest Service Road 032 to Oak Grove Campground (USFS 1995b, see Figure 1.4-1).

#### 1.4.8 Cedar City Ranger District

The Cedar City Ranger District occupies approximately 404,240 acres in Iron, Garfield, and Kane Counties. This District lies just east of Cedar City and west of the communities of Panguitch, Hatch, and Alton. It includes Panguitch Lake, Ashdown Gorge Wilderness, the Markagunt Plateau, Navajo Lake, and the Duck/Swains area. Cedar Breaks National Monument is located within the District boundary.

The Cedar City Ranger District is located on the Markagunt Plateau, a gently sloping, eastward tilted earth block that has been modified by erosion, volcanism, and some glaciations. The plateau has many dead spruce trees - trees that have been killed by an epidemic of spruce bark beetles. Bordered by the beautiful pink limestone of the Wasatch formation (the same formation that forms the spires and landscape of Bryce Canyon National Park and Cedar Breaks National Monument), the District has some of the more spectacular scenery in the West. This panoramic tapestry becomes even more spectacular during the splendor of autumn's colors. Elevations range from approximately 6,000 feet to 11,307 feet at Brian Head Peak. Volcanic knolls rise up to 800 feet above the plateau, and lava flows occupy the surface in numerous locations (Dixie National Forest website 2008). Vegetation transitions from pinyon-juniper and sagebrush at the lower elevations, through ponderosa pine, mixed conifer, and aspen at the mid elevations, climaxing in spruce-fir, aspen and high alpine meadows.

Sharing the western and northern borders of the desert like Cedar Breaks National Monument, the 7,022-acre Ashdown Gorge Wilderness (Very High SIO) displays eroded, multicolored Wasatch limestone, meadows, and forestland including a significant stand of bristlecone pine, known as the Twisted Forest, in the northern corner. Bristlecone pines are among the oldest living life forms,

Within this ranger district, 99,870 acres have not been assigned SIOs. About 44 percent of the remaining acreage in the Cedar City Ranger District is designated High SIO, and 39 percent is Moderate SIO (see Table 1.4-1). The High SIO areas on the Cedar City Ranger District include areas within ½ mile of Scenic Byways 143, 148, 14, and 89, and Forest Service Roads 064 and 068 (between Scenic Byways 143 and 14), Forest Service Road 053 (road along south side of Navajo Lake), Forest Service Road 060 adjacent to Swains Creek and dispersed recreation areas around Brian Head Ski Area and areas surrounding the Ashdown Gorge Wilderness (USFS 1995b).



**View of Navajo Lake and forested hills – showing evidence of spruce beetle damage.**

**Table 1.4-2 Landscape Theme and SIOs for Management Areas of the Dixie National Forest.**

Code	Forest Plan Management Area	Landscape Theme	SIO
1	General Forest Management	Natural Appearing	Outside of Concern Level 1&2 areas, assigned based upon scenic attractiveness which is assigned according to scenery inventory during project planning
1A	Developed Recreation	Developed Recreation	High
1B	Winter Sports	Developed Recreation – Rural Interface (except for some areas visible from Cedar Breaks National Monument where Landscape Theme is Natural Appearing)	High
2A	Semi Primitive Recreation	Natural Appearing	High
2B	Rural/Roaded Recreation	Natural Appearing	Moderate
4A	Fish and Aquatic	Natural Appearing	High
4A*	Fish and Aquatic (areas with developments for water-related recreation: Tropic Reservoir, Navajo Lake, Panguitch Lake)	Developed Recreation	High
4B	Wildlife Habitat, Management Indicator Species	Natural Appearing	Low
4C	Wildlife Habitat, Brush	Natural Appearing	Low
4D	Aspen	Natural Appearing	Low
5A	Big Game Winter Range	Natural Appearing	Moderate
5B	Big Game Winter Range	Natural Appearing	Moderate
6A	Livestock Grazing	Natural Appearing	Moderate
7A	Wood Production	Natural Appearing	Low
8A	Wilderness	Natural Evolving	Very High
8A1/8A2	Antone Bench, Box Death Hollow (adjacent to designated Wilderness Area)	Natural Appearing	Very High (High if existing CO <sub>2</sub> leases are developed)
9A	Riparian	Natural Appearing	Moderate
9B	Intensive Riparian	Natural Appearing	High
10A	Research Natural Areas	Natural Appearing	Very High
10B	Municipal Watersheds	Natural Appearing	Low

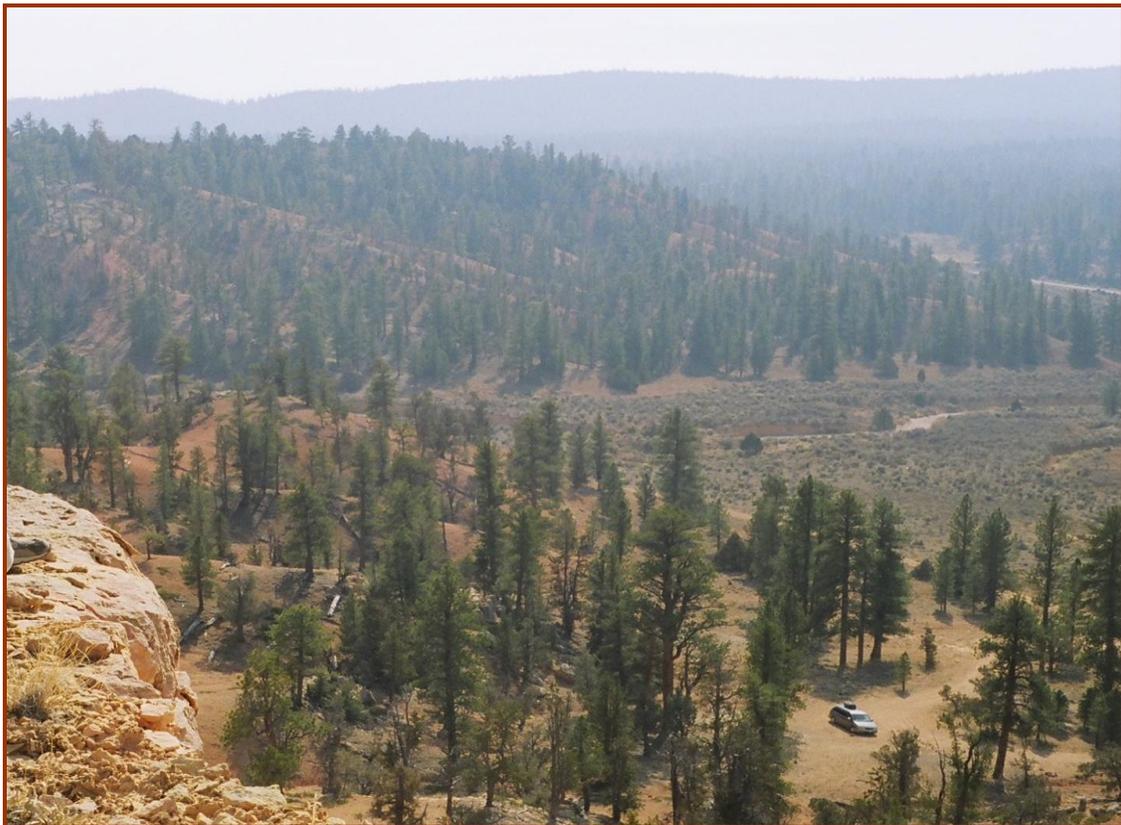
### 1.4.9 Powell Ranger District

The Powell Ranger District occupies approximately 388,594 acres in Garfield, Kane, and Piute Counties. It lies south of the communities of Circleville and Kingston, and east of Panguitch and Hatch, and is bordered by Bryce Canyon National Park on the southeast. The northern part of the Ranger District includes the Sevier Plateau, and the Paunsaugunt Plateau is to the south. The highly scenic Red Canyon, which contains several unique endemic plants, can be viewed from Scenic Byway 12. Perhaps the inspiration for the term "red rock," Red Canyon is one of the most scenic areas of the Claron Formation. Red limestone formations of Red Canyon rival those of Bryce Canyon National Park. Carved by wind and water, this colorful limestone formation is a popular spot for sightseers, photographers, hikers, horseback riders and bicyclists alike.

In 2006, the Powell Ranger District designated a series of dispersed campsites along the East Fork of the Sevier River south of Tropic Reservoir.

Within this ranger district, 29,871 acres have not been assigned SIOs. The majority of the remaining lands in the Powell Ranger District are assigned Moderate (30 percent) or Low (37 percent) SIOs, and about 25 percent are assigned High SIOs (See Table 1.4-1).

High SIO areas on the Powell Ranger District include those areas within ½ mile of Scenic Byway 12 to Bryce Canyon National Park including the Forest Service Red Canyon Campground and surrounding area, Scenic Backway – East Fork of the Sevier River (Forest Road 087) and dispersed recreation areas beyond the East Fork of the Sevier River Scenic Backway (USFS 1995b).



**Red Canyon, along Scenic Byway 12**

#### **1.4.10 Escalante Ranger District**

The Escalante Ranger District occupies approximately 436,585 acres in Garfield County. This ranger district shares most of its southern border with the Grand Staircase-Escalante National Monument and its northern border with the Fremont River Ranger District of the Fishlake National Forest. Highway 12 Scenic Byway (Forest Concern Level 1 travel way) passes through this ranger district for a few miles south of Escalante and north of Boulder for 25 miles. This highly scenic area includes Boulder Mountain area, Griffin Top area, the Aquarius Plateau, Box Death Hollow Wilderness Area, and many miles of roads and trails.

Boulder Mountain is the name applied to the high plateau area, including the Aquarius Plateau, between Highway 24 (Loa/Torrey) and Highway 12 (Escalante/Boulder). The Boulder Mountain area is one of two major high-elevation lake areas in Utah; the other is the Uinta Mountains, in northeastern Utah. From the top of Powell Point, it is possible to see for miles into three different states. Boulder Mountain area and the many different lakes provide opportunities for hiking, fishing, and viewing outstanding scenery.

The Box Death Hollow Wilderness Area has Very High SIOs. High SIOs are applied to 39 percent of the Escalante Ranger District, with Moderate SIOs applied to 36 percent of those lands designated with SIOs. Within this ranger district, 45,077 acres have not been assigned SIOs.

High SIO areas include areas within ½ mile of Scenic Byway 12, Forest Service Road 153 (Hell's Backbone), Forest Service Road 140 (Backcountry Byway – Griffin Top Road), Forest Service Road 132 including the access road to Pine Lake and Pine Lake Campground, Forest Service Road 153 and 154 (Backcountry Byway – Posey Lake Road), Forest Service Road 149 (Barker Reservoir and surrounding area), and popular dispersed recreation areas including the trails and primitive roads and recreation areas including: Lower Reservoir, Round Lake, Green Lake, Deer Creek Lake, Chriss Lake, and Lake McGath (USFS 1995b).

### **1.5 Impact Analysis**

This section describes the changes to the human environment that could occur as a result of implementing the Alternatives outlined in Chapter 2. Changes to the human environment are described using the terms “effect” and “impact,” which are synonymous under NEPA. Effects may be direct, indirect, or cumulative in nature.

- Direct effects occur at the same time and place as the action.
- Indirect effects are reasonable foreseeable effects that occur later in time or are removed in distance from the action.
- Cumulative effects are those impacts to the environment that result from the incremental impacts of an alternative when added to other past, present, and reasonably foreseeable future actions.

In this Specialist Report, the direct and indirect effects of an action are discussed in combination for the affected resource components in Section 1.5.4. Cumulative effects are described by alternative in Section 1.5.5.

NEPA requires that effects in an EIS be discussed in terms of context and intensity. In this Specialist Report, context refers to the location, type, or size of the area to be affected relative to each resource component. Intensity refers to the severity or level of magnitude of impact. In this Specialist Report, the intensity of effects is defined as Major, Moderate, Minor, or Negligible. In

addition, the duration of effects can be temporary, short term, or long term. These terms are described more specifically in Table 1.5-1.

**Table 1.5-1 Summary of Terms used to Describe Effects in the Specialist Report.**

Attribute of Effect		Description
Quality	Beneficial	An improvement of current conditions.
	Adverse	A degradation of current conditions.
Magnitude (Intensity)	Negligible	No measurable change in current conditions.
	Minor	A small, but measurable change in current conditions.
	Moderate	A moderate, measurable change in current conditions.
	Major	A big, easily measurable change in current conditions.
Duration	Temporary	Short-lived (i.e., during construction).
	Short-term	10 years or less.
	Long-term	More than 10 years.

### 1.5.1 Connected Actions

The Alternatives described in Chapter 2 do not authorize surface disturbance. Therefore, environmental impacts in this Specialist Report are analyzed as connected actions. Connected actions are defined by the Council on Environmental Quality (CEQ 1508.25) as actions that: 1) automatically trigger other actions which may require environmental impact statements; 2) cannot or will not proceed unless other actions are taken previously or simultaneously, and; 3) are interdependent parts of a larger action and depend on the larger action for their justification. Forest Service regulations (36 CFR 228.102I(4)) require the Forest Service to consider the subsequent actions that would be authorized by a lease as connected actions. Connected actions are the basis of the environmental analysis from which leasing decisions would be made. In this Specialist Report, connected actions are the predicted disturbance (i.e. from oil and gas leasing activity, which is discussed in Chapter 2 of the EIS.

### 1.5.2 Issue Statement for Visual Resources

*Post-leasing activities could decrease visual integrity and quality, could impact viewsheds, and could have an impact on night skies.*

The construction and operation of oil and gas facilities such as power lines, drill pads, drill rigs, roads, and production facilities could impact scenic quality, especially as viewed from sensitive recreation areas, adjacent communities, National Parks, and transportation corridors. Changes in air quality can also cause haze and impairments to visibility. Artificial lighting and flaring associated with oil and gas facilities could cause light pollution and impact viewing of the night sky.

### 1.5.3 Indicators

In this Specialist Report, effects will be described using indicators developed for each resource. Using the environmental conditions described in Section 1.1 as a baseline, indicators are used to predict or measure change in a resource related to effects of the Alternatives. Some indicators are quantitative and measure effects based on numerical thresholds, while other indicators involve a narrative to qualitatively describe any changes relevant to baseline conditions.

Following are the measurement indicators for visual resources:

- Predicted lumens for various phases.
- Narrative of potential changes to the landscape addressing the duration and change for each visual attribute.
- Compliance with Scenery Management /Scenic Integrity Objectives.
- Consistency with the 2000 RMP amendment.

#### **1.5.4 Direct and Indirect Effects**

Under all alternatives other than No Action, it is assumed that the Reasonably Foreseeable Development Scenario (RFDS) would occur. The RFDS for oil and natural gas is based on the assumption that all potentially productive areas can be open under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation, or executive order. It assumes a time period of 15 years and includes all lands within the boundaries of the Dixie National Forest regardless of ownership, and adjacent non-Forest lands where oil and gas activity may impact Forest lands.

The RFDS activities may result in surface disturbance of up to 60 to 120 acres (depending on ranger district), associated with overland travel for seismic surveys; 80 to 330 acres (depending on ranger district) of land required for exploration roads and well pads, and 254 acres of land required for a production field. The locations of these activities cannot currently be predicted.

The primary concerns associated with energy development on the visual quality of the Dixie National Forest are the visibility of constructed features including roads, well pads, and pipelines; the presence of seismic or drilling equipment and transportation on Forest roads surrounding mobilization to seismic testing or drill sites; and the long-term presence of a production facility.

The direct effects of post-leasing activities in the Dixie National Forest on visual resources are generally related to surface disturbance, activity, and the presence of un-natural elements previously not part of a landscape or view. Any human activity or man-made feature could degrade the visual quality of an area. The degree of degradation is dependent upon the amount of contrast between the natural and constructed landscape, the viewing distance, and the concern of the viewer for visual quality. Viewing distances are typically described as foreground (within 0.5 mile), middleground (0.5 mile to 3-5 miles), and background (3-5 miles and beyond). Facilities sited in a relatively open, flat, desert shrub community near (in the foreground) a commonly-used Forest road would impact the landscape in a different way than facilities sited within pinyon-juniper forest, against a rock outcrop, or distant from an actively-used Forest road.

The visual impacts related to construction of roads and well pads are mainly caused by removal of vegetation and the resulting inconsistency in the natural landscape. The impacts of vegetation removal are described in Specialist Report 10.0. In addition, the traffic associated with well installation and the presence of the equipment on the well pad create direct visual impacts, which vary in intensity depending upon the distance a viewer might be from the activity and the amount of disturbance. The visual impacts due to traffic activity for the purposes of seismic exploration or well installation would be temporary and could be major; the quality or degree of the impact would depend, again, on the sensitivity of the landscape (High SIO landscapes are more sensitive than Low), and the location of the activity in relation to roads and viewer access. The visual impacts of an exploratory drilling rig or an installed well depend upon the siting and location of the equipment or facility. Approximately 50 percent of Dixie National Forest lands are designated Moderate or Low SIOs (see Table 1.4-1). The diverse variety contained in the landscape on the Dixie National Forest will facilitate a high degree of alterations before middle ground or background Moderate SIOs or foreground to background Low SIOs are not achievable.

The potential impacts to visual resources associated with post-leasing activity (exploration, access, development) would include changes to scenic integrity based on the effects to scenic quality and scenic views. Although the diverse forest landscape has the ability to absorb some of the effects of exploration, there are some sensitive areas where it would be more difficult to meet scenic integrity objectives. The most sensitive areas are characterized as High SIO areas such as Red Canyon and the Scenic Byways. In these areas, depending upon the viewing distance, it most often would not be possible to meet the scenic integrity objectives under SLT. In addition, the Dixie National Forest lands are within view of neighboring National Parks and Monuments including Zion, Bryce Canyon, Capitol Reef, Cedar Breaks, and Grand Staircase-Escalante.

Exploratory drilling would result in strong visual contrasts resulting from vegetation removal, soil disturbance, the addition of linear road features in undeveloped areas, and the presence of equipment that does not easily blend into the landscape. The visual impacts of drilling would be greater in areas visible from scenic travel ways or viewpoints. These moderate to strong direct effects would, however, be temporary, lasting from approximately nine to twelve months per well site (USFS 1995b). Under the RFDS, this activity could be ongoing in several areas of the Dixie National Forest during any one year and ongoing for 15 years. Public access would be restricted from newly constructed drill roads, limiting views of some exploration areas, but others may be highly visible from existing roads and trails.

Once access roads are constructed and a well site is cleared and leveled, it is estimated that total one-way traffic volume would be up to 1,924 trips per exploration well (see Specialist Report 11.0). Traffic volume is directly correlated to estimated size of drill pads and amount of road construction/reconstruction. This concentration of traffic to/from a drill site location may cause dust and related visual quality issues, and/or may cause recreationists or Forest visitors to leave an area in search of a more pleasing Forest setting.

Drill rigs vary in height from 100 feet (single) to 136 feet (triple) (Barry Olsen, Sale Manager, IDM Equipment, LTD., Houston, Texas, Personal Communication). Depending on the height of the substructures, the mast of a drill rig may rise to 160 feet above ground surface, and is the most visible and noticeable part of a drill rig (USFS 1995a, Appendix D). Drilling operations typically continue 24 hours a day and 7 days a week. Nighttime lighting on the rigs can be controlled to reduce the nighttime visibility of the derrick from a distance. This can be done by including shades on the lights and being careful that they shine inward to the working area of the rig and not outward (Dustin Doucett, Petroleum Engineer, Utah Division of Oil, Gas, and Mining, Personal Communication). Focus and illumination engineering can be utilized to make the entire rig non-visible from outside of the drilling location (Barry Olsen, Personal Communication) in many instances or locations. The potential for light pollution would be minor to moderate, depending upon the site, and temporary.

In the development and production phase of post-leasing activity, visual impacts would be minor to major adverse effects, depending upon the site, and they would be long term (at least 30 years of production). It is estimated that total one-way traffic volume would be up to 6,884 trips for development of a 20-well production field (Specialist Report 11.0). Average daily traffic is thus estimated to be 13 one-way trips during the production field development stage. The presence of an oil field, with all the associated activity, dust, and traffic, may cause some viewers or recreationists to abandon use of the area (USFS 1995a).

If the exploration does not result in discovery, the equipment would be removed, and the area reclaimed. The visual contrast from exploration disturbance and activity would likely be minor to negligible after several months, and over the long term would disappear entirely.

With regard to the lighting at the oil fields, many well sites are designed with adequate tank storage so there is not a need for nighttime pickups of oil and/or produced water by transporters; i.e. these operations only occur in the daytime. These types of well sites would typically not be lit at night. Those sites that are lit at night are not brightly lit to illuminate the whole location. Rather, the lighting is only placed where necessary for safety reasons and to operate specific equipment. When stray lighting is an environmental issue for such sites, the operator could install appropriate lamps and fixtures to reduce the stray light out from the location (Dustin Doucett, Petroleum Engineer, Utah Division of Oil, Gas, and Mining, Personal Communication).

The indirect effects of post-leasing activity are connected to recreation, use, access, viewpoints, and the more personal perspective and expectation of the viewer in the landscape. Therefore, indirect effects are variable, personal, and site-dependent but together influence the scenic experience of those who enjoy and use the Dixie National Forest. The direct and indirect effects of oil and gas leasing on the Forest may affect SIOs, depending upon the site and leasing option applied to these areas.



**Example of well pad cut into a forested slope; drill rig and associated portable support structures.**

Table 1.5-2 lists the leasing options assigned to the various SIOs under each of the alternatives. The leasing options and associated impacts to visual resources are described in Section 1.5.4.1. Each assigned leasing option would either allow or restrict certain oil and gas activities (described in the RFDS) wherever the applicable resource component occurs on the Dixie National Forest.

**Table 1.5-2 Leasing Options Assigned under each Alternative for Visual Resources.**

SIO					
	A	B	C	D	E
Very High	NL	NSO	NSO	NSO	SLT
High	NL	NSO	NSO	CSU	SLT
Moderate	NL	CSU	CSU	SLT	SLT
Low	NL	SLT	SLT	SLT	SLT
SIO Unassigned	NL	LN	LN	LN	SLT

**1.5.4.1 Impacts of Connected Actions by Leasing Option**

Leasing options would dictate the conditions under which connected actions (described under the RFDS) may occur. Impacts from connected actions under each leasing option are discussed in this section. Impacts to visual resources considering leasing option overlaps (i.e., overlaps with more restrictive leasing options assigned to other resources) are discussed in Section 1.5.4.2 (Impacts by Alternative).

**NOT AVAILABLE (NA)**

NA applies to lands that are not legally available for leasing and includes Brian Head Ski Permit Area, wilderness areas (which are designated as Very High SIO areas), and areas surrounding the Box-Death Hollow Wilderness Area that were withdrawn from leasing by the Utah Wilderness Act of 1984. No oil and gas leasing would occur in these areas and there would be no effects to scenic resources. This leasing option does not apply directly to visual resource components.

**NO LEASE (NL)**

NL applies to lands where no new leases would be authorized. These lands would not be administratively available for leasing. Under Alternative A, there would be no new leasing, so no connected actions to leasing and no visual effects would occur in addition to those within currently leased areas.

**NO SURFACE OCCUPANCY (NSO)**

Under the NSO option, there would be no surface disturbance due to construction or activities related to oil and gas exploration or development, other than seismic surveys. NSO prohibits use or occupancy of the land for fluid mineral exploration or development, in order to protect identified resource values. Under Alternatives B and C, NSO applies to lands designated with Very High or High SIO (see Figure 1.4-1). Under Alternatives C, D, and E, with the Roadless Area Conservation Rule in effect, NSO would apply to Inventoried Roadless Areas (IRAs) in High, Medium, and Low SIO areas.

***Measurement Indicators***

- Measurement Indicator #1 PREDICTED LUMENS FOR VARIOUS PHASES

There would be no effects to visual resources as a result of lighting conditions under NSO because there would be no occupancy. Seismic exploration would have a negligible effect on lighting impacts to visual resources as these operations are performed only in daytime.

- Measurement Indicator #2 NARRATIVE OF POTENTIAL CHANGES TO THE LANDSCAPE ADDRESSING THE DURATION AND CHANGE FOR EACH VISUAL ATTRIBUTE

Under NSO, there would be minor and temporary effects to the landscape with seismic exploration

activity. There would be no impacts to the SIOs under this option.

- Measurement Indicator #3 COMPLIANCE WITH THE SCENERY MANAGEMENT SYSTEM (SMS)/SCENIC INTEGRITY OBJECTIVES (SIO)

Under NSO, there would be negligible to minor and temporary effects to the landscape with seismic exploration activity. In Very High SIO areas, the landscape character would remain intact, with few, if any deviations – the definition of Very High SIO areas (USFS 1995a). Seismic exploration in Very High SIO areas may impact the SIO in the short term due to crushed vegetation trails, if exploration occurs in areas inaccessible by existing roads and trails. High, Moderate, and Low SIOs are not expected to be compromised in the short term or long term. There would be no long-term impacts to the SIOs under this option.

- Measurement Indicator #4 CONSISTENCY WITH THE 2000 DIXIE SCENERY MANAGEMENT SYSTEM LAND AND RESOURCE MANAGEMENT PLAN AMENDMENT

Under NSO, there would be no long-term effects to SIOs; NSO would be consistent with the 2000 Dixie Scenery Management System Land and Resource Management Plan amendment.

#### **TIMING LIMITATION (TL)**

TL does not apply directly to visual resources.

#### **CONTROLLED SURFACE USE (CSU)**

CSU provides for controlled but generally allowed surface use on all or portions of a lease. Operations would be held to special operational constraints that may otherwise exceed the mitigation provided by SLT, and the regulations and operating orders.

CSU applies to some High SIO areas under Alternative D. Under Alternatives B and C, CSU is the lease option applied in Moderate SIO areas. CSU would require the use of the Bureau of Land Management's (BLM)-established Best Management Practices (BMPs) in the location and design of oil and gas exploration sites, and prior approval by the Dixie National Forest of proposed designs to reduce visual effects of exploration and production. Refer to Appendix D for descriptions of the CSU.

#### ***Measurement Indicators***

- Measurement Indicator #1 PREDICTED LUMENS FOR VARIOUS PHASES

There could be minor temporary effects to visual resources as a result of lighting conditions under CSU. As under SLT, the drill rig lighting can be directed inward and shields provided to minimize the visibility of the site. Seismic exploration would have a negligible effect on lighting impacts to visual resources.

- Measurement Indicator #2 NARRATIVE OF POTENTIAL CHANGES TO THE LANDSCAPE ADDRESSING THE DURATION AND CHANGE FOR EACH VISUAL ATTRIBUTE

Under CSU, there would be minor to major temporary effects to the landscape with seismic exploration activity and exploratory drilling. Impacts to visual resources under a production scenario would be minor to major and long term dependant on location.

- Measurement Indicator #3 COMPLIANCE WITH THE SCENERY MANAGEMENT SYSTEM (SMS)/SCENIC INTEGRITY OBJECTIVES (SIO)

Under CSU, there would be minor to major (depending upon the availability of vegetative or topographic screening and distance from viewpoints) temporary effects to the landscape with exploration drilling activity. Drilling or production field activities would not comply with High SIOs, since the drilling rigs and production equipment would be difficult to screen. Once drilling is completed, and a drill site is reclaimed, it would again be in compliance with the SIO. In Moderate SIO areas, compliance is more likely to be maintained during drilling and production with BMPs such as siting to reduce visual impacts, painting of facilities to match the landscape, and interim road reclamation. However, drilling in foreground locations would not meet the Moderate SIO until after reclamation is complete. In Low SIO areas, compliance with SIOs would be maintained.

- Measurement Indicator #4 CONSISTENCY WITH THE 2000 DIXIE SCENERY MANAGEMENT SYSTEM LAND AND RESOURCE MANAGEMENT PLAN AMENDMENT

Under CSU, the impacts to SIOs are described above. CSU in High SIO areas or Moderate SIO areas may not be consistent with the 2000 Dixie Scenery Management System Land and Resource Management Plan amendment.

#### **LEASE NOTICE (LN)**

The LN does not impose new restrictions on oil and gas activities; it provides more detailed information concerning existing limitations, regulations, or orders, or addresses special considerations. A LN based upon visual resources would apply if proposed leasing occurs in unassigned SIO Areas. In this case, the lessee would be notified that a visual analysis would need to be conducted to determine a scenic attractiveness Class to the landscape, and an associated SIO prior to any project implementation. The impacts under LN would be the same as those described for SLT, below.

#### **STANDARD LEASE TERMS (SLT)**

BLM and USFS (2007) provides operators with a combination of guidance and standards for encouraging compliance with agency policies and operating requirements. For example, site selection and design are required to “minimize long-term disruption of the surface resources and existing uses, and to promote successful reclamation.” Further, the operator must work towards compliance with the visual resource management objectives, or SIOs established in the land use plan for “all activities that alter landforms, disturb vegetation, or require structures. Site-specific mitigation practices may be required by the surface management agency to minimize visual impacts, while remaining consistent with the lessee’s right to conduct operations under the lease.” The BLM has outlined BMPs for Fluid Minerals (BLM 2006) in consideration of visual resources. In visually sensitive areas, BMPs may include painting of facilities to blend with the surrounding landscape, locating structures to utilize topographic or vegetation screens, locating structures away from ridgelines or other prominent natural features, use of low-profile equipment, and completing interim reclamation of disturbed areas. Under SLT, BMPs are those reasonable measures taken by the operator to minimize undesirable impacts to the environment.

#### **1.5.4.2 Impacts of Connected Actions under SLT**

Impacts in this section are discussed assuming no restrictions or leasing options other than those listed on BLM Lease Form 3100-11 (SLT) and the environmental protection measures that would be implemented by other laws and regulations as described in Section 1.8.5.2 of the EIS and Appendix 1B. As a minimum, all leases are governed by SLT and the impacts described in this section represent the maximum amount of disturbance that could occur as a result of oil and gas activities.

Alternatives B and C apply the SLT leasing option only to the Low SIO areas. Alternative D applies the SLT leasing option to Moderate and Low SIO areas, while Alternative E would apply the SLT leasing option to all visual SIO areas including Very High and High. Impacts to these visual resources under SLT are described below.

Under SLT, leases within Very High and High SIO areas would be issued under the conditions of the standard federal oil and gas lease and subject to existing regulations. There would be no laws or regulations that would protect the visual resource from the effects of oil and gas post-leasing activity. This leasing option would not comply with Very High or High SIOs. Impacts to visual resources under SLT could be minor to major and short to long term.

Under SLT, leases within Moderate SIO areas would be issued under the conditions of the standard federal oil and gas lease and subject to existing regulations. There would be no laws or regulations that would protect the visual resource from the effects of oil and gas post-leasing activity. In areas of activity close to roads, the strong visual contrasts of exploration may not comply with this SIO until reclamation is complete. When activity occurs in background areas more easily screened from public views, uses under SLT incorporating BMPs (BLM 2006) for visual resources management would comply with the visual resources objectives in Moderate SIO areas. Full production field development in foreground or middleground views would not comply with Moderate SIOs.

Under SLT, leases within Low SIO areas would be issued under the condition of the standard federal oil and gas lease and subject to existing regulations. There would be no laws or regulations that would protect the visual resource from the effects of oil and gas post-leasing activity. In these areas, the activity may be obvious in the landscape, but must borrow from existing natural shapes and colors in the background. Painting the facilities with non-reflective paint in a color to blend with the environment would be required, as well as other BMPs (BLM 2006). Oil and gas activity under SLT would comply with Low SIO.

Under SLT, leases within Unassigned SIO areas would be accompanied by a Lease Notice providing a reminder that a visual analysis would be conducted prior to any surface disturbance under the lease. The scenic analysis would be part of the Surface Use Plan approval process; however, the application of a scenic integrity objective would not preclude leasing activity. Oil and gas activity in Unassigned SIO areas is expected to comply with the determined SIO for the landscape in Low and Moderate SIO areas, and may not comply with the SIOs of areas determined under the scenic analysis to be High or Very High. The likelihood of Unassigned SIO areas being assigned a High or Very High SIO is, however, slight, as most Unassigned SIO areas of the Forest are of less distinctive scenic attractiveness (and therefore likely to be assigned Low or Moderate SIOs).

### ***Measurement Indicators***

- Measurement Indicator #1 PREDICTED LUMENS FOR VARIOUS PHASES

According to Barry Olsen, drill equipment manufacturing representative, the lumen ratings for derrick lights all vary. Based upon this, the total lumens for each phase would be completely variable depending upon equipment utilized. This measurement indicator would not be effective in determining the effects of various phases of oil and gas exploration and production, and will not be analyzed further. Impacts to visual resources from light emission would occur but the range of magnitudes is not known. As noted above, the drill rig lighting itself can be directed inward and shields provided to minimize the visibility of the site.

- Measurement Indicator #2 NARRATIVE OF POTENTIAL CHANGES TO THE LANDSCAPE ADDRESSING THE DURATION AND CHANGE FOR EACH VISUAL ATTRIBUTE

As noted above, exploratory drilling would result in major, short-term impacts, particularly in areas that have not been previously developed. Visual contrasts would be strongest initially, during surface disturbance and construction, and would lessen over time as activity decreases and reclamation is completed.

Development of a production field in the foreground of a viewpoint would create major, long-term impacts. A production field in the distance from a viewpoint would create moderate long-term impacts.

- Measurement Indicator #3 COMPLIANCE WITH THE SCENERY MANAGEMENT SYSTEM (SMS)/SCENIC INTEGRITY OBJECTIVES (SIO)

There would not be compliance with SIOs under SLT in Very High or High SIO areas. In Moderate SIO areas, compliance is likely for middleground to background activities. In Low SIO areas, exploration and production activities would be in compliance with the objectives.

- Measurement Indicator #4 CONSISTENCY WITH THE 2000 DIXIE SCENERY MANAGEMENT SYSTEM LAND AND RESOURCE MANAGEMENT PLAN AMENDMENT

In High SIO corridors, SLT without site-specific mitigation measures to maintain the SIO would not be consistent with the designation of Scenic Byways and Backways as Concern Level 1 travelways in the 2000 Dixie Scenery Management System Land and Resource Management Plan amendment (USFS 2000).

#### 1.5.4.3 Impacts by Alternative

The degree to which the connected action impacts (Sections 1.5.4.1 and 1.5.4.2) would differ by alternative are discussed in this section. Alternatives involve leasing options, which would restrict the locations and the nature of oil and gas impacts that are allowed. Because areas for different resource components overlap, leasing options assigned to each resource component would also overlap and the most restrictive leasing option would take precedence (refer to Section 1.3).

Table 1.5-3 shows the acres of each resource component under each leasing option by alternative. This table incorporates the amount of overlap with more restrictive leasing options (assigned to other resources) in addition to the leasing options assigned directly to each resource component. Alternatives D1, D2, E1, and E2 represent the dual analysis of Alternative D and E. D1 and E1 represent the acres available with NSO in all IRAs. D2 and E2 represent the acres with leasing allowed in IRAs under a less restrictive leasing option. The following SIO designations fall within IRAs: 1,119 acres Very High SIO (1 percent of Very High SIO acres); 128,437 acres High SIO (32 percent of High SIO acres); 144,451 acres Moderate SIO (27 percent of Moderate SIO acres); and 159,383 acres Low SIO (54 percent of Low SIO acres). Table 4.2-3 does not include acres for Unassigned SIOs, as these lands would most likely be assigned an SIO of Low or Moderate (see above, Section 4.2.4.7). Low and Moderate SIO areas are mostly covered by equal or more restrictive leasing options, as a result of overlapping leasing options assigned to other resources, than assigned specifically to SIO Low or Moderate for all alternatives. A more detailed table that separates the acreage by resource component and Ranger District will be available in Appendix B of the EIS.

In this section, impacts are discussed at the forest-wide level and not by ranger district. This is done to avoid repetition and facilitate the comparison of impacts across alternatives. However, any pronounced differences in the impacts to a resource component between ranger districts will be highlighted and discussed. Impacts in regards to Measurement Indicator #2 would be the same for Alternatives B through E, and as described above in Section 1.5.4.1.

**ALTERNATIVE A – NO ACTION**

There would be no effects to the landscape under the No Action alternative, other than those already occurring in existing lease areas. There would be no effects to SIO's under No Action (Measurement Indicator #3). There is no concern for lack of consistency with the 2000 LRMP Amendment (Measurement Indicator #4).

**Table 1.5-3 Acreage of Resource Components under each Leasing Option by Alternative.**

Resource Component	Leasing Option	Alternative						
		A	B	C NSO IRAs	D NSO IRAs	D CSU IRAs	E NSO IRAs	E SLT IRAs
<b>Scenic Integrity Objective (SIO)</b>								
Very High (Wilderness and RNA's)	NA	85,592	85,592	85,592	85,592	85,592	85,592	85,592
	NL	4,336	4,291	4,247	0	0	0	0
	NSO	0	45	89	4,336	4,336	4,336	1,119
	SLT	0	0	0	0	0	0	3,217
High	NA	3,510	3,510	3,510	3,510	3,510	3,510	3,510
	NL	396,519	283,390	8,562	0	0	0	0
	NSO	0	112,942	387,956	171,688	68,102	128,437	0
	TL	0	0	0	144,731	210,707	0	0
	CSU	0	0	0	80,100	117,710	0	0
SLT	0	0	0	0	0	268,082	396,519	
Moderate	NA	769	769	769	769	769	769	769
	NL	538,881	368,304	379	0	0	0	0
	NSO	0	115,889	372,077	180,367	39,375	144,541	0
	TL	0	0	34,075	174,939	254,533	0	0
	CSU	0	54,688	132,352	163,449	224,847	0	0
SLT	0	0	0	20,125*	20,125*	394,340	538,881	
Low	NA	147	147	147	147	147	147	147
	NL	293,003	237,527	6161	0	0	0	0
	NSO	0	44,209	231,668	173,601	23,730	159,383	0
	TL	0	0	16,885	73,893	184,193	0	0
	CSU	0	11,268	38,290	43,444	83,015	0	0
SLT	0	0	2	2,066**	2,066**	133,620	293,003	

NA – Not Available, NL – No Leasing, NSO – No Surface Occupancy, TL – Timing Limitation, CSU – Controlled Surface Use, SLT – Standard Lease Terms,\*includes 541 acres of LN which would be treated as SLT under visual, \*\*includes 209 acres of LN which would be treated as SLT under visual.

**ALTERNATIVE B**

Under this alternative there would be No Leasing on 4,291 acres of Very High SIO land, and leasing under NSO on 45 acres. The remaining 85,592 acres, or 95 percent of Very High SIO lands are Not Available for leasing.

In the designated High SIO areas of the Dixie National Forest, there would be No Leasing on 283,390 acres (71 percent), and the lease option would be NSO for an additional 112,942 acres, or approximately 28 percent of the High SIO areas of the Forest. The remaining High SIO lands (1 percent) are Not Available for leasing.

Of the Moderate SIO lands on the Forest, there would be No Leasing on 368,304 acres, or 68 percent of the designated Moderate SIO lands. On 115,889 acres, or 21 percent of the Moderate SIO lands on the Forest, NSO would be applied. The lease option would be CSU on 54,688 acres, or 10 percent of the Moderate SIO lands on the Forest. The remaining Moderate SIO lands (1 percent) are Not Available for leasing.

There would be No Leasing on 237,527 acres, or 81 percent of the Low SIO lands on the Forest. The NSO option would be applied to 44,209 acres, or 15 percent of the Low SIO lands on the Forest. On 4 percent, or 11,268 acres of Low SIO lands, leasing would be allowed under CSU. The remaining 147 acres (Brian Head and small areas associated with limitations of the GIS data) of Low SIO lands are Not Available for leasing.

With the exception of Alternative A, this alternative provides the most protection for the scenic resources of the Forest, and would be in compliance with the SIO's with considerations made for facility location and site design in Moderate SIO areas adjacent to viewing corridors (Measurement Indicator #3). This alternative would be consistent with the 2000 LRMP Amendment (Measurement Indicator #4).

#### **ALTERNATIVE C WITH NSO IN INVENTORIED ROADLESS AREAS**

Alternative C has less restrictive leasing options than Alternative B and more restrictive options than Alternative D. The Very High SIO lands carry essentially the same options as under Alternative B, other than the NSO option, which increases slightly to 89 acres.

Under this alternative, there are few High SIO areas (less than 1 percent) that are Not Available for leasing. There would be No Leasing on 8,562 acres of High SIO lands. The leasing option would be NSO for 387,956 acres, or about 97 percent of the High SIO areas of the Forest.

Of the Moderate SIO lands, NSO would be applied to 372,077 acres, or 69 percent of the Moderate SIO lands on the Forest. The lease option would be CSU on 166,427 acres, or 31 percent of the Moderate SIO lands on the Forest. The remaining Moderate SIO lands are Not Available for leasing or would have NL applied.

The NSO option would be applied to 231,668 acres, or 79 percent of the Low SIO lands on the Forest. On 20 percent, or 55,169 acres of Low SIO lands, leasing would be allowed under CSU. The remaining Low SIO lands are Not Available for leasing or would have NL applied.

This alternative places the majority of the Forest acreage into the NSO option. This provides protection for the scenic resources of the Forest, and would be in compliance with the SIO's with considerations made for facility location and site design in Moderate SIO areas adjacent to viewing corridors (Measurement Indicator #3). This alternative would be consistent with the 2000 LRMP Amendment (Measurement Indicator #4).

#### **ALTERNATIVE D WITH NSO IN INVENTORIED ROADLESS AREAS**

Alternative D has less restrictive leasing options than Alternative C and more restrictive options than Alternative E. The majority of Very High SIO lands are Not Available for leasing. There are 4,446 acres that could be leased under NSO. Of the High SIO lands, 171,688 acres, about 43 percent of the High SIO areas of the Forest, would be NSO. The High SIO acres under a TL include 144,731, which comprise 36 percent of the High SIO areas of the Forest. The CSU option applies to 80,100 acres, or 20 percent of High SIO lands. The remaining High SIO lands (less than 1 percent) are Not Available for leasing.

Under this alternative, SIO Moderate and Low areas would be available for leasing under SLT. Of the Moderate SIO lands, NSO would be applied to 180,367 acres, or about 33 percent of the Moderate SIO lands on the Forest. A TL would be in place for 174,939 acres, 32 percent of the Moderate SIO lands on the Forest. The lease option would be CSU on 163,449 acres, or 30 percent of the Moderate SIO lands on the Forest. SLT would be the option on 20,125 acres, less than 4 percent of Moderate SIO lands. The remaining Moderate SIO lands (less than 1 percent) are

Not Available for leasing.

The NSO option would be applied to 173,601 acres, or 59 percent of the Low SIO lands on the Forest. On 15 percent, or 43,444 acres of Low SIO lands, leasing would be allowed under CSU. A TL applies to 73,893 acres, or about 25 percent of the Low SIO lands. The remaining 147 acres of Low SIO lands are Not Available for leasing.

This alternative provides for NSO in IRAs. CSU in High SIO areas would not likely be in compliance with the SIO, depending upon the site and distance from viewing areas (Measurement Indicator #3). CSU, with considerations made for facility location and site design in Moderate SIO areas adjacent to viewing corridors, is likely to comply with the SIO. This alternative would likely not be consistent with the 2000 LRMP Amendment for those High SIO corridor areas subject to a TL or CSU (Measurement Indicator #4).

#### **ALTERNATIVE D WITH CSU IN INVENTORIED ROADLESS AREAS**

The majority of Very High SIO lands are Not Available for leasing. There are 4,446 acres that could be leased under NSO. Of the High SIO lands, the leasing option would be NSO for 68,102 acres, about 17 percent of the High SIO areas of the Forest. The High SIO acres under a TL include 210,707, which comprise 53 percent of the High SIO areas of the Forest. The CSU option applies to 117,710 acres, or 29 percent of High SIO lands. The remaining High SIO lands (less than 1 percent) are Not Available for leasing.

Of the Moderate SIO lands, NSO would be applied to 39,375 acres, or about 7 percent of the Moderate SIO lands on the Forest. The lease option would be CSU on 224,847 acres, or 42 percent of the Moderate SIO lands on the Forest. SLT would be the option on 20,125 acres, less than 4 percent of Moderate SIO lands. The remaining Moderate SIO lands (less than 1 percent) are Not Available for leasing.

The NSO option would be applied to 23,730 acres, or 10 percent of the Low SIO lands on the Forest. On 28 percent, or 83,015 acres of Low SIO lands, leasing would be allowed under CSU. A TL applies to 184,193 acres, or 63 percent of the Low SIO lands. The remaining Low SIO lands (less than 1 percent) are Not Available for leasing.

This alternative provides for CSU in IRAs. CSU in High SIO areas would not likely be in compliance with the SIO, depending upon the site and distance from viewing areas (Measurement Indicator #3). CSU, with considerations made for facility location and site design in Moderate SIO areas adjacent to viewing corridors, is likely to comply with the SIO. This alternative would likely not be consistent with the 2000 RMP Amendment for those High SIO corridor areas subject to a TL or CSU (Measurement Indicator #4).

#### **ALTERNATIVE E WITH NSO IN INVENTORIED ROADLESS AREAS**

Alternative E would open the majority of the Dixie National Forest to leasing under the standard lease terms and conditions contained on BLM Lease Form 3100-11, with the exception of areas identified as Visual Retention/SIO Very High and IRAs under the dual analysis scenario. Visual Retention/SIO Very High areas would be NSO or not available for leasing. The majority of Very High SIO lands are Not Available for leasing. There are 4,446 acres that could be leased under NSO. In High SIO areas, 128,437 acres would be NSO, 67 percent of High SIO areas. SLT would apply to 268,082 acres of High SIO lands, 32 percent.

In Moderate SIO areas, NSO would apply to 144,541 acres or 27 percent, and SLT would be the option on 394,340 acres or 73 percent of Moderate SIO lands. In Low SIO areas, NSO would apply to 159,383 acres, or 54 percent, and 133,620 or 46 percent would be available under SLT

This alternative would likely not be consistent with the 2000 Scenery Management System Amendment for High SIO areas, and Moderate foreground and middleground SIO areas subject to SLT (Measurement Indicator #4)

**ALTERNATIVE E WITH SLT IN INVENTORIED ROADLESS AREAS**

Leasing would be allowed anywhere on the Dixie National Forest that is administratively available. This alternative would be similar to Alternative E above, except NSO areas would decrease and SLT would increase. The majority of Very High SIO lands are Not Available for leasing. There are 4,446 acres that could be leased under NSO. Other than Very High SIO lands noted, the remainder of the Forest, for the most part (99 percent), would be available under SLT. In High SIO areas, 396,519 acres would be SLT. In Moderate SIO areas 533,881 acres would be SLT. In Low SIO areas, 293,003 acres would be available under SLT. Under this alternative, impacts would be as described in Section 1.5.4.1.

**1.5.5 Cumulative Effects**

Cumulative effects are the total effect, including direct and indirect effects, on a given resource resulting from the incremental impact of past, present, and reasonably foreseeable future actions. They can result from individually minor, but collectively significant actions taken over a period of time. Cumulative effects may arise from single or multiple actions and the effects may be additive or interactive. The net adverse effect of interactive actions may be less than the sum of the individual effects (countervailing) or the actions may interact to create a net adverse cumulative effect that is greater than the sum of the individual effects (synergistic). The magnitude and extent of the effect on a resource depends on whether the cumulative effects exceed the ability of a resource to function at a desired level (CEQ 1997).

**1.5.5.1 Description of Cumulative Effects Area**

The Cumulative Effects Area for Visual Resources would include the entire Dixie National Forest including all of Cedar Breaks National Monument. In addition, the CEA would include all of Bryce Canyon National Park, a 1-mile buffer along the boundary between the Escalante and Fremont River Ranger Districts, a 1-mile buffer along the boundary between the Escalante Ranger District and the Grand Staircase-Escalante National Monument, and all area in between the Powell and Escalante Ranger Districts (Figure 1.5-1).

**RATIONALE**

Cumulative effects of activities and actions within the Dixie National Forest may affect visitors to the Dixie National Forest as well as visitors to National Parks, National Monuments, and other National Forests with viewsheds that include Dixie National Forest lands. Oil and gas leasing activity possible on the Fishlake Forest or on State administered lands may compound visual effects of any potential oil and gas leasing activity on the fringes of the Dixie National Forest in these areas. The area in between the Powell and Escalante Ranger Districts was included as it is in close proximity to Dixie National Forest land and may also affect views from scenic Forest roads or Wilderness Areas. Activities outside the Forest may affect views from scenic Forest roads or Wilderness Areas.

**Table 1.5-4 The division of land status within the CEA for visual resources.**

<b>Land Ownership</b>	<b>Acres</b>	<b>% of Total CEA</b>
Bureau of Land Management (BLM)	83,444.09	4.27%
National Park Service (NPS)	41,973.23	2.15%
Private	109,800.94	5.62%

State Lands	54,089.06	2.77%
US Forest Service (USFS)	1,578,259.55	80.85%
USFS Wilderness Area	82,572.82	4.23%
Water	1,911.56	0.10%
TOTAL	1,952,051.26	100.00%

### 1.5.5.2 Past, Present, and Reasonably Foreseeable Actions

#### **PAST AND PRESENT ACTIONS**

Visual resources of the Dixie National Forest can be affected by any activities that change vegetation patterns or add man-made features to the Forest, or to areas beyond the Forest boundary, within Forest viewsheds. Natural events, such as wildfire or insect infestations may also impact the scenic resources of the Forest. In addition, the amount of casual use and recreation on Forest lands may affect the scenic experience. Past and present management activities continue to impact visual resources to some extent by altering vegetation communities. Development within and outside the Forest boundaries may affect scenic views.

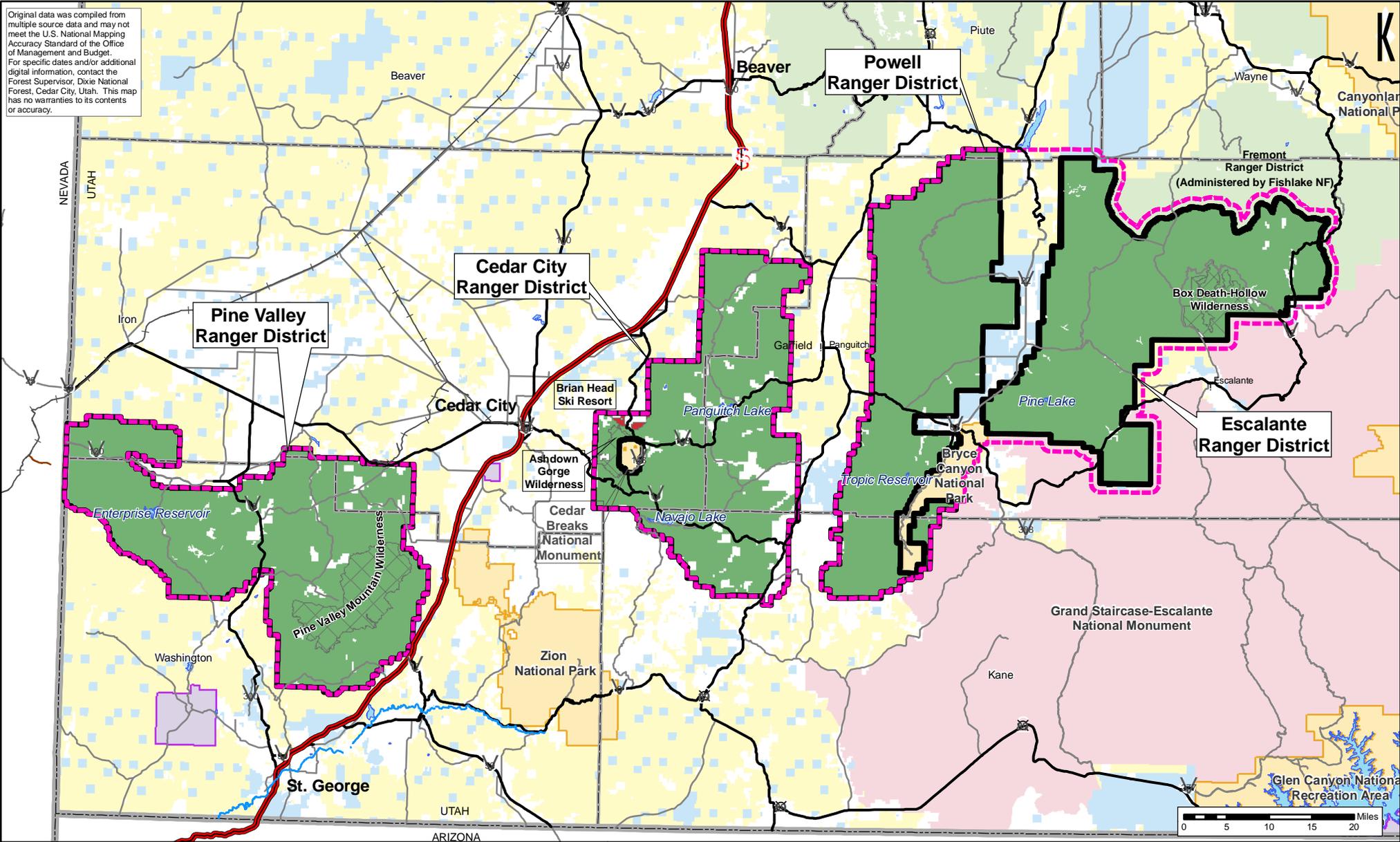
The past and present levels of each type of activity are listed below along with the impacts that have occurred and the expected level of future activity.

#### **RECREATION, MAINTENANCE, & OHV USE**

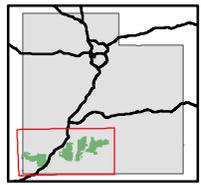
Overall, recreation on the Dixie National Forest has increased relative to past levels, primarily due to the burgeoning populations in nearby cities such as St. George and, further distant, Clark County (Las Vegas), Nevada. The areas of the Forest close to Interstate 15 (Pine Valley and Cedar City Ranger Districts) receive the largest amount of visitors from Clark County. In the past, much of the recreation on the Forest has been centered on consumptive forms of recreation (hunting and fishing). Driving for pleasure and viewing scenery and wildlife are also top visitor activities on the Forest.

OHV use has increased greatly on the Dixie National Forest in recent years, and there is a large amount of secondary or participating OHV use occurring primarily in conjunction with fishing and hunting activities (USFS 2006a). Although OHV use is a form of forest recreation, encroachment into primitive areas has degraded trail conditions and impacts those that are seeking solitude.

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. For specific dates and/or additional digital information, contact the Forest Supervisor, Dixie National Forest, Cedar City, Utah. This map has no warranties to its contents or accuracy.



**Oil and Gas Leasing EIS on Lands Administered by the Dixie National Forest**  
**FIGURE 1.5-1**  
**Cumulative Effects Area**  
**Dixie National Forest Boundary & Visual Impacts**



! Cities	County Boundaries	<b>Other Land Administration</b>	Private	Cumulative Effects Area***
Railroad	State Lines	Bureau of Land Management	State of Utah	
Minor Roads*	<b>National Forest System Lands</b>	GSENM**	Tribal	
Highways	Dixie National Forest	National Park Service		
Freeways	Wilderness Areas			
Virgin River	Fishlake National Forest			
Water Bodies	Brian Head Ski Resort			

\*Not all roads are shown. Only some roads are depicted for orientation purposes.  
 \*\*Grand Staircase-Escalante National Monument. Managed by the Bureau of Land Management.  
 \*\*\*Includes Dixie National Forest Boundary, Bryce Canyon National Park, Cedar Breaks National Monument, area between Escalante & Powell Ranger Districts, and a 1-mile buffer of Escalante Ranger District.

Maintenance of recreation facilities including trails can prevent visual degradation of landscapes. Activities within Brian Head Ski Resort are generally restricted to maintenance efforts. In Bryce Canyon National Park, there are three projects that have either recently been implemented, or are to be implemented in the near future. The Paria View Rehabilitation Project will rehabilitate walkways and railings at a scenic viewpoint. The Mossy Trail Rehabilitation Project will rehabilitate a trail that was washed out by a flood event, and will include installation of a viewing platform to reduce visitor impacts to the cave. The Tropic Canyon Highway Rehabilitation Project will fix a bridge damaged by flood events. These projects are expected to have minor, temporary, localized impacts, with beneficial effects for visitors to Bryce Canyon National Park.

The BLM's Richfield Field Office administers the BLM land around and to the south of Antimony, in between the Escalante and Powell Ranger Districts. Most of this area is Visual Class IV (Low SIO) which allows major modification. There are some Class III (Moderate SIO) areas along the western boundary of the Escalante Ranger District. Most of the area is open to cross-country motorized travel, except for roads up Pole Canyon, Pine Creek, Deep Creek, and Deer Creek (these are all canyons coming off the east side of the Powell Ranger District). The vegetation is mostly pinyon-juniper woodlands and is grazed.

#### **FIRE**

Historically, fire played a major role in ecosystems on the Dixie National Forest. The largest fire season since 1970 was in 2002, in which 57,745 acres burned. The Sanford Fire in 2002 (Powell Ranger District) burned mainly sagebrush and mixed conifer. In the short term, fire can diminish the visual quality of the landscape, thus making some areas undesirable for viewing scenery and wildlife, and dispersed camping.

#### **TIMBER HARVESTING, SPRUCE BEETLE OUTBREAKS, AND VEGETATION MANAGEMENT**

Heavy logging occurred on the Dixie National Forest during the late 1800s and early 1900s and considerably reduced the extent of the forested lands. Logging and forest management practices have also changed the vegetative and scenic composition of the forested lands. Under current management, forest harvests such as clear-cuts are rare. The currently-planned vegetation management projects described in detail in the Vegetation Specialist Report (#10) would impact vegetation in both the short and long term, but are not expected to have a long term adverse impact to visual resources. The majority of the effects from timber harvesting or vegetation management projects are temporary in duration, only lasting as long as the harvest or management activity is active. Impacts associated with large scale timber harvests, timber salvage, and prescribed burns tend to be short-term in duration. Impacts of these activities are generally associated with visual disruptions. However, once the vegetative integrity of these areas has recovered, the scenic quality of the affected area often improved beyond pre-activity conditions.

Bark beetles (i.e., spruce beetle, mountain pine beetle, and Douglas-fir beetle) have been and continue to be the most notable cause of widespread tree mortality in the Intermountain Region for the past several decades. Many of the largest infestations in Utah are on the Dixie National Forest. Forest management in the form of sanitation cuts, salvage cuts, and improvement cuts is conducted in an attempt to create conditions favorable to tree regeneration and increased diversity in order to reduce the risk of severe outbreaks. Removal of the dead trees has opened previously unseen vistas. Recent outbreaks have resulted in landscapes comprised of thousands of dead trees (See Vegetation Specialist Report and above photo of Navajo Lake) and the accumulation of downed woody debris.

Spruce, fir, mixed conifer, and pine forests on the Dixie are relatively susceptible to fire, insects, and disease due to recent droughts, and are the focus areas of current timber management. Forest susceptibility to bark beetle attacks is reduced with prescribed fires and other vegetation management practices. From 2004-2006, an average of 4,345 acres have been burned by prescribed fires per year. Ongoing and future timber harvesting and vegetation management projects are detailed in the Vegetation Specialist Report (#10).

#### **MINING, ENERGY, AND OIL & GAS DEVELOPMENT**

Regarding existing oil and gas leases within the CEA, BLM data indicates that there are 55 authorized leases and 1 pending lease. In total, these leases cover 26,670 acres. Other than the Upper Valley Field, however, none of these leases are active.

Mineral leases in the Grand Staircase-Escalante National Monument include 18 federal coal leases encompassing nearly 53,000 acres, and 85 federal oil and gas leases encompassing about 136,000 acres. Estimates for disturbance related to development of valid existing mineral rights in the Grand Staircase-Escalante National Monument were not included in the FEIS for the management plan because of insufficient information on potential for discovery and extent of development (BLM 1999). Existing BLM data indicates there are no pending leases on the portion of the Grand Staircase-Escalante National Monument included within the CEA. Development of wind energy in the Grand Staircase-Escalante National Monument is not allowed.

Within the BLM's Richfield District portion of the CEA, there are some oil and gas leases along the western edge of the Escalante Ranger District. However, the area has low development potential for oil and gas (BLM 2007). It predicts an average of 3 wells per year (in an area that includes much more than the area between the two Ranger Districts) for the next 15 years. Estimated disturbance is 12 acres per well. The area is considered low potential for wind energy development, according to the programmatic EIS prepared for wind energy on all BLM land (BLM 2005).

Impacts to forest visual resources could occur as a result of the development of minerals on adjacent private land. Oil and gas activity on private lands near the forest is not required to meet Forest Plan standards for visual resources.

#### **DEVELOPMENT AND POPULATION GROWTH**

Population is increasing in southern Utah, particularly in Washington County and Iron County. Developments are occurring on private subdivisions within the Dixie National Forest boundary. With development is temporary land disturbance, landscape change, and increased use of produced light.

Developments within and adjacent to the Forest remove vegetation permanently and increase the extent of urban-wildland interface which must be managed more intensely for fuels (e.g., Duck Creek and Pine Valley Fuels Treatments; see Table 10.5-6). Pine Valley is included on the Federal Register's list of Communities at Risk from wildfire, and Boulder Town has been identified by the State of Utah as a community at risk from catastrophic wildland fire (2006 SOPA, 2<sup>nd</sup> quarter). The largest amount of private land within the boundary occurs in the Pine Valley Ranger District, on routes between Cedar City, Enterprise, and St. George; and in the Cedar City Ranger District, on routes between Panguitch, Hatch, Alton, Cedar City, and Brian Head and the numerous campgrounds and other recreation sites (e.g., Cedar Breaks National Monument, Brian Head ski resort, Panguitch Lake, and Navajo Lake). Development is expected to increase and impact vegetation communities in the foreseeable future by permanently removing vegetation on private lands and increasing the wildland-urban interface.

There are 109,800.94 acres of private land in the CEA (5.62 percent). Of that, nearly 10 percent

(10,752 acres) is within municipalities (Bryce Canyon City, Brian Head Town, Boulder, Enterprise, and Antimony).

The majority of private land in the CEA outside of the Forest boundaries is within Garfield County. The Garfield County Planner indicated that the primary use of private land within the county is agriculture (outside of the municipalities). After agriculture, the primary industry is tourism. Accordingly, most development in the county consists of small subdivisions (second homes and recreational residences). Many of the subdivisions are single-lot splits, where a landowner splits a larger lot into 2-10 smaller lots. There are only 3-4 subdivisions planned that are larger, with over 50 lots. However, most of the subdivisions (both large and small) have not yet been developed. None of these subdivisions are of the large “resort” type and usually consist of dirt roads and single wells. There is also a RV park planned near Panguitch Lake, and a fair amount of development on private land around Panguitch Lake. To date, there have been no requests for conditional use permits.

Regarding development within the Grand Staircase National Monument, it is noted: “Few places are as dark as south-central Utah. It is one of the darkest spots on NASA’s satellite image of the United States at night. As such, the BLM would not propose actions within the Monument that would contribute to light pollution, and would be proactive in preventing light pollution within the Monument. The BLM would also work closely with the surrounding communities to minimize light pollution (BLM 1999).”

#### **REASONABLE FORESEEABLE FUTURE ACTIONS**

All of the above types of activities and development are expected to continue to some degree on the Forest and within the CEA. Consumptive recreation in the form of hunting and fishing will continue to be primary recreation activities; OHV use will also generally continue to trend upward. However, it is anticipated that the proposed Motorized Travel Management Project, which will restrict motorized use to specific trails, will largely eliminate off-trail or cross-country motorized travel. This should reduce some of the impacts of recreation on visual resources.

The use of prescribed fire and mechanical fuel treatments are also anticipated to increase over the next 5-10 years. The amount burned by prescribed fires will likely increase to over 10,000 acres per year in the near futures. Most prescribed burns have very minor and short-term effects on vegetation resources. Further, an increase in the number of prescribed fires and mechanical fuel treatments should ultimately lead to a decrease in the number of large, catastrophic fires.

The historically spruce-dominated landscape on the Cedar City and Powell Ranger Districts is expected to revegetate to aspen over the next century. Bark beetle outbreaks are expected in the Pockets area of the Escalante Ranger District; mortality of most spruce greater than 10 inches in diameter is expected. This will affect the forest composition but is not expected to negatively impact scenic resources in the long term. Vegetation restoration treatment of approximately 20,000 acres is also planned in the adjacent Grand Staircase-Escalante National Monument (BLM 1999); however, the specific treatment areas are not disclosed.

Maintenance of recreation facilities is planned to continue within Cedar Breaks National Monument, and Grand Staircase-Escalante National Monument. In addition, the FEIS for the Management Plan for the Grand Staircase–Escalante National Monument (BLM 1999) predicts several “Reasonably Foreseeable Actions,” including communication sites, utility rights-of-way, road rights-of-way, and water developments.

Much of the 1-mile buffer in the CEA that includes Grand Staircase-Escalante National Monument is within zones designated as “primitive or outback.” Activities that would impact visual resources such as rights-of-way would not be permitted in primitive zones, and communication sites would only be

allowed for safety purposes. In the outback zones, communication sites and utility sites would only be allowed if no other reasonable location exists. Where they are allowed, new utility lines would be buried if possible, power lines would be non-reflective, and towers would be galvanized steel or wood.

In the portion of the CEA which occurs on lands administered by the BLM's Richfield Field Office, there is minor activity planned, including a few range projects, some work on the Piute Trail, and perhaps a few small ROW applications.

### **1.5.5.3 Cumulative Effects**

Generally, activities within the Forest or within BLM-administered lands are guided by the restrictions in place to maintain scenic resources. Cumulative impacts to visual resources of the Dixie National Forest would be likely to occur with extensive development of communities, industry, or natural disasters, within the viewsheds of the most highly utilized and appreciated scenic viewpoints. Other than natural disasters, which cannot be reliably predicted, other forms of extensive development are not included in the plans described above for areas adjacent to the Forest boundary. Based on this, the potential for cumulative effects to visual resources is minor, unless Forest Plan objectives are changed and activities are allowed to develop in scenic areas that are currently protected. In regard to the dark sky aspect of visual resources, although light pollution can be accurately measured, the cumulative effects of even minor development on the dark sky resources of the CEA are more difficult to assess, and extend far beyond the surface boundaries of the defined CEA.

#### **ALTERNATIVE A**

Under Alternative A, no new oil and gas activity would occur and there would be no cumulative effects.

#### **ALTERNATIVE B**

Under Alternative B, the potential for cumulative effects to visual resources of the Dixie National Forest would be negligible to minor. The greatest potential for cumulative effects would be in Moderate SIO areas leased and developed under CSU, and High SIO areas that are adjacent to, or within view of private property developments or facility/resource development on non-Forest lands where compliance with scenic objectives is not required.

#### **ALTERNATIVE C**

This alternative places the majority of the Dixie National Forest into the NSO leasing option. Visual resources are protected under NSO. The potential for cumulative effects to visual resources would be greatest in Moderate SIO areas where development of oil and gas, in addition to any other development or vegetative management conditions, occur in the foreground or middleground views. Cumulative impacts to visual resources may occur in these areas if they have been impacted by and not recovered from past disturbance or if they are impacted by future management, development, and vegetation trends.

#### **ALTERNATIVE D WITH NSO IN IRAS**

The scenic resources of IRAs would be protected under NSO under this Alternative. However, the scenic resources in High SIO areas of the Forest would not be adequately protected by either the CSU or TL leasing options assigned to this SIO under this alternative; this includes 56 percent of the High SIO lands and about 12 percent of the Dixie National Forest. In these areas, there could be cumulative impacts to visual resources if exploration and development occur in concentrated areas and if such development occurs adjacent to, or within view of private property development or facility/resource development on non-Forest land where compliance with scenic objectives is not required. This scenario for cumulative effects is possible, but not likely to occur based upon the limited list of proposed developments on non-Forest lands.

### **ALTERNATIVE D WITH CSU IN IRAS**

Under this alternative the potential for cumulative impacts to visual resources would increase with IRAs available for leasing under CSU. For High SIO lands, the percentage increases from 56 to 82 percent of High SIO lands that would be inadequately protected. Moderate SIO areas under either CSU or SLT increases from 34 percent to about 93 percent of the Moderate SIO areas of the Forest.

Accordingly, the potential for cumulative effects increases with the increased acreage available for leasing in categories that may not adequately protect visual resources, and with the associated increase in potential for adjacent lands being private or non-Forest lands and not subject to compliance with scenic objectives. This scenario for cumulative effects is possible, but not likely to occur based upon the limited list of proposed developments on non-Forest lands.

### **ALTERNATIVE E WITH NSO IN IRAS**

Under this alternative, cumulative effects to visual resources would be more likely than under Alternative D because more lands are available for leasing under less restrictive options. Accordingly, the potential for cumulative effects increases with the increased acreage available for leasing in categories that may not adequately protect visual resources, and with the associated increase in potential for adjacent lands being private or non-Forest lands and not subject to compliance with scenic objectives.

### **ALTERNATIVE E WITH SLT IN IRAS**

The potential for cumulative impacts to visual resources under this alternative is greater than under Alternative E with No Surface Occupancy in IRAs, since additional lands in IRA's are included as lands available under SLT.

## **1.6 Compliance with Other Laws and Regulations**

There are no other known specific laws and regulations directly connected to visual resources that would impact the compliance of this proposed availability of lands for leasing with such laws or regulations.

## **1.7 Forest Plan Consistency Determination**

Alternative D would not be in compliance with the Forest Plan or the 2000 Scenery Management System Amendment to the Forest Plan for High SIO and potentially some Moderate SIO areas. Alternative E would not be in compliance with the Forest Plan or the 2000 Scenery Management System Amendment for Very High, High, and some Moderate SIO areas. Alternatives A, B and C are consistent with the 2000 Scenery Management System Amendment to the LRMP.

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## **Appendix 1A – Stipulation Forms**

**NO SURFACE OCCUPANCY STIPULATION  
Very High Scenic Integrity Objective Areas  
Alternatives B, C, and D**

**No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).**

Within all lands designated as having a very high scenic integrity objective as shown on Figure 3.2-1. This prohibition includes all surface disturbing activities including, but not limited to, drill pads, roads, powerlines, pipelines, and other facilities.

**For the purpose of:**

Preserving the existing very high scenic integrity of these areas.

**A request for a waiver, exception, or modification (WEM) to the above lease stipulation may be requested along with the submission of a Surface Use Plan of Operations (36 CFR 228.104).**

**Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).**

**R4-FS-2820-14 (8/92)**

**NO SURFACE OCCUPANCY STIPULATION  
High Scenic Integrity Objective Areas  
Alternatives B and C**

**No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).**

Within all lands designated as having a high scenic integrity objective as shown on Figure 3.2-1. This prohibition includes all surface disturbing activities including, but not limited to, drill pads, roads, powerlines, pipelines, and other facilities.

**For the purpose of:**

Preserving the high scenic integrity of these areas.

**A request for a waiver, exception, or modification (WEM) to the above lease stipulation may be requested along with the submission of a Surface Use Plan of Operations (36 CFR 228.104).**

**Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).**

**R4-FS-2820-14 (8/92)**

**Appendix 1B - Dixie National Forest Oil and Gas Construction  
and Operating Standards and Well Site Design Requirements**

# **Dixie National Forest Oil and Gas Construction and Operating Standards and Well Site Design Requirements**

## **I. INTRODUCTION**

The following operating standards and well site design requirements would be required by the Dixie National Forest for oil and gas facilities and operations to assure consistency with management objectives for the Forest. These operating standards should not be confused with stipulations contained in the applicable Federal oil and gas lease(s) which specify requirements regarding surface occupancy and timing within the specific areas in the lease. Operating standards must be consistent with the rights and restrictions established in the applicable lease(s) and are applicable to all drilling and production operations, unless otherwise approved by the responsible officer based on site-specific conditions.

These operating standards supplement the general requirements of the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (Gold Book) and Best Management Practices in place by the responsible agencies at the time of approval, and the Forest Service, Region 4 Oil and Gas Rooding Guidelines. Copies will be made available to operators at first notification of proposed operations.

Authority to require such standards is provided by the Mineral Leasing Act of 1920, as amended, Federal Regulations at 36 CFR 228.106-108 (Submission, Review, and Requirements of Surface Use Plans of Operations) and 43 CFR 3162.3 (BLM procedures for approval of post-lease applications for operations).

## **II. PURPOSE**

These operating standards have been developed to help operators meet agency and Forest requirement when planning operations and preparing their Surface Use Plan of Operations and to assure overall consistency with Forest Service management objectives/direction. They have been developed based on experience with oil and gas operations on National Forest System lands as needed to prevent or mitigate effects and conflicts with other uses.

## **III. PROCESS**

Approvals of proposed operations on lease are subject to the application, review, and approval provisions specified in Onshore Oil and Gas Order No. 1, other Onshore Oil and Gas Orders, and all applicable laws and regulations. Surface disturbing proposals must be evaluated under the requirements of the National Environmental Policy Act of 1969 and the Energy Policy Act of 2005. Operators are encouraged to obtain these operating standards from the Forest Service early in the planning and approval process and to incorporate them into their Surface Use Plans of Operations to help streamline the NEPA analysis and approval process. If not incorporated into the initial SUPO, the Forest Service will work with the operator to revise the SUPO to include them or may otherwise require them as Conditions of Approval (COA).

Other standards or mitigations may be required based on site-specific evaluations of proposed activities. They may be modified if needed to address site-specific conditions.

Operators are required to comply with all other applicable laws and regulations.

#### **IV. OPERATING STANDARDS**

These standards apply to the lease holder, contractors, and their sub-contractors. The term “operator” as used herein, includes the lease holder and/or company authorized to conduct operations on the lease or their contractors, subcontractors, and all employees or agents thereof.

1. The operator shall submit for review and approval, a detailed construction and maintenance plan for all exploration and production facilities and roads to be constructed or improved (reconstructed) for operations. Unless otherwise approved by the responsible Forest Service officer, pad designs must be consistent with requirements contained in the Dixie National Forest Well Site Requirements (Attachment 1). A road-use permit (or specific approval as part of the Surface Use Plan of Operations) must be obtained from the Forest Service for commercial use, improvement, and maintenance of National Forest System roads under authority of the National Forest Roads and Trails Act. Road designs must be generally consistent with the Forest Service guidelines provided in the Oil and Gas Rooding Guidelines, R-4.
2. The designs for roads, pads, and other facilities are subject to approval by the Forest Service. The designs must be approved and signed by a qualified licensed engineer. Any modifications to approved plans are subject to Forest Service review and approval.
3. Existing roads will be used to the extent possible as long as the existing alignment can be used or improved to the required standard. Additional roads or rerouting of existing road segments, if needed, shall be minimized and approved by the Forest Service prior to construction. Roads or road segments replaced and/or abandoned by construction of new roads or rerouting must be reclaimed by the operator. Road locations and designs must be generally consistent with the Forest Service guidelines provided in the Oil and Gas Rooding Guidelines, R-4.
4. Locate and design roads and drainage structures to prevent slope failure and minimize impacts on water quality. To the maximum extent feasible, locate facilities, including service and refueling areas, on benches upslope from streams, lakes, ponds, riparian areas, and floodplains.
5. A pre-construction meeting including the responsible company representative(s), contractors, and the Forest Service must be conducted at the project work site prior to commencement of operations. Earthwork must be construction staked prior to this meeting. Approval of the designs and earthwork staking by responsible Forest Service official is required prior to beginning earthwork.
6. A Spill Prevention Control and Countermeasures (SPCC) Plan consistent with the current EPA Region VIII Oil and Hazardous Substances Regional Contingency Plan must be filed with the Forest Service and approved by the authorized officer prior to conducting any construction and operations on National Forest System lands. The plan must address the potential for spills to occur from haulage of materials and supplies to the construction/operations site(s) as well as drilling and production facilities. Material Safety Data Sheets (MSDS) for all potentially hazardous substances

used for operations used for operations must be available on-site. Operators must be trained in MSDS protocols.

7. All surface disturbing activities, including reclamation, must be supervised by a qualified on-site responsible designated company representative(s) familiar with the approved plans as well as terms and conditions of approval. The designated representative(s) must be available for contact within the vicinity of the project area or by telephone at all times that operations are in progress. The name and contact telephone number of the designated company representative(s) must be filed with the responsible Forest Service official. A copy of all approved permits with specifications relative to operations in the project area must be available for inspection at the project site.
8. Topsoil must be salvaged from the area to be disturbed, stored, and protected from erosion and contamination until redistributed over recontoured areas for reclamation. The depth of topsoil to be salvaged must be determined through testing and approved by the Forest Service. Methods of topsoil handling and storage must be approved in project plans and specifications and/or appropriate project permits.
9. All vegetation removed by operations must be stored, used for reclamation, or disposed of as approved in project permits or as specified by the Forest Service. The operator must reimburse the Forest Service for the fair market value of all merchantable timber removed or damaged during operations. Prior to vegetation disturbance/removal all noxious weeds must be removed from the site and handled by approved methods needed to prevent spread of seeds.
10. Where determined appropriate by the responsible Forest Service officer, the operator may be required to bury pipelines and powerlines in or adjacent to roads to reduce surface disturbance and visibility. Designs must provide sufficient depth of cover and signs to indicate the type of pipeline(s), location, and depth to prevent damage from road maintenance and other surface disturbing activities in conformance with applicable Federal and State regulations.
11. Where feasible and appropriate, the operator will be required to centralize production facilities, use telemetry to monitor wells, and delay non-essential maintenance activities in important wildlife habitat during critical seasons of use to reduce the number of vehicle trips to the sites and activity that could disturb or stress wildlife.
12. Where needed to protect wildlife, the operator will be required to construct fences and/or nets on reserve pits or use other approved methods to prevent wildlife use or entrapment.
13. Stream crossings will be planned and constructed to minimize disturbance of the riparian and aquatic habitats by locating crossings at the most advantageous location and by crossing at or near the perpendicular. Structures must be designed to allow fish passage as needed to maintain habitat. Measures must be taken to minimize disruption of stream substrate. When no longer needed for operations, crossings must be removed and the stream and banks restored to pre-disturbance conditions/stream hydraulics. Sediment control measures must be used to minimize sediment introduction during all operations. Timing restrictions (construction and reclamation) may be needed to protect fisheries as coordinated with the Utah Division of Wildlife

Resources and through permitting with the Utah Division of Water Rights, Stream Alteration Program.

14. Unless otherwise specified by the responsible Forest Service officer, new oil and gas access roads shall be closed to the public. Operators must construct and maintain gates to Forest Service design standards at intersections of project access roads with National Forest System roads or other highways to prevent unauthorized traffic from entering. A locking system will be required to allow a Forest Service lock in addition to the operator's lock.
15. Off-road vehicle travel is prohibited unless specifically approved in project permits.
16. Roads used for drilling and production operations which remain open to public traffic must be properly signed to warn the public of project traffic and associated hazards. Signs must be consistent with the Manual on Uniform Traffic Control Devices, Federal Highway Administration.
17. Vehicle operators must obey posted speed restrictions. If speed restrictions are not posted, the operator and contractors must observe safe speeds commensurate with weather and road conditions.
18. Watering and/or application of appropriate dust suppressants shall be used if dust becomes a concern for visibility and sediment transport. Suppressants and application procedures are subject to approval by the responsible Forest Service officer.
19. Unless otherwise approved by the responsible Forest Service officer, all production pads will be fenced to prevent entry by the public and livestock. Designs and specifications are subject to Forest Service approval.
20. Sediment control structures will be used to catch sediment at the base of fill slopes on exploration and production pads. If silt fences are used, they must be constructed with adequate support and maintained to assure that they function at all times, including the winter season and spring runoff.
21. Establishment of staging areas or camp areas outside of the area permitted for surface disturbing operations for project personnel (operator or contractors) on National Forest System lands is subject to Forest Service approval.
22. All permanent survey markers within the area to be disturbed, including section corners, benchmarks, geodetic survey monuments, etc. must be located and flagged for protection prior to any surface disturbance activities. Disturbance or relocation of monuments requires the approval of the agency responsible for their use and preservation.
23. Water needed for operations must be obtained in accordance with State water law. The location and design of diversions on National Forest System lands are subject to review and approval of the responsible Forest Service official.
24. The operator and all contractors shall take measures needed for the prevention of fires started as a result of their operations and to suppress fires that are started as a result of their operations. Fire suppression equipment must be available to all personnel in

the project area consisting of shovels, axes, and other appropriate hand tools. At least one properly rated fire extinguisher must be available in each vehicle and around all machinery such that they are readily assessable for suppression of fires. During times of severe fire danger when fire restrictions are implemented by order of the responsible Forest Service officer, all operations must be conducted in conformance with the order. The operator may be required to submit and implement a Fire Prevention/Suppression Plan for review/approval by the responsible Forest Service official.

25. All vehicles and other gasoline/diesel-powered equipment must be equipped with properly functioning spark arresters and mufflers. Spark arresters must meet Forest Service specifications in accordance with USDA Forest Service Spark Arrester Guide.
26. The operator will be held responsible for damage and suppression costs for fires started as a result of operations. Fires must be immediately suppressed to prevent spreading and must be reported to the responsible Forest Service officer.
27. The operator must maintain structures, facilities, improvements, and equipment in a safe and neat manner and in accordance with approved permits. The operator must take appropriate measures in accordance with applicable Federal and State laws and regulations to protect the public from hazardous or conditions resulting from the operations. Such measures must include, but are not limited to, posting signs, building fences, or otherwise identifying the potentially hazardous site or condition.
28. All accidents or mishaps resulting in resource/property damage and/or serious personal injury must be reported to the responsible Forest Service officer as soon as possible.
29. The operator may be required to locate pads and facilities in areas where they can be effectively screened from view from sensitive areas. Production facilities must be located and designed to minimize visibility from sensitive viewing areas. Painting of facilities with a non-reflective paint in the color that would best blend with the background will be required. The color will be determined by the operator with approval of the responsible Forest Service officer.
30. The operator must comply with all applicable laws and regulations pertaining to the storage, use, and disposal of hazardous substances and solid or liquid waste. All fluids, chemicals, and solid wastes must be properly contained on-site. Reserve pits, catchment ponds, and bermed areas must be constructed to prevent seepage into the ground or adjacent areas. A minimum of 2-feet of freeboard must be maintained in all reserve pits and ponds at all times to prevent overflow and spillage into adjacent areas.
31. Chemical containers should not be stored on bare ground or exposed to the sun or moisture. Containers and labels are subject to degradation and punctured drums could leak contents onto the ground. Chemical containers should be maintained in good condition and placed within secondary containment in case of a spill or puncture. Secondary containment facilities must be of sufficient size to contain all appropriate fluids, including diesel or other fuels.

32. Sanitary facilities must be available to operators and contractors in the project area and properly used and maintained to prevent pollution. The installation of sanitary facilities, other than self-contained chemical toilets is subject to State and Forest Service approval.
33. Unless other methods are specifically approved, all solid wastes, contaminated soil materials, drill cuttings, petroleum products, and other fluids must be properly contained on-site. Disposal of associated waste materials must be at a facility licensed by the State to accept such materials.
34. Harassment of wildlife is prohibited. Pets must be properly restrained to prevent harassment of wildlife, livestock, government officials, and the public.
35. Move-in and move-out of heavy construction and drilling equipment will not be allowed during the opening weekends of the general big-game hunts or holiday weekends (including the observed holiday) from noon the previous day until midnight on Sunday or the observed holiday. Use and maintenance of National Forest System roads is regulated under authority of the National Forest Roads and Trails Act and the National Forest Management Act.
36. Vegetation seeding methods and seed mixes (species and amounts) used for interim and final reclamation must be approved by the Forest Service. Reclamation and revegetation plans and standards for success must be approved in project plans or permits. All vegetation materials, seeds, soil amendments, and sediment control materials must be certified that no noxious weed seed or noxious weeds are present. The operator is responsible for control and eradication of noxious weeds in project area, and the control and eradication of any invasive plant species not present at the site prior to operations, until such time as reclamation standards are met and the company is relieved of further reclamation responsibilities.
37. Vehicles and equipment shall be free of mud, soil, plant materials, and other debris which could contain noxious weed seeds prior to coming onto the Forest. This is needed to avoid transporting noxious weeds, or invasive species to sites on the Forest.
38. The operator shall follow Forest guidelines designed to prevent the introduction and spread of aquatic nuisance species (Dixie and Dixie National Forest Supplement, Forest Handbook 2509.16, chapter 1).

# Dixie National Forest Well Site Requirements

## V. WELL SITE DESIGN REQUIREMENTS

### A. General Requirements

The operator should propose locating the well site in cooperation with Forest Service personnel on the most nearly level location obtainable that would accommodate the intended use. However, potential well site locations should not be evaluated on the basis of site conditions alone. Access to the well site for road and possible future pipeline locations must also be considered in determining the most suitable location. What may be gained on a good location could be lost from an adverse access route. Plan the well site from the long-term standpoint, assuming a discovery could be made. Future pipeline locations are to be proposed by the operator as a part of his proposal on each well site.

Adjust the well site layout to conform to the best topographic situation. Avoid disturbance of drainages and locate reserve pits away from water courses. Deep vertical cuts and long fill slopes should be avoided. The cut and fill volumes should be balanced, excluding the topsoil and subsoil needed to backfill the reserve pit.

A contour map shall be developed for all well pad locations as an aid in the design of pad settings to the existing topography. This will allow the operator to plan the construction of facilities and the surface manager to evaluate impacts and calculate the bond more expeditiously and accurately. Maps should be prepared to a scale of 1 inch equals 20 feet horizontally and a contour interval of 2 feet vertically, or as otherwise directed by the responsible Forest Service officer.

Once this information is compiled, finished site elevations, cut and fill slopes and their respective catch points, drainage, balanced earth work, adequate storage area locations and other necessary construction features shall be determined and included with the drawings/specifications. Submittals shall include a well site plan (see Drawing No. 1), details of berms, diversion ditches, pits, catchments and other appurtenances and design features. Provide data to support drainage structure design.

### B. Clearing

The site must first be cleared of all brush and trees. All merchantable timber must be purchased by the operator prior to cutting, at the appraised price determined by the Forest Service. Grasses and small shrubs need not be removed; however appropriate measure will be required to prevent the spread of noxious weeds and nuisance species prior to starting excavations if they occur on the site. Trees and brush will be disposed of by removal from the Forest, by burning, chipping, or other approved methods needed to prevent the spread of insects. Tree trunks less than 8 inches in diameter and slash can be stockpiled at an approved location to be spread over reclaimed areas. Burning permits will be required and are issued by the Forest Service. Burning would only be permitted if the fire danger is low to moderate.

### C. Topsoil Removal and Storage

Surface soil material (topsoil), if present, will be stripped from all areas where surface

disturbance is necessary and stockpiled. All topsoil will be removed in a separate layer, avoiding mixing with other excavated materials, and stored in a stockpile to prevent loss from erosion or contamination, and from which topsoil may be easily recovered. The depth of surface soil material to be removed and stockpiled will be specified by the Forest Service but will generally include the A Horizon. The topsoil and subsoil stock piles must be located to prevent contamination from the blooie line, flare line, and other operations. Stockpiles shall be contained by silt fencing, ditches and traps or other containment measures to prevent erosion, contamination and loss. If topsoil stockpiles are to remain for more than a single season, seeding with an approved seed mix will be required to minimize loss from erosion and preserve fertility and biological activity.

#### **D. Site Grading**

Cut and fill slopes will be such that stability can be maintained for the life of operations. Cut and fill slopes will be constructed as follows (exceptions can be made depending on the type and competency of material encountered):

<u>Height of Slope</u>	<u>Slope</u>
0 – 5 feet	3:1
6 – 10 feet	2:1
over 10 feet	1.5:1

All fills will be free of vegetation and will be compacted in lifts no greater than 12 inches in thickness to a minimum of 90 percent Proctor dry density sufficient to prevent excessive settlement.

The drill site or pad surface will be surfaced with crushed gravel to a depth sufficient to support anticipated loads throughout the life of the well. Usually a depth of 12 inches of gravel is required.

#### **E. Site Drainage**

Diversion ditches having the minimum dimensions of 3 feet horizontal to 1 foot vertical (3:1 ditch) will be constructed around the site to divert existing drainages and surface runoff from flowing onto the site. Hydraulic design for ditches is required to determine capacity. The ditch(s) will be located at the top or base of the cut slope (to be determined based on site-specific conditions) and around the toe of the fill slopes (see Drawing No. 1 – Construction Requirements for Typical Well Sites). Straw dykes, catch basins, energy dissipaters or other approved structures will be constructed in the ditch outflow to trap any sediment and dissipate erosive flows. Provide data to support drainage structure designs. A culvert might be necessary where the access road enters the site.

A berm will be constructed around the perimeter of the site to contain all precipitation, spills, and other fluids from leaving the site. The berm will be a minimum of 18 inches high, 12 inches wide at the top, and have 1.5:1 side slopes. Berms will be compacted for stability and to reduce permeability as needed to contain fluids. The site surface will be graded at a minimum of 1 percent to drain to the reserve pit. Use silt fencing, ditches and traps or other containment at toe of fill slopes to prevent erosion and contamination.

The drainage pattern to be constructed will need to be designed for each site, depending on site-specific conditions.

#### **F. Construction and Maintenance of Reserve Pits**

Reserve pits will be constructed of sufficient size and capacity for the necessary fluids for drilling and to contain any runoff from the drill site. The pad will be graded to empty into the reserve pit or alternative pit or buried tank. Winter operations may require larger pits/tanks due to snow accumulations and runoff. Pits will not be constructed within intermittent or perennial drainage channels. If the operator has concerns that drainage from the pad could contaminate reserve pit muds, the pad can be constructed to drain into alternative lined pits or buried containment tanks.

It is preferred that pits be constructed in undisturbed materials and below the natural ground level to minimize the risk of failure. Where conditions exist that require pits to be constructed of embankment materials, the following criteria are required:

1. The area on which the embankment is to be placed will be cleared of all materials including vegetation, topsoil, and unconsolidated soils and gravels.
2. A foundation keyway will be designed and constructed into native materials to dimensions based on site-specific conditions to provide adequate anchoring and sealing of the embankment.
3. The embankment will be constructed using impermeable materials on slopes of 3:1 into the pit and 2:1 outside the pit. The embankment will have a minimum of 10-foot top width. The materials will be compacted to 95 percent Proctor density.

The following are requirements for construction and maintenance of all reserve pits:

4. Pits must be constructed to contain fluids without leaks throughout the life of operations. If pit liners other than clay coatings are used they must be constructed of sufficiently durable and watertight materials to prevent leakage. Compacted bedding material consisting of sand, clay, or other grout may be required to prevent rocks from puncturing the liner and to seal cracks.
5. A minimum of 2-foot freeboard will be maintained in the pit at all times during the drilling operations or if the pit is left unreclaimed over the winter.
6. If wildlife concerns exist, netting or some other approved method will be used to prevent wildlife use of the pit.

#### **G. Site Reclamation for Nonproductive Wells**

Reclamation of the entire site will be required and will commence immediately after drilling, testing, and well plugging/abandonment are complete. The site will be restored to as nearly as practical to its original condition (approximate original contour). Cut and fill slopes will be reduced and graded to conform to the adjacent terrain.

Reserve pits must be allowed to dry before they are backfilled. Fluids that will not dry

must be removed from the Forest. All polluting substances or contaminated materials, such as oil, oil-saturated soils and gravels will be removed and disposed of at a State licensed facility licensed to receive these materials. Exceptions to allow for reserve pit solidification may be made if the operator can demonstrate to the responsible Forest Service officer that this method would be effective based on site-specific conditions.

Drainages will be reestablished and temporary measures will be required to prevent erosion on the site until all reclamation and revegetation standards established for the site are met.

In general, the well identification standpipe will be set such that it can be buried by at least two feet of soil. A final determination will be made on a case-by-case basis.

After final grading and before replacement of topsoil, the entire surface of the site shall be scarified to eliminate slippage surfaces and promote root penetration. Topsoil will be spread over the site to achieve approximate uniform stable thickness consistent with the established contours.

The site will be seeded and/or planted with a seed mix as approved in the SUPO or as otherwise approved by the responsible Forest Service officer. Nutrients and soil amendments will be applied to the disturbed surface soil needed to meet the revegetation standards.

A temporary fence will be constructed around the site until reclamation standards have been met. The fence design is subject to Forest Service approval will be designed to prevent entry by livestock or wildlife as needed for the specific area. The fence must be maintained such that it is functional at all times as intended to prevent livestock use and unauthorized access by the public. The operator is responsible for damages to the reclaimed condition of the site due to unauthorized access until final reclamation standards are met and the fence is removed. The operator will be responsible for eradicating noxious weeds and nuisance species each season until the final revegetation standards have been met. Once all reclamation standards have been met, the operator is responsible for removal of the fence, gate, and associated structures and materials.

#### **H. Site Reclamation for Producing Wells**

Interim and final reclamation for producing wells will be accomplished for portions of the site not required for the continued operation of the associated facilities. All disturbed surfaces will be treated to prevent erosion and to compliment the esthetics of the area. A new site plan will be required encompassing the facilities required for operation and interim reclamation measures. Generally, the following measures will be required:

1. The reserve pit will be reclaimed as previously discussed.
2. All polluting substances and contaminated materials, including contaminated soil and gravels will be disposed of as previously discussed.
3. All cut and fill slopes and other disturbed areas not needed for production operations will be contoured to match the surrounding area, topsoiled, and revegetated as previously discussed.
4. The berm will be reestablished on the production pad where removed to accomplish the reclamation discussed in the previous item.

5. The pad perimeter and reclaimed area will be fenced. Once reclamation standards have been met for the reclaimed portion of the original pad the fence will be relocated onto the perimeter of the production pad.
6. Measures such as painting facilities an appropriate color, and other practical measures will be used to decrease visibility of the site as viewed from sensitive areas such as roads, highways, and recreation areas. Noise suppression devices and submersible pumps (if feasible) may be required as needed to meet scenic, wildlife, and recreation objectives for the area.

#### **I. Site Maintenance**

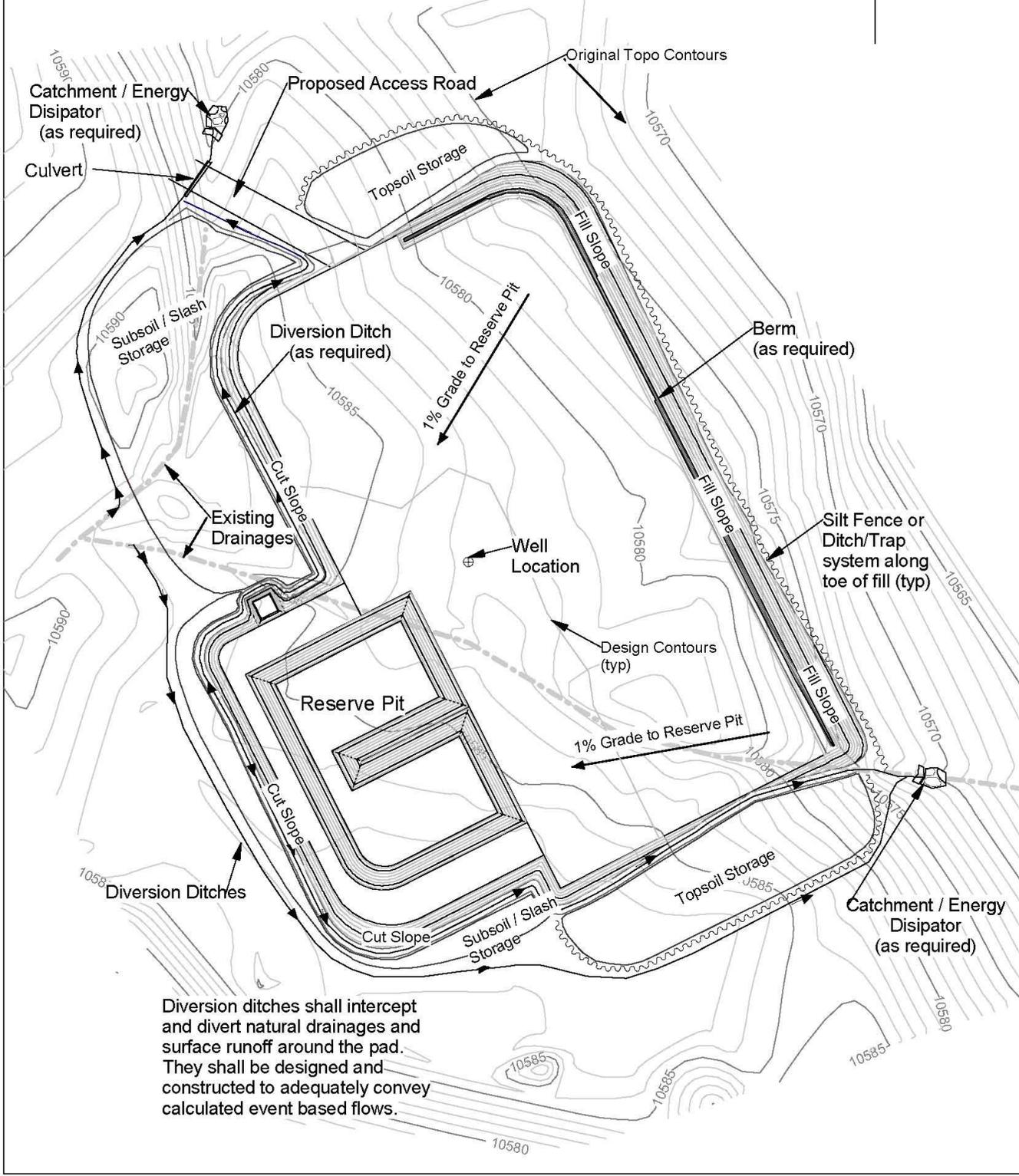
The site will require periodic maintenance to ensure that drainages remain functional and that surfaces are properly treated to reduce erosion, contamination, fugitive dust, invasion by undesirable plant species, and impacts to the adjacent areas.

All garbage, debris, and foreign materials shall be contained on site in a cage or other enclosure then will be removed to an established/licensed landfill or other recognized facility.

#### **J. Site Reclamation for Production Wells**

When production pads and production facilities are no longer needed, the facilities must be removed and final reclamation measures completed as previously prescribed for nonproductive wells. Abandoned or unneeded facilities will be removed/reclaimed within two years. In place abandonment of any facilities such as powerlines, pipelines, etc. will require approval of the Forest Service. If approved, appropriate measures to stabilize and decontaminate them will be required.

# Drawing No. 1 Construction Requirements for Typical Well Sites

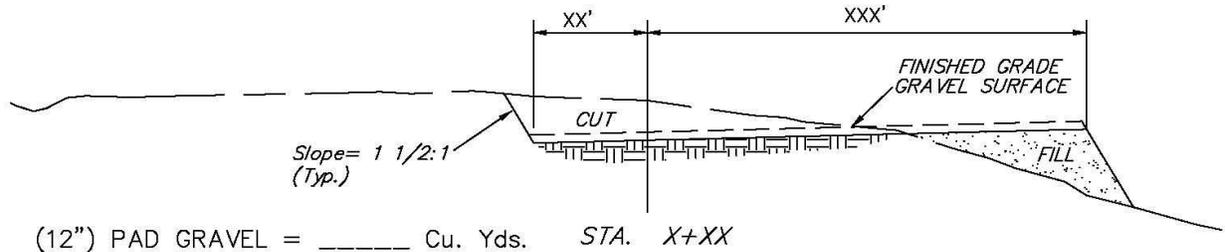
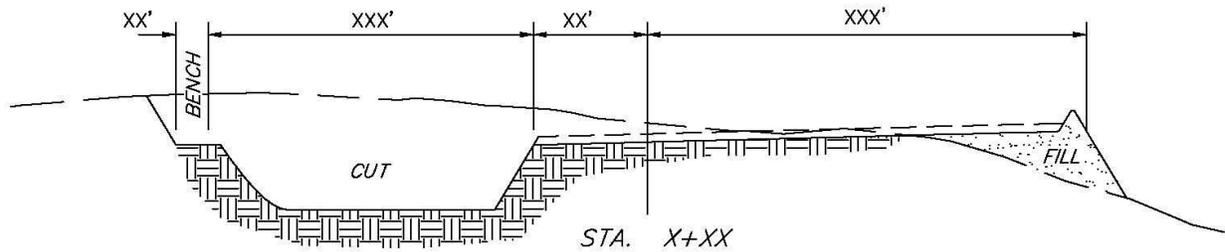
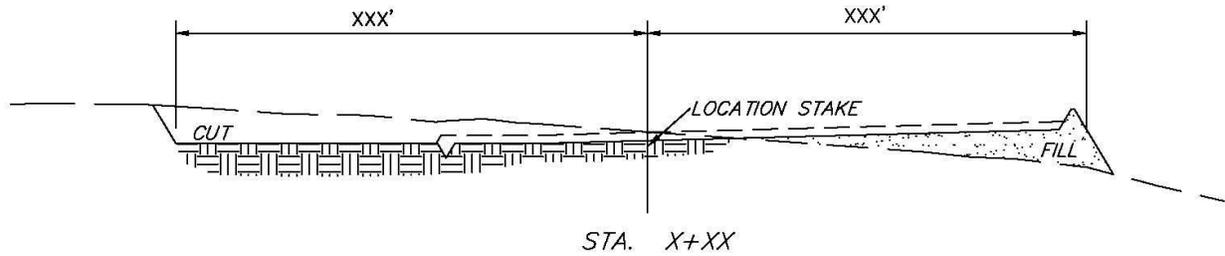
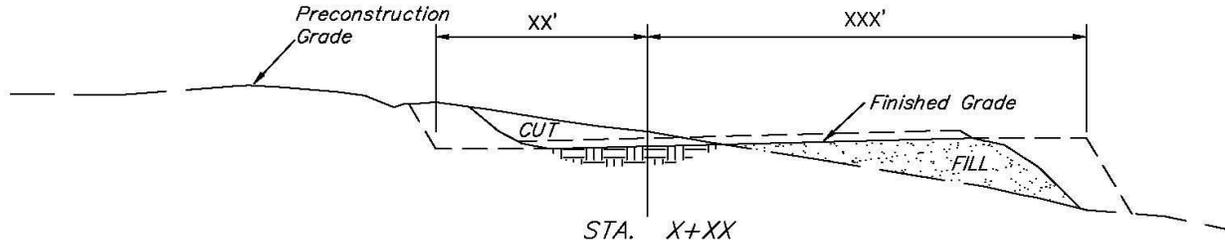


Diversion ditches shall intercept and divert natural drainages and surface runoff around the pad. They shall be designed and constructed to adequately convey calculated event based flows.

1" = 20'  
 X-Section  
 Scale  
 1" = 50'

SAMPLE DETAILS  
 TYPICAL CROSS SECTIONS FOR

WELL NAME & No.  
 WELL LOCATION



(12") PAD GRAVEL = \_\_\_\_\_ Cu. Yds. STA. X+XX

APPROXIMATE YARDAGES

CUT

Topsoil Stripping (based on xx") = \_\_\_\_\_ Cu. Yds.  
 Remaining (excavation) = \_\_\_\_\_ Cu. Yds.  
 TOTAL CUT = \_\_\_\_\_ CU.YDS.  
 FILL = \_\_\_\_\_ CU.YDS.

NOTE:  
 FILL QUANTITY INCLUDES  
 \_\_\_\_\_% FOR COMPACTION

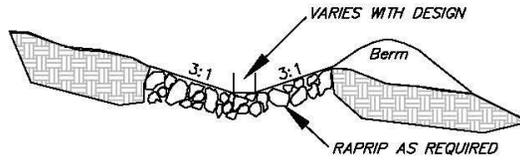
TOPSOIL STORAGE REQUIRED = \_\_\_\_\_ Cu. Yds.  
 SUBSOIL STORAGE REQUIRED = \_\_\_\_\_ Cu. Yds.

SAMPLE DETAILS

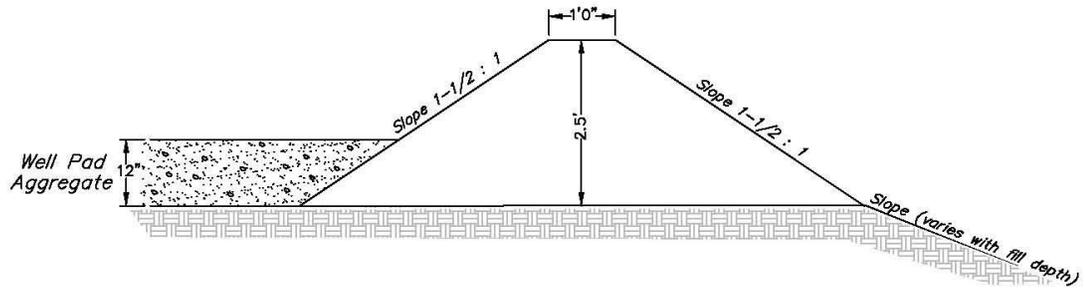
DETAIL SHEET

WELL NAME & No.

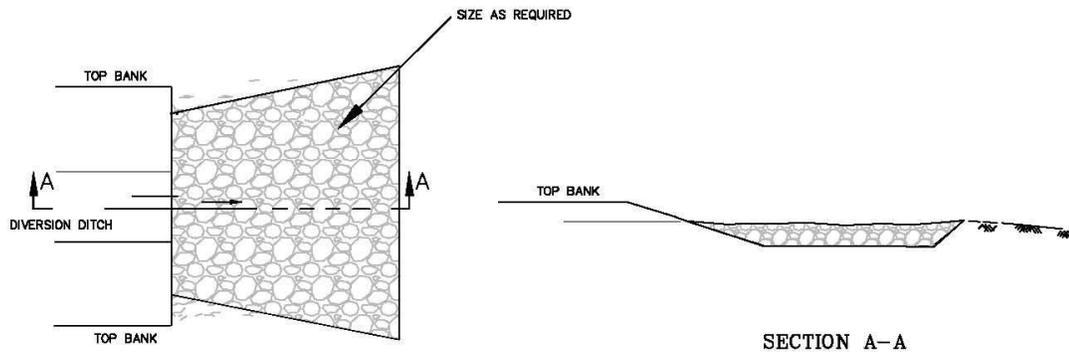
WELL LOCATION



DIVERSION DITCH (DETAIL)  
(Only Where Specified)



BERM (EDGE OF LOCATION)  
(NO SCALE)



PLAN VIEW

ENERGY DISSIPATER (DETAIL)