FEASIBILITY STUDY
DOLLY SODS WILDERNESS AREA
Davis, West Virginia
Contract DACA 87-90-D-0018

ENGINEERING REPORT
for
EXTENT OF OEW CONTAMINATION AND EVALUATION OF REMEDIAL ACTION ALTERNATIVES

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SECTION 1.0
INTRODUCTION

1.1 PROJECT DESCRIPTION

The Dolly Sods Wilderness Area Feasibility Study was authorized under the Department of Defense Environmental Restoration Plan (DERP) for Formerly Used Defense Sites (FUDS) which is administered by the Ordnance and Technical Programs Division of the Army Corps of Engineers, Huntsville, Alabama. Unexploded munitions present an imminent and substantial danger to the public welfare. Therefore, the Department of Defense (DOD) under the National Contingency Plan has the removal response authority for munitions under the jurisdiction, custody, or control of the DOD. It is the government's intent to remove all OEW encountered.

The Dolly Sods Wilderness Area is located in Grant, Tucker and Randolph Counties, West Virginia. The U.S. Forest Service operates the wilderness area which contains 10,215 acres and is open to the public at all times. The area was used for maneuvers during World War II by the Department of the Army and, in the past, the public has discovered abandoned shells from these military exercises. This site was selected for study based on the findings of the Huntington District Corps of Engineers that ordnance may still remain in the wilderness area, a situation which creates a severe hazard to the public.

1.2 OBJECTIVE

The purpose of the feasibility study is to characterize the nature and extent of ordnance and explosive waste (OEW) contamination. In addition, the feasibility study will identify cost effective remedial actions to alleviate the dangers of OEW contamination while protecting the environment of the wilderness area and providing for the public safety.

1.3 SITE BACKGROUND

1.3.1 Site Location and Description

The Dolly Sods Wilderness Area is a 10,215-acre site in the Monongahela National Forest which is contained in Grant, Tucker and Randolph counties in West Virginia. The wilderness area remains in a natural, undisturbed condition and is open to the public. A U.S. Forest Service information pamphlet describes Dolly Sods as an "area of high elevation wind-swept plains on the Allegheny Plateau." The location of Dolly Sods Wilderness area is shown in Figure 1-1. Figure 1-2 is a topographic map of Dolly Sods.

The Dolly Sods Wilderness Area varies in elevation from 2,600 to 4,100 feet above sea level. In general, the terrain is quite rocky and rugged and the plant and animal life is comparable to that of northern Canada. Several notable topographic features include the Red Creek and its tributary runs, Breathed Mountain and other knobs, and the "sods" or bogs in the level parts of the wilderness area.

The Red Creek runs from the northern boundary to the southwest corner of the Dolly Sods Wilderness Area dividing the wilderness area roughly in half. Its tributaries include the Stonecoal Run to the west and Fisher Spring Run to the east. The Stonecoal Run is the longest tributary of the Red Creek in the Dolly Sods Wilderness Area. It runs from the northwest corner of the wilderness area to its confluence with the Red Creek, just south of Breathed Mountain, in the south-central part of Dolly Sods. The Little Stonecoal Run runs roughly parallel to the larger Stonecoal Run and is approximately a mile west of it. Fisher Spring Run runs from the bogs in the northeast corner of the wilderness area southwest to the north-central part of the wilderness where it meets the Red Creek. Close to the northern edge of Dolly Sods Wilderness Area, the Left Fork of the Red Creek branches off from the Red Creek.

Breathed Mountain is in the south-central area of the Dolly Sods Wilderness and separates the Red Creek from the Stonecoal Run. It rises to over

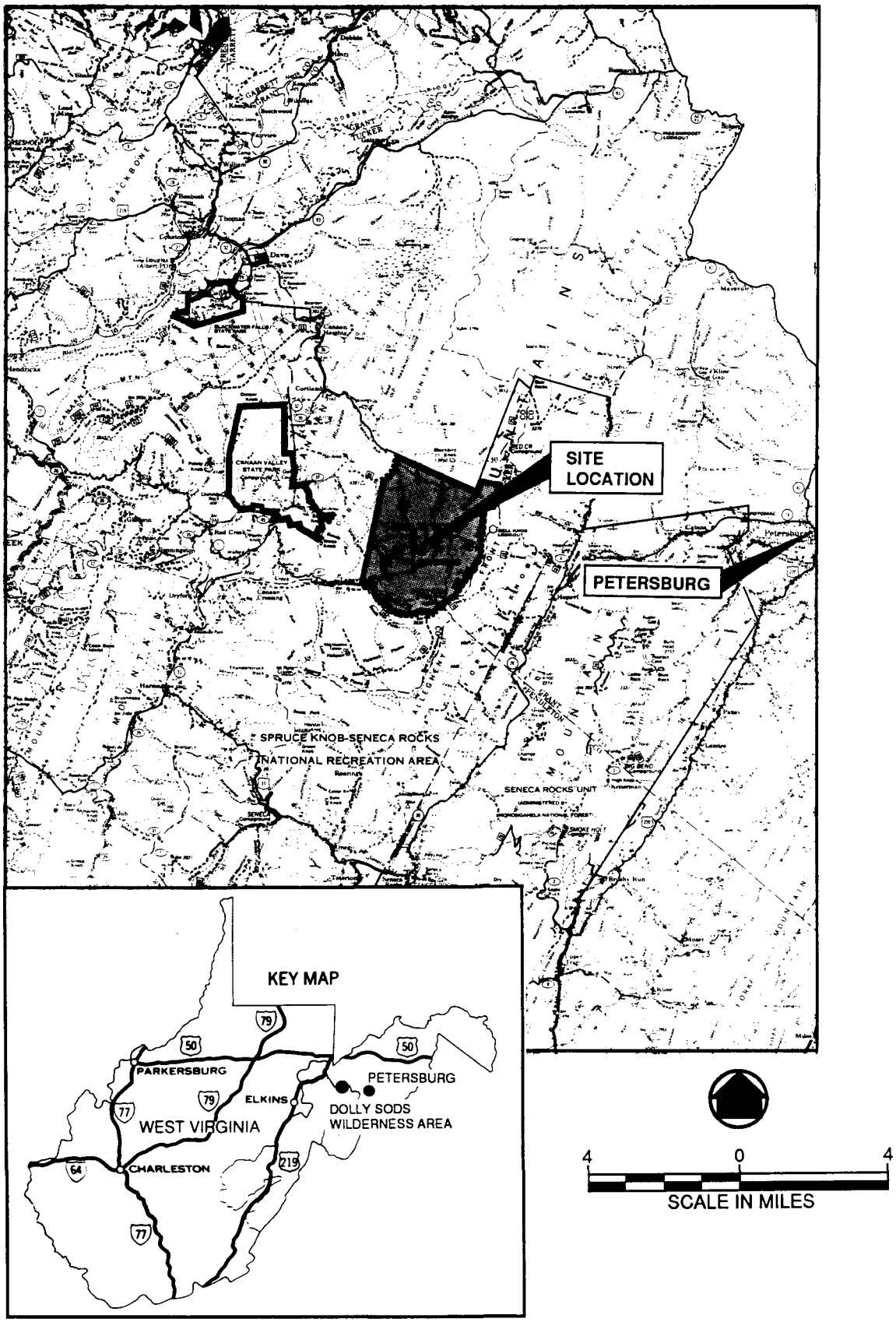


FIGURE 1-1. DOLLY SODS WILDERNESS AREA SITE LOCATION PLAN

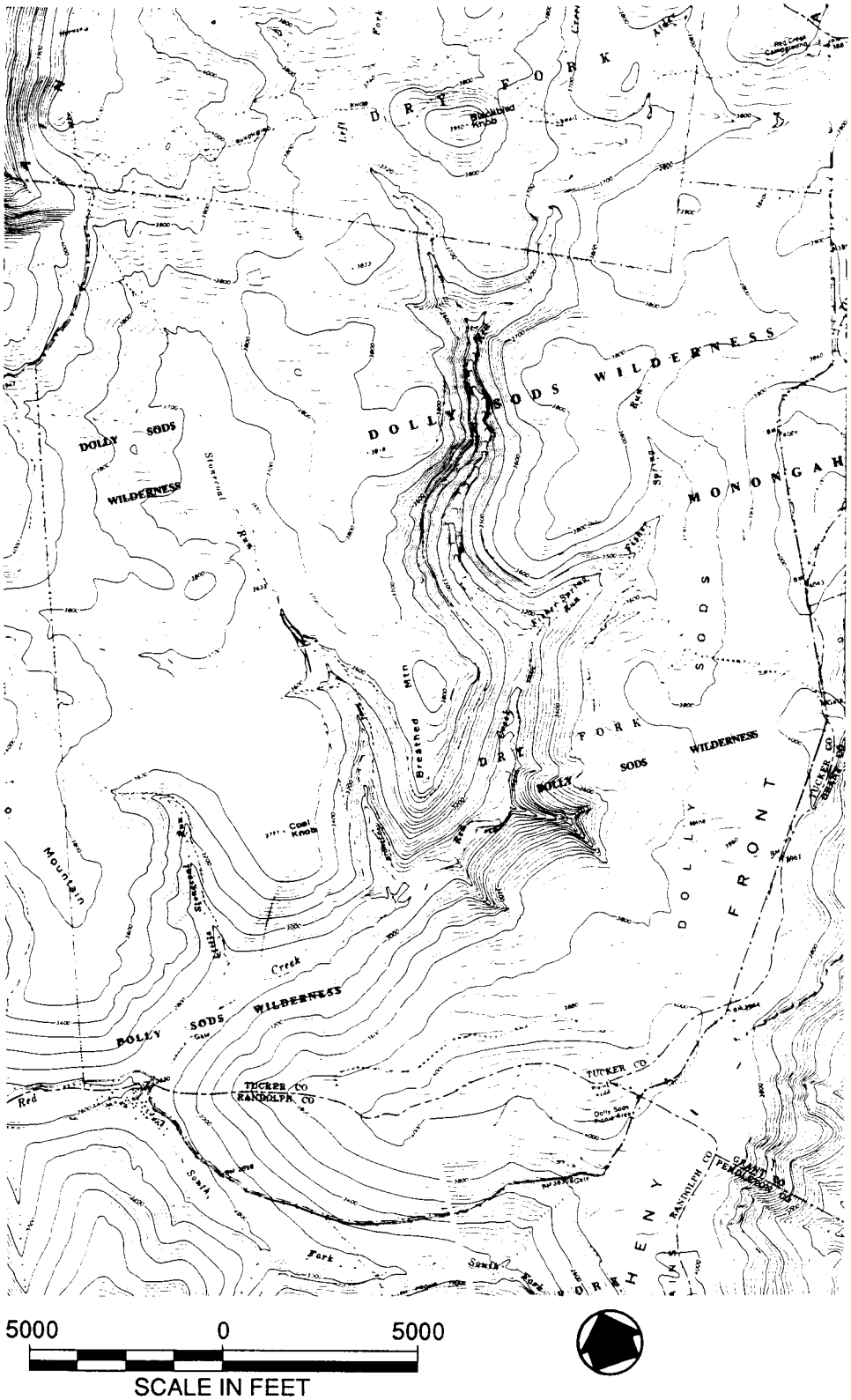


FIGURE 1-2.
DOLLY SODS WILDERNESS AREA

3,800 feet and drops steeply to the Red Creek and Stonecoal Run. Blackbird Knob is about a half-mile north of the Dolly Sods Wilderness Area, north of the confluence of the Red Creek and the Left Branch. Bell Knob is roughly a quarter-mile to the east of the wilderness area, in the Dolly Sods Scenic Area. A look-out tower is located at the top of Bell Knob. Cabin Mountain is located just beyond the northwest corner of the Dolly Sods Wilderness Area.

The sods, or bogs, are located mostly in the northern part of the wilderness area and can be found primarily at the headwaters of the runs and streams in the area. Large areas of sods are located in the level areas at the head of the Fisher Spring Run and an unnamed tributary of the Red Creek. These sods are marshy and contain different types of vegetation than the surrounding forest.

There are no roads in the wilderness area. Forest Service Road 75 is located on the eastern edge and Forest Service Road 19 is located on the southern edge of the site. They are one-and-a-half lane gravel roads which run along the boundaries of the wilderness area. Several trail heads located along the roads establish starting points for the many hiking trails leading into the wilderness area.

Dolly Sods is bordered by Forest Service owned land to the east and south and private land to the north and west. The Forest Service land includes the Flatrock Plains to the south and the Foreknobs of the Allegheny Front to the east and northeast. The Foreknobs extend several miles down towards the Jordan Run, a tributary of the North Fork of the South Branch of the Potomac River. Forest Service Road 75 extends north along the Dolly Sods Scenic Area to Bear Rocks where it turns east and winds down to West Virginia Route 4, also known as Jordan Run Road. In addition, the roads along the Dolly Sods boundaries can be reached by Forest Service Road 19 which runs from the southeast corner of the Dolly Sods Wilderness Area until it meets Jordan Run Road at a point less than a mile from West Virginia Route 28.

To the north of Dolly Sods are Blackbird Knob and the two forks of the Red Creek. This land is owned by the Western Maryland Railroad. At the southwest

corner of Dolly Sods is Laneville where Forest Service Road 19 ends and West Virginia route 45 extends to the west. To the west are the Cabin Mountains and, then, the Canaan Valley. The Canaan Valley contains the Canaan Valley State Park, as well as numerous farms and several ski resorts.

The vegetation in the Dolly Sods Wilderness Area is similar to that of northern Canada. Typical plants in the Dolly Sods area, as described in the Dolly Sods information pamphlet, include "one-sided" red spruce, sphagnum bogs, yellow birch, heath barrens and patches of aspen. Much of the plateau is covered with heath barrens where predominant plant species include azaleas, mountain laurel, rhododendron, and blueberries. The plants in the sods include cranberries and the carnivorous sundew plant which grows on mats of sphagnum moss. In the lower lying areas, hardwoods such as birch, aspen, and maple can be found and plantations of red pine exist throughout the Dolly Sods area.

Animal life within the Dolly Sods Wilderness Area is diverse. Common species found in the area include whitetailed deer, red and gray squirrels, chipmunks, and a variety of birds. Less common species include various turtles, snakes, newts, white hare, some frogs and toads, and black bear. Endangered species include the Cheat Mountain Salamander and, possibly, the Northern Virginia Flying Squirrel.

The Dolly Sods Wilderness Area is currently allowed to remain undeveloped, and the primary use of the area is for recreational purposes. There are several hiking trails through the wilderness, and camping is allowed with restrictions upon activities which might damage the wilderness area. A picnic area has been created next to Forest Service Road 75 at the southern end of the wilderness area, and hunting is allowed during the West Virginia hunting season.

Section 2.3 contains detailed descriptions of areas within Dolly Sods where surface or subsurface investigations were performed.

1.3.2 Site History

Before logging activity occurred in the late 1800s, the plains in the Dolly Sods area were covered by a red spruce and hemlock forest. The majority of logging occurred between 1890 and 1910. After these trees were logged, the humus layer was destroyed by fires leaving the current, relatively infertile, rocky terrain.

Local farmers burned the plains to create grazing land called "sods" and grazing continued until about 1980. One of the first inhabitants of the area was the pioneer Dahle family. This name was altered to become the "Dolly" of "Dolly Sods."

The Forest Service bought the land which is now the Dolly Sods Wilderness Area as logging came to an end between 1910 and 1913. In the 1930s, the Civilian Conservation Corps planted red pine and other conifers as well as aiding in the construction of Forest Service Road 75. Military maneuvering and training were performed in the Dolly Sods area during World War II from 1943 to 1944 and the land was returned to the Forest Service in 1950. The Dolly Sods Wilderness Area was created by an act of Congress in 1975.

1.3.3 WWII Military Operations

During World War II, about 2,181,000 acres in the vicinity of Dolly Sods were used by the Thirteenth Army Corps of the Third Army for mountain training and maneuvers including the firing of artillery and mortars. This training continued from October 15, 1943, to July 1, 1944, with several divisions taking part in training. These divisions included the 77th infantry from October 15, 1943 to January 2, 1944, the 28th infantry from August 2, 1943, to September 30, 1943, the 31st infantry from September 9, 1943 to November 17, 1943, the 35th infantry from February 4, 1944 to March 28, 1944, and the 95th infantry from May 1, 1944 to July 1, 1944.

Records on the military operations in the area are scarce because the majority of pertinent documents have been lost or destroyed over time, but it is known

that the targets of the 105 mm and 155 mm artillery fire near the Dolly Sods Wilderness Area included the southern face of Blackbird Knob and the eastern face of Cabin Mountain. There were, apparently, three groups of gun emplacements. One was in the Canaan Valley, although the exact locations of these guns are not known. A second was along Forest Service Road 75 from "a point near the Bell Knob tower, north to the end of the road." Finally, there were gun emplacements "on the east side of the mountain on the Allegheny Front... north of the Dolly Sods Wilderness Area." The gun emplacements to the west (the Canaan Valley) would have fired only upon Blackbird Knob while the positions to the east apparently fired at both Blackbird Knob and Cabin Mountain. The firing locations and targets are shown in Figure 1-3. One can see that some of the artillery fire would have been fired across the northern end of the wilderness area.

In addition to this artillery fire, mortar fire took place in the area. The targets are unrecorded, however, it is possible that open, high ground would have been targeted to lessen the likelihood of fires started by the explosions and to make the impact more visible. The mortars were probably fired from a multitude of locations around the Dolly Sods area. These locations will be addressed in detail in Section 3.1.

Retired forest rangers have stated that fires, possibly from artillery fire, occurred in several locations along the northern edge of what is now the Dolly Sods Wilderness.

1.3.4 Current Status of the Site

It is known that the artillery range was grid-searched and decontaminated of unexploded ordnance following the end of operations in the area. At some later time, as persons hiking into the area continued to discover isolated ordnance, military Explosive Ordnance Disposal (EOD) teams were used again to clear the area of unexploded ordnance (UXO). The exact location and extent of these disposal operations are unknown.

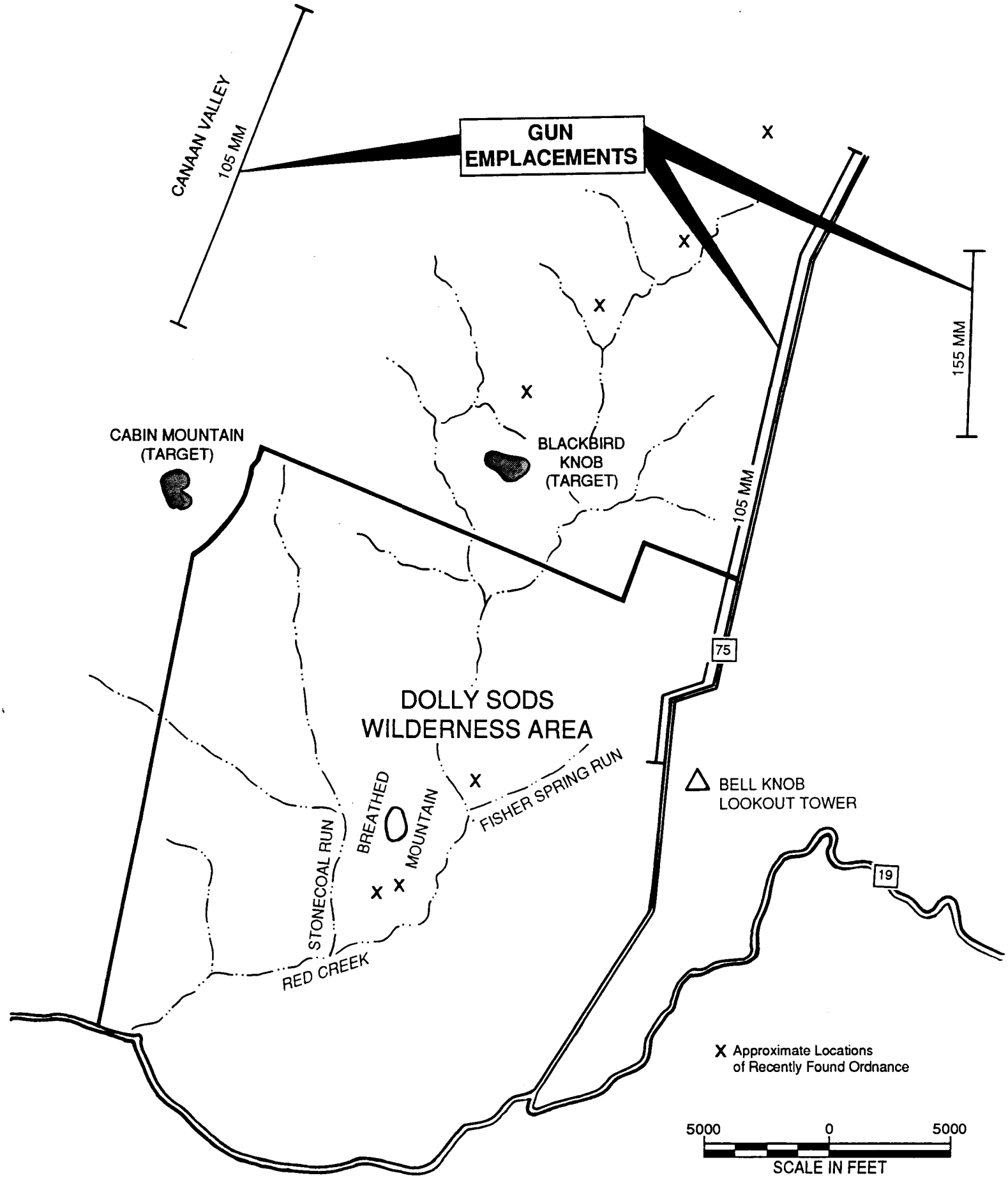


FIGURE 1-3. FIRING LOCATIONS AND TARGETS AT DOLLY SODS

Despite these past efforts, ordnance has been discovered several times in the recent past. Seven separate locations where ordnance has been discovered recently were provided by two Forest Service employees who have worked in the Dolly Sods Wilderness Area. Three of these mortar rounds were in the Dolly Sods Wilderness itself and four were found further to the north, in the Blackbird Knob area which is privately owned land. The locations are shown in Figure 1-3. The years in which five rounds of the ordnance were found were known by the Forest Service personnel. None of these dates were prior to 1983. All of the recently discovered ordnance consists of 81 mm mortar shells, however, it appears that 105 mm artillery ordnance has been found in the vicinity of Dolly Sods in the past. Information brochures and bulletin boards in the wilderness continue to provide information describing the ordnance and warning the public not to touch or move mortar or artillery shells found in the wilderness area.

1.4 PROJECT HISTORY

1.4.1 Records Research

Government agencies, newspapers and private citizens were contacted by telephone for historical information concerning the military activities at the Dolly Sods Wilderness. Records were reviewed and/or obtained from the following sources of information during personal site visits: National Archives in Washington, D.C.; National Forest Service in Elkins, West Virginia; and National Forest Service in Petersburg, West Virginia.

Topographic maps were obtained from the U.S. Geological Survey, Denver, Colorado. Aerial photos were obtained from the U.S. Geological Survey, Sioux Falls, South Dakota, and the National Archives Cartographic Branch in Alexandria, Virginia. Metcalf & Eddy personnel visited the project site and conducted interviews with the local populace and current as well as former forest service personnel.

Reports were furnished by the Corps of Engineers, Huntsville, Alabama; and Corps of Engineers, Ohio River Division, Cincinnati, Ohio. Former Forest

Service employees provided letter reports concerning military activities at Dolly Sods during World War II.

Metcalf & Eddy and UXB International made an evaluation of the research information and general areas were selected for further investigation during the site visit. This information included the approximate locations of gun emplacements, sites where forest fires were started by ordnance, impact areas for artillery and mortar fire, and locations were UXO was found by hikers.

1.4.2 Site Visit

The statement of work for the Dolly Sods project called for a site visit in order to "assist in the development of the work plan." This site visit was performed from May 20, 1991, to May 31, 1991. The personnel conducting the site visit included representatives from Metcalf & Eddy and UXB, the ordnance specialist subcontractor. Based on the data obtained from the records search, areas of the site likely to contain UXO were investigated. The results of these investigations were to be used to select the areas for surface and subsurface clearing operations.

Figure 1-4 displays the locations investigated during the course of the site visit as well as the methods of searching for ordnance used at these locations.

No unexploded ordnance was discovered during the course of the site visit. At three locations, buried metal items were found, but, because of their depth beneath the surface, couldn't be confirmed as ordnance-related materials. Two of these locations were in the bog at the headwaters of Fisher Spring Run. The third was found among what appears to be gun emplacements west of Forest Service Road 75. In addition to this buried metal, ordnance fragments were found near the confluence of the Red Creek and Fisher Spring Run. During the site visit, Global Positioning System (GPS) equipment was used to record the location of areas which were considered likely to contain OEW.

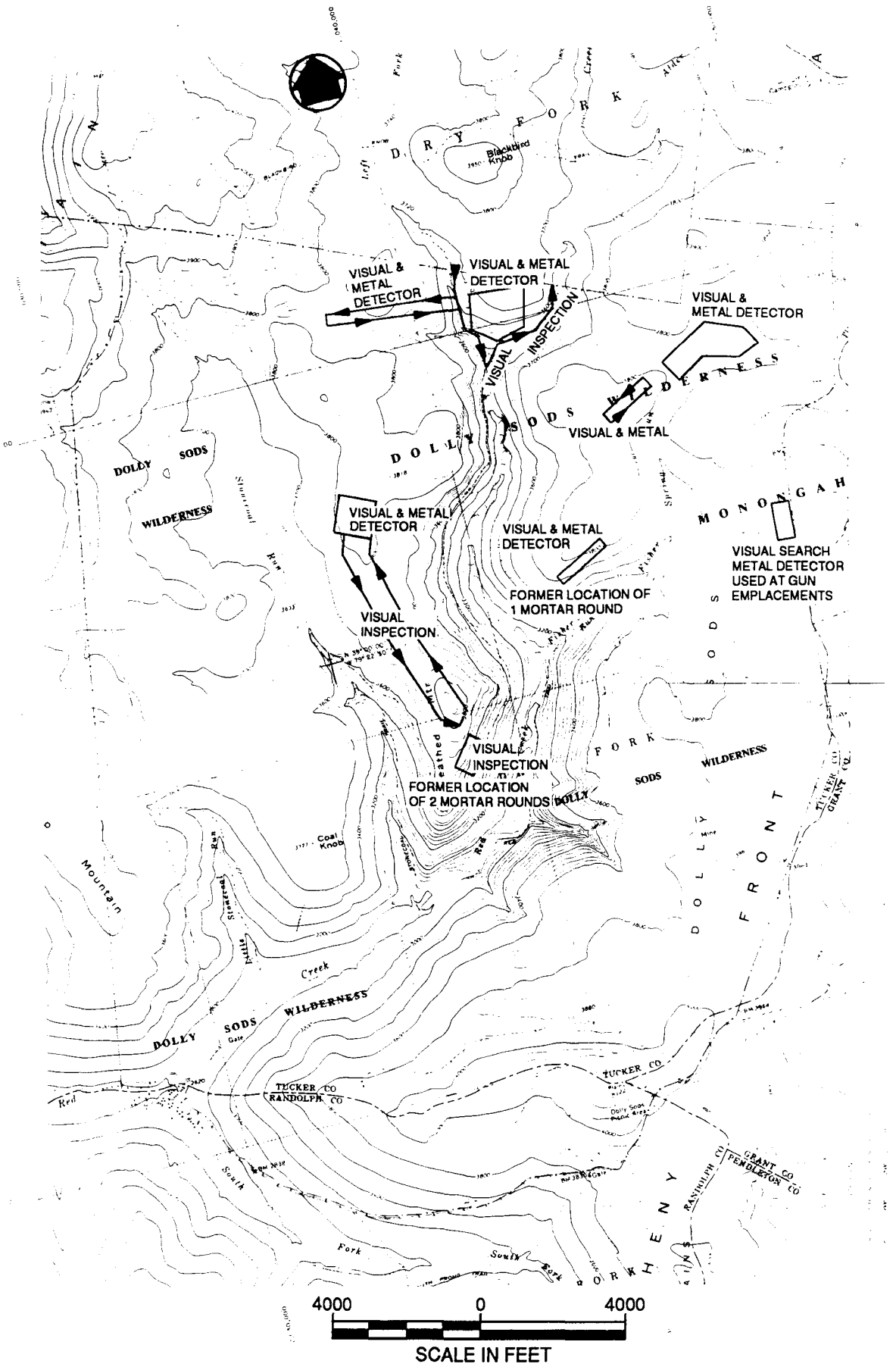


FIGURE 1-4. AREAS SEARCHED DURING DOLLY SODS SITE VISIT

1.4.3 Surface and Subsurface Investigation Plans

In accordance with Section 3.3 of the Scope of Work (SOW), a Work Plan was prepared for surface and subsurface investigation. This Work Plan established a scheme for searches to find ordnance in the Dolly Sods Wilderness Area. The SOW detailed that 250 total acres be cleared in a surface search, divided into five-acre search sites. A subsurface search would follow the surface search investigating ten, one-acre sites.

The plans for searching for surface ordnance at Dolly Sods called for three teams each consisting of three UXO technicians. The sweep team would form a line along one side of the area to be searched spaced at approximately six foot intervals. Thus, each UXO technician would be responsible for a six foot wide lane across the search area. This sweep line would proceed across the search site with the left end of the line following the boundary of the site while the person on the right end of the line marked the edge of the swept area. When the sweep line reached the far end of the area it would move eighteen feet and search this area walking the opposite direction. In this way one could be sure that the entire five-acre site was covered. In order to supplement the visual search, Schoenstedt Magnetic Locators were used. These devices were capable of detecting ferrous metals under brush, leaves or shallow soil.

The scheme for investigation to find subsurface ordnance was similar to that of the surface investigation. The sites to be searched were only an acre, however, and two different types of ordnance-locating devices were used. These two devices were the Foerester Ferex Electromagnetic Detector and the White's Eagle II Metal Detector.

The Foerester Ferex Ordnance Locator, the most current military-approved locater, is in use by the U.S. military EOD forces and is designated the Mark 26 Ordnance Locator. This device is capable of detecting changes in magnetic field and thus is only useful in locating ferrous metals. The White's Eagle, while less sensitive than the Foerester Ferex, detects metals using inductive rather than magnetic fields. Therefore, it can detect both ferrous and nonferrous metals.

The fifty, five-acre sites which were to be searched were initially divided into sixteen larger areas, each of which was to contain one or more of the five-acre search sites. Two additional areas were added and some of the areas were moved during the course of the investigation. Figure 1-5 shows the areas as initially planned.

1.5 ENGINEERING REPORT

This report will present and analyze the data found during the surface and subsurface investigations. Section 2 will describe where ordnance was found, the condition of the ordnance and what types of ordnance was present. In section 3, this data will be analyzed to determine the likelihood of finding additional ordnance in various portions of Dolly Sods, and in Section 4, alternatives for remediation of the ordnance dangers will be developed. Section 5 will discuss lessons learned during the Dolly Sods operation, and Section 6 contains photographs of the site investigation efforts.

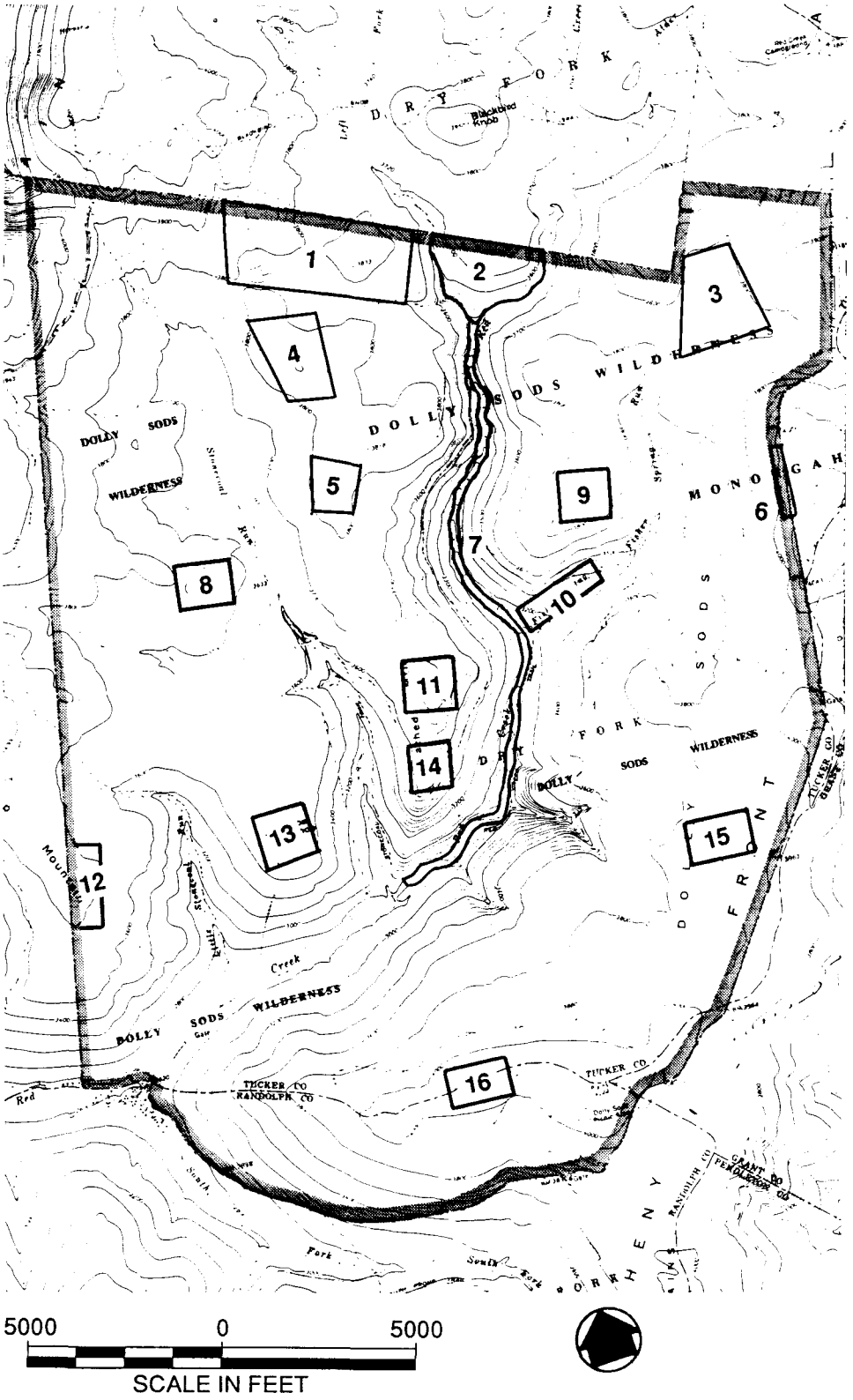


FIGURE 1-5. DOLLY SODS ORDNANCE SEARCH AREAS

SECTION 2.0
DATA PRESENTATION

The investigation of the Dolly Sods Wilderness Area took place from July 29 to October 3, 1991. During the course of the investigation, thirteen separate rounds of ordnance were located. This section will be divided into subsections covering the surface and subsurface investigations and a third subsection describing the areas where investigations took place.

2.1 SURFACE INVESTIGATION

The surface investigation was completed during a five-week program that took place from July 29 through August 29, 1991. The investigation was performed as outlined in the Final Work Plan, Surface and Subsurface Investigation and Onsite Disposal of Ordnance, submitted July 19, 1991. Clearance protocol was defined for fifty, five-acre sites within the Dolly Sods Wilderness. These sites were distributed into sixteen areas. Two additional areas were added during the course of the surface investigation. These areas were chosen as the areas which were most likely to contain ordnance based on topography and information obtained during the records search and site investigation. Areas which were chosen were often hill tops as these were considered likely to have been used as targets. In addition, locations which were considered to be likely to contain undershots or overshots from artillery firing at Blackbird Knob were chosen. Finally, several areas where chosen in order to provide a distribution of investigation coverage throughout the wilderness area. The original sixteen search areas are shown in Figure 1-5.

Photographs of surface investigation are included in the report as Figures 6-1, 6-4 and 6-6.

A decision was made by M&E and UXB field personnel to deviate slightly from the surface sweep methods detailed in the work plan and allow investigations of contacts (discoveries made with the Schonstedt GA-52B magnetic locators) to include excavation to a depth of six inches. This change was made to distinguish between iron bearing rock (see Figure 6-2, iron bearing rock),

scrap metals, and ordnance. Excavating to six inches and identifying shallow contacts facilitated the selection of subsurface investigation locations.

A total of forty-eight surface sweep areas were investigated during the surface clearance covering approximately 281 acres in the Dolly Sods Wilderness. Forty-eight areas were investigated instead of fifty because several adjacent five-acre areas were combined to ten-acre sweep areas.

Figures 2-1 through 2-19 show the locations of surface sweep areas, and ordnance during the surface investigation discovered. The locations are presented on a CAD-generated base map depicting topographic features of the Dolly Sods Wilderness. Surface sweep areas are shown as polygons (generally four-sided) enclosed by solid line. The area designations indicate in which area (1-18) the surface clearance was conducted and which sub-area within the larger area it was. For example, 1E indicates that this was the fifth surface investigation conducted in Area 1. Table 2-1 contains a summary of state plane coordinates, acres searched, and elevations for the surface investigations.

Figure 2-1 is full size 1" = 1,000' scale plan that shows the entire Dolly Sods Wilderness and all of the surface clearance areas, subsurface clearance areas, and discovered ordnance. Figures 2-2 through 2-19 are 1" = 2,000' scale plans depicting each surface search area (Area 1 through Area 18) on an 8 1/2 x 11

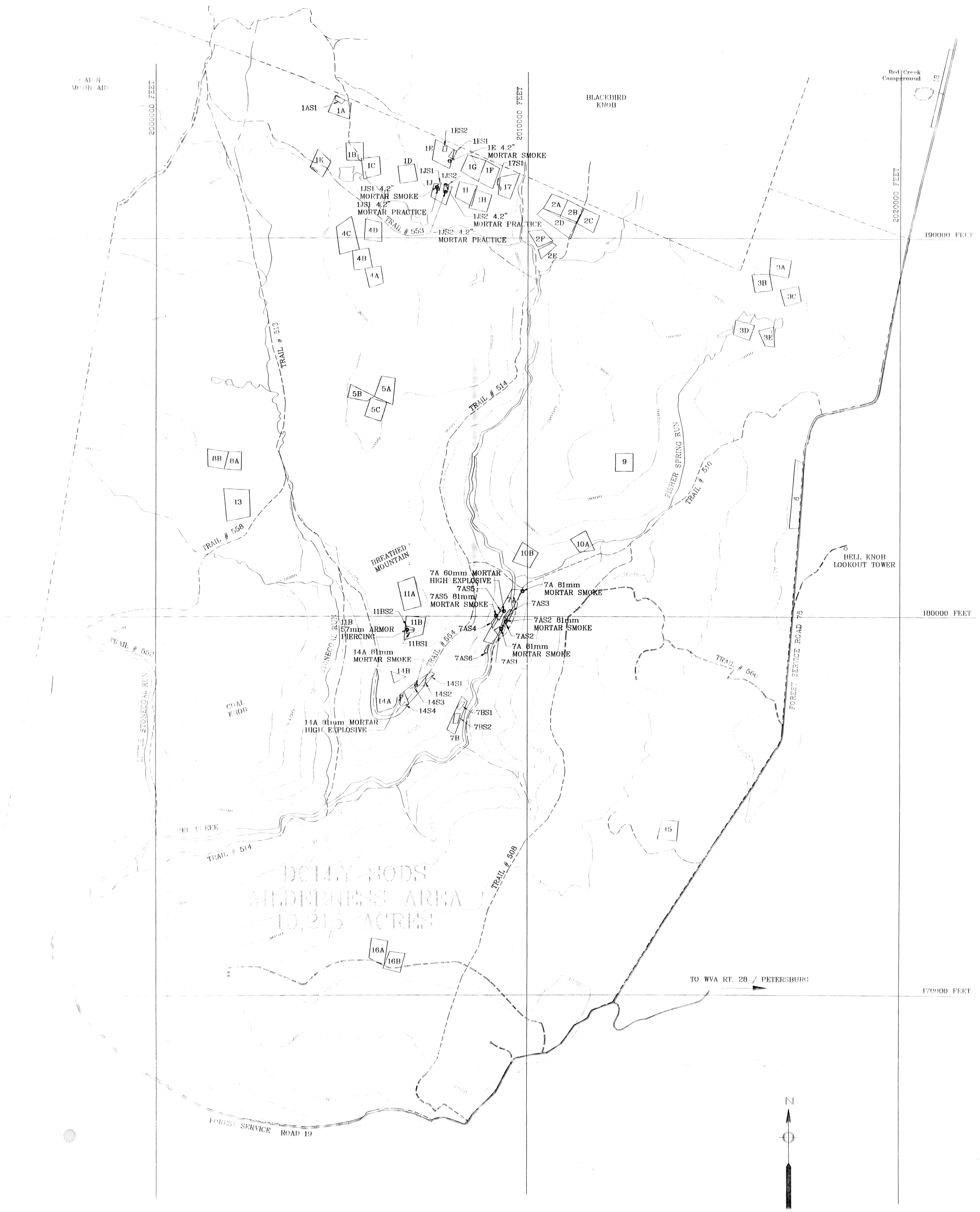
Iron bearing rock was discovered in almost every surface clearance area and was common throughout the Dolly Sods Wilderness. Non-OEW materials, railroad spikes, horseshoes, logging chains, tin cans, tent stakes, and other miscellaneous scrap metals were generally concentrated in areas where past human activities (logging railroads and logging camps), had occurred and present human activities (hiking and camping) currently take place. Isolated discoveries of non-OEW materials were made throughout the Dolly Sods Wilderness. Ordnance was found in northern Dolly Sods (Areas 1 and 17), in the Breathed Mountain region (Area 14), and in the Red Creek floodplain adjacent to Breathed Mountain (Area 7A). Summaries of OEW and Non-OEW wastes are presented in Tables 2-2 and 2-3.

TABLE 2-1. SURFACE CLEARANCE LOCATION SUMMARY

Subsurface Clearance Area	State Plane Coordinates (feet)								Area (acres)	Elevation (feet MSL)
	NW		SW		SE		NE			
	North	East	North	East	North	East	North	East		
1A	193,742	2,004,831	193,313	2,004,633	193,116	2,005,200	193,545	2,005,251	5.42	3,850
1B	192,493	2,005,111	192,038	2,005,132	192,030	2,005,583	192,510	2,005,575	4.92	3,800
1C	192,080	2,005,524	191,541	2,005,589	191,661	2,006,046	192,132	2,006,011	5.75	3,800
1D	191,885	2,006,504	191,423	2,006,561	191,491	2,007,028	191,933	2,006,947	4.81	3,800
1E	192,587	2,007,514	192,043	2,007,421	191,816	2,007,888	192,309	2,008,015	6.39	3,820
1F	192,025	2,008,871	191,478	2,008,658	191,287	2,009,059	191,824	2,009,243	5.70	3,780
1G	192,178	2,008,381	191,748	2,008,187	191,478	2,008,658	192,025	2,008,872	6.38	3,800
1H	191,278	2,008,582	190,773	2,008,404	190,677	2,008,900	191,122	2,009,036	5.64	3,780
1I	191,470	2,008,157	191,063	2,008,039	190,828	2,008,478	191,363	2,008,630	5.46	3,810
1J	191,428	2,007,476	191,074	2,007,387	190,856	2,007,789	191,337	2,007,959	4.70	3,830
1K	192,331	2,004,364	191,859	2,004,154	191,583	2,004,482	191,998	2,004,715	5.00	3,800
2A	191,149	2,010,636	190,768	2,010,404	190,543	2,010,850	190,993	2,011,064	5.15	3,760
2B	190,992	2,001,064	190,543	2,010,850	190,367	2,011,303	190,771	2,011,500	5.29	3,760
2C	190,771	2,001,500	190,393	2,011,289	190,134	2,011,749	190,580	2,011,919	5.14	3,740
2D	190,612	2,010,230	189,961	2,011,137	190,408	2,011,317	190,774	2,010,402	8.43	3,720
2E	189,869	2,010,662	189,961	2,010,269	189,427	2,010,348	189,780	2,010,758	2.12	3,570
2F	190,162	2,010,004	189,742	2,010,256	189,910	2,010,667	190,207	2,010,388	3.92	3,550
3A	189,494	2,016,527	189,027	2,016,491	188,927	2,017,002	189,403	2,017,083	5.90	3,800
3B	189,014	2,016,000	188,546	2,016,093	188,594	2,016,579	189,027	2,016,491	5.12	3,800
3C	188,609	2,016,783	188,177	2,016,907	188,296	2,017,345	188,709	2,017,269	4.74	3,800
3D	187,819	2,015,580	187,428	2,015,515	188,279	2,015,943	187,674	2,016,087	4.57	3,800
3E	187,536	2,016,198	187,143	2,016,375	187,109	2,016,633	187,638	2,016,611	3.62	3,800
4A	189,182	2,005,466	188,683	2,005,561	188,782	2,005,970	189,243	2,005,900	4.90	3,860
4B	189,664	2,005,138	189,136	2,005,184	189,169	2,005,681	189,725	2,005,573	5.88	3,880
4C	190,570	2,005,114	190,290	2,004,704	189,563	2,004,797	189,694	2,005,323	9.31	3,840
4D	190,503	2,005,492	189,957	2,005,459	189,894	2,005,929	190,406	2,005,924	5.50	3,800
5A	186,331	2,006,070	185,794	2,005,875	185,575	2,006,371	186,272	2,006,420	6.37	3,820
5B	186,100	2,005,278	185,770	2,005,164	185,670	2,005,680	185,794	2,005,875	3.75	3,820
5C	185,755	2,005,780	185,284	2,005,618	185,146	2,006,053	185,627	2,006,208	5.20	3,820
6	184,154	2,017,193	182,327	2,017,035	182,345	2,017,297	184,032	2,017,430	10.24	4,000
7A	189,710	2,009,579	179,357	2,008,823	179,284	2,009,071	180,707	2,009,886	9.53	3,000
7B	177,867	2,008,232	176,982	2,007,829	176,853	2,008,044	177,736	2,008,380	4.78	2,480
8A	184,343	2,001,963	183,884	2,001,847	183,861	2,002,304	184,343	2,002,314	4.38	3,800
8B	184,421	2,001,398	183,959	2,001,409	183,884	2,001,846	184,337	2,001,965	5.37	3,800

TABLE 2-1 (Continued). SURFACE CLEARANCE LOCATION SUMMARY

Surface Clearance Area	State Plane Coordinates (feet)								Area (acres)	Elevation (feet MSL)
	NW		SW		SE		NE			
	North	East	North	East	North	East	North	East		
9	184,276	2,012,361	184,296	2,012,803	183,829	2,012,826	183,828	2,012,370	5.07	3,800
10A	182,029	2,011,154	181,693	2,011,394	181,745	2,001,800	182,263	2,011,559	4.77	3,440
10B	181,956	2,009,865	181,444	2,009,598	181,274	2,010,065	181,673	2,010,292	5.95	3,400
11A	180,880	2,006,514	180,151	2,006,687	180,266	2,007,141	181,035	2,006,953	8.24	3,800
11B	180,010	2,006,741	179,384	2,006,684	179,532	2,007,185	179,971	2,007,263	6.16	3,820
12	178,469	1,996,781	178,002	1,996,764	177,957	1,997,215	178,432	1,997,227	5.07	3,800
13	183,375	2,001,834	182,510	2,001,917	182,633	2,002,551	183,336	2,002,525	11.96	3,520
14A	178,525	2,007,424	--	--	--	--	178,465	2,007,519	14.82	3,680
14B	178,534	2,006,330	178,220	2,006,417	--	--	178,391	2,006,733	1.31	
15	174,634	2,013,619	174,112	2,013,488	174,064	2,014,008	174,587	2,014,058	5.85	3,960
16A	171,509	2,005,808	170,985	2,005,737	170,775	2,006,147	171,428	2,006,247	6.02	3,890
16B	171,155	2,006,293	170,708	2,006,116	170,597	2,006,577	171,099	2,006,705	5.04	3,890
17	191,594	2,009,249	191,133	2,009,195	191,010	2,009,519	191,698	2,009,775	5.64	3,650
18	195,038	2,021,280	192,975	2,020,800	192,957	2,020,917	195,004	2,021,390	5.65	3,880
								TOTAL	280.74	



MCNEILL & EDDY

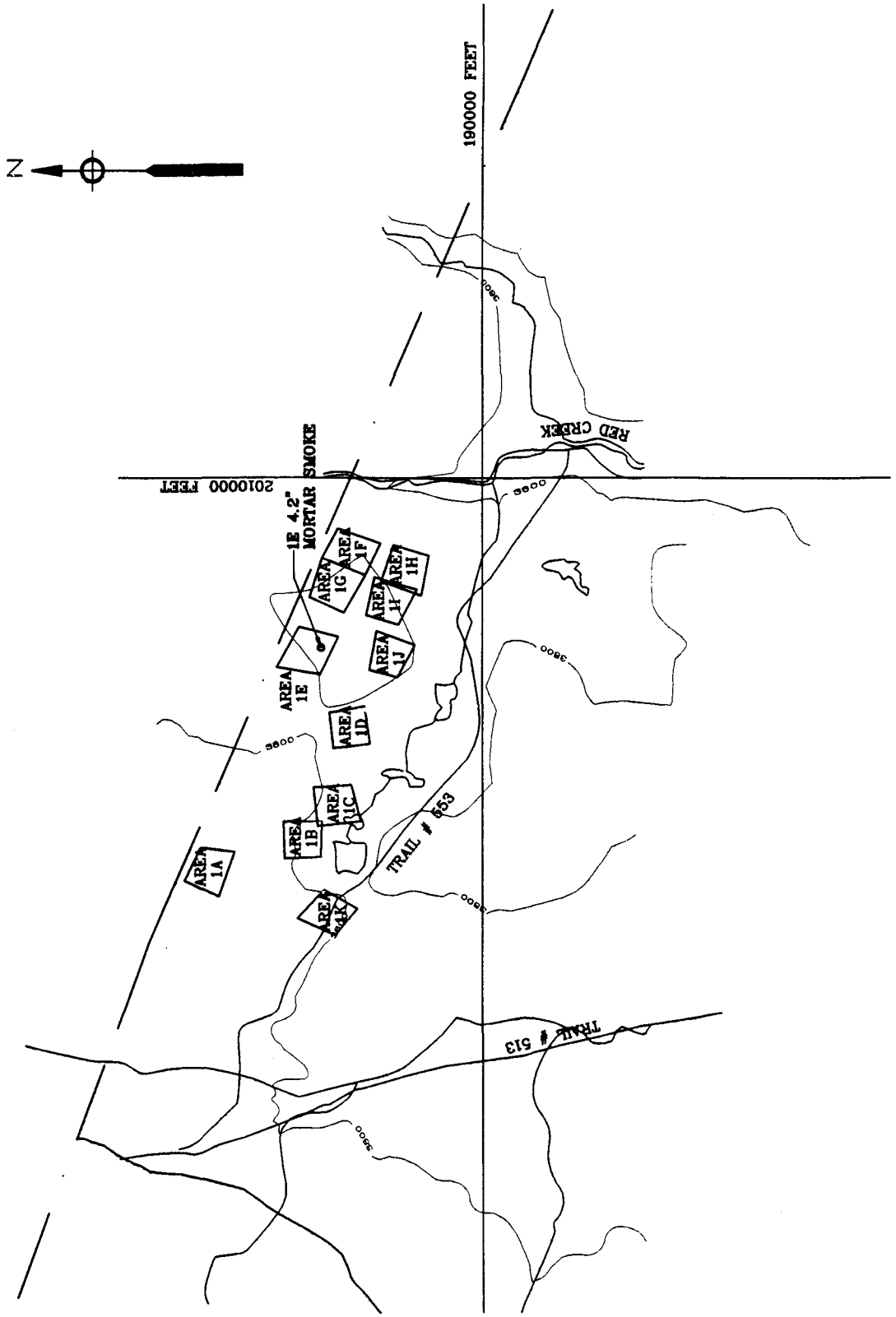
FIGURE 2-1
LOCATIONS OF SURFACE INVESTIGATIONS, SUBSURFACE INVESTIGATIONS, AND FOUND ORDNANCE

LEGEND

	FOREST SERVICE ROAD	o	ORDNANCE LOCATED DURING SITE INVESTIGATION
	JEEP TRAIL (CLOSED)		BOUNDRY OF SURFACE OR SUBSURFACE INVESTIGATION
	FOOT PATH	16A	SURFACE INVESTIGATION AREA
	DOLLY SODS WILDERNESS AREA BOUNDRY	16AS1	SUBSURFACE INVESTIGATION AREA
	STREAMS OR RUNS	2000	ELEVATION CONTOUR

NOTES:

1. GRID SHOWN IS WVA STATE PLANE COORDINATE SYSTEM.
2. TOPOGRAPHIC DATA FROM USGS TOPOGRAPHIC MAPS, 1961
3. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL



METCALF & EDDY

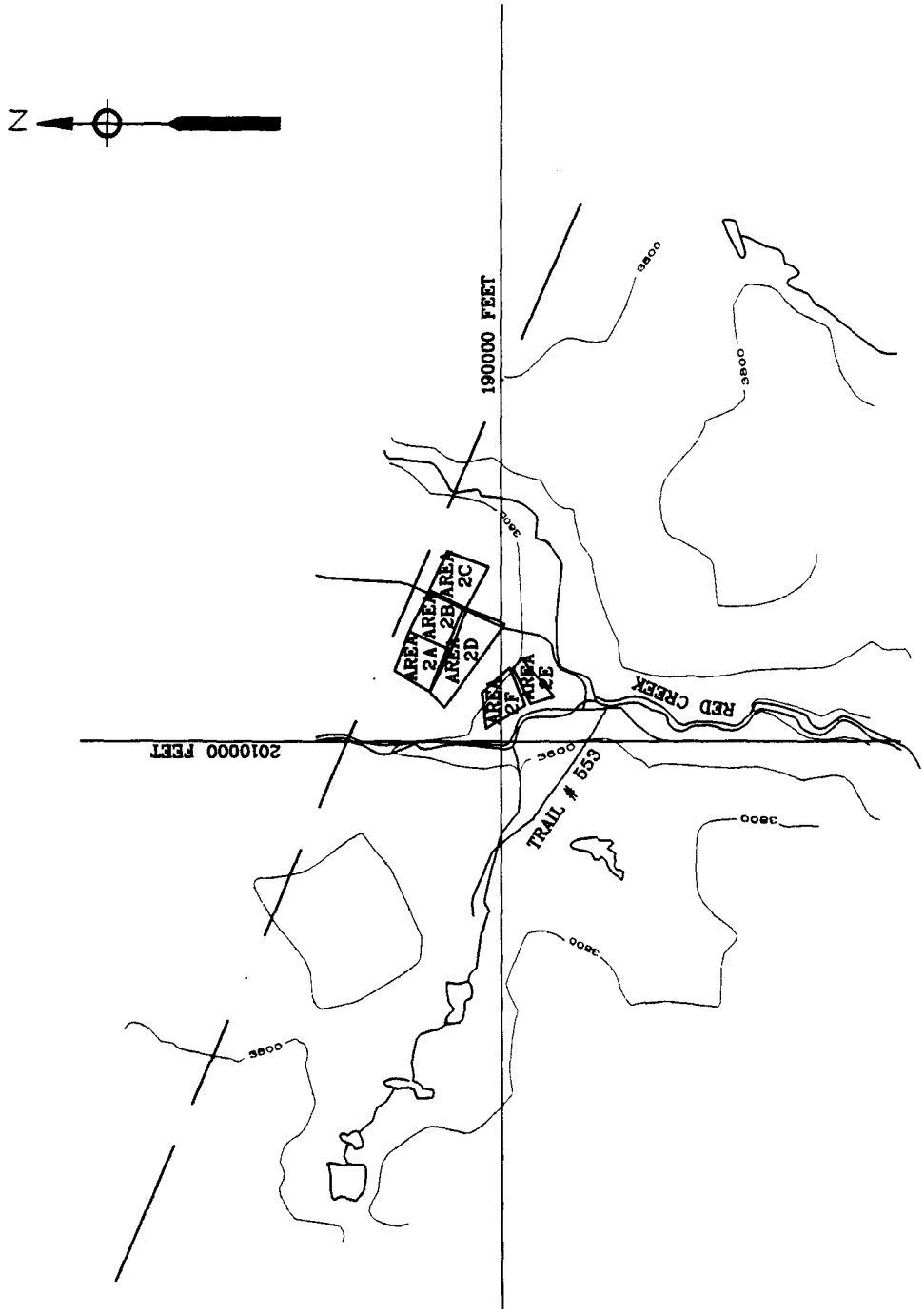
DOLLY SODS WILDERNESS AREA

AREA 1 SURFACE CLEARANCE AREA AND ORDNANCE LOCATIONS

SCALE: 1" = 2000'

FIG. 2-2

DOLA1-1



METCALF & EDDY

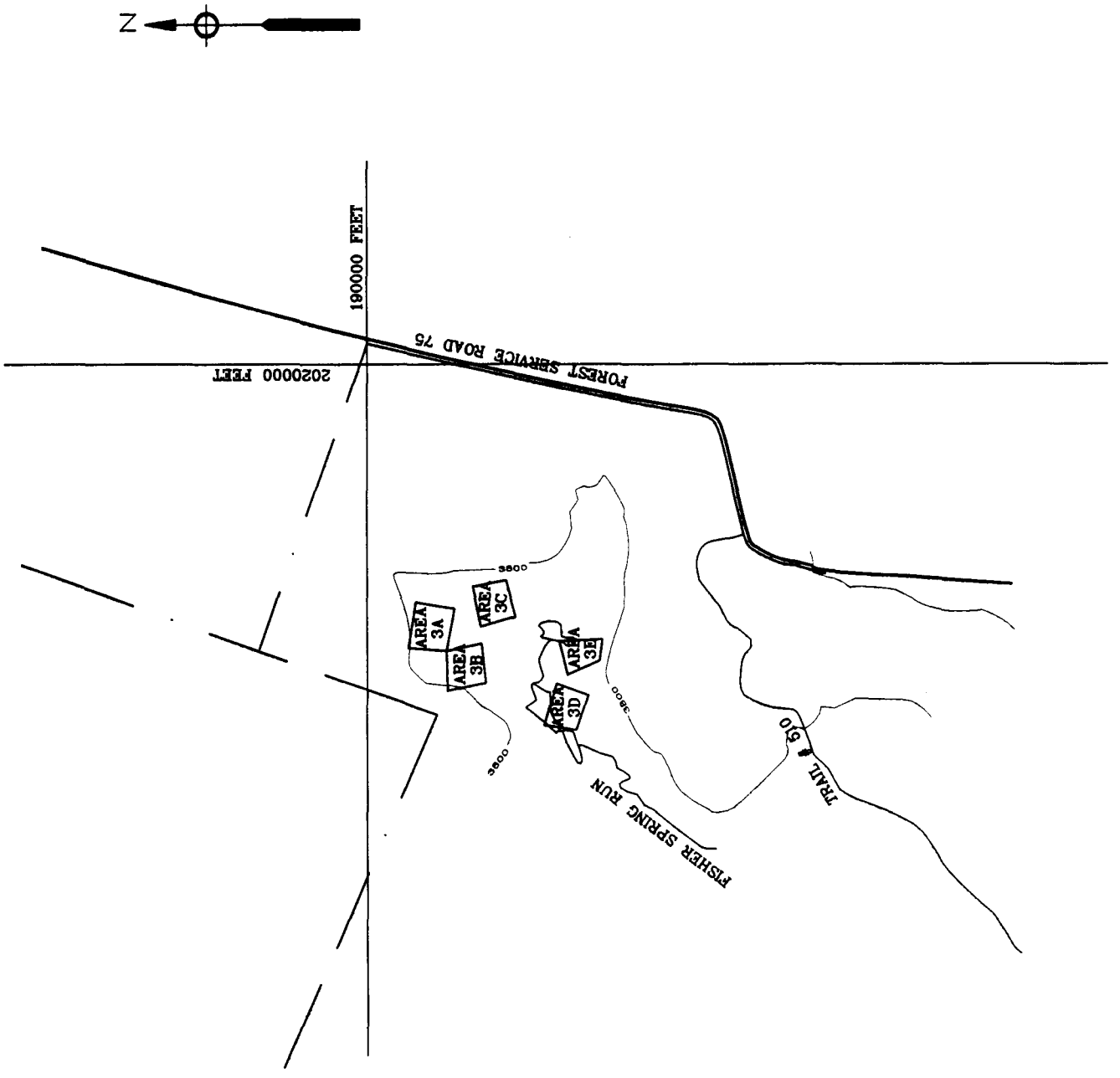
DOLLY SODS WILDERNESS AREA

AREA 2 SURFACE CLEARANCE AREAS

SCALE: 1" = 2000'

FIG. 2-3

DOLA2-1



METCALF & EDDY

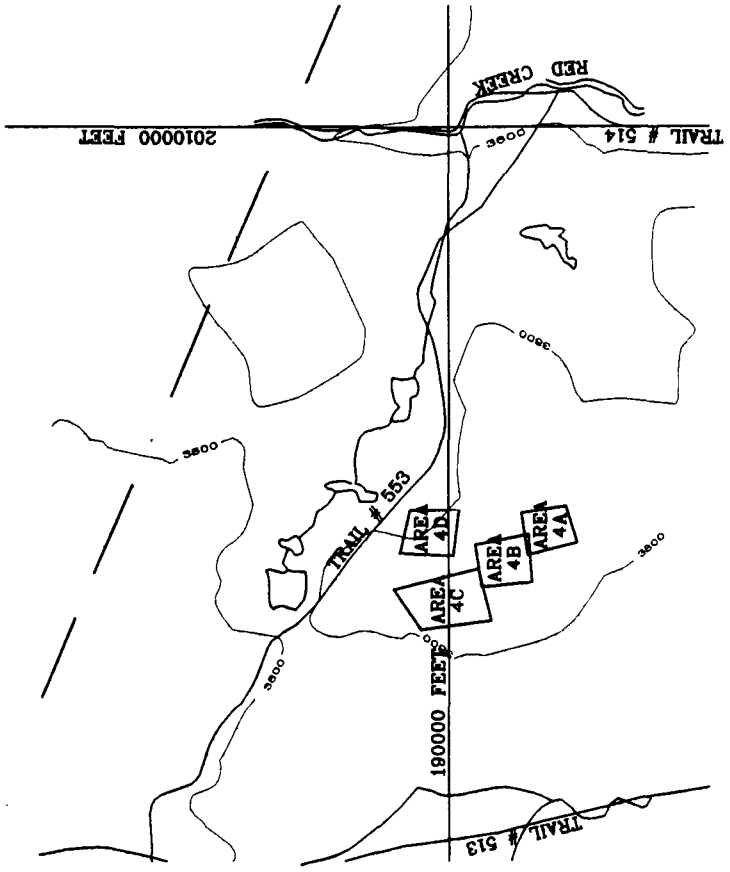
DOLLY SODS WILDERNESS AREA

AREA 3 SURFACE CLEARANCE AREAS

SCALE: 1" = 2000'

FIG. 2-4

DOLA3-1



M&E METCALF & EDDY

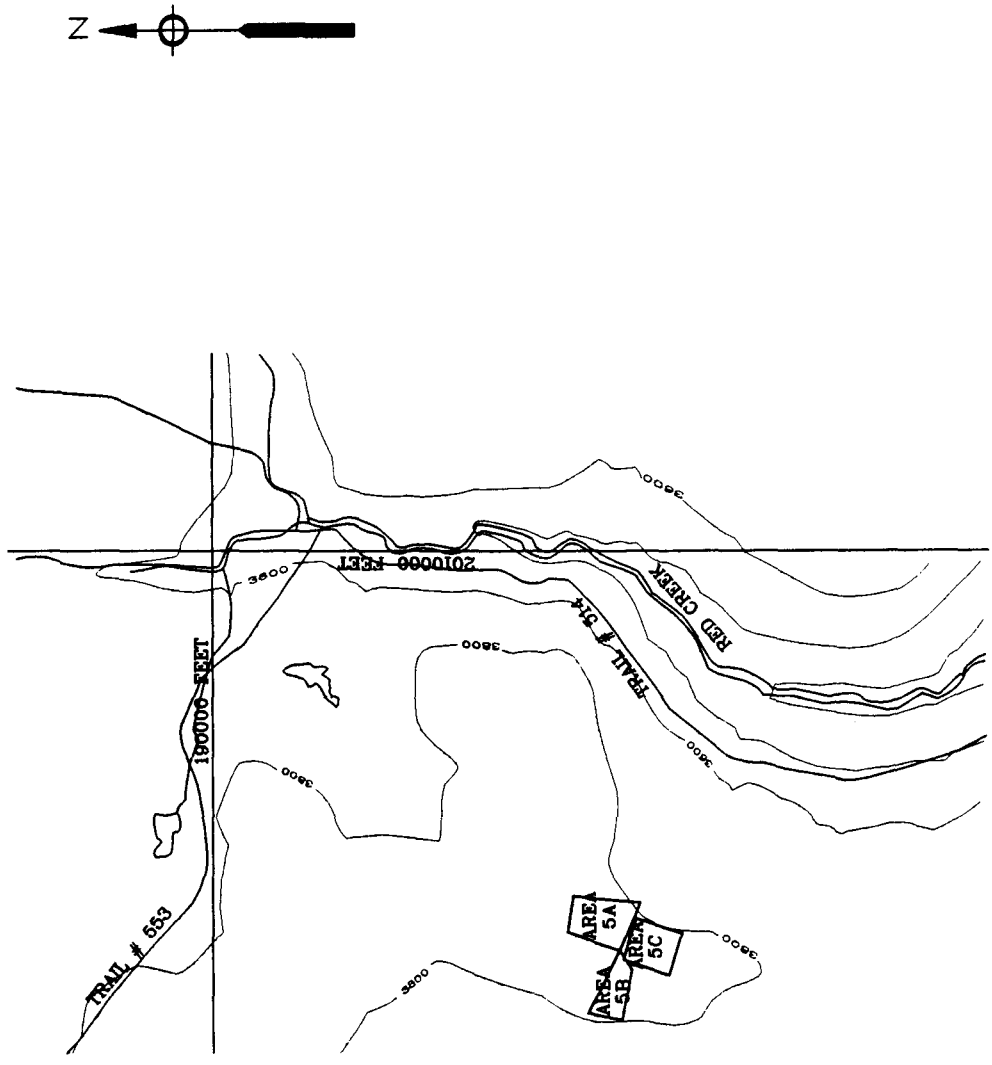
DOLLY SODS WILDERNESS AREA

AREA 4 SURFACE CLEARANCE AREAS

SCALE: 1" = 2000'

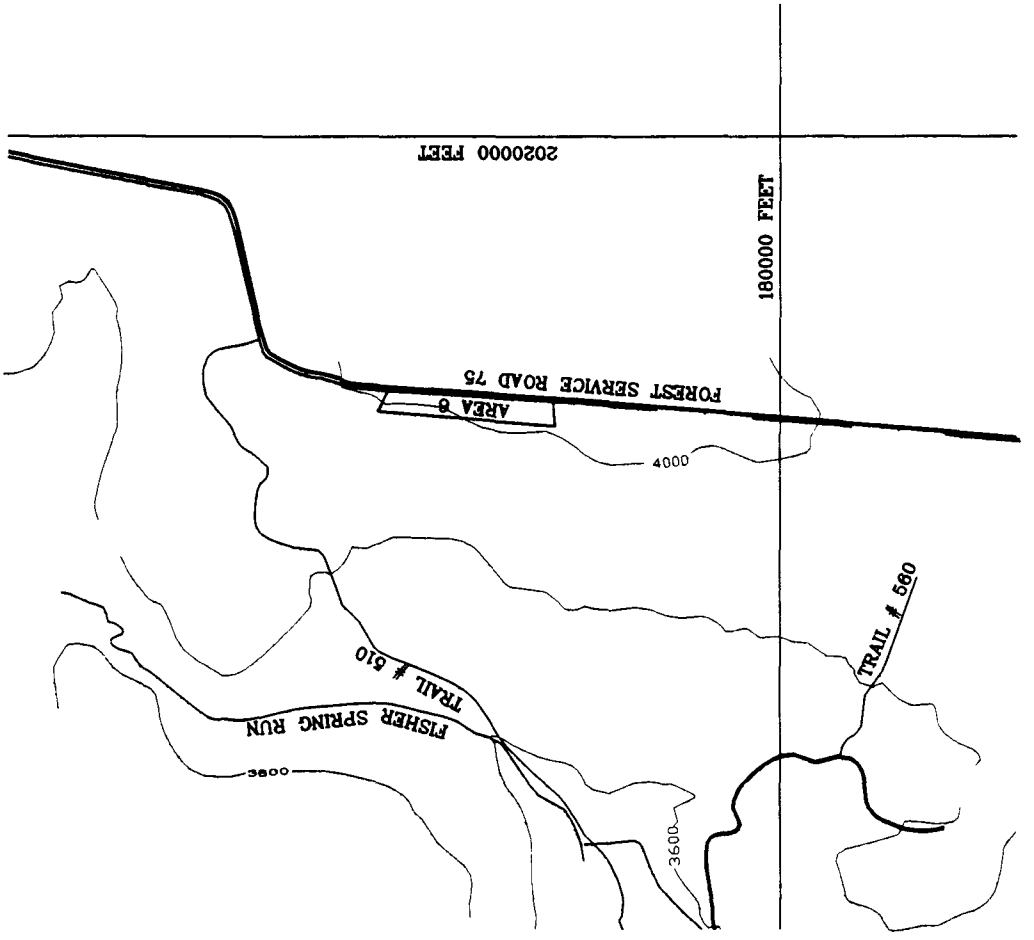
FIG. 2-5

DOLA4-1



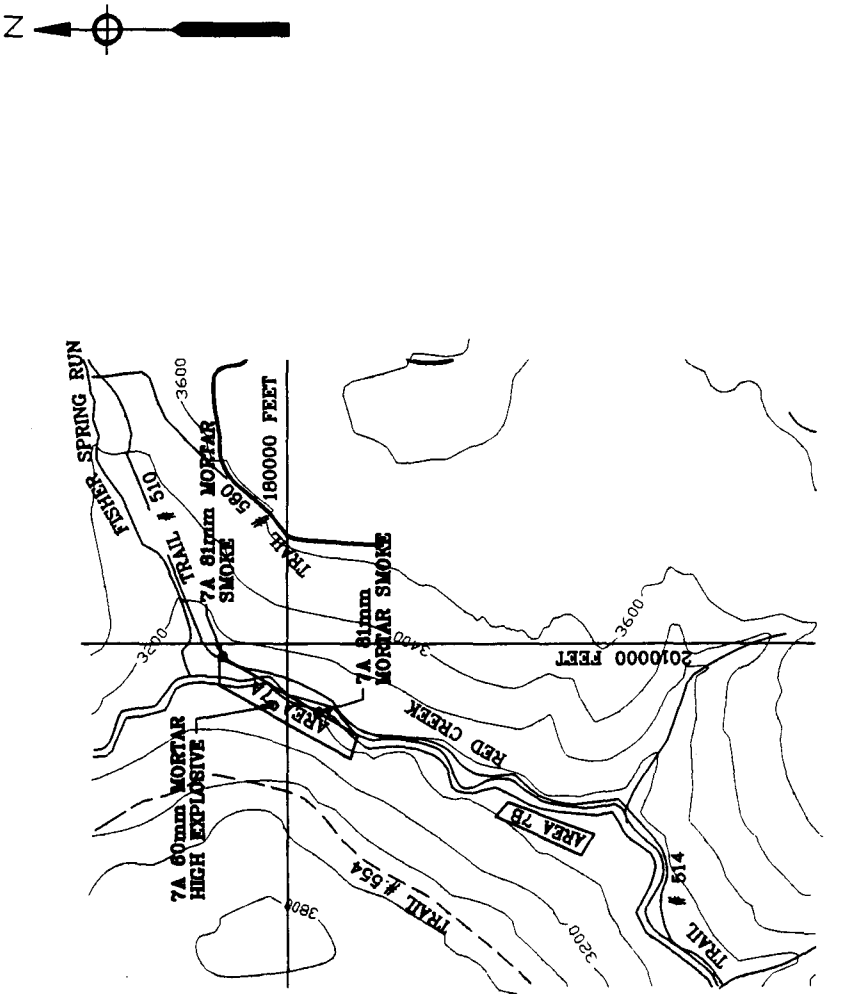
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 5 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-6

DOLA5-1



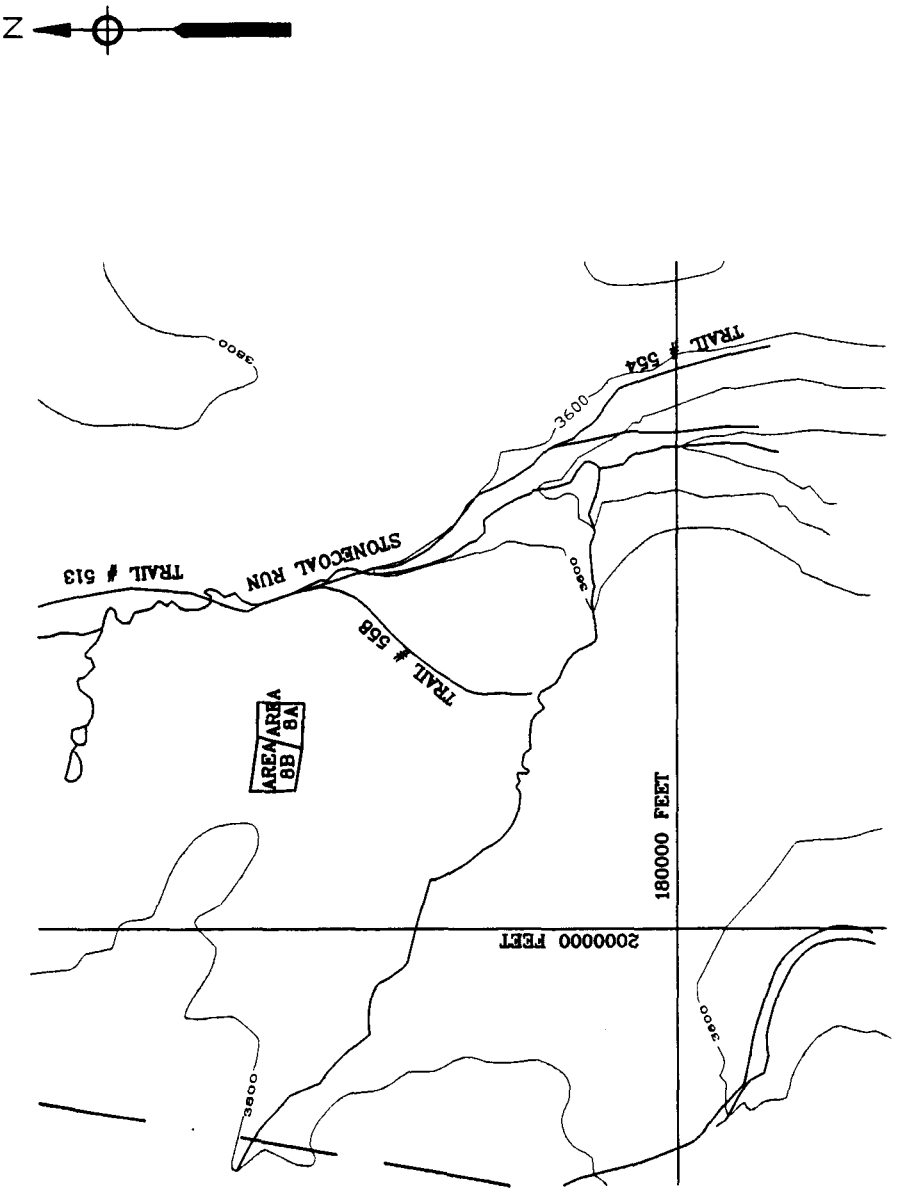
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 6 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-7

DOLA6-1



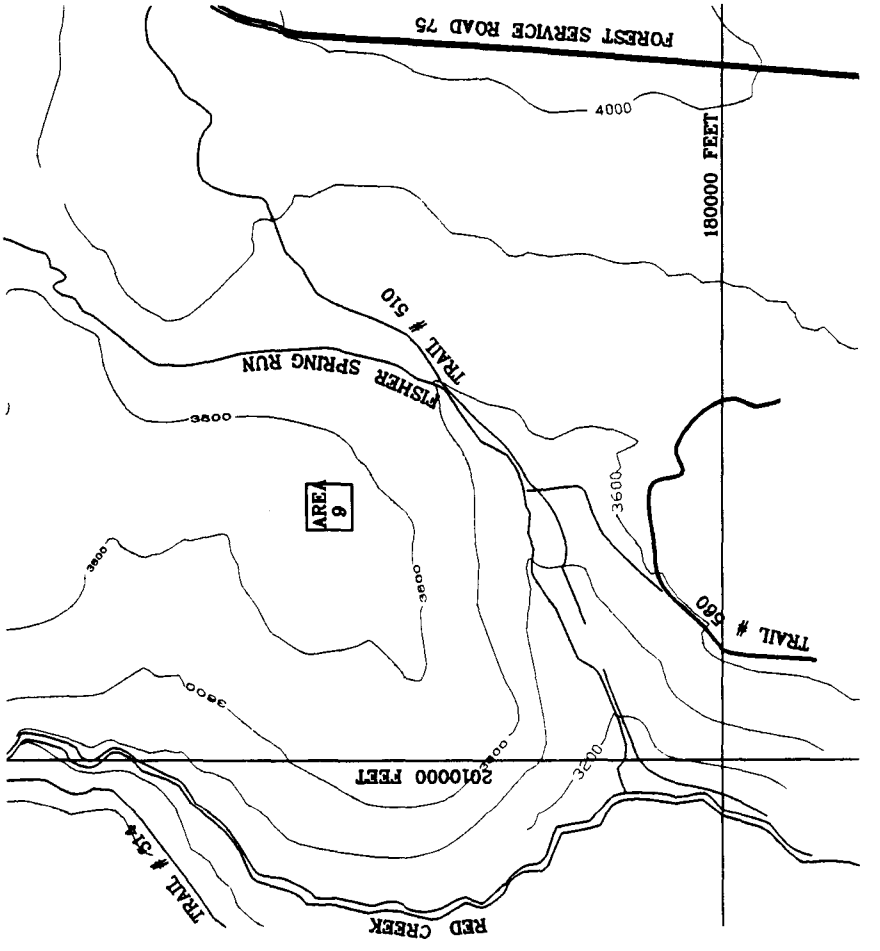
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 7 SURFACE CLEARANCE AREA AND ORDNANCE LOCATIONS			
	SCALE: 1" = 2000'			FIG. 2-8

DOLA6-1



M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 8 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-9

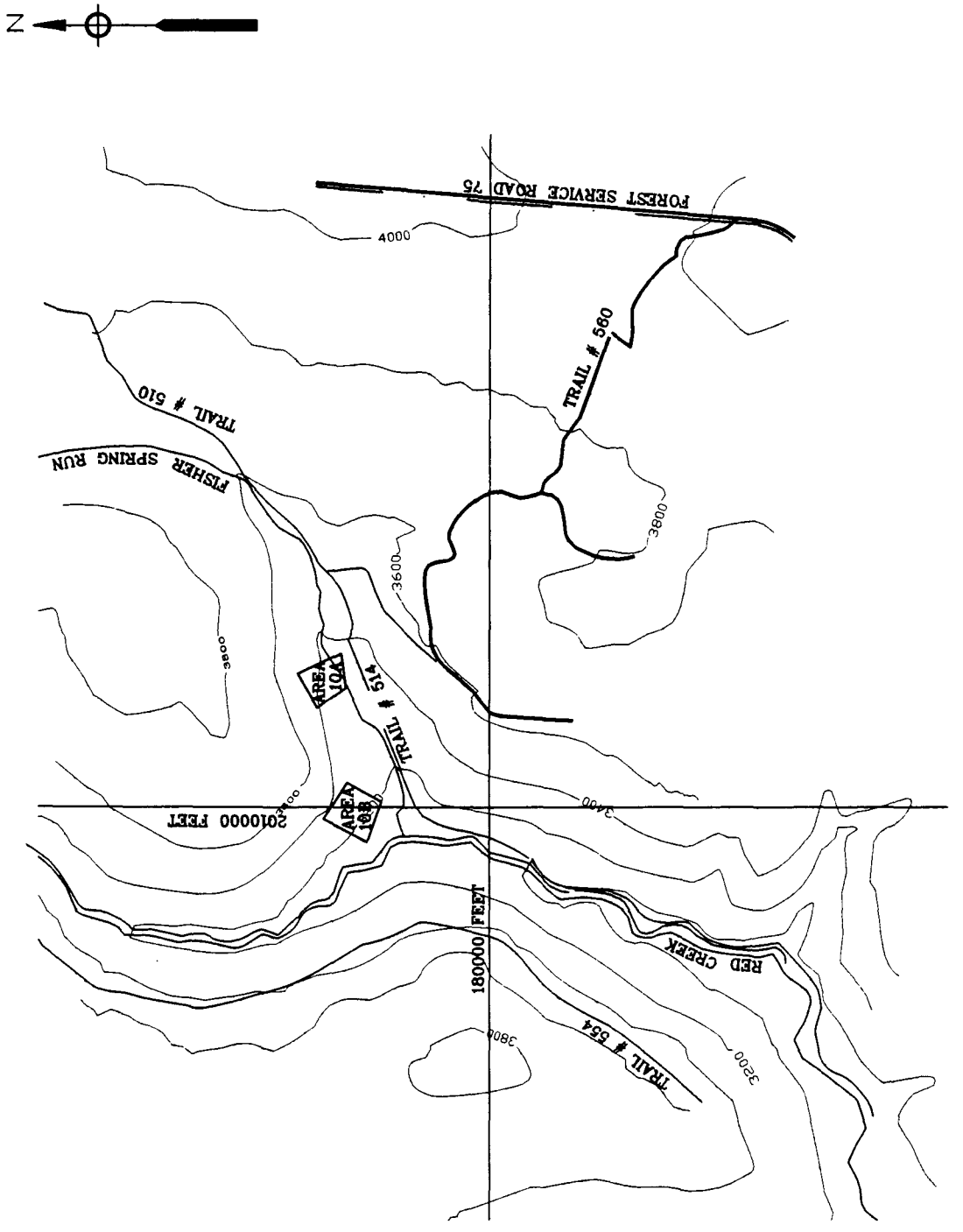
DOLA8-1



Z

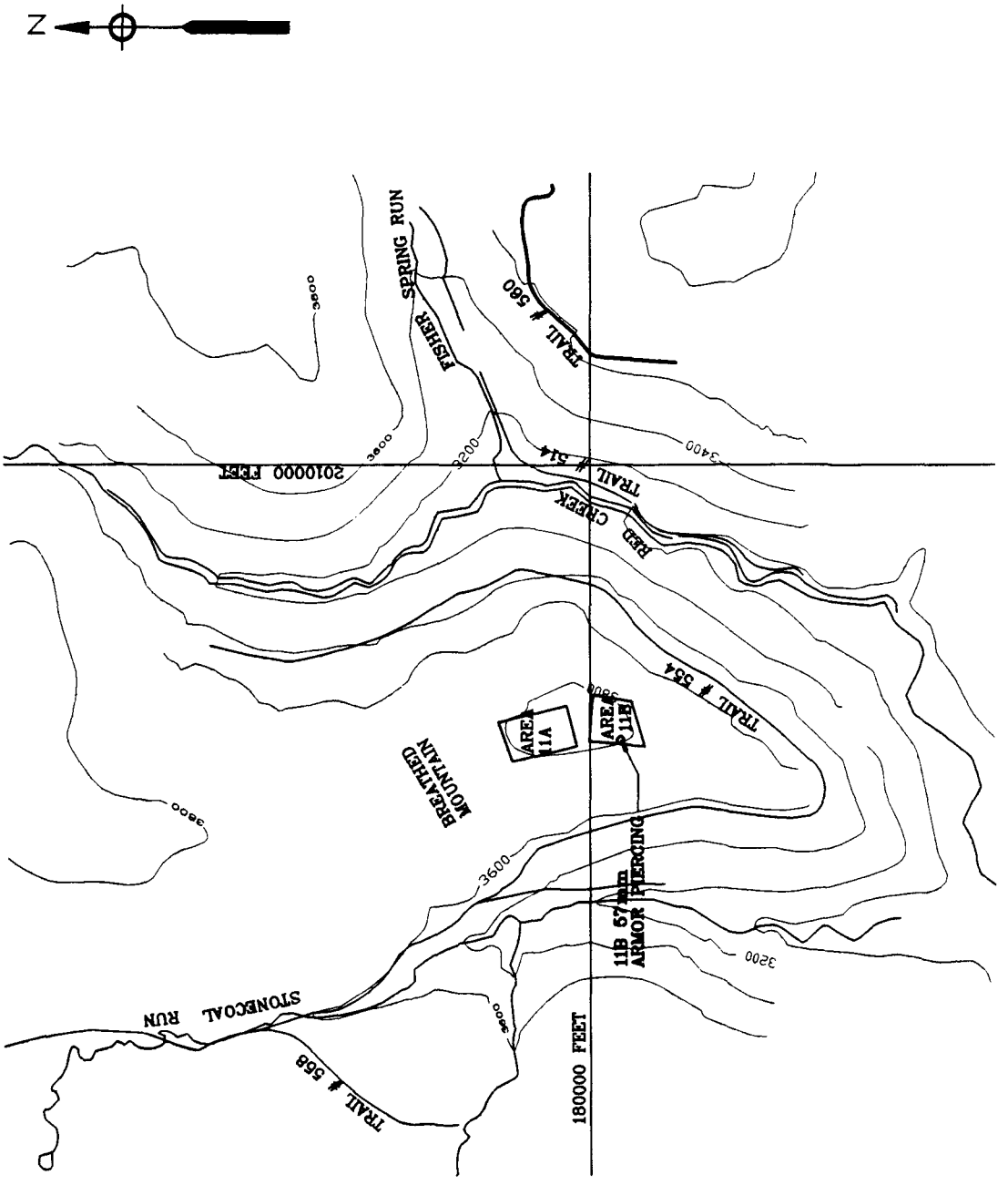
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 9 SURFACE CLEARANCE AREAS
	SCALE: 1" = 2000' FIG. 2-10

DOLA9-1



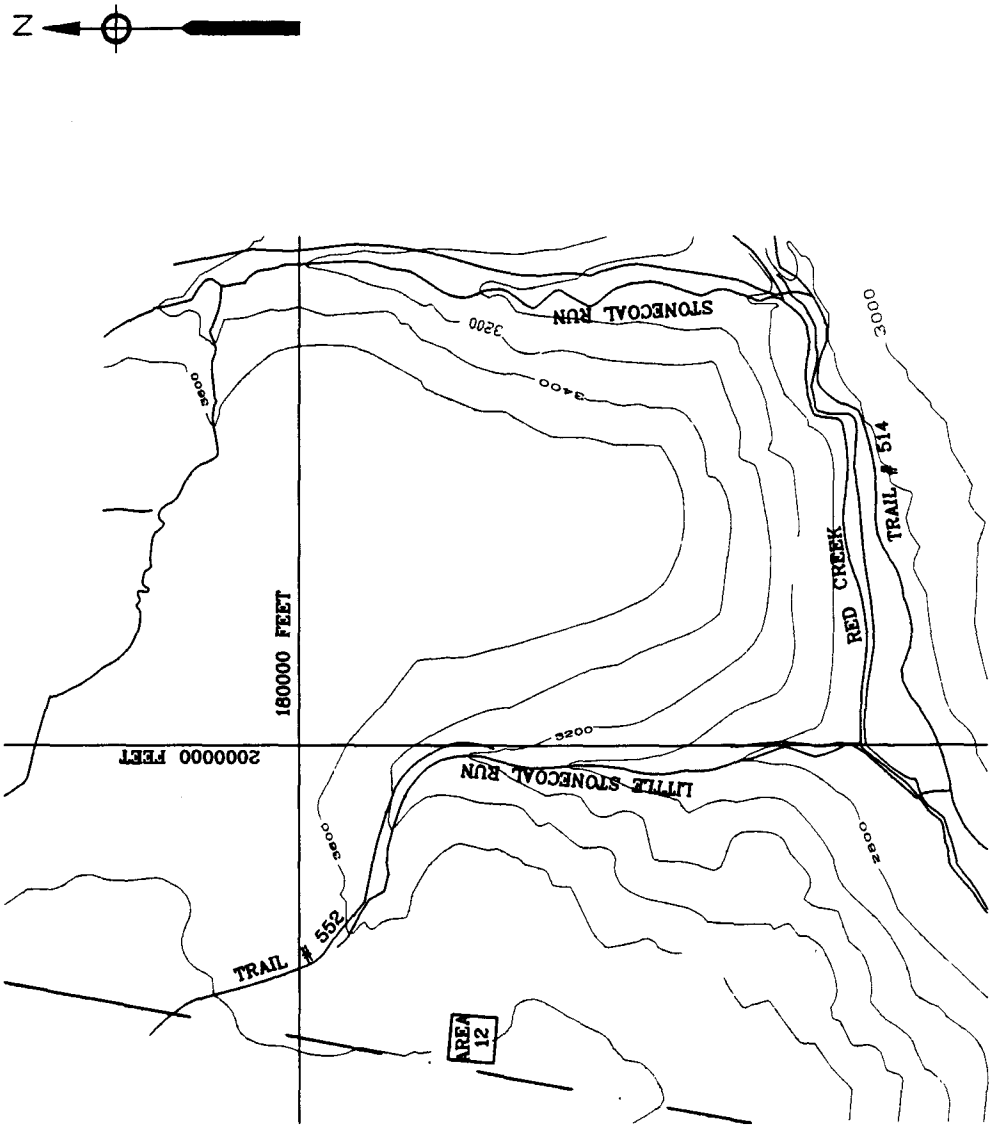
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 10 SURFACE CLEARANCE AREAS
	SCALE: 1" = 2000' FIG. 2-11

DOLA10-1



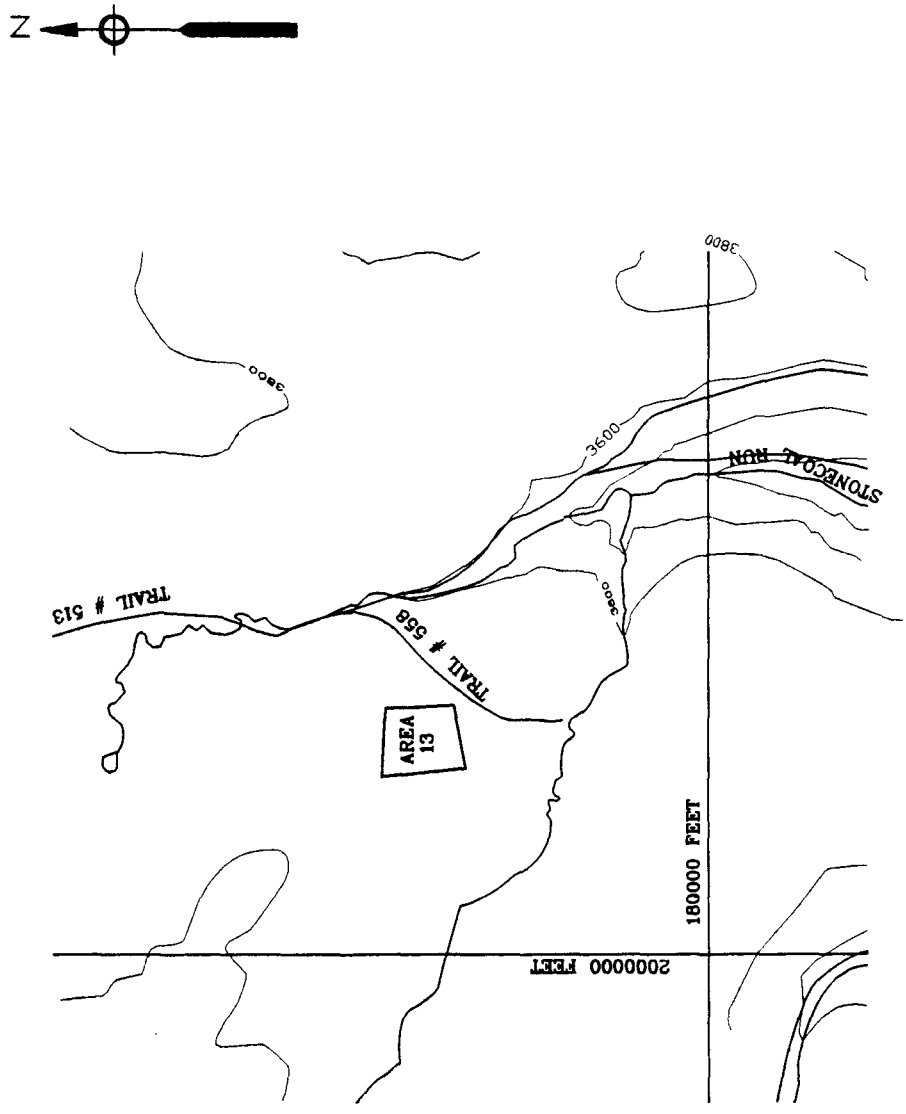
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 11 SURFACE CLEARANCE AREA AND ORDNANCE LOCATIONS
	SCALE: 1" = 2000' FIG. 2-12

DOLA11-1



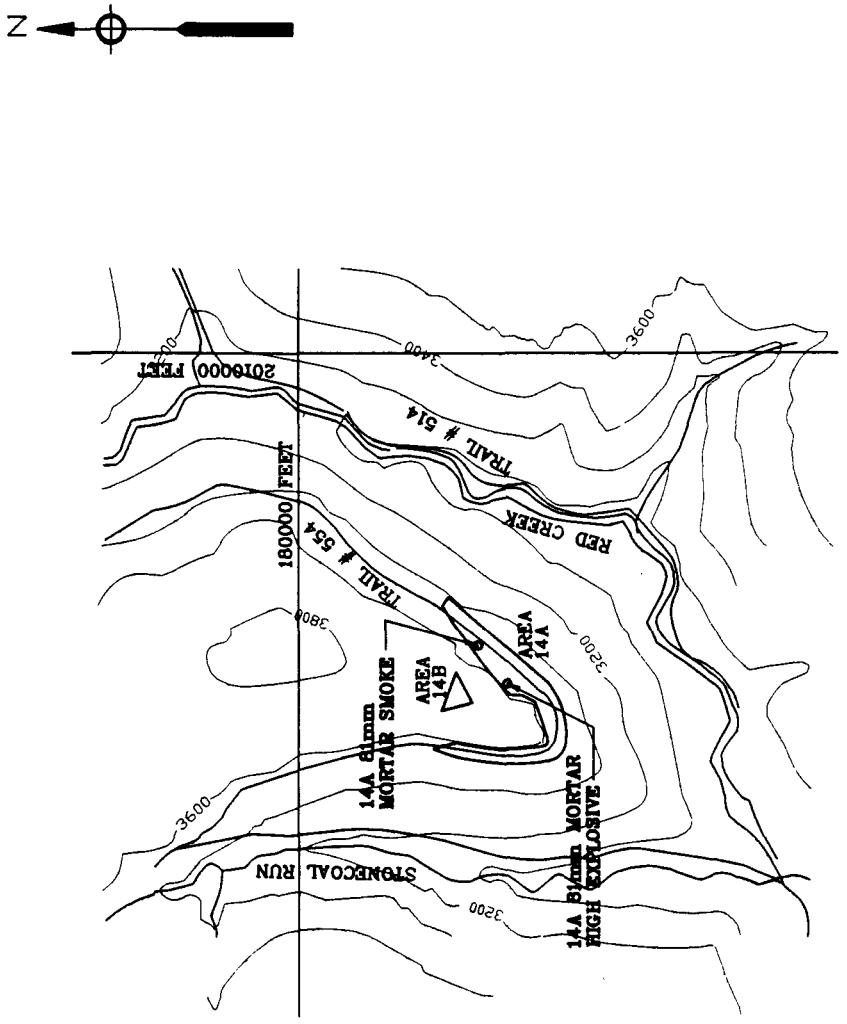
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 12 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-13

DOLA12-1



M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 13 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-14

DOLA13-1



METCALF & EDDY

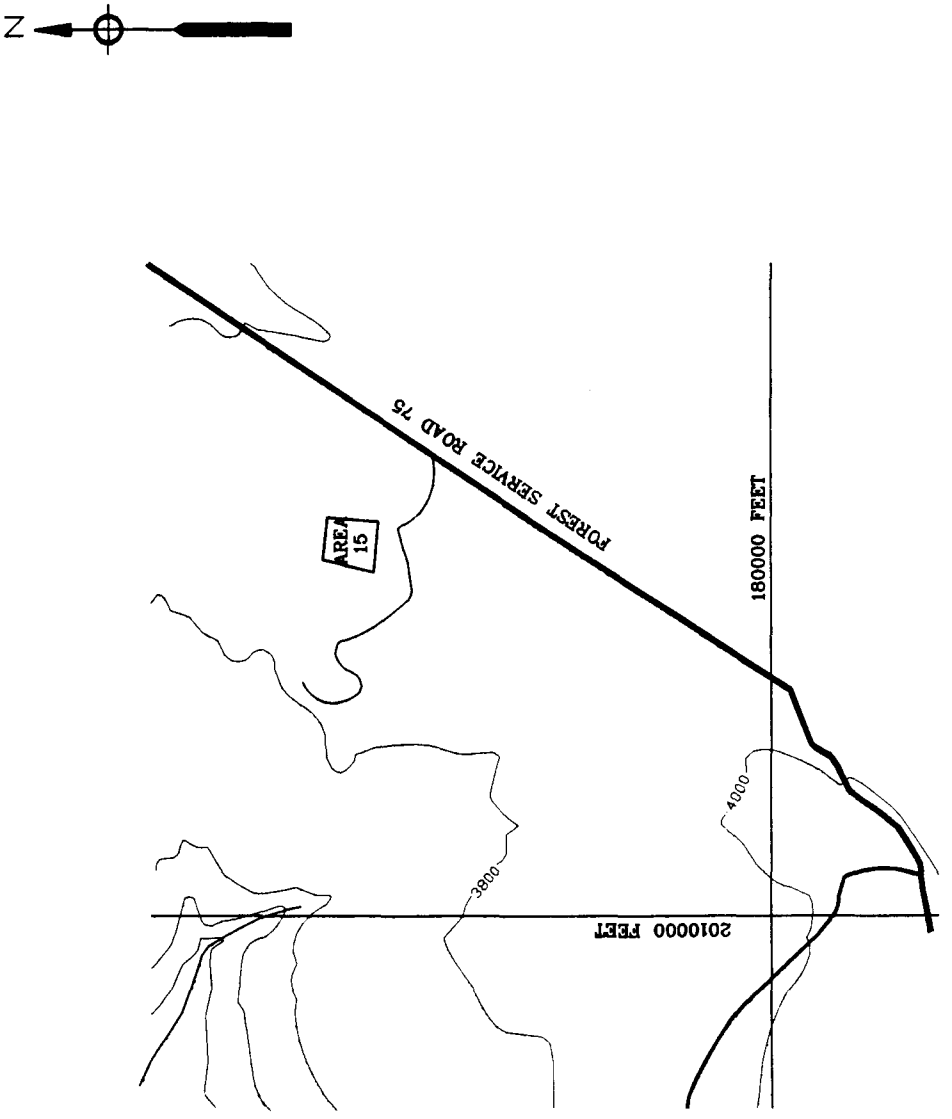
DOLLY SODS WILDERNESS AREA

AREA 14 SURFACE CLEARANCE AREA AND ORDNANCE LOCATIONS

SCALE: 1" = 2000'

FIG. 2-15

DOLA14-1



METCALF & EDDY

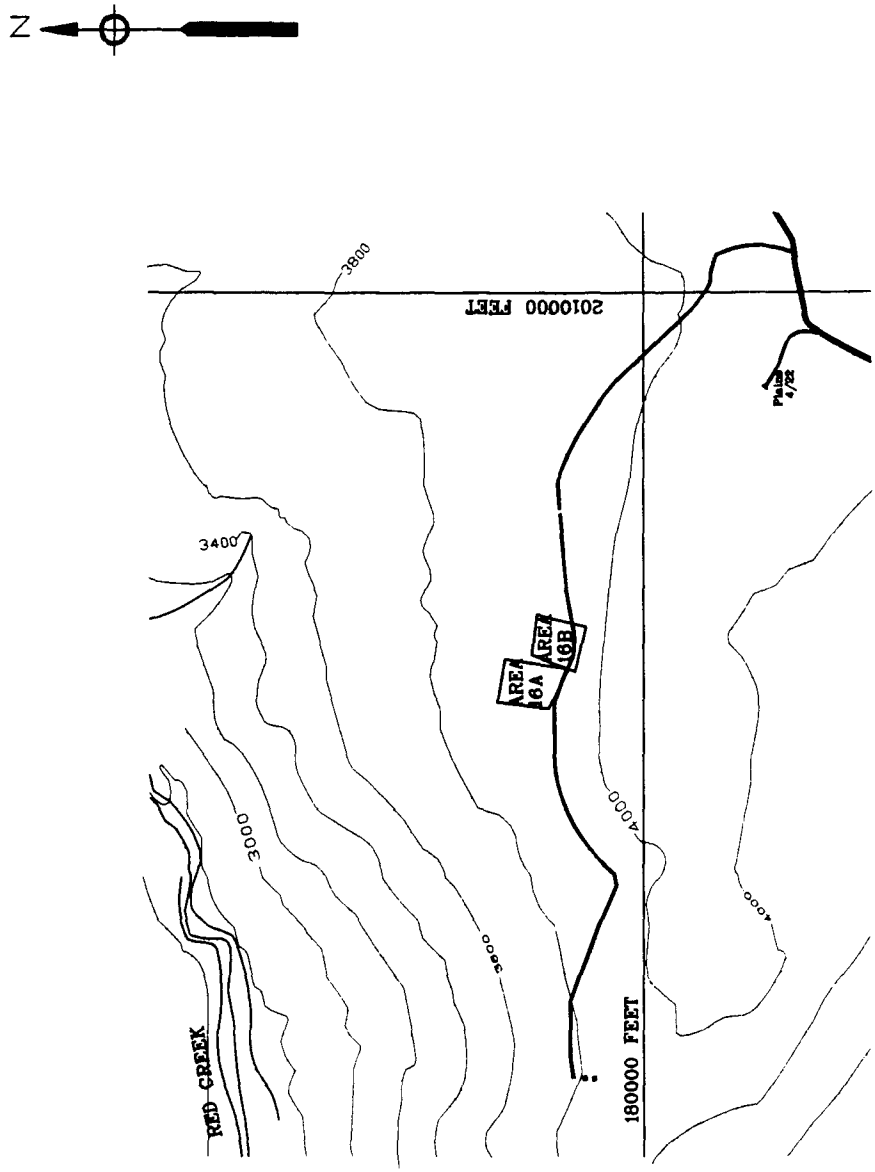
DOLLY SODS WILDERNESS AREA

AREA 15 SURFACE CLEARANCE AREAS

SCALE: 1" = 2000'

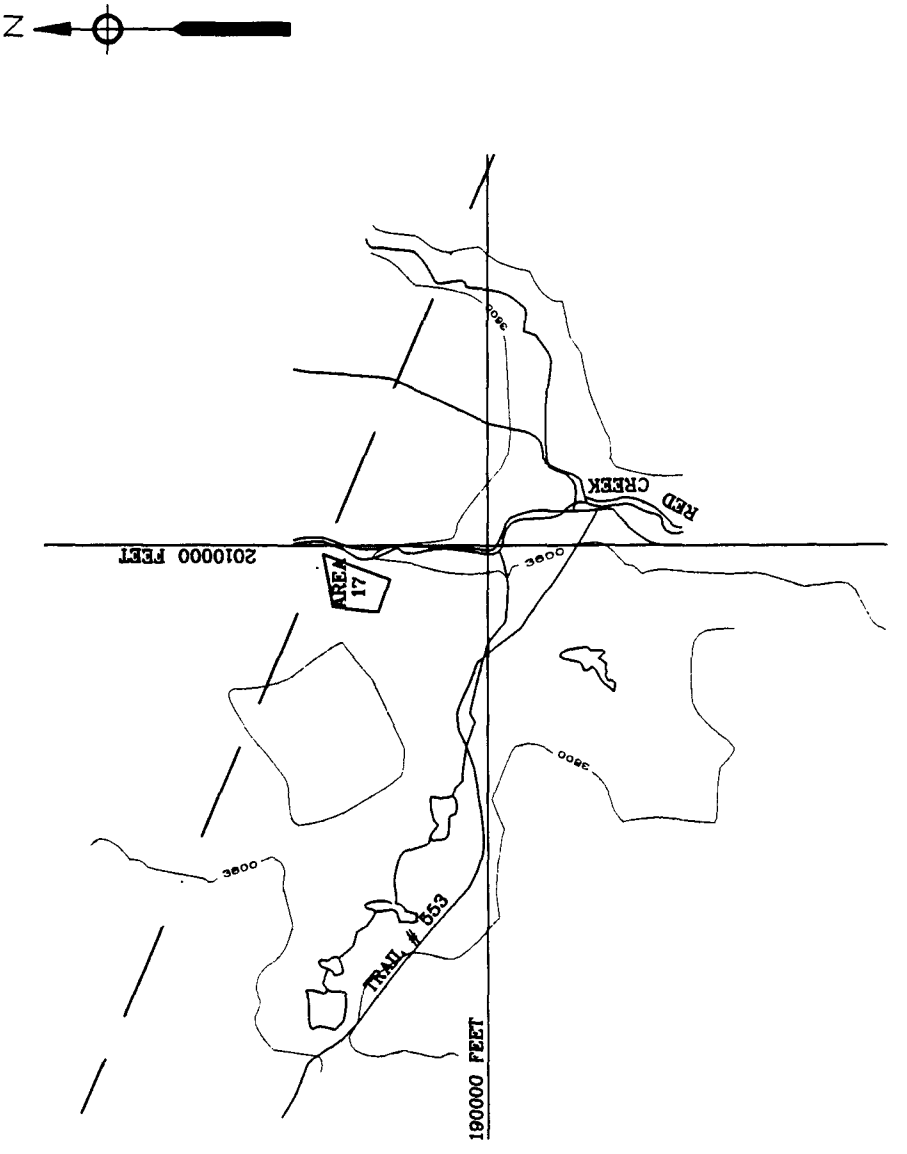
FIG. 2-16

DOLA15-1



M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 16 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-17

DOLA16-1



METCALF & EDDY

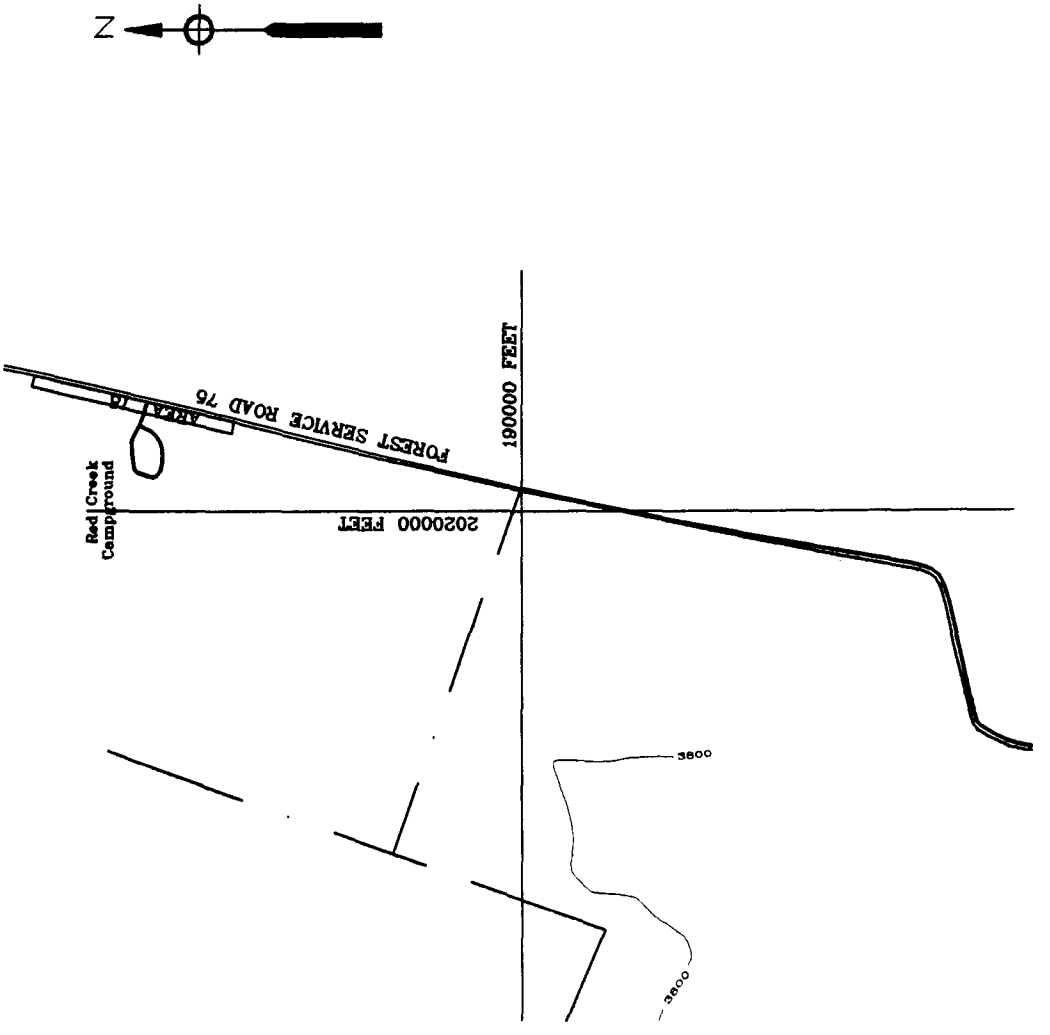
DOLLY SODS WILDERNESS AREA

AREA 17 SURFACE CLEARANCE AREAS

SCALE: 1" = 2000'

FIG. 2-18

DOLA17-1



M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 18 SURFACE CLEARANCE AREAS			
	SCALE: 1" = 2000'			FIG. 2-19

DOLA18-1

TABLE 2-2. ORDNANCE DISCOVERED DURING SURFACE INVESTIGATION

Area	Description	Date (found/demo)	Engineer	Depth	Location (north/east)
1E	4.2" high explosive	8-6-91/9-27-91	R. O'Brien	6"	192,013/2,007,879
14A	81mm high explosive	8-12-91/9-23-91	C. Dwinal	<6"	177,859/2,006,612
14A	81mm smoke round	8-12-91/9-23-91	C. Dwinal	<6"	178,159/2,007,008
14A	Frag-81mm smoke round tail fin & boom	8-12-91/---	C. Dwinal	<6"	
7A	Frag-2 81mm high explosive tail fin & boom frag.	8-21-91/---	C. Dwinal	<6"	
11B	57mm solid round with tracer ports	8-21-91/---	C. Dwinal	<6"	179,654/2,006,761
7A	60mm high explosive; boom & fin separate, no fuse	8-22-91/9-6-91	C. Dwinal	<6"	180,141/2,009,420
7A	Frag-81mm smoke round tailfin & boom	8-22-91/---	C. Dwinal	<6"	
7A	81mm smoke round	8-22-91/9-6-91	C. Dwinal	<6"	179,871/2,009,420
17	Frag-4.2" sand filled 60-80% complete	8-27-91/---	D. Wang	<6"	
7A1	Frag-81mm smoke round tail fin, boom & frag	8-30-91/---	D. Wang	<6"	
7A1	Frag-81mm smoke round tail fin & boom	8-30-91/---	D. Wang	<6"	
7A2	81mm smoke round	8-30-91/9-6-91	D. Wang	6"	180,688/2,009,868

TABLE 2-3. NON-OEW WASTES DISCOVERED DURING SURFACE INVESTIGATION

Area	Tin Can	Tent Stake	Railroad Spike	Iron Bolt	Logging Chain	Wire Pieces	Horse Shoe	Hand Tool*	Bobby Pin	Fork
1E	1									
1H	1									
2E	4	5	6		1		2			
2F	3	1	2					2		
4B		3						1		
5C	1	1								
7A	42	68	107	11		28			2	1
7B				5		8				2
10A						8				
11B					1					
12	3									
14A								2		
18	34	31					1	1	1	

*Hand tools include items such as an iron chisel, knife, grub hook, and garden trowel.

2.2 Subsurface Investigation

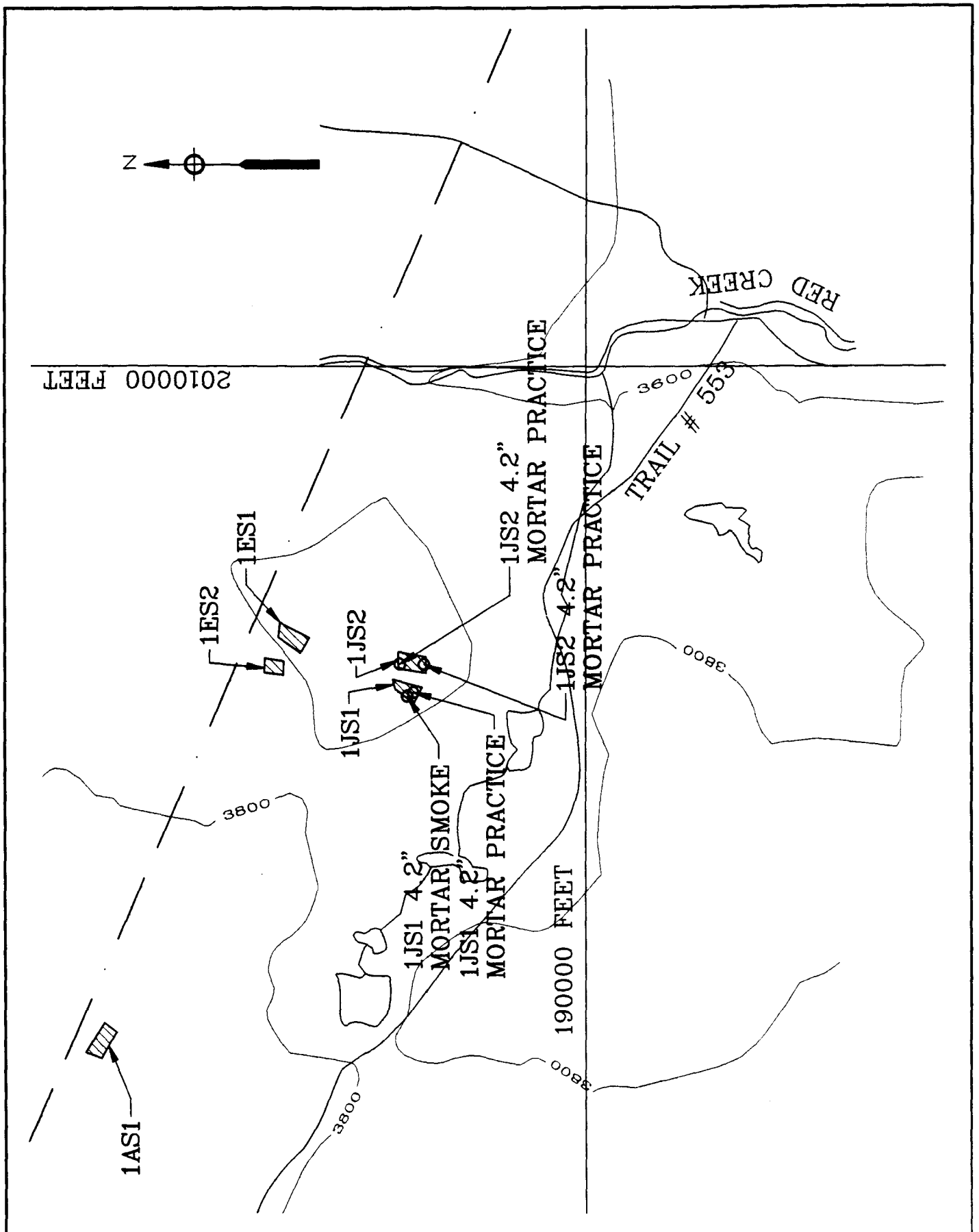
The subsurface investigation was initiated immediately after the surface investigation had been completed. It took place from September 3 to October 3, 1991. The investigation was performed as outlined in the Final Work Plan, Surface and Subsurface Investigation and Onsite Disposal of Ordnance, submitted July 19, 1991. Clearance protocol was defined for ten, one-acre sites within the Dolly Sods Wilderness. Figures 6-9 and 6-10 are photographs of the subsurface investigation.

The subsurface clearance areas were selected based upon the results of the surface investigation. M&E and UXB decided to sweep twenty, 1/2-acre sites to allow concentrated coverage in areas where mortars had been found while maintaining an equitable distribution of subsurface search areas. The subsurface investigation covered a total of 10.5 acres.

Figures 2-20 through 2-24 show the locations of subsurface sweep areas and ordnance discovered during the subsurface investigation. The locations are presented on the same CAD-generated base map as the figures showing results of the surface investigation. Subsurface sweep areas are shown as cross-hatched polygons enclosed by a solid line. The area designations for subsurface sweeps indicate in which surface sweep area the subsurface investigation was conducted and what number it was within the surface sweep area. For example, 7B-S2 indicates that this was the second subsurface investigation conducted in Area 7B. Table 2-4 contains a summary of state plane coordinates, acres searched, and elevations for the subsurface investigations.

Figure 2-1, the full size 1" = 1,000' scale plan showing the entire Dolly Sods Wilderness, includes subsurface clearance areas and all discovered ordnance. Figures 2-20 through 2-24 are 1" = 1,000' scale plans, on 8 1/2 x 11 sheets, depicting subsurface investigations in Areas 1A, 1E and 1J, Areas 7A and 7B, Area 11B, Area 14A, and 17.

Non-OEW discoveries that were made during the subsurface investigation were similar to the non-OEW related materials that were found during the surface



METCALF & EDDY

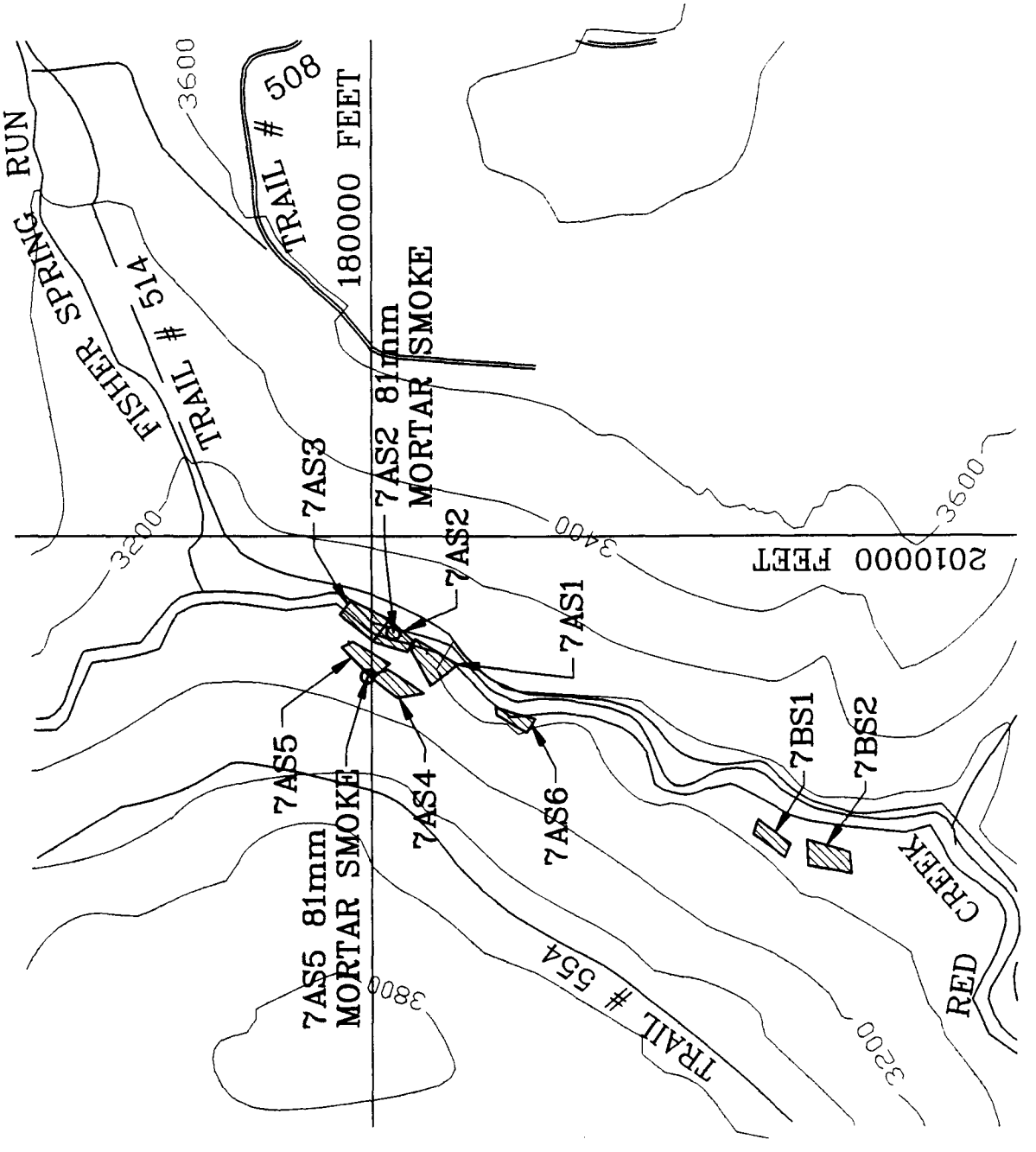
DOLLY SODS WILDERNESS AREA

AREA 1 SUBSURFACE CLEARANCE AREA AND ORDNANCE LOCATIONS

SCALE: 1" = 1000'

FIG. 2-20

DOLA1-2



METCALF & EDDY

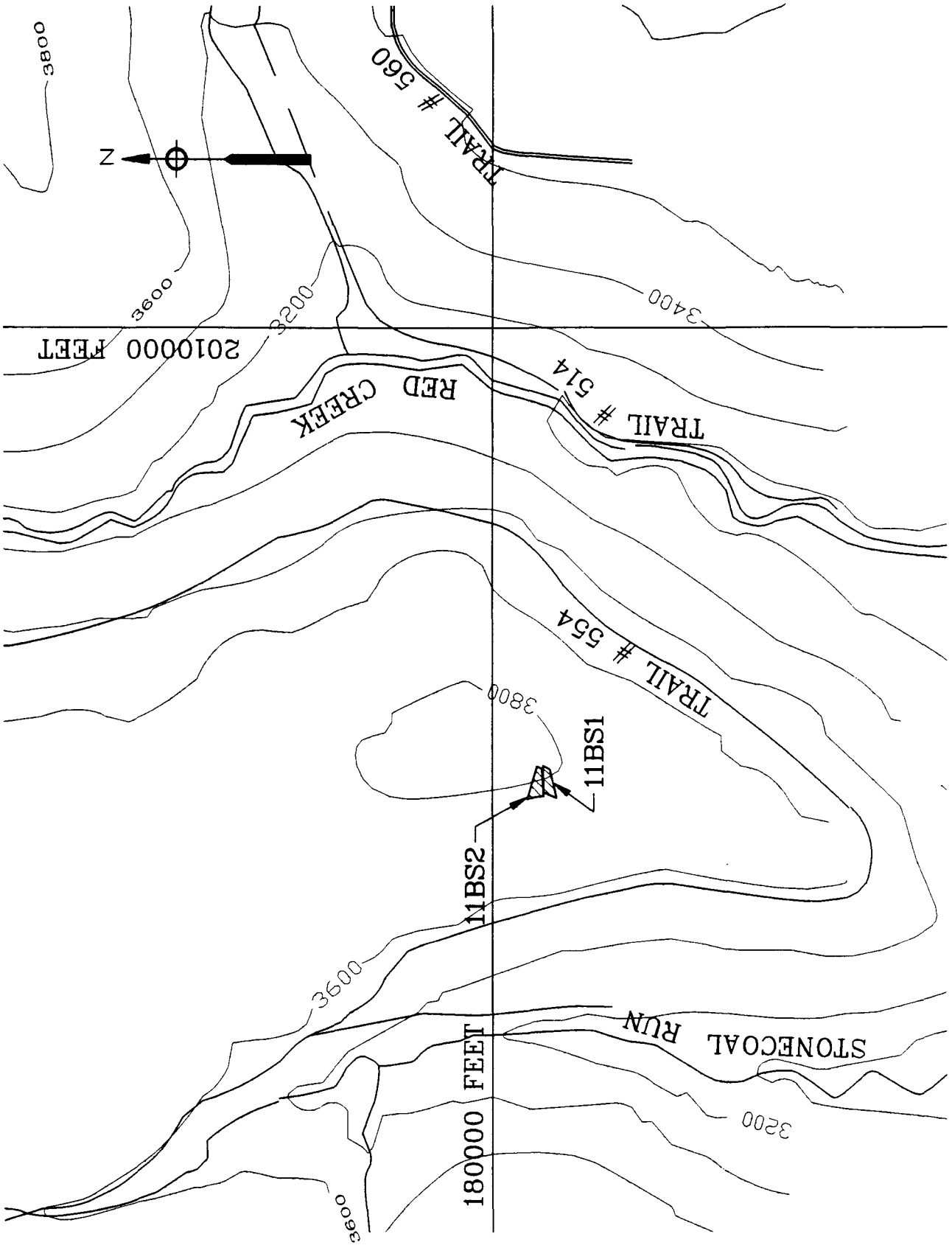
DOLLY SODS WILDERNESS AREA

AREA 7 SUBSURFACE CLEARANCE AREA AND ORDNANCE LOCATIONS

SCALE: 1" = 1000'

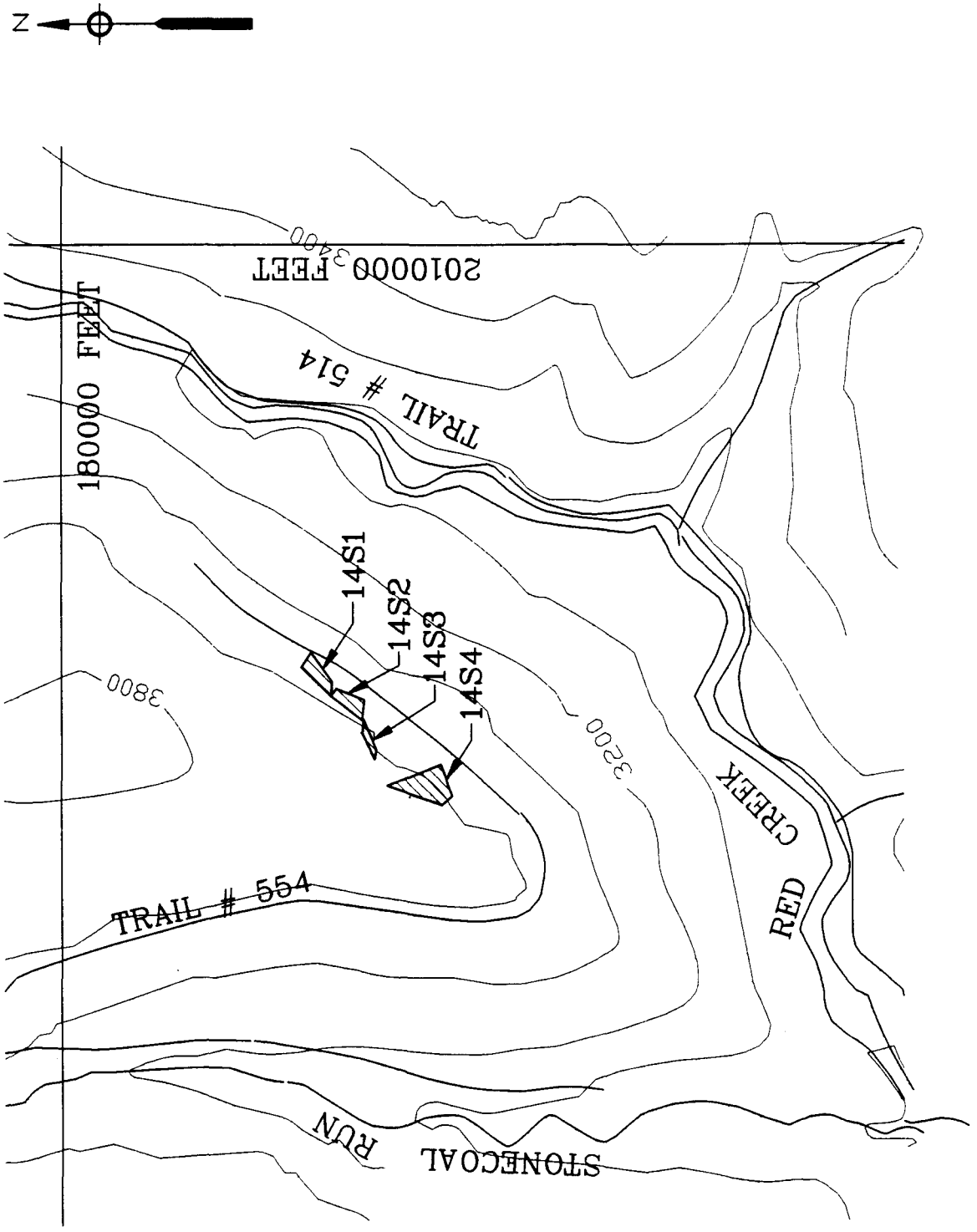
FIG. 2-21

DOLA7-2



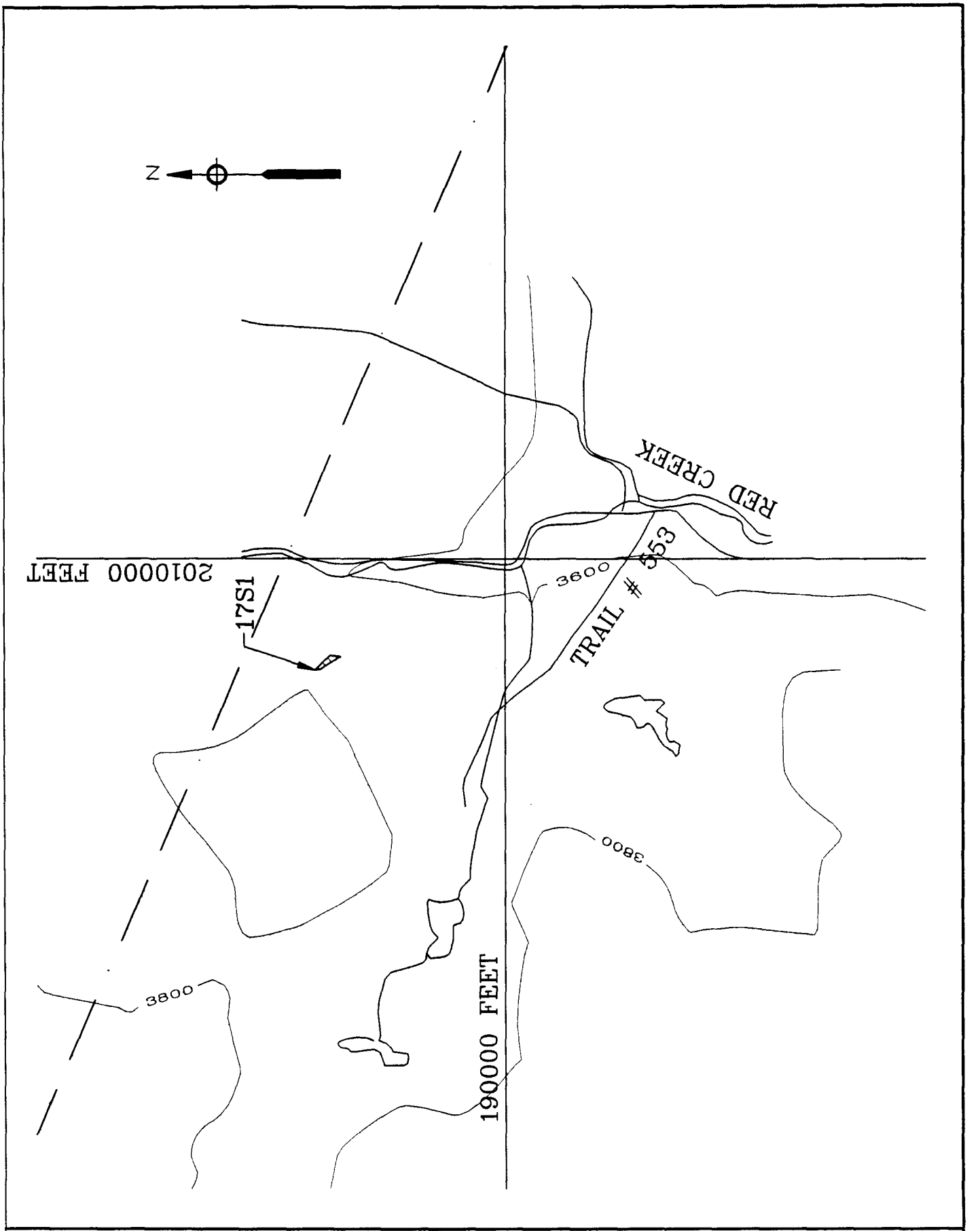
M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 11 SUBSURFACE CLEARANCE AREAS			
	SCALE: 1" = 1000'			FIG. 2-22

DOLA11-2



M&E METCALF & EDDY	DOLLY SODS WILDERNESS AREA AREA 14 SUBSURFACE CLEARANCE AREAS			
	SCALE: 1" = 1000'			FIG. 2-23

DOLA14-2



METCALF & EDDY

DOLLY SODS WILDERNESS AREA

AREA 17 SUBSURFACE CLEARANCE AREAS

SCALE: 1" = 1000'

FIG. 2-24

DOLA17-2

TABLE 2-5. ORDNANCE DISCOVERED DURING SUBSURFACE INVESTIGATION

Area	Description	Date (found/demo)	Engineer	Depth	Location (north/east)
7A-S2	81mm smoke round	9-4-91/9-6-91	D. Wang	<6"	179,672/2,009,298
7A-S4	Frag-81mm high explosive tail boom	9-5-91/---	D. Wang		
7A-S5	81mm smoke round	9-6-91/9-6-91	D. Wang	<6"	180,028/2,009,160
7A-S5	Frag-81mm tail boom	9-6-91/---	D. Wang		
1A-S1	Frag-6" x 8" fragment from 4.2" round	9-11-91/---	L. Landry		
1J-S1	4.2" smoke round	9-17-91/9-27-91	L. Landry	24"	191,279/2,007,563
1J-S1	4.2" practice round	9-17-91/9-27-91	L. Landry	18"	191,382/2,007,771
1J-S2	4.2" practice round	9-24-91/10-1-91	C. Dwinal	9"	191,200/2,007,768
1J-S2	4.2" practice round	9-24-91/10-1-91	C. Dwinal	15"	191,326/2,007,537

TABLE 2-6. NON-OEW WASTES DISCOVERED DURING SUBSURFACE INVESTIGATION

Area	Tin Can	Tent Stake	Railroad Spike	Iron Bolt	Axe Head	Cable and Chain Pcs.	Trash Piles*	Wire Pieces	Nail	Misc. Metal**
7A-S1	1	2					1			1
7A-S2	9	2	2	1	1	6	1	1		
7A-S3	2	10	4				3	1		1
7A-S4	5	12	8	1		17	1	8	4	4
7A-S5	4	11	10							
7B							Several			

*Trash piles contained steel items such as saw blades, chains, spikes, horseshoes, and coathangers.
**Misc. Metals include iron slabs, plates, scrap chunks, hitches, hooks, and razor blades.

TABLE 2-4. SUBSURFACE CLEARANCE LOCATION SUMMARY

Subsurface Clearance Area	State Plane Coordinates (feet)								Area (acres)	Elevation (feet MSL)
	NW		SW		SE		NE			
	North	East	North	East	North	East	North	East		
1A-S1	193,633	2,004,800	193,521	2,004,997	193,609	2,005,071	193,751	2,004,843	0.67	3,880
1E-S1	192,301	2,007,968	192,133	2,007,850	192,065	2,007,964	192,284	2,008,079	0.61	3,810
1E-S2	192,404	2,007,712	192,264	2,007,690	192,258	2,007,790	191,400	2,007,812	0.33	3,800
1J-S1	191,418	2,007,588	191,277	2,007,486	191,214	2,007,601	192,438	2,007,660	0.43	3,830
1J-S2	191,395	2,007,745	191,188	2,007,705	191,188	2,007,821	191,396	2,007,860	0.56	3,830
7A-S1	179,769	2,009,319	179,654	2,009,105	179,491	2,009,236	179,744	2,009,385	0.81	3,000
7A-S2	179,996	2,009,370	179,791	2,009,307	179,759	2,009,375	179,897	2,009,499	0.53	3,000
7A-S3	180,196	2,009,531	179,996	2,009,370	179,897	2,009,494	180,128	2,009,619	0.80	3,000
7A-S4	180,024	2,009,168	179,852	2,009,038	179,690	2,009,063	179,908	2,009,206	0.58	3,100
7A-S5	180,117	2,009,368	180,004	2,009,149	179,897	2,009,241	180,184	2,009,335	0.60	3,100
7A-S6	179,265	2,008,982	179,080	2,008,839	179,027	2,008,917	179,258	2,008,941	0.32	3,000
7B-S1	177,731	2,008,234	177,544	2,008,091	177,510	2,008,176	177,704	2,008,320	0.47	3,100
7B-S2	177,403	2,008,041	177,141	2,007,995	177,151	2,008,123	177,408	2,008,197	0.84	3,100
11B-S1	179,645	2,006,776	179,553	2,006,737	179,598	2,006,939	179,646	2,006,963	0.30	3,820
11B-S2	179,756	2,006,733	179,644	2,006,751	179,653	2,006,942	179,690	2,006,959	0.36	3,820
14A-S1	178,526	2,007,415	178,343	2,007,238	178,337	2,007,325	178,467	2,007,508	0.46	3,600
14A-S2	178,343	2,007,238	178,155	2,007,087	178,140	2,007,212	178,312	2,007,282	0.41	3,600
14A-S3	178,151	2,007,003	178,076	2,006,846	178,065	2,006,902	178,143	2,007,095	0.17	3,600
14A-S4	178,616	2,005,936	--	--	177,669	2,006,814	177,997	2,006,679	1.14	3,600
17-S1	191,429	2,009,166	191,234	2,009,264	191,317	2,009,271	191,388	2,009,171	0.15	3,760
								TOTAL	10.55	

investigation. Ordnance was found in northern Dolly Sods (Area 1) and in the Red Creek flood plain near Breathed Mountain (Area 7A). Summaries of OEW and non-OEW wastes are presented in Tables 2-5 and 2-6.

A copy of the Certificate of Ordnance Clearance certifying that the areas searched for the subsurface investigation have been cleared is included in Appendix D. Also in Appendix D is documentation of turn in for the ordnance related materials found in the Dolly Sods Wilderness.

2.3 DESCRIPTIONS OF AREAS

The following section contains detailed descriptions for the 18 areas searched during the surface and subsurface investigations. Given that the types of animals, birds, reptiles, and amphibians present were often seen in more than one area, they will not be listed individually for each area. Creatures that were encountered are as follows: white-tailed deer, black bear, bull snakes, garter snakes, red-spotted newts, red squirrels, gray squirrels, chipmunks, turkey vultures, wild turkeys, downy woodpeckers, blue jays, crows, ravens, black-capped chickadees, robins, black-throated green warblers, black-throated blue warblers, magnolia warbler, common yellowthroats, common flickers, gold finches, hermit thrushes, song sparrows, mourning doves, dark-eyed juncos, ruffed grouses, salamanders, and toads.

2.3.1 Area 1

Area 1 was by far the largest area, consisting of approximately 206.6 acres at the northern boundary of Dolly Sods to the west of the Red Creek. The highest point, 3,830 feet above MSL, was located on a hill in the eastern central portion of the area. From this point, the ground gradually sloped downward in all directions. At the northwest, the land sloped up toward Cabin Mountain. An unnamed tributary of the Red Creek flowed through several beaver ponds just inside of the southern boundary of the area. The lowest point of Area 1 was located where the unnamed tributary leaves Area 1 and flowed to the east toward Red Creek; there, the elevation was roughly 3700 feet above MSL.

The terrain in Area 1 was quite varied due to its large size. The southern section considered of beaver ponds and bogs. Here the primary vegetation was sphagnum moss, cranberries, and various marsh grasses. Just to the north of these bogs the land was thickly wooded with Red Spruce and other conifers along with a dense under brush of Mountain Laurel and rhododendron. In the northwest, the forest became more open and consisted of Yellow Birch trees with a fern underbrush. To the northeast, the terrain was more rocky with large open fields containing blueberry bushes and light to medium dense mixed growth forest.

Eleven surface sweep areas, 1A-1K, were located in Area 1. Area 1A contained 5.4 acres and was near the northwest corner of Area 1. Areas 1B, 1C, and 1K contained 4.9, 5.6, and 5.0 acres, respectively, and were located near the southwestern edge of Area 1, adjacent to the unnamed tributary and beaver ponds. Area 1D was just to the west of the hill located in the eastern central portion of Area 1 and contained 4.8 acres. Areas 1F and 1H contained 5.7 and 5.6 acres and were located just to the east of the hill described above. Areas 1E, 1G, 1I, and 1J were located on the hill described above and contained 6.4, 6.4, 5.5, and 4.7 acres, respectively.

Five subsurface sweep areas, 1A-S1, 1E-S1, 1E-S2, 1J-S1, and 1J-S2 were located in Areas 1A, 1E, and 1J.

2.3.2 Area 2

Area 2 encompassed approximately 87.2 acres and ranged from 3,490 feet to 3,780 feet above MSL. The highest point in Area 2 was located at the approximate center of the northern boundary. From here, the land sloped gradually to the west, south, and east over an area of approximately 30 acres. The slopes then steepened significantly to the west and south and more dramatically to the east. An open field, with occasional conifers, approximately 100 yards wide, existed along the middle portion of the northern boundary. To the west, along the northern boundary, exists a dense mix of conifers, azaleas, rhododendrons and Mountain Laurel with many scattered rocks. To the east, along the northern boundary, were some open fields with

small hardwoods and shrubs which turned into a hardwood forest on the western slope of the right fork of Red Creek. The center of Area 2 contained a mix of open hardwood areas, thick conifers and rhododendrons, and a combination of both. The southern tip (10 acres) was mostly conifers. This area was relatively flat and contained a camping area with trails to the east and west.

Six surface clearance areas, 2A-2F, were located in Area 2. Areas 2A, 2B, and 3C were established along the north border of the Dolly Sods Wilderness near the center of Area 2 and encompassed 5.2, 5.3, and 5.1 acres. Area 2D contained 8.4 acres and was adjacent to the southern boarders of Area 2A and Area 2B. Areas 2E and 2F were located at the southern tip of Area 2 north of the confluence of Red Creek and the Left Fork and contained 2.2 and 3.9 acres, respectively. No subsurface investigations were performed in Area 2.

2.2.3 Area 3

Area 3 contained approximately 110.2 acres and was at a relatively constant elevation of 3,800 feet above MSL. A wet bog covers approximately 75 percent of Area 3. This bog was essentially void of trees and shrubs; vegetation consisted primarily of sphagnum moss, cranberry plants, and various marsh grasses. The bog fed Red Creek through Fisher Spring Run. Although Area 3 was almost entirely open, the boundaries were completely within forested areas (except for short sections in the southeast and southwest). The northern and western boundaries were just inside the tree line and the southern and eastern boundaries were up to 500 feet inside the tree line. The vegetation of the northern and eastern boundaries consisted mainly of medium dense conifers of small to large size. The western side was similar with slightly more azaleas, rhododendrons, and Mountain Laurel. The southern forested section was the thickest with small to medium conifers, thick azaleas, rhododendron, and Mountain Laurel, and occasional small boulder fields.

Five surface clearance areas, 3A, 3B, 3C, 3D, and 3E, were delineated in Area 3. Areas 3A, 3B, and 3C contained 5.9, 5.1, and 4.7 acres and were located in the northern section of Area 3 described as a wet bog. Areas 3D and 3E encompassed 4.6 and 3.6 acres, respectively, and were located within

the densely vegetated forest at the southern border of Area 3. No subsurface investigations were performed in Area 3.

2.3.4 Area 4

Area 4 encompassed approximately 50.5 acres and ranged in elevation from 3,780 feet to 3,900 feet above MSL. The highest point in Area 4 existed in the central portion where the Breathed Mountain Trail (#553) ran through the area. There was a gradual slope to the northwest and a slightly steeper slope to the southwest. The extreme northeast corner of Area 4 was just to the south of the bog in Area 1. The remainder of the north and east portion of Area 4 consisted of hardwood forests with medium tree size and low to medium density and some semi-open fields with blueberry and huckleberry covered hummocks. A rock strewn field with some small hardwoods was located in the southeast corner. The remainder of the southern third of Area 4 was dominated by dense conifers of medium to large size such as Red or Norway Pine, Red Spruce, Eastern Hemlock, and Balsam Fir. Some of the conifers, namely Red Pine, appeared to be in straight lines and were probably planted by the Civilian Conservation Corps in the 1930's. The northwest portion was mostly open fields with occasional hardwood and softwood thickets. Undergrowth in the hardwood forests and in the fields consisted mainly of dense ferns. Burn areas were evident in a field in the eastern portion, just south of the access trail.

Four surface clearance areas, 4A, 4B, 4C, and 4D were established in Area 4. Areas 4A and 4B encompassed 4.9 and 5.9 acres and were located on the hill in the central portion of Area 4. Areas 4C and 4D contained 9.3 and 5.5 acres, and were located on the northern slope of the hill described above. No subsurface investigations were performed in Area 4.

2.3.5 Area 5

Area 5 occupied approximately 33 acres to the south of Areas 1 and 4 and ranged in elevation from 3,760 feet to 3,840 feet above MSL. The high point of Area 5 existed in the north with a gradual slope to the south and slightly

steeper slopes to the east and west. Approximately two-thirds of Area 5 was open field with occasional hardwood and softwood thickets. Huckleberry and blueberry bushes were in the open areas and Red Chokecherry shrubs were also present. The southern portion of the open area was slightly moist with occasional areas of standing water. The western half of the northern boundary was no more than 100 feet inside the tree line and the eastern half was open field. The western portion had small to medium hardwoods such as American Beech and Red Maple amongst large rocks. The eastern and southern portions were similar to the west but with larger hardwoods at a greater density and fewer rocks.

Three surface clearance areas were placed in Area 5. Area 5A encompassed 6.4 acres and was located on a hill in the center of Area 5. Areas 5B and 5C were located south of Area 5A and contained 3.7 and 5.2 acres, respectively. No subsurface investigations were performed in Area 5.

2.3.6 Area 6

Area 6 encompassed one 10.2-acre surface clearance area directly to the east of Forest Service road 75 and ranged from 3,985 feet to 4,135 feet above MSL. The high point of Area 6 existed in the southeast corner and sloped gradually to the northwest. The majority of Area 6 was made up of small, low density hardwood trees with an occasional dense area of conifers. The area had some rocks and ferns as undergrowth. No subsurface investigations were performed in Area 6.

2.3.7 Area 7A

Area 7A occupied a 9.5-acre area and ranged in elevation from 3,080 feet to 3,140 feet above MSL. Area 7A was on a level floodplain just above Red Creek, which bisects the area. Steep slopes existed to the east and west of the floodplain just outside of Area 7A. The composition of plant life varied greatly over the area, but consisted mostly of Yellow Birch, Red Maple, Red Spruce, Eastern Hemlock, Balsam Fir, azaleas, rhododendron, and Mountain Laurel. Rhododendrons and laurel were especially thick on the steep eastern

slope of 7A, on both banks of the creek and in the southeast corner. Scattered rocks and many flat, open areas which were used frequently for camping were located in Area 7A. Trails 510 and 514 meet in Area 7A making it one of the most heavily travelled parts of the Dolly Sods Wilderness Area.

Six subsurface clearance areas, 7A-S1, 7A-S2, 7A-S3, 7A-S4, 7A-S5 and 7A-S6, were placed in 7A.

Area 7B

Area 7B occupied approximately 4.8 acres in the Red Creek floodplain approximately 1500 feet downstream (southwest) of Area 7A. It ranged in elevation from 3,060 ft. to 3,120 ft. above MSL. The Red Creek ran along the western border of Area 7B. There was evidence to suggest that a railway ran along the western border where trail 514 currently exists. There was also evidence to suggest that the area was used as a logging camp at one time. The western portion of the area existed on a level floodplain just above the creek. The topography along the eastern portion of the area consisted of gentle and steep slopes running west to east. There was a small campsite located in the southern portion of Area 7B, which was flat and sparsley populated with small to medium hardwoods. The rest of Area 7B was more densely populated with Red Maple, Red Spruce, Eastern Hemlock, Balsen Fir, and Yellow Birch trees. Rhododendrons were scattered sporadically on the steeper slopes in the eastern portion of the area and to a lesser extent along the rocky edge of the creek on the western border.

Two subsurface clearances were performed in Area 7B. Areas 7B-S1 and 7B-S2 consisted of 0.5 and 0.8 acres, respectively.

2.3.8 Area 8

Area 8 consisted of approximately 35.3 acres about a half mile from the western border of Dolly Sods. It ranged in elevation from 3,720 feet to 3,800 feet above MSL. A high point was in the north central portion with gradual slopes to the south and west and more dramatic slopes to the east and north.

The extreme southeast corner sloped off sharply. Area 8 was predominantly wooded with medium to large hardwoods of low to medium density. Species present included Yellow Birch, Red Maple, Pin Cherry, Black Cherry, American Beech, and Striped Maple. Conifers were very sparse but Red Spruce, Eastern Hemlock, and Balsam Fir were present; mostly on the northern slope. Some moss and lichen covered boulders were present on the north slope as well. Ferns were present as undergrowth. A large rock strewn wash divided the northern boundary, running from the high point of Area 8 and was presumed to feed a low bog area to the north.

Two surface clearance areas were delineated in Area 8. Areas 8A and 8B were located on the hill in the north central portion of Area 8 and encompassed 4.4 and 5.4 acres, respectively. No subsurface investigations were performed in Area 8.

2.3.9 Area 9

Area 9 encompassed one 5.1 acre surface clearance area northeast of the confluence of the Red Creek Fisher Spring River. The area ranged in elevation from 3,730 feet to 3,840 feet above MSL. The majority of Area 9 consisted of a plateau ranging from 3,810 feet to 3,840 feet above MSL. This plateau was densely vegetated with azaleas, rhododendron, Mountain Laurel, small hardwoods, and softwoods. Large hardwoods and softwoods were present in sparse amounts. Undergrowth was predominantly huckleberry and blueberry bushes and moss covered soil and rock. Approximately a quarter of the plateau consisted of deer trails and small open areas. The southeast corner was very steep and contained a less dense rhododendron and Mountain Laurel forest. No subsurface investigations were performed in Area 9.

2.3.10 Area 10

Area 10 contained approximately 31 acres and was located near the center of the Dolly Sods Wilderness. It was bounded on the south by trail 510 and Fisher Spring Run and on the east by Red Creek. The topography rose to the north, away from Red Creek and Fisher Spring Run, at grades ranging from 20 to

50 percent. Elevations ranged from 3,150 to 3,500 feet above MSL. Area 10 was primarily covered by a mature hardwood forest (average tree diameters of 16-inches and maximum tree diameters of 36-inches) with occasional pine stands, laurel, and rhododendron. The ground cover consisted of ferns and moss covered boulders. The southern edge of Area 10, along Fisher Spring Run, was covered by a boulder field with dense rhododendron growth.

Two five-acre surface sweep areas, 10A and 10B, were located at the east and west edges of Area 10, respectively. Areas 10A and 10B were similar, as the vegetative cover in area 10 was relatively uniform. The southern edge of Area 10A borders Fisher Spring Run and was covered by a boulder field and dense rhododendron as described above. No subsurface investigations were performed in Area 10.

2.3.11 Area 11

Area 11 was located at the highest point of Breathed Mountain and consisted of a plateau encompassing approximately 38.2 acres and ranged from 3,600 feet to 3,800 feet above MSL. The highest elevation was in the center of the area with gradual slopes in all directions. The slope steepened to the southeast. Most of Area 11 was covered by thick conifers, azaleas, rhododendrons, Mountain Laurel, and moss and lichen covered rocks. A strip of hardwood growth, varying from 0 to 400 feet in thickness, dominates the terrain along the south and east borders of Area 11. This strip of hardwoods ran from about 400 feet north of the southwest corner to the northeast corner of the area. Trees present in this strip included American Beech, White Ash, and aspen. The undergrowth in the hardwood strip consisted of dense ferns as well as moss and lichen covered rocks.

Area 11 contained two surface clearances. Areas 11A and 11B encompassed the plateau at the top of Breathed Mountain. Area 11A was located along the north border of Area 11 and Area 1B was located along the south border.

Two subsurface clearances were performed in Area 11B. Area 11B-S1 and 11B-S2 were located along the west border of area 11B and consisted of 0.3 and 0.4 acres, respectively.

2.3.12 Area 12

Area 12 contained approximately 50 acres and was located along the western boundary of the Dolly Sods Wilderness on Stone Camp Mountain. The topography sloped to the west, down towards Little Stonecoal Run, at a grade of approximately 15 percent. Elevations ranged from 3,760 to 3,840 feet above MSL. A mature hardwood forest consisting primarily of American Beech trees (average tree diameters of 16-inches and maximum tree diameters of 36-inches) with occasional maple and pine trees covered Area 12. The groundcover consisted of light brush. One 5.1-acre area was investigated in Area 12 during the surface clearance activities. No subsurface investigations were performed.

2.3.13 Area 13

Area 13, located to the north of Coal Knob ranged in elevation from 3,680 feet to 3,720 feet above MSL. Area 13 was located very near to the southern slope of Area 8 (approximately 100 to 200 yards south) and was, therefore, very similar to the southern section of Area 8. The southern section of Area 13 levels out as it nears an open area with an intermittent stream running through it. The southeastern portion of Area 13 differed from Area 8 in that it had azaleas, rhododendron, Mountain Laurel, conifers, and other shrub-like tree growth and many moss-covered rocks. One 12.0-acre area was investigated in Area 13 during the surface clearance activities. No subsurface investigations were performed.

2.3.14 Area 14

Area 14, located at the tip of Breathed Mountain, encompassed approximately 35.3 acres and ranged in elevation from 3,400 feet to 3,685 feet above MSL. The north central portion (Area 14-B) was located on the southern plateau of Breathed Mountain. Exposed rock outcroppings and ledges were present in the south with steep drop offs to south, west, and east. The plateau was covered with dense small tree growth including Red Maple, Yellow Birch, American Mountain Ash, Pin Cherry, azalea, rhododendron, Mountain Laurel, and scrub

conifers. The southern, western, and eastern slopes (from the plateau to Trail 554) all dropped off steeply with the southern slope being the steepest and rockiest. Area 14A was located along Trail 554 at the southern tip of Breathed Mountain. Area 14A was a steep hardwood ridge almost completely covered with moss and lichen covered rocks. Plant and tree life noted include teaberry, crabgrass, ferns, Witch Hazel, Mountain Laurel, azaleas, rhododendron, Eastern Hemlock, Red Maple, Yellow Birch, Striped Maple, Pin Cherry, and American Beech. Tree growth was small to medium in size and of low to medium density.

Two surface clearance areas were investigated in Area 14. Areas 14A and 14B were located as described above and encompassed 14.8 and 1.3 acres, respectively.

Four subsurface clearances were performed in Area 14A along Trail 554. Areas 14-S1, 14-S2, 14-S3, and 14-S4 contained 0.5, 0.4, 0.2, and 1.1 acres.

2.3.15 Area 15

Area 15 encompassed 37 acres and was located in southeastern Dolly Sods, approximately 1,000 feet west of Forest Service Road 75. The topography was relatively flat, elevations ranged from 3,920 to 3,965 feet above MSL. Area 15 was bounded on the south by an access road to an abandoned mine. The forest consisted of medium density hardwood trees with occasional pine stands. The ground cover was comprised by light brush, ferns and boulders. One surface clearance search, covering 5.8 acres, was performed in the southeast corner of Area 15. No subsurface investigations were conducted.

2.3.16 Area 16

Area 16 consisted of 33 acres of wooded terrain located in the southern section of the Dolly Sods Wilderness Area approximately halfway between the Red Creek and Forest Service Road 19. The area was bisected by an abandoned jeep trail running form east to west. The ground sloped down to the north with many minor streams and rivulets running toward Red Creek. The tree cover

in area 16 consisted primarily of Red Spruce, Yellow Birch and Red and Sugar Maples. These trees were fairly dense and appeared to be younger trees with a average diameter of about 8 to 12 inches. The area also contained a number of large dead trees and rotting stumps. The ground was extremely uneven and strewn with rocks. Ground cover consisted primarily of ferns and moss with occasional rhododendron thickets.

Two surface clearance areas, 16A and 16B, contained 5.0 and 6.0 acres and were located along the abandoned jeep trail. No subsurface investigations were performed in Area 16.

2.3.17 Area 17

Area 17 was located between Areas 1 and 2 directly to the west of the left fork of the Red Creek and abutted the north boundary of Dolly Sods. Area 17 consisted of 5.6 acres of steeply sloped woods and was added after the start of investigations at Dolly Sods based on the account of a local resident who stated he had seen a piece of ordnance there several years earlier. The western boundary of Area 17 was adjacent to the eastern boundary of area 1, very close to Areas 1-H, 1-I, 1-J, and 1-K. This boundary was just clear of the medium-dense tree cover which comprised the majority of Area 17. From the western border, Area 17 sloped to the east down to the Red Creek and Area 2. The tree cover consisted primarily of Yellow Birch and Red Spruce. Undergrowth was comprised primarily of ferns and moss covered rocks. One 0.2-acre subsurface area, 17-S1, was located near the center of Area 17.

2.3.18 Area 18

Area 18 consisted of one 5.6-acre surface sweep area and was located along the west edge of Forest Service Road 75, adjacent to the Red Creek Campground. The ground surface was relatively flat and was approximately 3,880 feet above MSL. Area 18 had a dense cover of laurel, rhododendron, and blueberry bushes. Area 18 was added after the start of the surface investigations based on a report that ordnance had been uncovered during maintenance of the drainage ditch along Forest Service Road 75 near the Red Creek Campground. No subsurface investigations were performed in Area 18.

SECTION 3.0
INTERPRETATION OF DATA

Upon completion of the site investigation, the collected data was evaluated in order to determine which locations within the Dolly Sods Wilderness might contain additional unexploded ordnance. As the information gathered from the site investigation covered only a small, representative fraction of the Dolly Sods Wilderness Area, any analysis performed using this data involves a certain amount of conjecture. The data analysis and interpretation performed in this section will be utilized in Section 4 for the determination of feasible schemes for future remediation efforts.

3.1 POSSIBLE FIRING & TARGET LOCATIONS

One can observe from an examination of Figure 2-1 that all ordnance unearthed during the site investigation was located in two regions. These regions were located around area 1 in the northern section of Dolly Sods, and areas 7, 11, and 14 in the south central region of Dolly Sods, around Breathed Mountain and in the Red Creek valley. Outside of these areas, no ordnance or fragments of ordnance were found. Because all locations which were considered possible targets for use in mortar training were searched as part of the surface investigation, it is quite likely that the two locations where ordnance was found contained the only targets for mortar fire in the Dolly Sods Wilderness. Assuming this to be true, it would follow that virtually no ordnance exists in the extreme east, west or south sections of Dolly Sods and that further discussion of locations where ordnance is likely to be found should focus on the two areas mentioned above.

There are a number of different pieces of evidence which one can use to speculate as to the locations of the positions from which mortars were fired at the two target areas. One such clue would be the position of any excavated ordnance in the ground. By observing the orientation of the ordnance as it was buried, one could often speculate at which direction the ordnance might have been fired from. A second method for establishing the location of firing positions would be to observe the terrain and speculate as to tactics which

might have been used as part of training. Techniques and tactics which would be used for training or taught as part of training, locations which might have been chosen for use as firing positions, and specific areas which would have been convenient for use as targets for training could provide insights into potential firing positions. A third method would be to consider locations which were made accessible by roads and paths leading into the wilderness. 4.2 inch mortars and the ammunition are fairly heavy and could not be carried a long distance by hand. While tracked vehicles could reach certain parts of the wilderness which couldn't be reached by jeeps, accessibility could still have been a factor in determining firing positions for training exercises. The fourth way in which the location of the firing positions can be inferred would be to consider the remains of entrenchments which might have been firing positions. Such entrenchments could have been used as firing positions and were occasionally observed throughout the site investigation.

3.1.1 Firing and Target Locations in the Northern Sections of Dolly Sods

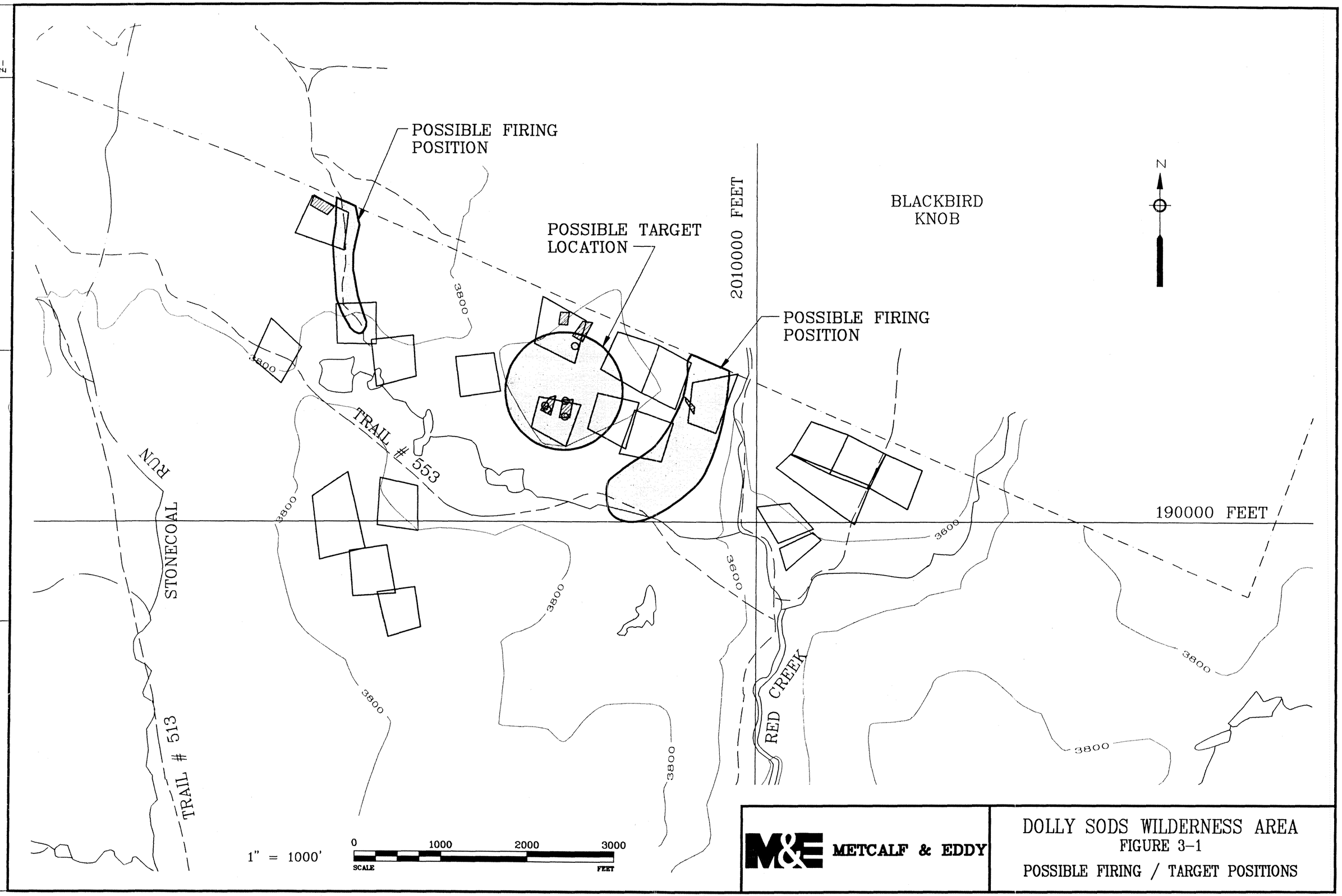
In area 1, five pieces of ordnance were found during the site investigation. The ordnance consisted entirely of 4.2 inch mortar rounds. Four of these rounds contained inert fillers (concrete or sand) while the fifth round contained a smoke filler. Four pieces of ordnance were located in area 1-J, while the fifth was found in area 1-E. In addition to the five 4.2 inch rounds which were discovered, several large ordnance fragments were found. One fragment, found in area 17, could be identified as the remains of a 4.2 inch, sand filled round. Another large (6" x 8") fragment of ordnance was located in area 1-A. This item, which was not identifiable, was, most likely, a fragment from a 4.2" round similar to the other ordnance which was discovered in area 1.

For several reasons, the target of mortar fire in area 1 is most likely to be the hill in area 1-J. First, the hill is a suitable location for a target because it's a high, clear location. The location of mortar hits could be seen relatively easily, and the risk of fires would be minimal due to the light vegetation. Second, the discovered ordnance was closely concentrated in this area. Four rounds were located within three hundred feet of each other.

Large portions of area 1 were thoroughly investigated, and the only other piece of ordnance found was in area 1-E, less than 700 feet from area 1-J. Finally, personnel who worked at the site stated that the hilltop possessed a scarred and pockmarked look, similar to how a former target area would appear. For these reasons, the hill in area 1-J appears to have been the target of mortar fire during WW II training maneuvers. Figure 3-1 shows possible locations of the target and firing positions in the northern section of Dolly Sods.

The location of positions from which mortars were fired at the hill is not as clear as the location of the target. One possible firing position is from what appears to be trenchworks to the east and south of the hill. Another possible firing location is from the west. Because of the changes to the terrain over the last forty years, and the large area of wilderness within the range of 4.2 inch mortars, it is difficult to know which of these possibilities is correct, or if there are other potential firing locations which have not been considered.

The trenchworks to the south and east of the hill were located during surface clearance operations, and consist primarily of shallow eroded trenches running along the side of the hill. The shape, location and condition of these trenches would seem to indicate that they were created during the WWII operations, however, it is not known for what purpose they were constructed. Several pieces of evidence suggest that these trenchworks might have been the firing locations during training maneuvers at Dolly Sods. The trenches are quite close to the target (about 500 yards). Considering the range of the 4.2 inch mortar (from about 500 to over 4,000 yards), it would seem that firing positions might have been placed further from the target, however, it is typical for persons being trained in the use of a mortar to fire them at a short range to minimize the area which will be hit by stray rounds. Some uncertainty exists as to how the mortars and ammunition would have been transported to the trenchworks because the jeep trails which lead into the Dolly Sods Wilderness do not run to the trenches nor do the old logging railroad beds, which were probably used for vehicle traffic during training maneuvers. Therefore, it would have been necessary to move mortars and


POSSIBLE FIRING POSITION
POSSIBLE TARGET LOCATION
POSSIBLE FIRING POSITION
2010000 FEET
BLACKBIRD KNOB
N
190000 FEET
TRAIL # 553
STONECOAL RUN
TRAIL # 513
RED CREEK
3800
3600
1" = 1000'
0
1000
2000
3000
SCALE
FEET
M&E
METCALF & EDDY
DOLLY SODS WILDERNESS AREA
FIGURE 3-1
POSSIBLE FIRING / TARGET POSITIONS
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ammunition to the positions over extremely rough terrain or upon roads which no longer exist. The Blackbird Knob trail (see Figure 1-2) and various spurs off the trail are former jeep trails. These trails could have been used in the transportation of equipment to the entrenchments. Finally, two of the four mortar rounds which were found in search area 1-J were in positions which would have indicated that they were fired from the northeast, which is the direction of some of the trenchworks. For these reasons, it is possible that the trenchworks were the location from which mortars were fired upon area 1-J.

Another position from which area 1-J might have been fired upon is the end of a jeep trail to the west of the target. The trail ends near areas 1-A, 1-B, and 1-C. This jeep trail, while its date of construction is unknown, could have provided a means of easily transporting the mortars and ammunition into a position to fire at the target. In addition, this area currently contains significant open, grassy areas and probably possessed open areas when military maneuvers took place over forty years ago. These open areas would have been convenient for firing mortars, and viewing the locations of hits. It might not have been necessary to have entrenched firing positions for mortar training, and the orientation of the two rounds found in area 1J do not conclusively show that ordnance was fired from the east. The area is close to the target, but slightly further than the trenchworks in area 1-F. This would put the distance to the target comfortably into the shorter part of a 4.2 inch mortar's range. The existence of the jeep trail would make this location a convenient location from which mortars could have been fired at the target in area 1-J.

In the end, there is no conclusive evidence to indicate the location of firing positions around area 1. In addition to the possibilities which have been suggested, fire could have come from any number of other locations. The range of the 4.2 inch mortars is over two miles and it would not be feasible to search all of an area that large for evidence of possible firing positions. Furthermore, it is known that training activities were conducted to the north of the Dolly Sods Wilderness Area. This area has not been subject to even a minimal search so firing positions may have existed north of Dolly Sods where no investigations took place. The location of the trenchworks to the

northeast of the target is likely to be the firing position. However, no attempts were made to establish the position of other trenchworks or potential firing positions in the area so this possibility remains uncertain. Therefore, the location of the firing position(s) is not known at this time and plans for remediation will have to be developed with this uncertainty in consideration.

3.1.2 Firing and Target Locations in the Central Section of Dolly Sods

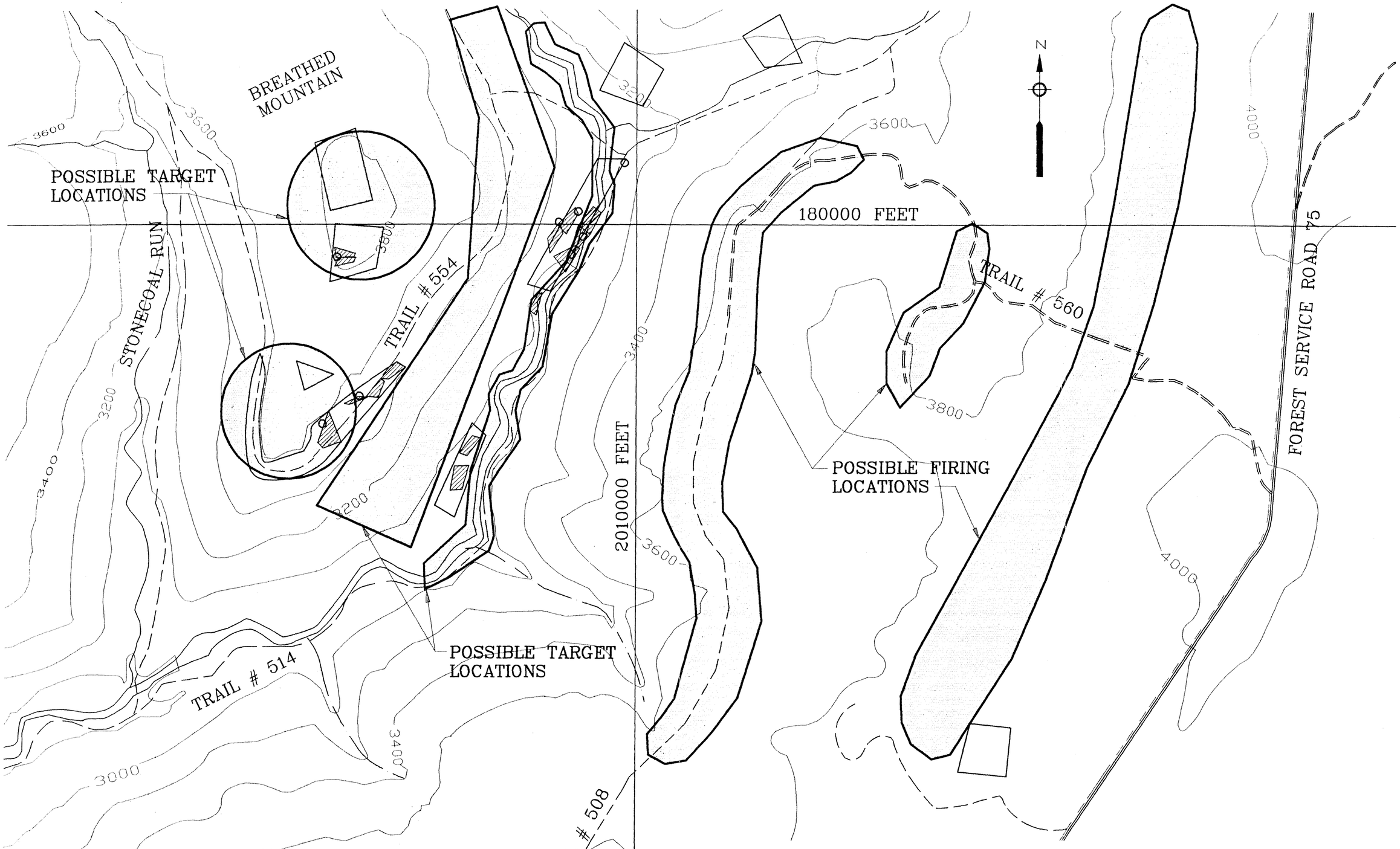
Eight rounds of ordnance were found in the vicinity of Breathed Mountain (See Fig. 2-1) during the site investigation. Five of these rounds were located in area 7-A, in the Red Creek valley. Ordnance found in area 7-A included four 81 mm smoke rounds and one 60 mm high explosive round. It is unknown whether this ordnance was fired at area 7-A, was washed down to this location by erosional processes, or if it consists of rounds which fell long or short of the target. Two other mortar rounds were located in area 14-A. These rounds included an 81 mm high explosive round and an 81 mm smoke round. As before, it is not known how these rounds came to the location where they were found. They were, however, located quite close to the southern tip of Breathed Mountain and were less likely to have been moved by erosion than the rounds at the bottom of the Red Creek valley. The last round located in the Breathed Mountain area was a 57 mm armor piercing round found in area 11 which is at the top of the mountain. This artillery projectile did not contain high explosive or a tracer element and constituted no danger to the public.

Finally, two additional rounds have been located since the site investigation. The second round, found by EOD personnel while searching for the first round, was disposed of by the EOD personnel. The first round had been found by a hiker between areas 11 and 14. The second round was discovered by the EOD personnel was in the Stonecoal Run valley, just south of the intersection of trails 554 and 558 and identified as a 4.2 inch high explosive. The first round is also believed to be a 4.2 inch round. The identification of these rounds as 4.2 inch mortar rounds does not follow the pattern in which types of ordnance were found during the site investigation. During the site investigation 4.2 inch mortar rounds were found exclusively in

the northern section of Dolly Sods while the ordnance found in Breathed Mountain region consisted primarily of 81 mm mortar rounds.

Because of the variety of locations in which ordnance was found, it is more difficult to determine the location of the target area around the Breathed Mountain region than it is in the north. Figure 3-2 shows possible targets and firing locations in the Breathed Mountain region of Dolly Sods. One possible target is the eastern slope of Breathed Mountain. It is typical for mortar training to utilize steep hills or cliffs as targets. The slope of the Red Creek valley could have been fairly easily viewed from the east so that the location of mortar hits could have been seen. If the eastern slope of Breathed Mountain was the target, then the ordnance which was found must consist of short and long rounds. Furthermore, the slope of Breathed Mountain should contain large amounts of ordnance, assuming it hasn't all been washed down towards the Red Creek. Another possibility is that both the top of Breathed Mountain and the Red Creek valley were targets. In either case, the actual location of the target is not likely to be determined without further investigation.

The location from which mortars were fired at Breathed Mountain is also elusive, but some evidence as to the locations of these firing positions exists. If the eastern side of Breathed Mountain was the target, then the firing positions would have been located to the east in order to observe the mortar hits. Furthermore, there are jeep trails which run from Forest Service Roads 19 and 75 to the south and east of the likely targets (see Fig. 2-1). These trails would provide easy access to the locations which could have been used as firing positions to the east of Breathed Mountain. The 81 mm mortars have a range similar to that of the 4.2 inch mortars, approximately 4,000 yards, so that the distance from the target to these trails is well within the short part of the mortars' range. The railroad beds, which might have been used by WW II vehicles run to the south, east and west of the mountain. A number of the trails in the area including 508, 513, 514 and 554 follow what were once railroad beds. With the exception of trail 508, these old railroads are all considerably closer to Breathed Mountain than the jeep trails and are probably too close to most of the likely targets to have been used during the



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DOLLY SODS WILDERNESS AREA
FIGURE 3-2
POSSIBLE FIRING / TARGET POSITIONS

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training maneuvers. The most likely firing locations appear to be along the jeep trails to the east and south of the mountain, and along the length of trail 508, but there is no material evidence to prove whether or not this hypothesis is true. As in area 1, remedial alternatives should take this uncertainty with respect to the firing positions into account and must be devised accordingly.

3.2 ESTIMATED EXTENT OF ORDNANCE CONTAMINATION

In the area of the first target, the hill in area 1-J, the location of the target is fairly well established. However, ordnance might be found a substantial distance from the target itself. Factors which could be responsible for ordnance located outside of the target area might include mortar fire falling long or short of the target, ordnance which ricocheted off of rocks, or ordnance which might have been blown out of the target area by subsequent explosions. For these reasons, ordnance might be found well beyond the target area as demonstrated by ordnance fragments found in areas 17 and 1-A.

In the area of the second target, the extent of ordnance is much more poorly defined because the target isn't known and because ordnance has been found over a fairly large area. It is known that ordnance exists at the top of Breathed Mountain and in the Red Creek valley. It is uncertain whether or not ordnance exists in between these locations on the slopes of Breathed Mountain. It is also unknown if ordnance exists on the east side of the Red Creek. Unexploded ordnance could be located on the west side of Breathed Mountain where long rounds might have fallen or been washed down from the peak. The Stonecoal Run area, also, could contain ordnance. The full extent of ordnance contamination is unknown even in regions where it has been found during the site investigation and can only be determined by further investigation.

Because information obtained from records review and interviews seemed to indicate a possibility of 105 mm and 155 mm artillery rounds existing in the Dolly Sods Wilderness Area, the site investigation was designed to search for

these large artillery rounds in addition to mortar rounds. Neither 105mm nor 155mm ordnance was found. In addition, no fragments of artillery rounds or evidence of these rounds was discovered. Therefore, it is believed that no large sized artillery ordnance exists in the Dolly Sods Wilderness. This may not be the case for land to the north of Dolly Sods owned by the Western Maryland Railroad where Blackbird Knob was known to be a target for artillery fire during training activities.

SECTION 4.0
ALTERNATIVES FOR REMEDIAL ACTION

In this section, several alternatives for remedial action will be considered to determine their relative costs and benefits. First, different possible courses of action will be defined. Then, each of these alternatives will be analyzed in terms of their cost, effects upon the environment, and the extent to which they would reduce the danger to the public which is posed by the unexploded ordnance currently in the Dolly Sods Wilderness. This section will also briefly address the various environmental regulations which would require consideration in the construction of a plan for the remediation of the Dolly Sods Wilderness.

The purpose of the site investigations which have been presented and analyzed in this report was to determine the extent of ordnance contamination in the Dolly Sods Wilderness Area. To the extent which it was possible, the locations, types, and conditions of ordnance have been determined. It is now necessary to evaluate appropriate schemes for remediation of the wilderness which will take into account the results of the site investigation.

4.1 ALTERNATIVE PLANS FOR REMEDIAL ACTION

In this sub-section, different plans will be presented for the remediation of the Dolly Sods Wilderness. The wilderness area is 10,215 acres in size, and, because of the large size of the wilderness area and the extremely rugged terrain, remediation of the entire wilderness area would be an extremely difficult and expensive proposition. In addition, it is likely that difficulties would arise due to the existence of endangered species in sections of the wilderness and the necessity of excavating metallic contacts or clearing areas of underbush. Furthermore, it has been established from the site investigation that certain regions of the wilderness area are extremely unlikely to contain ordnance. For these reasons, the remediation of the entire wilderness area is not considered to be a feasible option. Therefore, the subject of this section is the determination of the level of remediation which is appropriate for the ordnance contamination and the determination of the locations where this remediation would be of the greatest benefit

Three different plans for remedial action plus the "no action" alternative will be considered here. These different plans will be referred to as remediation levels one through three. The first level of remediation will assume that the clearing of underbrush will not be allowed. This alternative, therefore, focuses on clearing areas which are accessible without clearing of underbrush. Remediation will be performed in area one, on and around trails in the Breathed Mountain area, and in the Red Creek valley. Alternative one will be the smallest of the three remediation alternatives and would remediate 250 acres of ordnance. Remediation levels two and three assume that brush clearing would be allowed in the areas where remediation is planned. Alternative two would remove ordnance from a total of 915.5 acres. This effort would remediate areas where ordnance is thought to exist, investigate areas where ordnance might exist, and retain a substantial amount of the total remediation acreage for removing ordnance from areas where it would be found by the investigation. The purpose of level two remediation would be the removal of all ordnance which could pose an immediate threat to the public safety, while keeping costs at a reasonable level. Finally, the third level will clear 1,281.5 acres of all ordnance. This option would remediate a larger portion of Dolly Sods with the intention of removing almost all of the ordnance from the wilderness area. This level would also involve a plan for additional investigation and additional remediation which would be located according to the findings of the investigation.

4.1.1 No Action

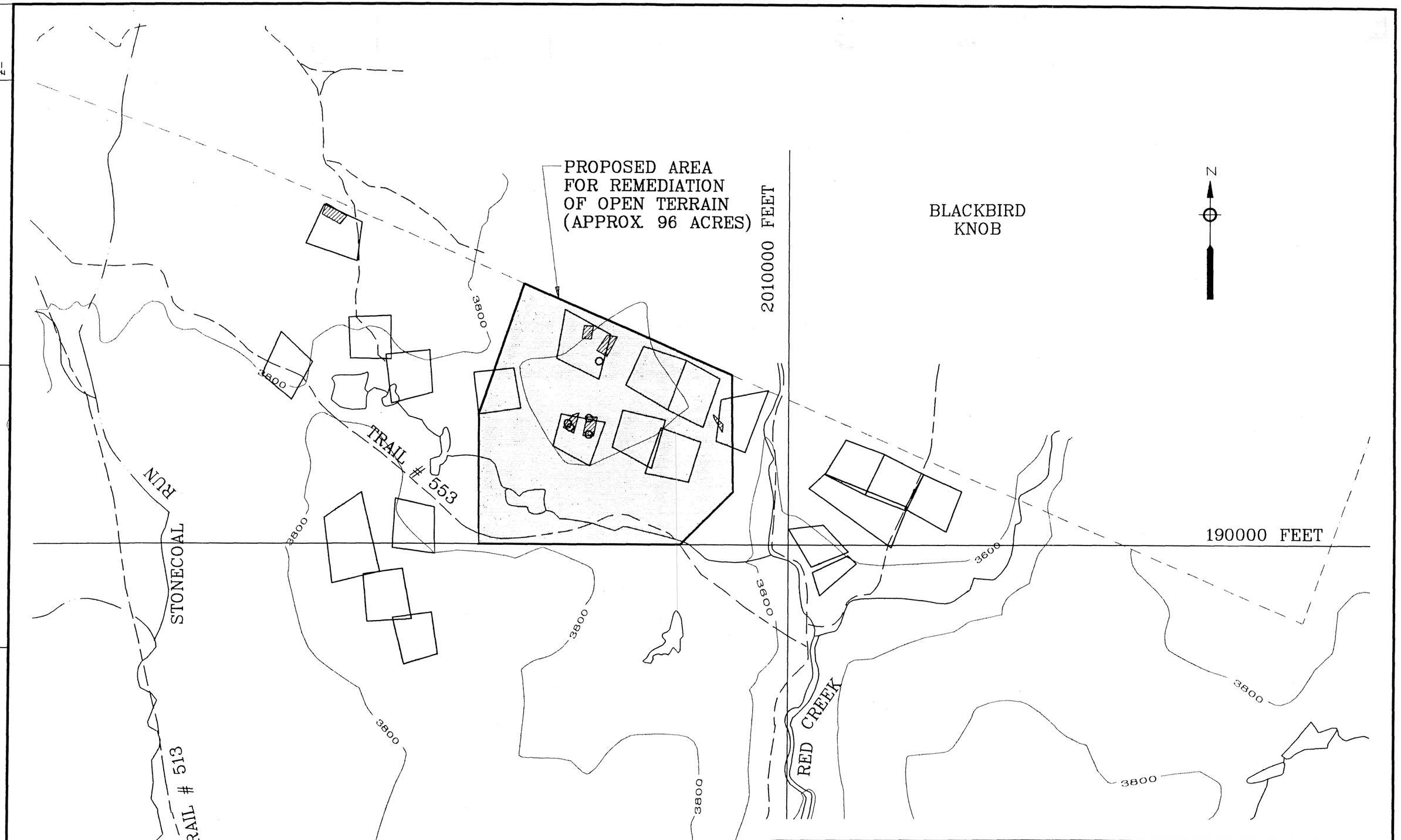
The first option is no action. If this option were chosen, then no remedial activities would take place in the Dolly Sods Wilderness. Other actions to control the risk to the public could still be taken such as continuing to inform the visitors to the Dolly Sods area of the existence of unexploded ordnance throughout the area and of precautions which should be taken if this ordnance were encountered.

TABLE 4-1. AREAS OF REMEDIATION

Level One Remediation	
Remediation in Area One Region	96 acres
Remediation in Breathed Mountain Region	136 acres
Supplementary Remediation (Camping Sites etc.)	18 acres
Total	250 acres
Level Two Remediation	
Remediation in Area One Region	148 acres
Investigation in Area One Region	30 acres
Remediation in Breathed Mountain Region	542.5 acres
Investigation in Breathed Mountain Region	45 acres
Supplementary Remediation	150 acres
Total	915.5 acres
Level Three Remediation	
Remediation in Area One Region	281.5 acres
Investigation in Area One Region	30 acres
Remediation in Breathed Mountain Region	675 acres
Investigation in Breathed Mountain Region	45 acres
Supplementary Remediation	250 acres
Total	1,281.5 acres

4.1.2 Level One: Remediation of Easily Accessible Areas

The second option would involve the remediation of limited parts of the Dolly Sods Wilderness Area. The areas selected for remediation under remediation level one include areas which are accessible to the public, can be remediated without brush clearing and are likely to contain ordnance. The parts of the wilderness which would be cleared of ordnance under this plan are shown in Figures 4-1 and 4-2. The total area of these sections of Dolly Sods is approximately 232 acres. An additional 18 acres would be included for the remediation of open areas outside of the planned sections that appear to be heavily used by the public. The total area, therefore, is 250 acres. Table 4-1 details the distribution of acreage for all three remediation alternatives.



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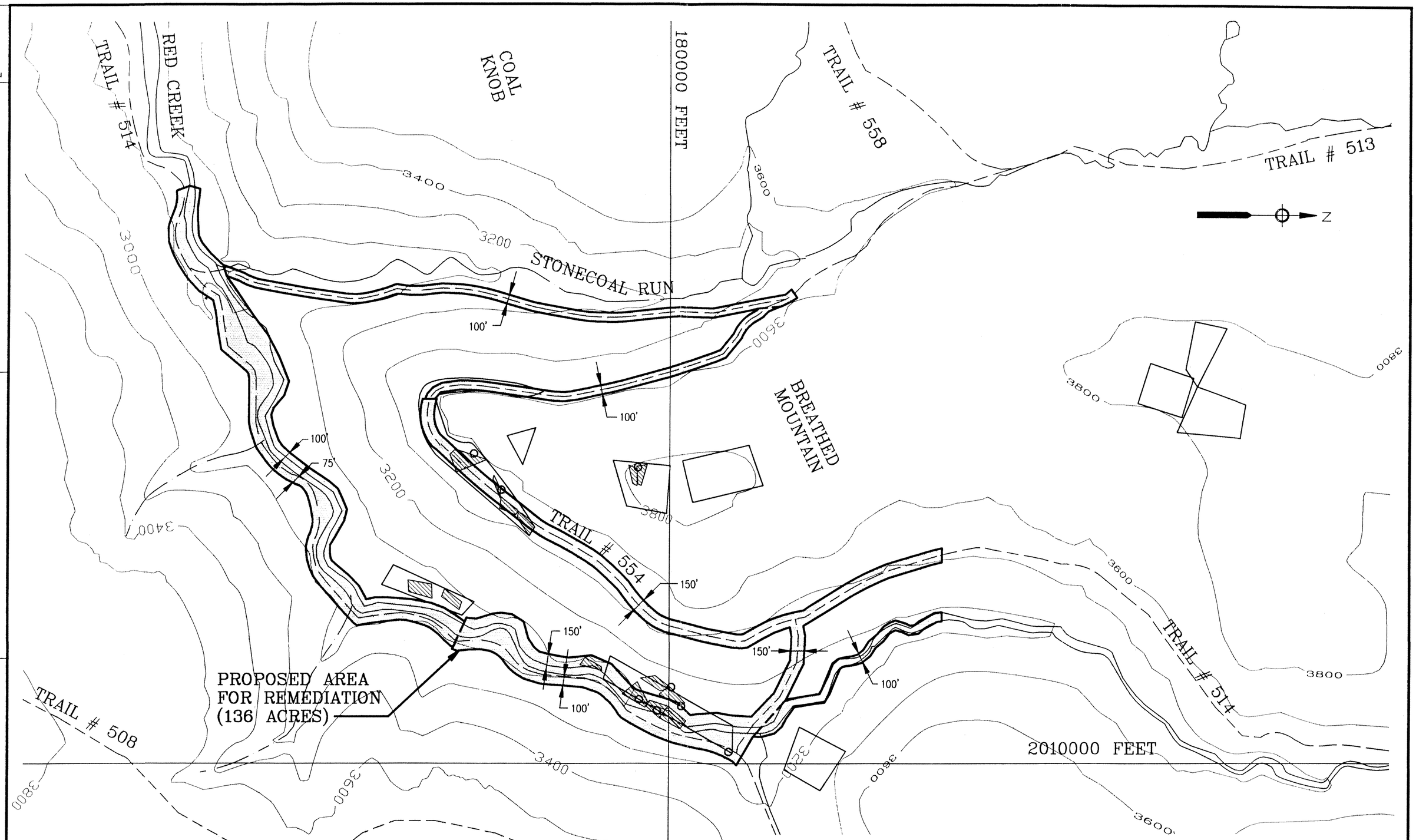
DOLLY SODS WILDERNESS AREA
FIGURE 4-1
REMEDIATION LEVEL ONE
NORTHERN SECTION WILDERNESS AREA



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DOLLY SODS WILDERNESS AREA
FIGURE 4-2
REMEDIATION LEVEL ONE
BREATHED MOUNTAIN AREA

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Under level one, 148 acres are selected for remediation in the area one region. However, it is expected that from thirty to forty percent of the area will be covered with heavy underbrush which would make ordnance remediation impossible. This is because, in order to perform a complete sweep, UXO personnel must be able to cover the full area with the ordnance locators which are being used. This is not possible in dense underbrush and, therefore, the Army Corps could not perform a successful remediation in these areas. Because only open area would be remediated, the area where remediation could be performed is approximately thirty-five percent less than the 148 acres initially selected. While it is estimated that 96 acres would be remediated, this figure could be substantially higher or lower.

In the Breathed Mountain region, areas to be remediated would include the trails around the mountain and portions of the Red Creek valley. If areas within the planned remediation boundaries would require brush clearance, then they cannot be remediated. The area which is unused should then be used to remediate areas outside of the boundaries which appear accessible to the public.

Trail 513, the Stonecoal Run Trail, would be remediated from the Red Creek to its intersection with trail 554. Remediation would extend fifty feet from the center of the trail in either direction.

Trail 554, the Breathed Mountain Trail, would be remediated from its intersection with trail 513 to its intersection with trail 514, the entire length of the trail. From the intersection of trails 554 and 513, east to the tip of Breathed Mountain, remediation would extend fifty feet from the trail in either direction. For the remainder of the trail, from the tip of Breathed Mountain to trail 514, remediation would extend seventy-five feet from the trail.

The Red Creek valley would be divided into three sections. The first section would consist of the Red Creek valley and trail 514, the Red Creek trail, from a point approximately 1,000 feet south of the confluence of the Stonecoal Run and the Red Creek to a point approximately 5,000 feet north of this

confluence. In this section, remediation will extend one hundred feet from the center of the Red Creek and seventy-five feet from trail 514 and cover the entire area in between. The second section would stretch north of the first section almost to the confluence of Fisher Spring Run into the Red Creek. Remediation in this section would extend 150 feet from the center of the Red Creek and one hundred feet from trail 514. This section would be approximately 3,500 feet long and, again, would include the area between trail 514 and the Red Creek. The last section would extend north of the second section for approximately 2,500 feet. Here, remediation would extend fifty feet in either direction from the Red Creek.

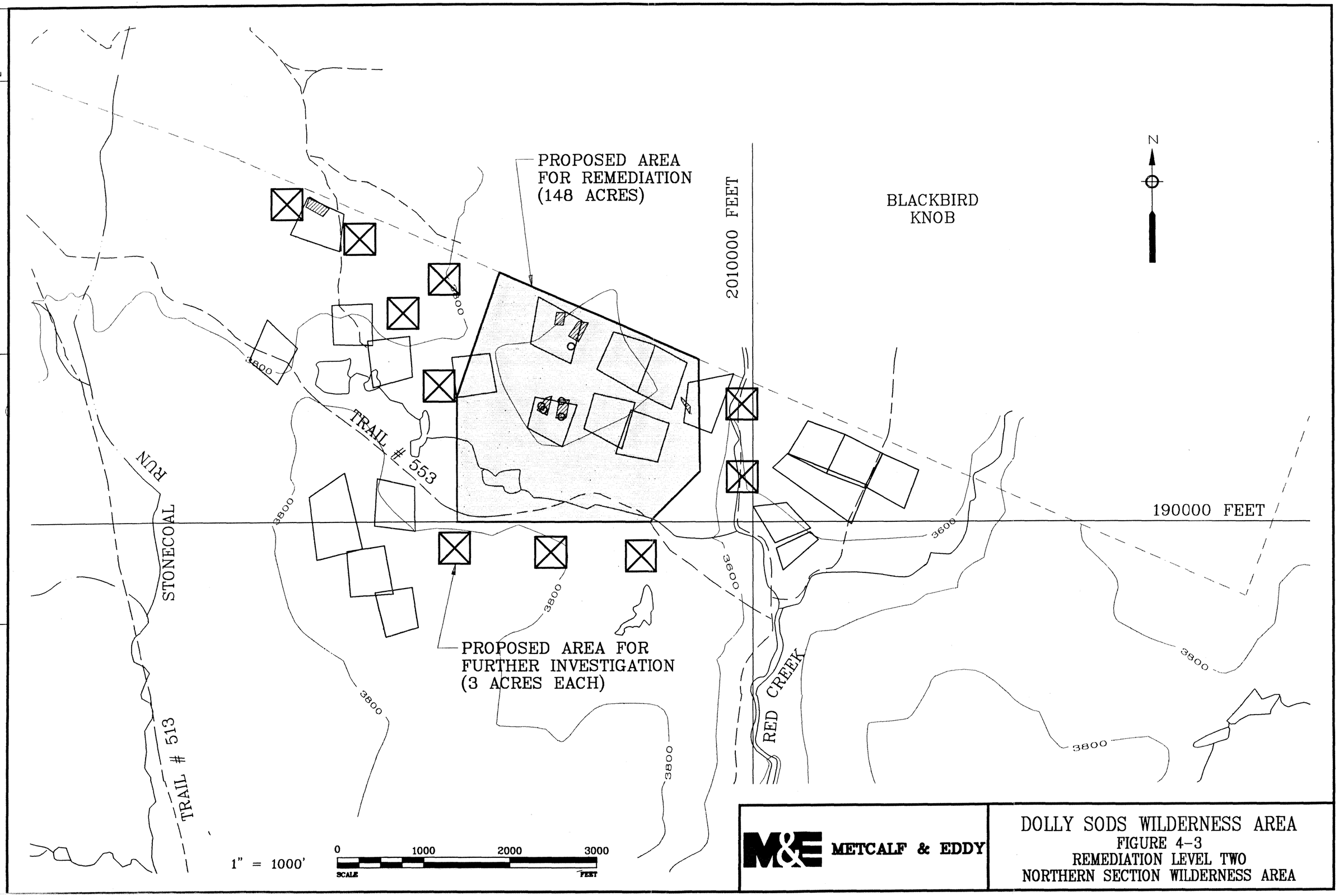
Trail 514, the Red Creek Trail, separates from the Red Creek near the confluence of the Red Creek and the Stonecoal Run. From this point to the intersection of trails 514 and 554 and for approximately 1,800 feet further north, the wilderness along the trail would be remediated for seventy-five feet in either direction.

The entire remediation of the Breathed Mountain area would constitute an area of 136 acres. Combined with ninety-six acres from the area one region and eighteen acres of additional remediation, this brings the area cleared of ordnance under remediation level one to a total of 250 acres.

4.1.3 Level 2: Remediation and Investigation of Ordnance

Level two remediation attempts to reduce the danger to the public by accomplishing two tasks: the remediation of known or suspected targets, and the remediation of heavily travelled areas. In addition, level two remediation calls for clearing of underbrush from areas where it is necessary. The plan for level two action is displayed in Figures 4-3 and 4-4 and calls for the remediation of 915.5 acres.

While the initial investigation was useful in determining which general areas throughout the Dolly Sods Wilderness might contain ordnance, it was a limited investigation. It is known that ordnance exists in the area one region and the Breathed Mountain region, however, it is not known where, within these regions, ordnance exists. For this reason, it is necessary to create a plan which could find pockets of ordnance within these larger areas if one wants to


PROPOSED AREA
FOR REMEDIATION
(148 ACRES)
2010000 FEET
BLACKBIRD
KNOB
N
TRAIL # 553
STONECOAL
RUN
190000 FEET
3800
3600
PROPOSED AREA FOR
FURTHER INVESTIGATION
(3 ACRES EACH)
RED CREEK
TRAIL # 513
1" = 1000'
0
1000
2000
3000
SCALE
FEET
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METCALF & EDDY
DOLLY SODS WILDERNESS AREA
FIGURE 4-3
REMEDIATION LEVEL TWO
NORTHERN SECTION WILDERNESS AREA
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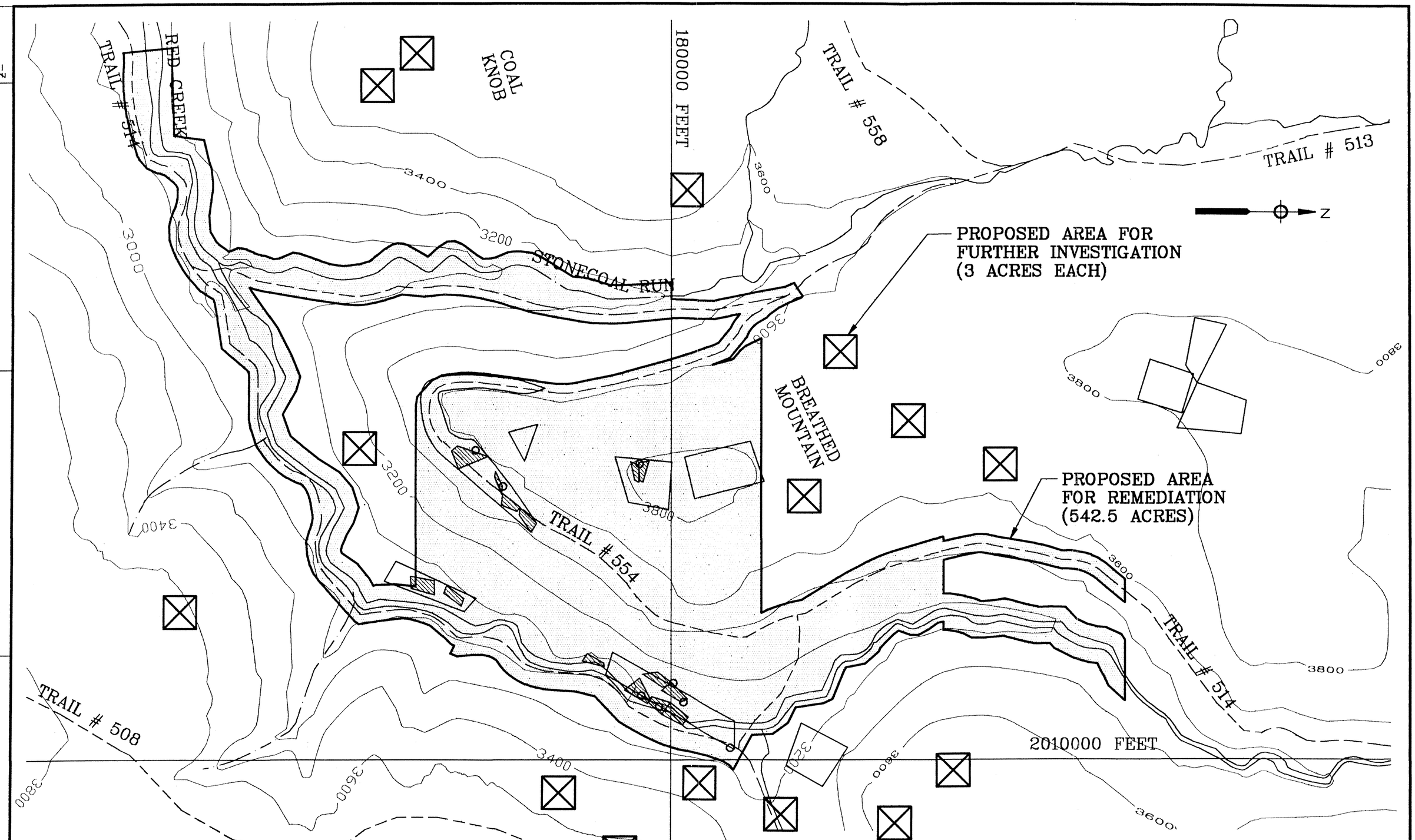

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DOLLY SODS WILDERNESS AREA
FIGURE 4-4
REMEDIATION LEVEL TWO
BREATHED MOUNTAIN AREA

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avoid searching an enormous area around the suspected targets. In remediation levels two and three this is done by including a program of additional investigation and a set amount of supplementary remediation to be distributed after the additional investigation and initial remediation have been completed.

In the area one region, alternative two initially remediates an area of 148 acres identical to the level one remediation. As remediation level two includes brush clearing, the full acreage could be remediated as planned. In addition to this remediation, there is a total of 30 acres of clearance allocated to further investigation. This acreage is split into ten investigation areas of three acres each spread into a pattern which will attempt to determine if ordnance exists outside the area selected for remediation. An additional 150 acres of supplementary remediation area are available for distribution through the northern section and the Breathed Mountain area. This supplementary remediation is for the purpose of clearing areas outside of the initial remediation suspected of containing UXO due to ordnance and ordnance fragments located during remediation and additional investigation.

In the vicinity of areas 7, 11 and 14, a total of 542.5 acres is alotted to the initial remediation (see Fig. 4-4). This area will encompass all of the trails covered in alternative one and increases the areas planned for remediation. In addition, the eastern slope and the top of Breathed Mountain will be remediated. The top of Breathed Mountain is considered a potential target due to ordnance discovered in the area and is relatively accessible to visitors to the wilderness. The eastern side of Breathed Mountain is considered to be likely to contain some ordnance. Reasons for this likelihood include the possibility that the slope was a target and the existence of several alternative targets surrounding the mountain side. Even if the eastern slope contains very little ordnance, the distribution of the ordnance should provide a great deal of information as to the location of the actual targets. Additional investigation will be performed to decide where portions of the 150 acres of supplementary remediation will be necessary. The investigation will consist of 45 acres divided into fifteen, three acre

plots. The distribution of these investigation plots is arranged so as to investigate areas which could contain additional ordnance.

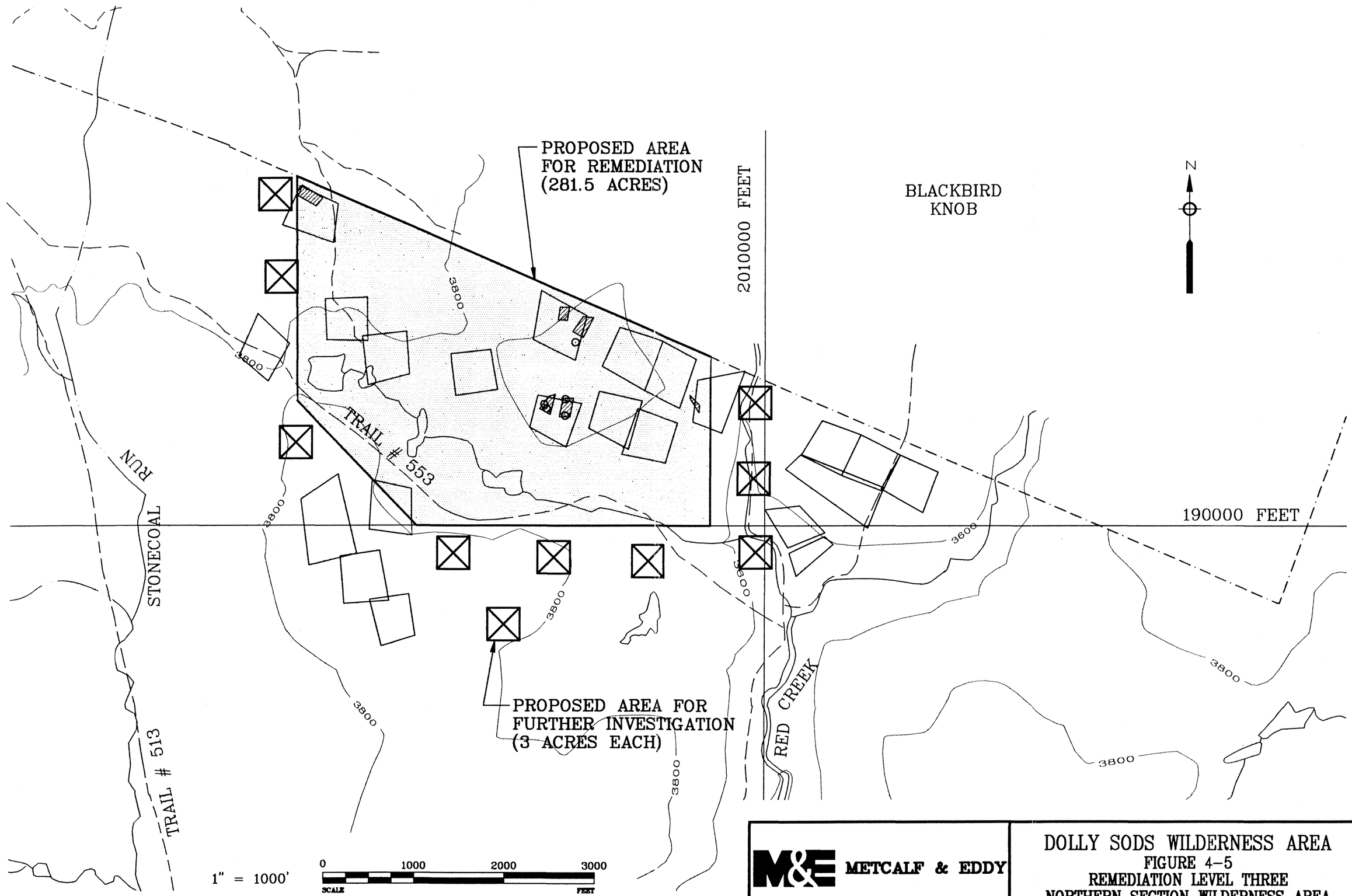
The 150 acres of supplementary remediation are an integral portion of the plan for additional investigation. If ordnance is found in the additional investigation areas, then the supplementary acreage should be used to remediate these areas. Also, if ordnance is found close to the boundary of the initial search area, that search area should be expanded outward around the ordnance. If no ordnance is found then supplementary acreage should be used in whatever locations are considered most likely to contain ordnance. These decisions must be made by the U.S. Army Corps and the ordnance contractor after investigations are completed.

4.1.4 Level 3: Full Remediation of Suspected Areas

The third level of remediation of ordnance contamination involves the removal of ordnance from all areas currently suspected of containing ordnance. Remediation level three assumes that limited searches for ordnance might not locate isolated pieces of ordnance which could still pose a danger to the public. Alternative three would attempt to locate virtually all of the ordnance in the wilderness by covering a larger area than alternative two and clearing underbrush as necessary. This plan is shown in Figures 4-5 and 4-6 and would remediate a total of 1,281.5 acres.

In the northern part of Dolly Sods, a total of 281.5 acres would be remediated. This acreage would constitute an expansion of the areas presented for the level one and two plans for remediation. In addition to this area, 30 acres of additional investigation would be performed as shown in Figure 4-5.

Because remediation level three aims to remove as much ordnance as possible from the Dolly Sods Wilderness, it would be advantageous to have a larger amount of supplementary remediation available. This will allow UXO personnel to perform a more complete remediation of Dolly Sods. Therefore, for remediation level three, 250 acres of supplementary remediation will be planned.



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DOLLY SODS WILDERNESS AREA
FIGURE 4-5
REMEDIATION LEVEL THREE
NORTHERN SECTION WILDERNESS AREA

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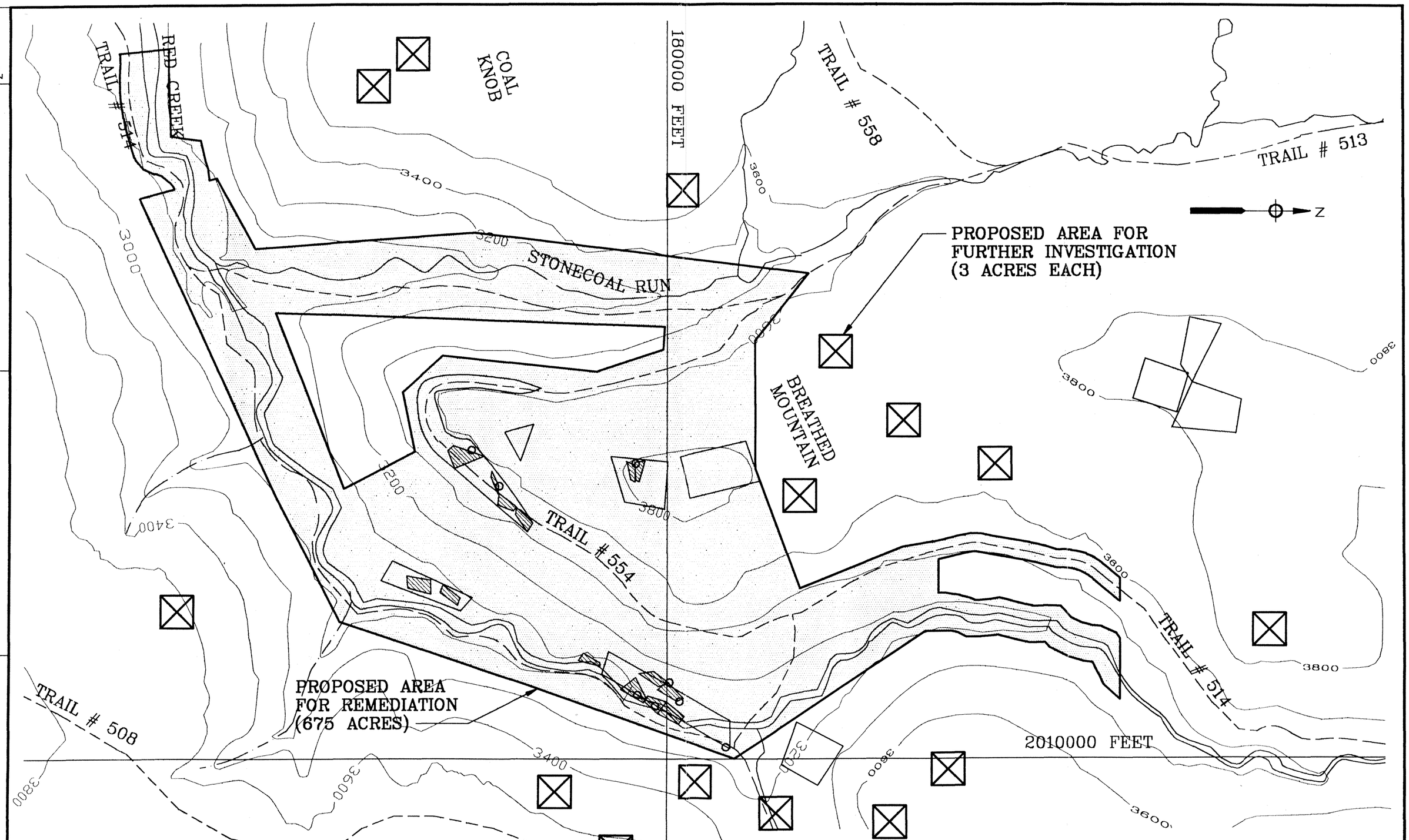

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DOLLY SODS WILDERNESS AREA
FIGURE 4-6
REMEDIATION LEVEL THREE
BREATHED MOUNTAIN AREA

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In the Breathed Mountain region, a total of 675 acres would be planned for remediation. This acreage covers the Red Creek and Stonecoal Run, all of the trails in the area, and the top of Breathed Mountain. The eastern side of Breathed Mountain would also be covered. Additional investigation would consist of 45 acres, divided into fifteen, three acre plots. The investigation, shown in Figure 4-6, would focus on the areas surrounding Breathed Mountain and the east side of the Red Creek.

4.2 FACTORS INFLUENCED BY EXTENT OF REMEDIAL ACTION

4.2.1 Economic Costs of Dolly Sods Remediation

The cost to remediate Dolly Sods will depend, primarily, upon the number of acres subject to remediation, and, to a lesser degree, the types of terrain and remediation which will be performed. The estimated cost of maintaining a four-man crew in the Dolly Sods Wilderness will be approximately $19,000/week based on 1991 prices. This figure covers all costs including labor, overhead, equipment, G&A, ODCs, and fee. In addition, there is a cost for mobilization which would be approximately $50,000. If separate crews are required in order to clear underbrush, they will cost approximately $12,500 per week. These crews would consist of five persons each including a UXO technician.

It is assumed, for the purposes of estimating costs, that a UXO team could remediate eight acres per week. This places the cost per acre at roughly $2,400. A number of considerations produce this estimate. First, the production rates during the Dolly Sods investigation were considered. During the surface investigation approximately 250 acres were covered in five weeks or fifteen crew weeks. This means that a production rate of approximately seventeen acres per week was achieved. The subsurface investigation proceeded considerably slower. Approximately ten acres were covered by one crew in four weeks. This is a production rate of two and a half acres per week. The subsurface operation was an exceedingly methodical operation while the surface investigation was performed relatively quickly. The estimated production rate for full remediation falls in between these figures.

Another consideration which affects the production rate is the terrain and the geometry of the remediation. The remediation, whether or not clearing of underbrush occurs, is likely to force UXO teams to work in extremely rough terrain. In the Breathed Mountain area in particular, teams are likely to encounter very steep ground and occasional cliffs which will impede progress to some degree. The arrangement of the areas to be remediated will make work somewhat simpler. Because the remediation area is located in two sections, relatively little time will be spent laying out the areas. The exception to this is the additional investigation in levels two and three. Because of the separation of these areas from the larger remediation areas, they will take longer. In calculating costs, it is assumed that six acres of additional investigation can be performed by a one-UXO crew in a week.

Several assumption are used to determine these estimates of cost. These costs are for a UXO contractor only. The uses of an A-E contractor would increase the costs of the operation depending upon the level of involvement. The costs given also assume the use of Schoenstedt ordnance locators. Foerester Ferex ordnance locators would be used for quality assurance purposes. If Forester Ferex locators were used for remediation, costs would increase by $600 per crew per week or by about $75 per acre.

An additional expense in remediation levels two and three is clearing underbrush. It is estimated that a crew of five men for brush clearing would cost $12,500 per week. Furthermore, it is estimated that each crew could clear twelve acres per week. Therefore, the cost per acre of clearing is approximately $1,050. For pricing purposes, it is assumed that 35% of the area to be remediated will require brush clearance. Because field conditions remain largely unknown, cost estimates are uncertain. Table 4-2 displays estimated costs of the three levels of remediation.

4.2.2 Environmental Effects of Dolly Sods Remediation

4.2.2.1 Environmental Impacts Without Brush Clearance. If no brush clearing is allowed in the Dolly Sods wilderness, environmental impacts of ordnance

TABLE 4-2. COSTS OF REMEDIATION

Level of Remediation	Remediation Acreage	Investigation Acreage	Brush Clearance Acreage	Total Acreage	Crew-Weeks	Brush-Crew Weeks	Mobili-zations	Cost (Millions of) (Dollars)
Level One	250	0	0	250	31	0	1	0.64
Level Two	840.5	75	320	915.5	118	27	2	2.62
Level Three	1206.5	75	449	1281.5	163	37	2	3.58

remediation would come from three sources. These sources would include the trampling of vegetation by foot traffic, the disruption of vegetation and wildlife by the excavations required to unearth ordnance, and the noise and disruption to wildlife created by detonation of unexploded ordnance.

Foot traffic is necessary in order to search for ordnance in the wilderness area. No technology is currently available for remediation of the wilderness which could reach the remote work sites without the use of motorized vehicles and operate in the extremely rough terrain other than hand held ordnance locators. In order to use these locators, personnel must walk across each area to be searched at six foot intervals. This density of traffic is considerably more than usually exists in the wilderness and a certain amount of environmental damage will be caused by the closely spaced operation. The primary source of damage will be the trampling of plant life. Three endangered plant species are known to exist within the Monongahela National Forest within which the Dolly Sods Wilderness Area is located. These plant species all exist in limited habitats, and none of the habitats are known to exist in the Dolly Sods Wilderness. Therefore, no endangered plant species are known to exist in Dolly Sods, and damage to vegetation is likely to be temporary and of minor significance.

136 acres of the Rohrbaugh Plains region, between trail 508 and Forest Service road 75, are designated as a Research Natural Area (RNA). RNAs are areas within the National Forest which are managed so as to minimize any disturbance to the environment. These areas are studied and used as controls in research and should be protected from any remediation effort. Additional investigation or supplementary remediation could potentially extend into this area. If ordnance is found in this RNA, it should be transported outside of the RNA for disposal.

Excavations to find ordnance will cause damage to the environment by disturbing plant roots, burrowing animals and buried artifacts. Damage to plants will again be temporary, and does not constitute a significant environmental effect. One endangered species, the Cheat Mountain Salamander, is known to exist in the Dolly Sods Wilderness, but its range does not include

the areas where remediation is planned. Archaeologically valuable items were, unfortunately, disturbed during the site investigation, so steps must be taken in any remediation to avoid further disturbance of historical artifacts. Such steps would include close coordination with the U.S. Forest Service to define which areas are likely to contain artifacts, the halting of operations which would disturb artifacts and, if possible, having Forest Service archaeologists present when work is being performed in areas known to contain items of historical value.

The final manner in which remediation activities would damage the wilderness area would be through the detonation of unearthed, unexploded ordnance. These explosions would damage the environment in the immediate vicinity through their noise and concussive force. However, while some physical damage would occur, this damage is also minor and temporary. The report of a Forest Service technician who accompanied UXO personnel during the site investigation when ordnance demolition was being conducted, stated that this was the case. The technician stated that "No apparent damage was detected [from the demolition]." In addition, the report mentions that "[shrapnel] made no detrimental impact on [the] area [where it impacted]." The only noticeable damage from the demolition was at the location of the explosion. The Forest Service technician described the damage to the site as "a small indentation approximately eight inches round and three inches deep." Photographs of areas where detonation of ordnance was performed are displayed in Figures 6-19 and 6-20. The damage caused by the detonations was, as a whole, quite minor.

Several laws and regulations are in place in order to protect the wilderness area and its waterways and wetlands from environmental damage. These regulations should all be obeyed completely, and several pertinent ones summarized in section 4.4.

4.2.2.2 Environmental Impacts of Brush Clearing. Clearing brush may have significant direct and indirect environmental impacts upon the Dolly Sods Wilderness. Direct impacts may include loss of wildlife habitat, temporary disruption of the ecosystem, and a loss of the aesthetic and scientific values of the immediate area. Indirect impacts could include erosion or siltation

and the increased risk of fire. These impacts are especially sensitive issues due to the wilderness area status of the site. Any wilderness area is protected from human modification by the Wilderness Act. The system of wilderness areas was created in 1964 by Congress to preserve an "enduring resource of wilderness." As stated in section 1.3, Dolly Sods Wilderness Area was created by an act of Congress in 1975, and all of the limitations upon activities apply.

If remediation levels two or three were chosen, the underbrush would be cut and removed from areas where it would interfere with the remediation of ordnance contamination. The underbrush which would be cleared consists primarily of laurel (Kalima Latifolia), rhododendron (Rhododendron Sp.), and various deciduous and evergreen saplings, but would include any herbaceous cover, saplings, or brush which would interfere with the planned remediation. The lower branches of some trees would also be cut when necessary to perform the remedial action. Underbrush would be cut to the extent necessary to permit thorough remediation of the area. At the minimum, this would consist of lanes wide enough to operate the selected ordnance locators cut through the underbrush at six-foot intervals. The brush would then have to be removed from the immediate area and either moved to an already remediated area or, if the brush were less dense, spread out so as to allow remediation in that area. It is estimated that thirty to forty percent of the Dolly Sods wilderness would require brush clearing before remediation could take place. If remediation level three were chosen, approximately 449 acres would be cleared of brush. Before any remediation involving brush clearing, plans must be developed to minimize the potential impacts of the clearing including sediment/erosion control, minimization of cutting, and possible revegetation of indigenous species.

In the areas which would require brush clearing, the local environment varies considerably. A general description of Dolly Sods is given in section 1.3 while descriptions of areas of Dolly Sods where work was performed during the site investigation are given in Section 2.3. As the composition of the plant communities varies throughout the wilderness area, the amount of brush clearance necessary and the sensitivity of the community to the brush

clearance differs. The extent of damage to the immediate flora and fauna would depend upon the amount of clearing which will be necessary. If a large number of herbaceous and woody plants can be left undamaged during the remediation, then recovery of the community will be relatively quick.

Direct environmental impacts would include an immediate loss in the density of the forest understory and the diversity of plant life, the loss of wildlife habitat and a loss of the scenic, educational and scientific values of the area. The magnitude of these impacts will vary depending on the extent of brush clearing in the wilderness area. The cutting of these plants in itself may constitute a loss to the local environment. In addition, there may be secondary impacts to the herbaceous plant cover, and to some extent, the saplings and mature trees which may be damaged in the process of clearing. These species enjoy a symbiotic relationship with cleared flora and may be affected by the action. The woody and herbaceous plants which are to be cleared provide both cover and forage for ground dwelling species. The extent of this impact would depend on the composition of the terrestrial wildlife community, and the size and locations of the areas which are cleared. In addition, the potential cutting of saplings would create an impact of lesser magnitude but with longer term loss upon tree dwelling species.

Loss of scenic and recreational value would be greatest in the Breathed Mountain area where remediation would be performed in the immediate vicinity of trails which are traveled heavily by visitors to the wilderness. Much of the scientific value of the wilderness is in the Research Natural Areas which, most likely, will not be disturbed during the course of the remediation. However, where clearing is to occur, natural succession would be disrupted and the area would become less valuable for scientific study as a undisturbed environment. The educational value of the wilderness area is directly related to the scientific and recreational values and would be lost as these other values are lost.

The Cheat Mountain salamander is known to exist in parts of the Dolly Sods Wilderness Area. While it is not known to exist in the areas where remediation is being performed, the brush clearing could affect potential

habitat for the salamander. This possibility should be investigated in any further study of the impacts of brush clearing.

Indirect impacts on the wilderness would result from an increase in the erosion potential and stripping of topsoil. In addition, the effects of these mobilized sediments upon the indigenous aquatic species in the Red Creek and its tributaries may be significant. Increases in the potential for fires and other effects might be discovered upon further evaluation. Erosion due to the loss of underbrush could be considerable. The remaining tree cover may reduce the amount of erosion, but, conversely, the mountainous nature of the wilderness area could increase erosion. Although vegetation will be cut, root systems will remain and will protect the topsoil from excessive erosion until revegetation occurs. The potential for erosion would depend upon rainfall, terrain and soil conditions. Without adequate controls, sediments mobilized from the increased erosion could be washed into the Red Creek and may adversely affect the ability of the stream to sustain certain species of fish and other aquatic organisms. The potential for fire could be minimized by selecting appropriate methods and procedures for handling brush after it is cut.

In time, normal vegetative succession would return the community to its previous state. The length of this process will depend upon the extent of clearance and the size of the cleared areas. The time for recovery will also depend upon the species cleared, the environment, the extent of erosion damage to the topsoil, and any mitigation of the environmental damage which would be performed as a part of the remediation.

This overview of environmental damages is extremely brief and does not involve any detailed study of the Dolly Sods community. It is intended to provide a summary of potential environmental consequences of clearing underbrush. Because the Dolly Sods wilderness is an extremely valuable wilderness resource, further study of environmental consequences is likely to be required. This additional study could potentially take the form of a NEPA-mandated environmental assessment or environmental impact statement. NEPA is discussed in section 4.5. Management of the wilderness in such a way

as to protect its natural character is mandated by the Wilderness Act. The Wilderness act is also discussed in section 4.5. While the Wilderness Act does not include wording which would specifically disallow brush clearing, it could impose restrictions on certain activities and it gives responsibility to the Forest Service for the protection of the Dolly Sods environment. The Forest Service is likely to require additional assessment of environmental impacts before allowing the clearing of underbrush, may impose restrictions upon methods of brush clearing (e.g., the use of chainsaws), and may opt to not allow brush clearing at all.

4.2.3 Reduction of Public Risk by Dolly Sods Remediation

The risk to the public due to unexploded ordnance at Dolly Sods is dependent upon a number of factors. These factors include the density of ordnance, the number of visitors and the terrain at a particular site. The locations where one might find unexploded ordnance were discussed in Section 3 and were used in choosing potential locations for remedial action.

The number of persons who travel through a particular location and the activities which they perform there are also significant factors in assessing risk to the public. It is readily apparent that the chances for injury to the public are increased by the number of persons passing over or by a piece of ordnance. Therefore, operations should be concentrated in locations frequented by visitors to the wilderness area such as trails and other easily accessible and scenic areas.

In addition, the activities which are performed by the visitors would affect the danger posed to them by the ordnance in the Dolly Sods Wilderness Area. For example, while a hiker would be unlikely to disturb ordnance which was inches below the ground surface, a camper might drive tent stakes into the ground or start a campfire over ordnance. The camper would be at a much greater risk of being injured than the hiker in the same location. It also seems reasonable that the public safety is at greater risk at locations where people spend a greater amount of time and perform activities which could disturb the ordnance. For this reason, it would be sensible for ordnance

clearance operations to place a greater emphasis upon clearing areas which are used as campsites or for other activities in addition to hiking. The Red Creek valley in particular sees a heavy traffic of hikers and contains a number of heavily used campsites.

The final factor which affects public safety at a particular location is the terrain. Terrain has two affects. First, it affects the likelihood of finding ordnance and the depth at which it will be found. For example, ordnance in the Red Creek valley is likely to be at a greater depth than ordnance elsewhere in Dolly Sods due to the greater depth of sediment there. However, ordnance there is also more likely to be exposed due to erosion because of the flooding and large amounts of runoff flowing into the Red Creek. In some areas which are unusually rocky, ordnance is likely to be found closer to the ground surface or at the surface. The second effect of terrain is that it changes the number of people visiting a particular area. For example, ordnance on the steep slopes of Breathed Mountain pose less of a risk to visitors to Dolly Sods than ordnance on the top of Breathed Mountain which is relatively flat and fairly accessible to hikers.

The reduction of public risk is the driving force behind the remediation of the Dolly Sods Wilderness. Each of the alternatives being considered was selected for its ability to reduce the danger to the public to the maximum extent possible given the available level of resources.

4.3 EVALUATION OF REMEDIAL ALTERNATIVES

4.3.1 Effects of "No Action"

The no action alternative would have neither economic nor environmental impacts. If nonremedial activities were pursued by the forest service, such as posting additional signs at the entrances to the wilderness area, some costs would be incurred, but they would remain relatively minor. The wilderness area environment would also remain unchanged from its current status. If ordnance were to explode for some reason, then environmental damage would be incurred, but it would be similar to that caused by the

detonation of ordnance for disposal.

The threat posed to public safety by the presence of potentially explosive ordnance would remain as it currently stands. It is impossible to quantify the risk as no recorded cases of injury due to ordnance have been found. In addition, most of the ordnance is buried and the amount of it which remains in the area is undetermined. The risk, however, is present and is illustrated by the discovery of ordnance within several feet of a site used as a campfire pit. If the campfire location were to have been placed over the piece of ordnance, there is a likelihood that the ordnance would have been detonated potentially harming several persons. A high concentration of ordnance is thought to exist within the Red Creek valley, where campers are commonly found. This ordnance, as well other ordnance throughout Dolly Sods, presents a danger to the public which would remain unmitigated by the no action alternative.

4.3.2 Effects of Level One Remediation

Level one remediation would be the least expensive of the action alternatives presented, as it would remediate only 250 acres. The cost of level one remediation would include 31 crew-weeks plus mobilization at an approximate total cost of $640,000. The cost per acre would be about $2,600.

The level one plan, to a large extent, consists of remediating areas which are frequented by visitors to the wilderness area and it contains less acreage than the other levels of remedial action. Therefore, environmental effects of level one remediation would be less than those effects caused by the other levels of remediation.

Level one would substantially decrease the risk to wilderness area visitors as it remediates those areas which are most heavily frequented by those hikers and campers. However, it leaves a preponderance of the wilderness untouched. For this reason, level one remediation will result in a reduced, but still substantial residual risk to the public.

4.3.3 Effects of Level Two Remediation

Level two remediation would be more expensive than level one and less expensive than level three remediation. The total area which would be remediated or investigated consists of 915.5 acres. The majority of the area which would be remediated would be in reasonably accessible terrain so that this would not affect the amount of time it would take to perform remediation. Seventy-five acres of the remediation would consist of investigation activities instead of remediation. Level two remediation would take a total of 118 crew-weeks. With mobilization and brush clearance, the total cost of level two remediation would be approximately $2,620,000. The cost per acre would be approximately $2,850.

Environmental damages are substantially greater for remedial level two than from level one. This is because of the greater area covered and, more importantly, the clearing of underbrush. Brush clearing would involve a significant environmental impact as described in section 4.2.2.2. If this option were chosen, an environmental assessment or, potentially, an environmental impact statement might be required in order to further study and take into account the value of the environment.

Public risk would be decreased by a greater extent by level two remediation than by the level one remediation. However, a risk remains that small, isolated pieces of ordnance would not be found. For this reason, level two remediation is unlikely to eliminate all danger to the public.

4.3.4 Effects of Level Three Remediation

Level three remediation would involve work in the largest area of all the remedial schemes. Therefore, both the costs and the environmental impacts would be at their largest levels. 1,281.5 acres of the Dolly Sods Wilderness would be remediated or investigated if this option were chosen. Of this area, seventy-five acres would be allocated for further investigation. Level three would pose the greatest impacts on the environment of any of the options. This is because it remediates the largest area of any of the options and

utilized brush clearing with all of its environmental effects. The effects of brush clearing are discussed in section 4.2.2.2. It is likely that further study of the Dolly Sods ecology will be necessary before this remediation can be performed. It is possible that an environmental assessment or environmental impact statement will be required for this option to be used. Level three remediation would take about 163 crew-weeks for completion, and the total cost of the project would be approximately $3,580,000. The cost per acre would be approximately $2,800.

The reduction of public risk would be greater than that of levels one or two. This is because remediation is planned in all of the areas where ordnance is suspected to exist. Under either of the first two levels of action, quantities of ordnance could remain in unremediated regions. These pieces of ordnance would pose a risk to public safety. Under the third level of remediation, almost all of the ordnance in the areas of the Dolly Sods Wilderness which are remediated would be removed. Because level three remediation would remediate all areas of Dolly Sods where it is believed ordnance might exist, hopefully, virtually all of the ordnance in the entire wilderness area would be removed. For this reason, level three remediation would minimize any future risks to the public. Because it is not feasible to search the entire wilderness area, it can not be guaranteed that all ordnance will be removed from Dolly Sods, however, this last scheme for remediation would fully remediate all areas where ordnance is believed to exist, the areas surrounding these, and areas where visitors to Dolly Sods frequently visit. In addition, 250 acres retained for supplementary remediation after further investigation. These steps should insure, to the maximum degree which is feasible, the safety of the public.

4.4 ORDNANCE DISPOSAL METHODS (on-site vs. off-site)

Two methods of ordnance disposal could potentially be used at Dolly Sods. The ordnance could be either disposed of on-site or off-site. While there are certain minor advantages in the reduction of environmental damage to disposing of ordnance off-site, the costs and risks associated with the off-site disposal of ordnance make it a unusable option.

The environmental damage to the wilderness area has already been discussed and is considered to be of little to no consequence. In cases where substantial environmental damage could potentially be done by the disposal of ordnance such as areas where endangered species are known to exist, ordnance could be moved short distances to parts of Dolly Sods where less environmental damage would be done.

The cost of moving ordnance for off-site disposal is considered to be prohibitive for two reasons. One reason is the labor required to transport the UXO to vehicles from the wilderness. Most of the ordnance would be located more than a mile from the nearest roads. The ordnance, some of which was extremely heavy, would have to be carried by UXO personnel to the nearest vehicles over the rough trails which lead out of the wilderness. Necessary safety precautions would include clearing the trails of any visitors in the wilderness which would be a very difficult operation to carry out thoroughly over the full length of a trail. Another reason for not moving the ordnance for off-site disposal is the cost required to transport ordnance over public highways. The nearest UXO disposal range would probably be at Letterkenny Army Depot in Pennsylvania. Alternatively, a nearby quarry could be used as a temporary UXO disposal range. The safety requirements for this journey might include such precautions as escort vehicles and would certainly be extremely rigorous and expensive to perform.

In addition to being extremely expensive, the movement of ordnance would pose increased dangers to UXO personnel. It is therefore recommended that on-site disposal of ordnance be conducted during the remediation. Short movements of ordnance would only be justified if ordnance were found in extremely sensitive environments. The only cases which would merit off-site disposal would be the discovery of ordnance which would cause considerable damage to the environment despite all precautions. The results of the investigation and nature of the work area would indicate that this is not a likely possibility.

4.5 DISCUSSION OF PERTINENT REGULATIONS

4.5.1 Archaeologic, Historic, and Scientific Preservation

Archaeological and Historic Preservation Act, 16 U.S.C. § 469-469c-1. Under the Archeological and Historic Preservation Act of 1974, the Department of the Interior establishes procedures for preservation of historic and archaeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program (16 U.S.C. § 469). The Dolly Sods site contains sites which may be deemed as being archaeologically significant. Therefore, steps must be written into the work plan for remediation which will preserve the archaeological value of these sites. Such steps would be coordinated with the forest service and might include the use of Forest Service overseers to inspect operations in archaeologically sensitive areas.

4.5.2 Endangered Species Act (16 U.S.C. §1531 et seq.)

The endangered species act requires actions to be taken that will conserve identified local endangered or threatened species of fish, wildlife, and plants.

The term "critical habitat" is defined at 16 U.S.C. §1532(5(A)) as:

(i) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of this Act, on which are those physical or biological features (1) essential to the conservation of the species and (2) that may require special management considerations or protection; and

(ii) Specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species.

Under Section 7(a), federal agencies must consult with the Department of the Interior, Fish and Wildlife Service, and the National Marine Fisheries Service to ensure that remedial actions do not jeopardize the continued existence of

endangered or threatened species, or adversely modify or destroy their critical habitat.

It is known that the Cheat Mountain Salamander exists within the Dolly Sods area. While proposed work will not directly harm the species nor should it do long term damage to its habitat, efforts should be coordinated with the Forest Service and the Fish and Wildlife Service to ensure that remedial activities will not harm this species or other endangered species which may be present in the Dolly Sods Wilderness Area. If remediation levels two or three are chosen, special care must be taken to ensure that Cheat Mountain Salamander habitat is not damaged. Further study may be necessary in order to determine exactly where this habitat exists and how to protect it.

4.5.3 Fish and Wildlife Coordination Act (16 U.S.C. §661 et seq.)

The Fish and Wildlife Coordination Act requires that actions be taken to protect fish and wildlife that may be impacted by diversion, channeling, or other activities that modify a river or stream (16 U.S.C. 662). Specifically, the FWCA, along with the Conservation Act and other advisories, requires federal agencies issuing a permit to modify any off-site body of water to consult with federal and state wildlife agencies to ensure that resources are appropriately protected. Consultation is strongly recommended for on-site remedial activities. Coordination with a number of state and federal agencies would be necessary for those alternatives which may impact area water bodies to prevent, mitigate, or compensate for project-related losses of fish or wildlife.

With the exception of brush clearing, all activities outlined in this report are unlikely to significantly impact fish or wildlife populations. If brush clearing is part of the selected option, then steps must be taken to protect the Red Creek and its tributaries. The Forest Service, Fish and Wildlife Service, and the appropriate division of the Army Corps of Engineers must be consulted before work begins.

4.5.4 40 CFR Part 6, Appendix A

EPA policy for carrying out the provisions of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) are set forth in 40 CFR Part 6, Appendix A. These policies are discussed below.

- **Floodplain Management.** Executive Order 11988 directs federal agencies to avoid long- and short-term adverse impacts associated with occupancy and modification of floodplains. Agencies responsible for providing federal assistance for construction and improvements and for conducting programs affecting land use must take actions to accomplish the following:

  - Reduce risk of flood loss

  - Minimize the impacts of floods on human safety, health and welfare

  - Restore and preserve the natural and beneficial values served by floodplains

  These requirements could be potentially applicable if federal funds are used (e.g. federal lead on remedial actions or mixed funding).

  Most of the requirements associated with the order are set forth in the Floodplain Management Guideline, published February 10, 1978, by the Water Resource Council to aid federal agencies in complying with the order. These guidelines include alternative evaluation, impact assessment and mitigation, and public involvement that are already incorporated into the feasibility study process.

- **Protection of Wetlands.** Executive Order 11990 directs federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands. To preserve and enhance the natural and beneficial values of remediation, potential wetlands in the area must be evaluated. Wetland protection requirements include assessing the impacts of any proposed actions on the wetlands, evaluating alternatives and their potential effects on the wetlands, and identifying mitigative measures to minimize potential harm to the wetlands. These requirements are included within the FS process and therefore do not result in any additional requirements.

  Wetlands are defined as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (33 CFR §323.2(c)).

At Dolly Sods, there are wetlands which will be under investigation. The wilderness area status of the site goes beyond the requirements of this regulation in protecting these areas. If brush clearing is a part of the selected option, care must be taken to ensure that these wetlands are protected and that damages to the wetlands are mitigated.

4.5.5 The Wilderness Act

The Wilderness Act was passed in 1964 in order to "secure for the American people of present and future generations the benefits of an enduring resource of wilderness." The act establishes a National Wilderness Preservation System consisting of wilderness areas such as Dolly Sods. The act states that this system will "be administered for the use and enjoyment of the American people in such a manner as will leave [the wilderness areas] unimpaired for future use and enjoyment as wilderness, and so as to provide for the the protection of these areas [and] the preservation of their wilderness character."

In the Wilderness Act, limitations are placed upon the activities which may be allowed inside the wilderness areas. Each of the agencies administering wilderness areas is responsible "for preserving the wilderness character of the area." The agencies are further directed to administer the wilderness areas so as to "preserve its wilderness character." Temporary roads, motorized vehicles or equipment, landing of aircraft, and structures or installations are not allowed in any wilderness areas. The exceptions to these restrictions are allowed "as necessary to meet minimum requirements for the administration of the area for the purpose of [the Wilderness] Act (including measures required in emergencies involving the health and safety of persons within the area)."

While the Wilderness act does not specifically prohibit the activities which have been proposed as parts of remediation alternatives two and three, these actions would have to constitute a significant exception to the normal administration of the wilderness area. The removal of ordnance contamination is of great importance and could be interpreted as necessary administration of

the area. In addition, damage to the environment would be primarily short term and would be less severe than previous actions which have occurred at the site such as logging or military training. However, these actions took place before Dolly Sods became a wilderness area. The wilderness area status of the site will continue to place limits upon activities which can be performed at the site, and all activities performed during remediation, in particular those which are not typically allowed in Dolly Sods, must be carefully coordinated with the Forest Service.

4.5.6 The National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA), signed into law on January 1, 1970, established a national policy to strive for beneficial use and improvement of the environment without degradation. The act set forth a comprehensive federal environmental policy and a process for environmental review of all major federal actions in light of environmental goals and needs. Section 102C of the act calls for the preparation of a detailed Environmental Impact Statement (EIS) as a major part of this process whenever it is determined that the action has a potential to cause significant adverse impact on the quality of the human environment. In 1978, the Council on Environmental Quality (CEQ) adopted regulations (40 CFR 1500-108) to strengthen and focus the NEPA/EIS process. The emphasis of the CEQ regulations is to establish uniform procedures for the implementation of NEPA, to reduce paper work, to minimize delays, and to improve decision-making. Section 1507.3 requires each federal agency to adopt procedures to implement NEPA in accordance with the requirements of the regulations.

The overall objective of the NEPA process is to ensure that adequate consideration is given to environmental factors in carrying out federal actions. The elements of the process include consideration of these factors early in the planning effort, use of a systematic interdisciplinary approach to environmental analyses, development and evaluation of alternatives to ensure mitigation of adverse impacts, and involvement of the public, as well as governmental officials, in the review and decision-making process.

The remediation of ordnance contamination at Dolly Sods may require preparation of an EIS. As stated above, 40 CFR 1507.3 states that federal agencies should have established procedures for implementing NEPA requirements. In the case of Dolly Sods, the Army Corps' and the Forest Service's own procedures must be used initially to examine the proposed actions from an environmental point of view and to determine if an EIS is necessary. It is possible that outside parties might disagree with any finding that no EIS is necessary and may litigate the issue. Several environmentally active organizations could have an opinion in this regard.

If the particular case of an action involving a wilderness area is not addressed in the procedures of the agencies involved, then the value of the wilderness area to the human environment will have to be determined in order to judge whether or not the proposed action will require the preparation of an EIS. 40 CFR 1508.27 states that, in determining the significance of the proposed action, "unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas" and the "loss or destruction of significant scientific, cultural, or historical resources" must be taken into account. Therefore, it is apparent that, in the eyes of NEPA, the action in the Dolly Sods wilderness must take the special nature of the location of the proposed action into account. The damage to the environment itself may be relatively minor, but damage to the wilderness area as a resource may be of greater significance.

SECTION 5.0
LESSONS LEARNED AT DOLLY SODS

Field operations in the Dolly Sods Wilderness Area provided several valuable insights into this type of OEW project which could be applicable to similar work in the future. The Dolly Sods work encountered several obstacles which are not typical of EOD work. Unique aspects of the Dolly Sods project which created difficulties include (1) the isolated location of the job site, (2) the extremely rugged terrain, and (3) the limitations placed on field activities due to the wilderness area status of the job site.

These difficulties could (1) cause operations to take more time than under normal conditions, (2) make coordination between personnel more difficult, and (3) present physical hazards to the site investigation personnel. The following section will address these difficulties, steps taken to work around the problems, and actions which could be taken to lessen the impact of such problems in future operations.

5.1 TIME MANAGEMENT DURING THE DOLLY SODS OPERATION

5.1.1 Description of Difficulties

Several difficulties were encountered at Dolly Sods which slowed different elements of the operation. One of these difficulties was the large amount of time spent travelling to and from the site. Travel time to and from the work areas took considerably more time than it would have at a typical site for a number of reasons. One reason was the distance of convenient lodging from the Dolly Sods Wilderness. The majority of the personnel working at Dolly Sods stayed in or around Petersburg, about a half hour from the southeast corner of the wilderness area and an hour from the northwest corner. The lack of roads to and around the work site was also a factor in the large amount of travel time. No motor vehicles are allowed into the site because of its wilderness area status. To get to the work areas, one had to drive to the edge of the wilderness area on gravel roads and, then, proceed on foot for up to an hour and a half to get to the work locations because of the restrictions upon

vehicles in the wilderness area. The rough trails also increased the time spent walking, and the lack of visible landmarks could increase the amount of time it took to find unfamiliar points. For some remote areas such as area 14, getting to and from the site took as much as five hours of a ten hour work day.

An additional means by which site conditions slowed the investigation was the difficult working conditions at the areas which were to be searched. A combination of extremely steep slopes and thick plant growth made large areas of Dolly Sods extremely difficult to search. Walking to areas 13 and 16 was so difficult that it was necessary to relocate the two areas to more accessible locations. Even in areas which were relatively open and level, five acre work sites had to be selected carefully so that they could be swept within a reasonable amount of time. The thick undergrowth could increase the amount of time required to investigate five acres dramatically.

5.1.2 Steps Taken to Alleviate Difficulties

A number of actions were taken to minimize the time consumed by the difficulties with the investigation. In order to minimize travel time, travel was reduced whenever it was possible. One means of reducing travel time was to work ten hour days, four days each week, instead of eight hour days. By working four, longer days, travel time was reduced by twenty percent. Another important means of minimizing travel time was to plan each days' work efforts carefully. Each day was organized so that work teams would not usually have to move from one area to another. In particular, the remote sites, 9, 14, 13, and 12, were cleared by one crew which attempted to mark, layout, and clear the area in one day. In addition, the UXO personnel were all in relatively good shape so the walking pace to and from the work sites was generally quite fast. Walking a mile or more into work areas was a strenuous task, so personnel in poor physical shape could have significantly slowed UXO teams.

Time spent working in areas where difficult work conditions existed was minimized by selecting relatively open spaces in areas which contained dense underbrush. In all areas, the locations of the 5-acre search sites were

chosen balancing the necessity of performing investigations in reasonable time spans along with the necessity of searching a variety of sample areas.

5.1.3 Actions to Reduce Difficulties in Future Operations

One particularly time consuming aspect of the Dolly Sods investigations, was the need to return to a site several times due to the various tasks required at each site. One plan which would potentially reduce the amount of travel time would be to send a team to a site with all of the equipment necessary to finish a site in one day. This would be particularly useful for remote areas such as 14, 11, or 12 where, despite efforts to efficiently coordinate teams, three trips were required by different crews to mark the boundary of the area, clear the areas, and record GPS readings on corner stakes. Reducing these tasks so that one team could do all of them would require that: (1) a GPS unit be available for each UXO team and an adequate number of persons be trained in using them, (2) each team have equipment available for staking the corners and clearing a five acre plot, and (3) the teams have a method, possibly using GPS, for finding an appropriate location for a five-acre search site without the area's borders being completely marked in advance. This system of organization would greatly accelerate work in remote locations because only one team would have to walk to that location. This organization would also simplify the coordination of efforts in more accessible areas because one teams efforts would not be dependent on another team. Walking time would be minimized and the project planning would be simplified. This work scheme would also mean that each UXO team would no longer be dependent upon the completion of a previous task in an area before the team could proceed to the next task in that area. For example, a UXO team which finished clearing a 5-acre site in the middle of the day could proceed to any other 5-acre site without determining whether or not it had been marked by another team.

5.2 PROBLEMS IN COORDINATION AND COMMUNICATION AT DOLLY SODS

5.2.1 Description of Difficulties

Another aspect of the Dolly Sods site investigation which was complicated by the site conditions was the coordination and communication between UXO teams and among project leaders. Communications by radio in the Dolly Sods Wilderness were difficult due to the tree cover, the mountainous topography and the large distances between UXO teams. In addition, the remote nature of the site meant that telephones, including cellular telephones, were unavailable for communication with outside personnel. Finally, site conditions were unknown until a UXO team started to work in a particular area because no one involved in planning the operation possessed knowledge about the terrain of Dolly Sods at specific sites. The difficulty of communication and the unpredictable work conditions combined to create difficulty in the coordination of work efforts at Dolly Sods.

Several factors contributed to the lack of communications at Dolly Sods. Because of the large distances between work teams and the rough terrain, it was recognized during the planning phase of the operations that communication would be difficult. The initial plan was to have each team leader carry a portable radio, linked by a repeater station which would boost the signals so that the radios would be able to reach all of the teams throughout Dolly Sods. Unfortunately, the repeater station was not effective during the course of operations. Apparently, due to the large trees and hills, the radio signals couldn't reach the repeater station. In direct contact the radios were useful for communication, but they had a limited range depending upon the surrounding terrain. In the Red Creek valley, for example, the radios were virtually useless because of the steep slopes in all directions.

It was virtually impossible to consult personnel outside of the Dolly Sods area such as project management, the Forest Service, or the Army Corps of Engineers. Forest Service radios didn't have the range to reach from Dolly Sods to the Petersburg ranger station and there were no telephones or cellular telephones available. At a more typical work location, e.g. a range clearance

operation, when serious problems arose which required the alteration of previous plans, it would have been possible to confer with the managers with authority over the operation to determine the necessary steps to be taken. At Dolly Sods, it was necessary to make decisions in the field based on the information available in order to avoid wasting large amounts of time and to maintain the project schedule.

Another aspect of the project which complicated the coordination of field activities was the shortage of information about the Dolly Sods terrain. Several areas were found to be extremely difficult or virtually impossible to investigate when UXO personnel arrived at the sites. Areas 9, 13, 14 and 16 could not be investigated as originally planned. When areas such as these were encountered, adjustments to the initial plans were then required. These decisions had to be made by the team leader or the engineer present instead of the project manager or project leader because of the lack of communication. While it is difficult to determine the effects of this decentralized leadership, it decreases the coordination of the work efforts and the capability of project management to plan the operation.

The final cause of coordination difficulties at Dolly Sods was the infrequent face-to-face communication during working hours between the parties involved. The only opportunities for communication between the project leader and engineers usually occurred just prior to or after the day's field work. This lack of face-to-face communication among the persons with authority over the site investigation was a problem with respect to coordination as each person making a decision at a particular time was not always aware of all aspects of the project. Because of the isolation in which each team spent their days, it was difficult to communicate changes in procedures or plans to the individual EOD teams or to discuss these changes with other personnel at the site.

5.2.2 Steps Taken to Alleviate Difficulties

Several steps were taken in order to cope with the lack of voice contact during the site investigation. Thorough planning was necessary so that each

crew could work through the day without receiving additional instructions from the project leader. Each crew received a set assignment at the beginning of the day, and, thus, could generally work until the end of the day without requiring additional communication and without difficulties in the coordination of work efforts. In addition, teams would stay in contact by radio when possible, sometimes relaying instructions to a team which couldn't be reached by the project leader. The engineers accompanied UXO personnel whenever possible so that any team encountering a difficulty in the field would have a person familiar with the entire project with whom to consult.

Areas which possessed extremely dense vegetation or excessively steep slopes proved to be obstacles to coordination because they forced the alteration of previous plans when teams were in the field and communication was extremely limited. This type of difficulty could only have been ascertained by prior inspection of the work area. As prior inspection would have been unreasonably time consuming, the primary solution to these obstacles was to improve communications between EOD teams and to have informed persons accompanying the teams to make necessary decisions as stated in the previous paragraph. In addition, during the development of the work plan, the difficulty of searching a particular area was considered in order to avoid terrain which would have consumed unreasonably large amounts of time. By avoiding these areas the number of areas which couldn't be searched for ordnance as planned was minimized. Finally, when a search area was so difficult to clear that no reasonable five acre site could be found, search teams would investigate five acres within the investigated area in some more reasonable pattern. This led to some areas being investigated in geometrics which were difficult to document, but allowed site investigations to be distributed approximately as proposed in the approved work plan.

The problem of infrequent face-to-face meetings during working hours between the various persons with authority over the Dolly Sods operation was addressed in several ways. As field engineers were typically accompanying UXO teams into the field, there was a large amount of communication between engineers and team leaders. This communication substituted for communication between engineers and the project leader to some degree. When important issues needed to be addressed, meetings could be scheduled between engineers and the UXO project leader.

5.2.3 Actions to Reduce Difficulties in Future Operations

During future operations, several steps could be taken to improve coordination between UXO teams and leadership personnel. The first step should be to improve communications between teams in the field. It is possible that better radio equipment would accomplish this. If improved radios failed to improve communications, then, perhaps, a check-in time could be established when teams would contact the project leader at the command post. If necessary, a team could send a member to higher, clearer ground to establish contact.

In addition, if team reorganization resulted in teams being independent, then teams could remain in close proximity, working in the same part of the wilderness as other teams. This proximity would be possible because teams would spend more time at one area instead of doing their particular task and moving on to work at several areas in a day. The benefit of improved communication would be in addition to the organizational advantages which were already described in section 5.1.3.

It is probably not feasible to investigate each part of the Dolly Sods Wilderness prior to sending in UXO personnel. Therefore, steps must be taken to adapt to the lack of information about terrain in Dolly Sods or a similar, future job. It is important to have flexible plans which can allow for necessary adjustments that must be made in the field. The work plan for Dolly Sods was flexible enough in most cases as the large work areas allowed the UXO teams to choose reasonable five-acre search sites most of the time. Future work plans for similar areas could be written to include additional flexibility, perhaps a set procedure for dealing with difficult areas and alternative search areas. Improved communications between work teams, engineers and off-site personnel would further improve operational flexibility by enabling consultations with personnel outside of Dolly Sods with authority over the Dolly Sods operation. Finally, it appears that open areas might be identifiable in advance through the use of color aerial photographs. The use of available color aerial photographs in future operations could potentially give project planners a tool for choosing work areas other than the short preliminary site visit and historical and topographic data.

Additional communication between all parties involved is necessary at projects such as Dolly Sods. One possible way to improve communications in future operations would be to set up weekly or biweekly meetings between engineers, the project leader, and the Forest Service. This would give all parties a chance to address any questions or comments which are of concern to them. It would also ensure that any changes in procedure be communicated to UXO personnel through the appropriate persons, and that all parties concerned are allowed to comment upon situations which might occur.

5.3 PHYSICAL HAZARDS AT DOLLY SODS

5.3.1 Description of Difficulties

A further source of difficulty caused by Dolly Sods site conditions is the physical danger to personnel at the site. The rugged terrain and uneven trails, and the extremely dense vegetation combined to increase the likelihood of an accident. The trails into work areas, as well as the off-trail portions of Dolly Sods, contained numerous hazardous conditions. Furthermore, the work areas themselves included similar hazards in addition to steep slopes and thick vegetation. Compounding the dangerous conditions was the lack of telephones to summon emergency aid in case of injury.

5.3.2 Minimization of Difficulties

Several steps were taken to minimize the physical danger to EOD personnel at Dolly Sods. The health and safety plan addressed many concerns and all personnel were required to read it before working on the site. In addition, an emergency medical technician (EMT) was present at the site at all times. A modular phone was acquired in order to provide communication with outside assistance if necessary. While this enabled persons at Dolly Sods to summon outside assistance, it was sometimes difficult for teams in Dolly Sods to contact the person with the telephone. Fortunately, all personnel at Dolly Sods for the majority of the work performed were in good condition and were alert to dangerous work conditions. For these reasons, the likelihood of serious injury at Dolly Sods was minimized.

Difficulties with communication in future operations have already been addressed in section 5.2. If communication was improved then it would become easier to summon help in the case of a serious accident or injury. This could be done by coordinating the efforts of UXO teams so that they could work in areas closer together. In this way, communications between work teams would be improved, it would be easier to summon an EMT if necessary, and, hopefully, it would be possible to contact someone at the base station to summon outside assistance.

5.4 MISCELLANEOUS DIFFICULTIES AT DOLLY SODS

5.4.1 Assignment of Department of Defense Identification Code

When EOD personnel from UXB attempted to turn in the UXO materials from Dolly Sods, they met with difficulties due to their lack of a DODIC (Department of Defense Identification Code). Because no DODIC was available, the turn in of the ordnance was delayed for several hours and, if not for the help of the Letterkeny Army Depot (LEAD) EOD detachment, could have been delayed for considerably longer.

The liaison visit to LEAD DRMO (Defense Reutilization and Marketing Office) was completed as planned during the site visit phase of the investigation. The UXB representative met with the receiving officer and discussed the project and what materials were likely to be turned in at the end of the project. All instructions from DRMO were followed, but the DODIC was left blank on the 1348-1 document because the Dolly Sods investigation was a civilian activity. When UXB personnel attempted to turn in the ordnance related materials at the end of the investigation, the receiving clerk would not accept the material without a DODIC, and the UXO technician was not able to consult with the DRMO receiving officer to discuss the procedure.

The UXB representative who visited the LEAD also visited the LEAD EOD detachment in order to find information about any previous UXO activities at the Dolly Sods site. Fortunately, the LEAD EOD personnel remembered this visit and allowed the UXO technician to use their units' DODIC on the 1348-1 (with some reluctance).

The lack of a DODIC extended the turn-in procedure by several hours and could have caused further delays if the LEAD EOD detachment hadn't allowed the use of their DODIC. A potential solution to this problem would be a temporary DODIC assignment for any future job with similar turn in requirements. This temporary assignment could be the permission to use the US Army Corp's DODIC or that of the nearest EOD detachment and would provide UXB with a DODIC for the 1348-1 form. Another potential solution would be an official liaison visit with the nearest EOD unit in conjunction with the DRMO visit in order to obtain help in the turn in of any UXO materials. The local EOD unit could coordinate the turn in of ordnance so that delays aren't caused by the lack of a DODIC.

5.4.2 Preservation of Archaeological Artifacts at Dolly Sods

One problem of particular concern which arose during the Dolly Sods ordnance investigation was that of preserving archaeological artifacts while conducting the surface and subsurface investigation. During the course of the operation, shallow subsurface excavations were commonly performed when strong magnetic disturbances were located using the Schoenstedt magnetometers. These explorations would rarely be deeper than six inches, and were in general, of no disturbance to the wilderness environment. Without the shallow investigations, little ordnance would have been found during the course of the surface investigation as ordnance could not have been distinguished from iron bearing rock or non-OEW related metals.

Unfortunately, it was determined by a Forest Service archaeologist that one of the areas which had been the site of several such shallow subsurface exploration was of archaeological value. This area, 7-B, was suspected of being a former logging camp and contained several types of iron artifacts such as horse shoes and logging spikes. These items would be removed from the ground by EOD personnel searching for ordnance and then placed away from the path of future sweeps in the area. These actions were in violation of standard Forest Service procedure although they weren't in violation of Metcalf & Eddy's contract. It was agreed upon that, in the future, the Forest Service policy would be followed. Metcalf & Eddy, Inc. and UXB International,

Inc. agreed to stop work and contact the Forest Service if any other archaeological items of significance were unearthed. This would give the Forest Service an opportunity to send a ranger or technician to the site to log the items found.

One problem with the agreement between Metcalf & Eddy and the Forest Service was that if archaeological artifacts were found, an archaeologist might not be immediately available. Time would have been wasted and the schedule confused by the delay. If the problem of unearthing archaeological artifacts had been addressed at an earlier time, a solution could have been determined in advance which would not have had the potential of wasting days of the contractors time. It is possible that a Forest Service archaeologist could have indicated which areas were of possible archaeological value and accompanied EOD teams in these areas.

This misunderstanding could have been prevented through better communication between the Forest Service and the contractor conducting the ordnance investigation. It might have been possible to change the investigation procedure during the comments stage, or at other points in time, so as to incorporate steps in the work plan to avoid such damage to archaeologically valuable sites. A larger distribution of the work plan and a longer period of time to collect comments would enable a better compilation of problems which various agencies see in the draft work plan. This was not possible during the course of the Dolly Sods surface and subsurface investigation due to the strict time requirements of the project.

In the future, similar situations could be prevented by better communication and planning and careful consideration of all regulations which might affect field efforts at Dolly Sods. Improvements in communication with the Forest Service might include the meetings which have been mentioned previously and the establishment of a Forest Service contact for both the contractor and any ordnance subcontractors involved. Regulations which might affect future operations in Dolly Sods are briefly mentioned in Section 4 and should be further considered before any further remediation is performed.

SECTION 6.0
PHOTOGRAPHS OF DOLLY SODS OPERATION

The Dolly Sods operation took place from July 29 to October 3, 1991. During this time engineers who were onsite carried cameras with them to record the operation as it took place. Twenty of the photographs taken are displayed here as Figures 6-1 to 6-20. The pictures display different phases of the operation from laying out the sweep areas to detonating the ordnance which was found. Captions indicate the dates on which the photographs were taken and the phase of the investigation which was taking place.

Fig. 6-1 Sweep Team performing surface search in 1-E (8/6)

Fig. 6-2 Iron Bearing Rock (8/6)

Fig. 6-3 Layout of area 1-J (8/6)

Fig. 6-4 Surface search of area 8-A (8/15)

Fig. 6-5 57 mm armor piercing round (8/21)

Fig. 6-6 Surface search of area 18 (8/27)

Fig. 6-7 Location of 81 mm WP round in area 7-A (8/30)

Fig. 6-8 Unearthed 81 mm WP from above (8/30)

Fig. 6-9 Lanes for subsurface investigation in area 7A-S3 (9/5)

Fig. 6-10 Foerester Ferex Ordnance Locator in area 7A-S1 (9/5)

Fig. 6-11 81 mm white phosphorus rounds (9/6)

Fig. 6-12 61 mm high explosive round ready for demolition (9/6)

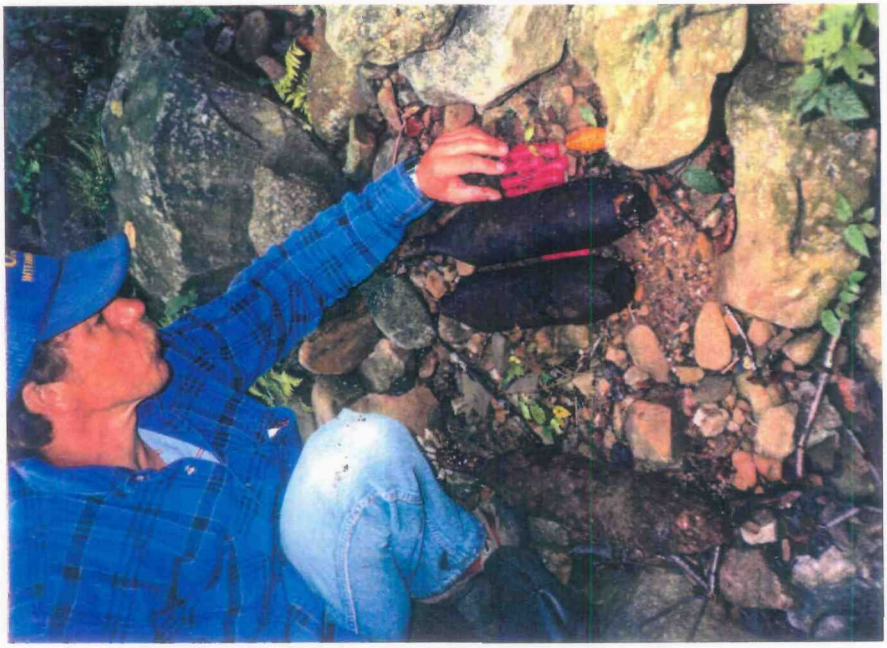

Fig. 6-13 Placement of plastic explosive (9/6)

Fig. 6-14 81 mm WP (bottom) and HE (top) rounds (9/23)

Fig. 6-15 4.2 inch mortar round in area 1J-S2 (9/21)

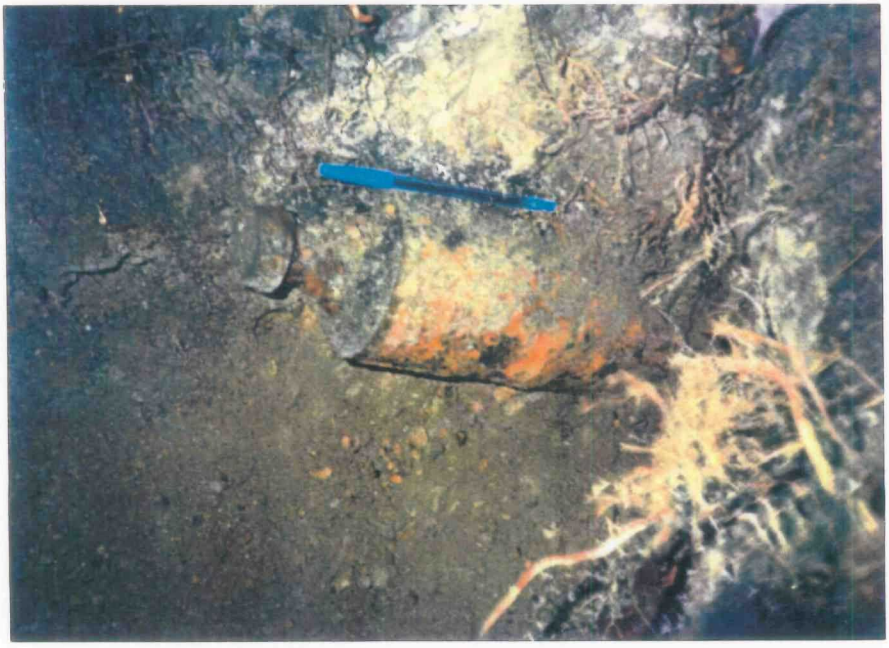

Fig. 6-16 4.2 inch mortar round in area 1J-S2 (9/21)

Fig. 6-17 4.2 inch mortar rounds in area 1 (9/26)

Fig. 6-18 4.2 inch mortar rounds found in area 1J-S1 (9/26)

Fig. 6-19 Site of detonation with shrapnel, area 7 (10/1)

Fig. 6-20 Blast area in area 14-A (10/1)

APPENDIX A

DATA SUMMARY

DATA SUMMARY

1. Scope of Work Feasibility Study
2. Inventory Project Report
3. Preliminary Assessment Report
4. Letter B. William Vanorsdale USFS Retired
5. Memorandum B. William Vanorsdale USFS Retired
6. Metcalf & Eddy's Site Visit Interviews
7. Dolly Sods Wilderness Brochure
8. USFS Environmental Assessment Statement

Scope of Work Feasibility Study

ANNEX A

FEASIBILITY STUDY
DOLLY SODS WILDERNESS AREA
(FORMER WEST VIRGINIA MANEUVER AREA), DAVIS, WEST VA

1.0 BACKGROUND AND GENERAL STATEMENT OF WORK

1.1 The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program (DERP). Ordnance and Explosive Wastes (OEW) exist on property that was formerly owned by Department of Defense (DOD). This SOW addresses the OEW that exists on the property listed below.

1.1.1 OEW is a safety hazard and constitutes an imminent and substantial endangerment to site personnel and the local populace. During this feasibility study, it is the government's intent that the contractor remove all OEW encountered.

1.2 Definitions: The definitions contained in Appendix A apply plus the following.

1.2.1 OEW: OEW is defined as explosive ordnance (see Appendix A) and soils with explosive constituents if the concentration in the soil is sufficient to present an imminent safety hazard. Soils contaminated with explosives which do not constitute an imminent safety hazard will be evaluated following Hazardous and Toxic Wastes (HTW) procedures. Surface and groundwater contaminated with explosives will be evaluated following HTW procedures.

1.2.2 Inert ordnance: An item which has functioned as designed, leaving an inert carrier; an item manufactured inert to serve a specific training purpose; and fragments from OEW.

1.2.3 EOD Specialist: An active duty military Explosive Ordnance Disposal (EOD) qualified person.

1.3 Description of project area.

1.3.1 The site is located in Grant, Tucker and Randolph Counties, W.VA.

1.3.2 The maneuver area consisted of approximately 2,181,000 acres and was used by the Army for military exercises, including mountain training and maneuvering during WWII. The exercises included firing of artillery into a designated area.

1.3.3 The site is owned by the Western Maryland Railroad and the U.S. Forest Service. The Forest Service operates a wilderness and scenic area for the general public, while the railroad restricts access to its property. The wilderness area is open to the public at all times and contains 10,215 acres. The public discovers abandoned ammunition on an annual basis and personal injuries have occurred.

2.0 OBJECTIVES

2.1 Identify the contaminated areas and determine the extent and magnitude of OEW contamination.

2.2 Determine remedial action alternatives which will alleviate OEW contamination.

3.0 DESCRIPTION OF SERVICES

3.1 (TASK A-1) RECORDS REVIEW, EVALUATION, AND SITE VISIT The contractor shall obtain, review, and evaluate existing records, studies, and data concerning the former Dolly Sods Wilderness Area. Data available within the Huntsville Division will be provided by the contracting officer (CO). Other data may exist in the files of Government agencies such as USACE, Huntington District, Federal Records Center, General Services Administration, and other appropriate agencies. Points of contact will be provided by the CO to the contractor as a starting point.

3.1.1. A site visit is authorized to complete the records review and assist in the development of the work plan. An UXO Specialist shall be included in the site visit team. An approved site safety plan is not necessary for the initial site visit. The site visit shall include a liaison visit to the DRMO-Chambersburg, Letterkenny Army Depot PA to arrange details for turn-in of inert ordnance and scrap metal located during *Tasks A-3 and A-4*.

3.2 (TASK A-2) WORK PLAN. The contractor shall prepare and submit a detailed Work Plan which describes the methods and procedures to accomplish the objectives and remaining tasks. As a part of this work plan, detailed information shall be submitted to describe the contractor's safety program, engineering controls, work practices, personal protective equipment, the technical approach to performing the tasks, and the management plan describing organizational functions, assignments, quality control system, individual qualifications, names of UXO personnel and their qualifications, functional relationships and responsibilities among the organizational elements that will participate in this SOW.

3.2.1 The Site Specific Safety Plan shall address responsibilities, hazard communication and training, medical surveillance and exposure monitoring, internal and external communications, and standard operating procedures (SOP), to include completion of ENG Form 3394 in the event of an accident.

3.2.2 The Work Plan shall include the necessary approved state permits to complete all tasks.

3.2.3 The contractor shall submit a draft Work Plan for review IAW paragraph 4.0, this SOW.

3.2.4 The contractor shall submit a final Work Plan for review and approval IAW paragraph 4.0, this SOW.

3.2.5 No access, recovery, or disposal of OEW shall be performed until the final Work Plan has been approved by the government.

3.3 (TASK A-3) DETERMINE EXTENT OF SURFACE CONTAMINATION.

3.3.1 The contractor shall furnish all personnel and equipment necessary to determine the extent of surface OEW contamination and dispose of any encountered non-chemical OEW. If toxic chemical OEW is encountered, operations in that area shall cease and the CO shall be notified, who will inturn notify military EOD for appropriate action.

3.3.2 Based on the data from *Task A-1*, the contractor shall select a total of 250 acres for surface sampling/clearing.

3.3.2.1 A planned, systematic approach shall be utilized to search and clear the sample area. This methodology shall be addressed in the work plan.

3.3.2.2 The surface clearance shall be accomplished in 5 acre plots scattered throughout the project site. Fifty 5-acre plots shall be delineated in the work plan with the rational for selection and shall be approved by the CO before clearance operations begin.

3.3.3 The contractor shall identify the cleared/contaminated areas. The areas shall be clearly defined and drawn on a topographic or planimetric map at a scale no smaller than one inch equals two thousand feet (1 inch = 2000 feet), to show their location with respect to all surface features within the project area. Each corner of each five acre plot shall be identified by state plane grid coordinates to the closest one foot and shown on the maps. The maps shall be included in the engineering report.

3.3.4 The contractor shall maintain a detailed accounting of all materials encountered on the 250 acres. This accounting shall include the amounts of OEW, their identification/condition, and disposition. The accounting shall include all non-OEW related metallic debris that is present and which will interfere with a subsurface clearance. The non-OEW related metallic debris shall be detailed in pounds per acre. OEW-related metallic debris shall be identified and detailed in pounds per acre. This accounting shall be a part of the Engineering Report.

3.3.5 Inert OEW, to include fragments, shall be collected, the inert filler explosively vented, and then placed in a contractor established holding area pending turn-in by the contractor.

3.4 (TASK A-4) DETERMINE EXTENT OF SUBSURFACE CONTAMINATION.

3.4.1 The contractor shall furnish all personnel and equipment necessary to determine the extent of subsurface OEW contamination and dispose of encountered non-chemical OEW. If toxic chemical OEW is encountered operations in that area shall cease and the CO notified, who will inturn notify military EOD for appropriate action.

3.4.2 Based on the results of *Task A-3*, the contractor shall select 10 acres for subsurface examination and clearance.

3.4.2.1 The subsurface clearance shall be accomplished in 1 acre plots scattered throughout the project site. Ten 1-acre plots shall be recommended to the CO for approval.

3.4.2.2 A planned, systematic approach shall be utilized to search the sample areas. This methodology shall be addressed in the work plan.

3.4.3 A detailed accounting of the OEW, OEW-related debris and non-OEW related metallic debris encountered shall be maintained. This accounting shall include the identification of the OEW, its condition, depth encountered, and disposition. The OEW related debris and the non-OEW related metallic debris shall be accounted for in pounds per acre. This accounting shall be a part of the Engineering Report.

3.4.4 The contractor shall utilize geophysical techniques to detect subsurface UXO. Techniques, which may include seismic methods, metal detection, magnetometer, ground penetrating radar, resistivity, geophysical diffraction topography, and electromagnetic induction shall be considered and addressed in the work plan.

3.4.4.1 The two systems proposed shall be capable of detecting a 105mm projectile to a depth of six feet and shall be addressed in the work plan.

3.4.4.2 Access shall be gained to suspect subsurface UXO to perform diagnosis and appropriate disposal procedures. All access holes shall be refilled upon completion of the investigation.

3.4.4.3 Diagnosis and disposal procedures of UXO shall be accomplished by an UXO Supervisor.

3.4.5 Inert OEW, to include fragments, which interferes with the operation of the contractor shall be collected and placed in a contractor established safe holding area at the project site for turn-in. The contractor shall vent the inert filler prior to the OEW being placed in the holding area.

3.5 (TASK A-5) TURN-IN RECOVERED INERT ORDNANCE ITEMS AND METAL SCRAP

3.5.1 The contractor shall furnish all necessary personnel and equipment to turn-in all recovered inert ordnance items and metal scrap to the Defense Property Disposal Office (DPDO), located at DRMO-Chambersburg, Letterkenny Army Depot PA. The contractor shall coordinate with the DRMO-Chambersburg during the site visit in *Task A-1*.

3.5.2 The contractor shall segregate inert ordnance items from other types of metal scrap. The inert fillers of ordnance items shall be exposed. This shall be accomplished in any way necessary to preclude rupture due to confined pressure.

3.5.3 The contractor shall complete a DD Form 1348-1 as turn-in documentation. Instructions for completing this form are contained in DOD 4160.21-M.

3.5.3.1 The contractor shall prepare a Certificate signed by the Project Senior UXO Supervisor as follows:

"I certify that the property listed hereon has been inspected by me and, to the best of my knowledge and belief, contains no items of a dangerous nature."

3.5.4 The contractor shall propose the methodology to accomplish this task in the Work Plan.

3.6 (TASK A-6) SUBMIT ENGINEERING REPORT

3.6.1 At the conclusion of the field work, the contractor shall submit an Engineering Report which consists of the following:

3.6.1.1 Map of Cleared/Contaminated Areas

3.6.1.2 Detailed accounting of found OEW/debris and estimate of extent/amount of contamination.

3.6.1.3 Remedial Action Alternatives

3.6.1.3.1 Environmental Consequences of each alternative.

3.6.1.3.2 Economic analysis of the alternatives.

3.6.1.4 Data Summary

3.6.1.5 Correspondence Summary

3.6.1.6 Lessons Learned

3.6.1.7 Color 5"x7" photographs depicting field effort and any found OEW/debris.

3.6.2 The Engineering Report presenting all data, analyses, and recommendations shall be prepared in a standard format for A-E reports and include all the items above. All site drawings shall be of engineering quality with sufficient detail to show interrelations of major features on the site map. The report shall consist of 8 1/2 by 11 inch pages with drawings folded, if necessary, to this size. The report covers shall be durable binders which hold pages firmly while allowing easy removal and/or addition of pages. A report title page shall identify the A-E, the Corps of Engineers Huntsville Division and the date. This SOW shall be incorporated in the draft report. At least 20 original 5"x7" color photographs shall be included in each copy of the draft and final Engineering Report. Photocopies of photographs are unacceptable.

3.6.3 Identify Remedial Action Alternatives. Based on the results of the investigation and contamination encountered, the A-E shall identify remedial actions for OEW at this site and include in the Engineering Report. The A-E shall select from, but not be limited to, the following alternatives:

3.6.3.1 No Action

3.6.3.2 On-site disposal

3.6.3.3 Off-site disposal

3.6.3.4 Any combination of the above.

3.6.4 Based on the analyses of alternatives, the A-E shall recommend by separate letter, recommendations and justifications for the optimum corrective measure. If separate corrective measures are recommended by the A-E for different areas within the project site, the A-E shall so specify and justify.

3.6.5 The Engineering Report shall include a recapitulation of exposure data. This shall include total number of man-hours worked on-site, total motor vehicle mileage, total number of flying hours, and number of flights.

3.7 CONTRACTOR QUALIFICATIONS: The contractor shall furnish a staff that is qualified through education, training, and experience that will accomplish the objectives and tasks of this SOW.

3.7.1 The contractor shall have experience in architect-engineering and managing multi-facet operations involving Formerly Used Defense Sites-OEW projects.

3.7.2 Minimum qualifications for the UXO Team Members:

3.7.2.1 The senior UXO Specialist on-site shall be detailed as the Senior UXO Supervisor. In addition to being a graduate of the USN EOD School, Indian Head MD, the Senior UXO Supervisor shall have served at least 15 years in active duty military EOD assignments, of which at least six years shall have been in supervisory positions. This individual shall have supervised multiple UXO Teams involved in UXO land clearance operations. Up to 3 years of active duty military experience may be substituted by contractor UXO experience on a one-day to one-day basis for the Senior UXO Supervisor. This substituted experience may be approved on a case-by-case basis by the Safety Specialists, CEHND-ED-SY.

3.7.2.2 UXO personnel designated as Team Leaders, shall be detailed as UXO Supervisors. In addition to being a graduate of the USN EOD School, Indian Head MD, the UXO Supervisor shall have served at least 10 years in active duty military EOD assignments, of which 3 years shall have been in supervisory positions.

3.7.2.3 UXO Specialists, in addition to being a graduate of the USN EOD School, Indian Head MD, shall have at least 2 years experience in active duty military EOD assignments.

3.7.2.4 Detailed resumes for all UXO personnel, to include EODS certificates, all EOD assignments, and in the case of the Senior UXO Supervisor, a detailed listing of contractor UXO experience, shall be included as part of the work plan.

3.7.3 Minimum qualifications for Non-UXO Specialist, Non-management Project personnel:

3.7.3.1 Shall have the necessary education, training and experience to accomplish assigned tasks, as certified by the contractor.

3.7.4 Certification IAW 29 CFR 1910.120(e) is not required for this site.

4.0 SUBMITTALS

4.1 Submittals. The contractor shall furnish copies of the plans and reports as identified in paragraph 4.3 to each addressee listed below in the quantities indicated. The contractor shall utilize express mail services for delivering these plans and reports. Following each submission, comments generated as a result of their review shall be incorporated. A reproducible copy shall be furnished with the final Engineering Report submittal only to CEHND-ED-PM. At the discretion of the Contracting Officer (CO), the contractor shall turn over to the CO all working papers, maps, and documents relating to this project at the end of the contract. Throughout the contract, the contractor shall make available all working papers, maps, and documents relating to this project to the CO.

ADDRESSEE	COPIES OF EACH SUBMITTAL
U.S.Army Engineer Division, Huntsville ATTN: CEHND-ED-PM (Walt Perro) 106 Wynn Drive Huntsville AL 35805-1957	6
HQ, USACE Department of the Army ATTN: CEMP-EB 20 Massachusetts Ave Washington, DC 20314-1000	3
US Army Engineer District, Huntington ATTN: CEORH-ED 502 8th St. Huntington WV 25701-2070	3
Commander 549th Ordnance Detachment (EODCC) Fort Meade MD 20755-5320	2

4.2 Correspondence. The contractor shall make a record of each phone conversation and written correspondence regarding information related to the performance of this contract. A summary of the phone conversations and written correspondence shall be submitted to the CO with the Engineering Report.

4.3 Due Dates, Submittals, and Action Items.

Submittals	calendar days after award
1. Draft Work Plan	30
2. Draft Work Plan reviewed by CEHND	45
3. Final Work Plan	60
4. Final Work Plan reviewed/approved by CEHND	75
5. Draft Engineering Report	150
6. Final Engineering Report	180

5.0 PUBLIC AFFAIRS

5.1 The contractor shall not make available or publicly disclose any data generated or reviewed under this contract or any subcontract unless specifically authorized by the CO. When approached by any person or entity requesting information about the subject of this contract, the contractor shall refer to the CO for response. Reports and data generated under this contract shall become the property of the government and distribution to any other source by the contractor is prohibited unless authorized by the CO.

5.2 The contractor shall incorporate a similar condition in all subcontracts, which states as follows:

> The subcontractor shall not make available or publicly disclose any data generated or reviewed under this subcontract unless specifically authorized by the prime contractor. When approached by any person or entity requesting information about the subject of this subcontract, the subcontractor shall refer to the prime contractor for response. Reports and data generated under this contract shall become the property of the prime contractor and distribution to any other source by the sub-contractor is prohibited unless authorized by the prime contractor.

6.0 REFERENCES

6.1 AR 75-14, Interservice Responsibilities or Explosive Ordnance Disposal.

6.2 EM 385-1-1, CE Safety and Health Requirements Manual

6.3 AR 358-40, Accident Reporting and Records dtd Apr 87 with USACE Supplement dtd Mar 90.

6.4 TM 9-1300-206, Ammunition and Explosive Standards

6.5 DOD 4160.21-M, Defense Utilization and Disposal Manual

6.6 TM 9-1300-214, Military Explosives (Paragraph 13-2)

6.7 CEHND UXO Safety Concepts and Basic Considerations

7.0 SPECIAL INSTRUCTIONS

7.1 If an unmovable UXO is encountered that cannot be detonated on site because of the closeness of inhabited areas, structures, or facilities, the CO shall be notified, who will inturn contact military EOD for applicable procedures.

7.2 The safety concepts and basic considerations outlined in reference 6.7 shall be complied with, unless exceptions are granted by the CO.

7.3 If suspected pieces of explosive are encountered, color tests shall be conducted in accordance with reference 6.6 above to provide an immediate clue to the possible identification of an energetic material.

7.4 The government shall arrange right-of-entry permits.

7.5 29 CFR 1926.100(a) requires employees to wear protective helmets in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock or burns. During the accomplishment of this SOW, hardhats need be worn only when the above possibilities are present.

Inventory Project Report

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR FORMERLY USED DEFENSE SITES
INVENTORY PROJECT REPORT
DOLLY SODS WILDERNESS AREA
(WEST VIRGINIA MANEUVER AREA)
DAVIS, WEST VIRGINIA
PROJECT NO. G03WV006500

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PART III - POLICY CONSIDERATIONS

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PART I - PROJECT DESCRIPTION

PROJECT DESCRIPTION
DOLLY SODS WILDERNESS AREA
(WEST VIRGINIA MANEUVER AREA)
DAVIS, WEST VIRGINIA
PROJECT NO. G03WV006500

1. INTRODUCTION

At the request of the Huntsville Division, the Huntington District performed a site inspection of the former West Virginia Maneuver Area on 3 December 1984. The purpose of the site inspection was to determine the presence of unsafe debris, hazardous or toxic waste, and unexploded ordnance at the site.

2. DESCRIPTION OF PROJECT

A Remedial Investigation and Feasibility Study (RI/FS) is proposed to determine the types and extent of ordnance contamination at the site and develop alternatives to safeguard the public. The public discovers ordnance at the site on an annual basis, and personal injuries have occurred.

3. DESCRIPTION OF SITE

a. The site is located in Grant, Tucker and Randolph Counties, West Virginia.

b. The former maneuver area is owned by the U.S. Forest Service and Western Maryland Railroad. The Forest Service operates a wilderness and scenic area for the general public. Access is uncontrolled. Overnight camping permits are required and warning signs are posted. The railroad restricts access to its property. Personal injuries related to ordnance have occurred in the wilderness area.

ATTACHMENT 1 - SITE SURVEY SUMMARY SHEET

SITE SURVEY SUMMARY SHEET
FOR
PROJECT NO. G03WV006500

1. SITE NAME: Dolly Sods Wilderness Area (West Virginia Maneuver Area)

2. LOCATION: Davis, West Virginia - Tucker, Grant and Randolph Counties

3. DESCRIPTION OF SITE: Former maneuver area and artillery range

4. SITE HISTORY: The site was acquired by the Army in the early 1940s for military exercises. The site was returned to the Department of Agriculture in 1950.

5. AVAILABLE STUDIES AND REPORTS: None

6. CATEGORY OF HAZARD: Unexploded ordnance

7. BASIS FOR DETERMINATION OF DOD RESPONSIBILITY: The Department of Defense leased the area for a maneuver and artillery range.

8. POC/DISTRICT: Frank Albert, (304) 529-5194, Huntington District

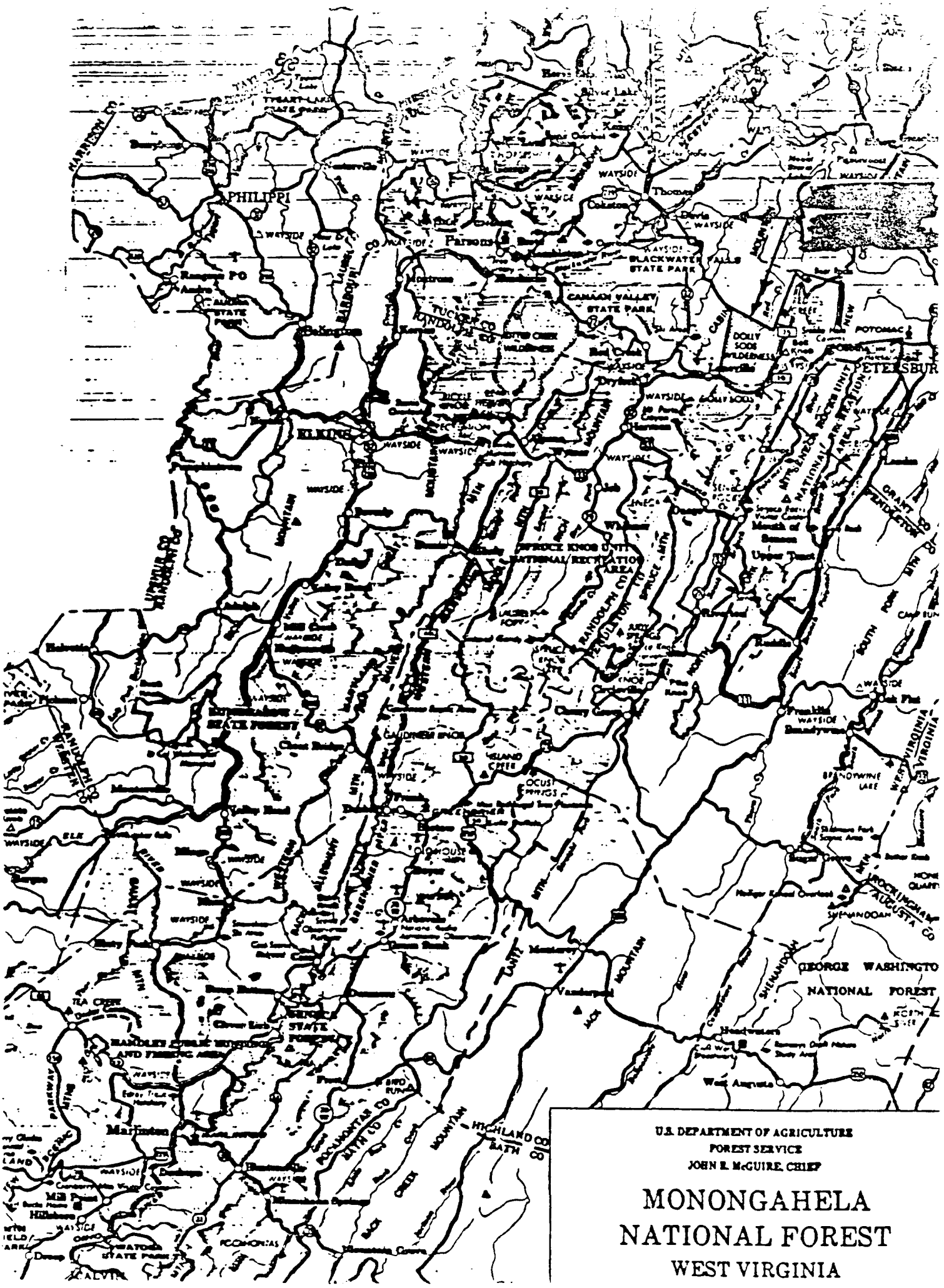
9. DESCRIPTION OF PROPOSED REMEDIAL ACTION: A Remedial Investigation and Feasibility Study are proposed to determine the types and extent of contamination and develop alternatives to safeguard the public.

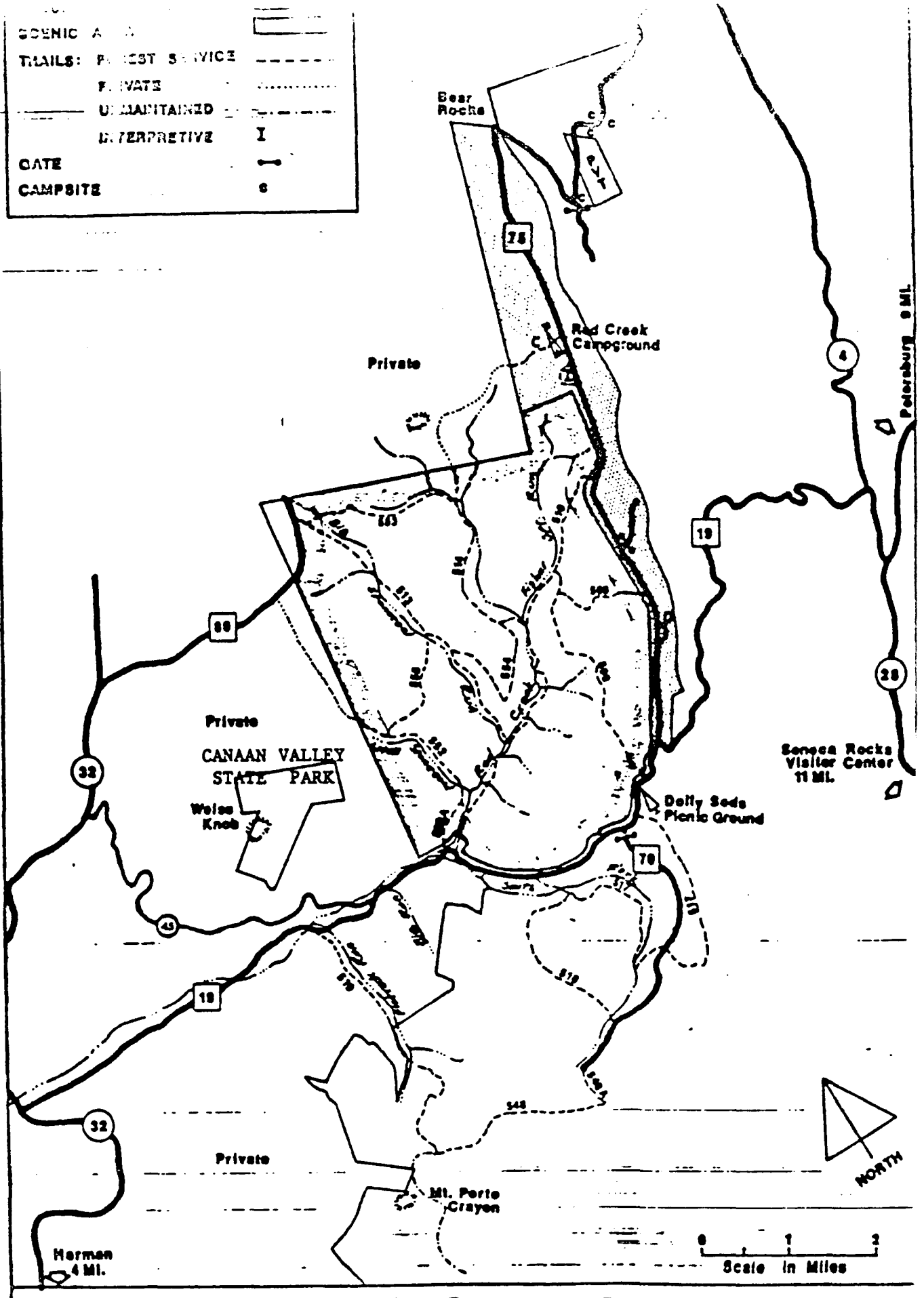
10. STATUS: The site is operated as a wilderness area by the U.S. Forest Service.

11. ESTIMATED COST: Safety to provide

ATTACHMENT 2 - COST ESTIMATE

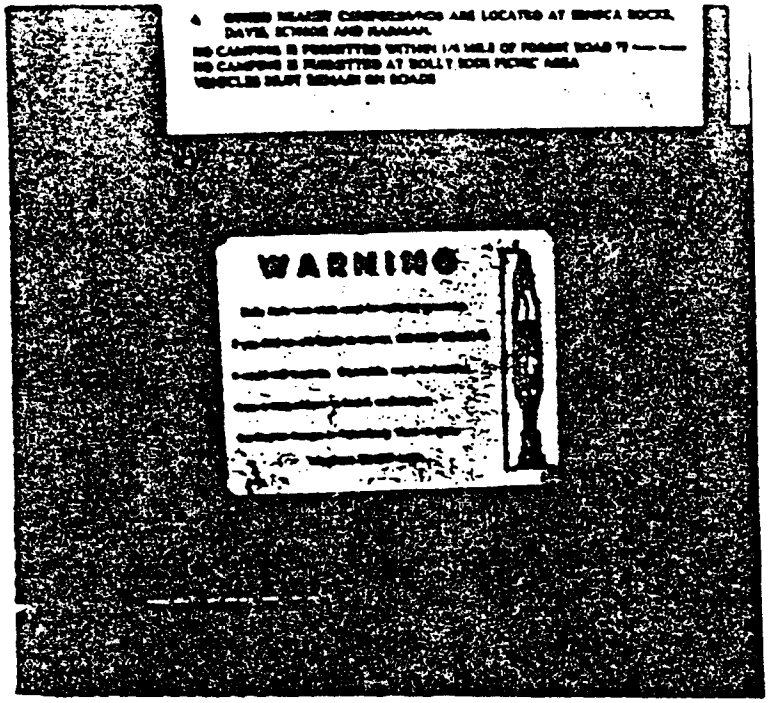
ATTACHMENT 3 - SITE MAPS AND PHOTOGRAPHS


PHILIPPI
ELKINS
BLACKWATER FALLS STATE PARK
CANAAN VALLEY STATE PARK
DOLLY SODS WILDERNESS
SPRUCE KNOB UNIT NATIONAL RECREATION AREA
GEORGE WASHINGTON NATIONAL FOREST
Marlinton
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
JOHN R. McGUIRE, CHIEF
MONONGAHELA
NATIONAL FOREST
WEST VIRGINIA

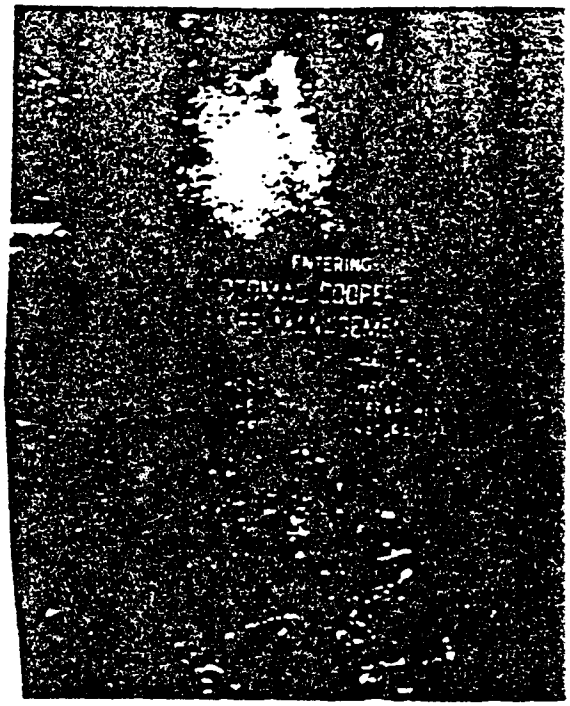


DOLLY SODS WILDERNESS AND SCENIC AREA

National Forest WEST VIRGINIA



ENTRANCE SIGN



ENTRANCE SIGN

IMPACT AREA

IMPACT AREA

PART II - FINDINGS AND DETERMINATION OF ELIGIBILITY

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY
DOLLY SODS WILDERNESS AREA
(WEST VIRGINIA MANEUVER AREA)
DAVIS, WEST VIRGINIA
PROJECT NO. G03WV006500

FINDINGS OF FACT

1. A Remedial Investigation and Feasibility Study (RI/FS) is proposed to determine the types and extent of ordnance contamination and develop alternatives to safeguard the public at this former munitions range. The general public has discovered unexploded ordnance at this site on an annual basis, and personal injuries have occurred.

2. The maneuver area consisted of a total of 2,180,742.37 acres of land. Of this, 350,416.37 acres were public lands; 48,557.00 acres were leased; and 1,781,769 acres were so-called lesser interests. According to a warning order notice dated 26 March 1945, these lesser interests were covered by "trespass agreements." Apparently, the land owners had given use of these lands to the Army verbally. There are no records surviving that describe the trespass agreements or the area they covered.

The public lands were all permitted to the Secretary of War by the Department of Agriculture, all being a part of the Monangahela National Forest. By letter dated 4 August 1943, 341,266 acres were permitted to the Army. By letter dated 10 November 1943, an additional 9,150.37 acres were permitted to the Army. Leases over 48,557 acres and one license from Western Maryland Railroad Company for a stream line were acquired by purchase and condemnation. All lands where work is recommended are those covered by the permits from the Department of Agriculture.

3. The West Virginia Maneuver Area was used by the Army for military exercises, including mountain training and maneuvering, during World War II. The exercises included firing of artillery into a designated area. No permanent facilities were constructed in the former maneuver area. There is no evidence that the area was under other than DOD control during the period of DOD interest.

4. A warning order issued for the entire facility, dated 26 March 1945, stated that on 19 March 1945 the entire 2,180,742.37 acre facility was declared surplus. A subsequent warning order dated 10 August 1945 withdrew the entire facility from surplus. A 21 April 1945 letter from the Office for Emergency Management, Office of Scientific Research and Development, Washington, DC (OEM-SRD) requested OCE issue a permit for OEM-SRD or its agencies or contractors to test fire rockets and projectiles.

The permit was issued and would expire upon the Army's relinquishing the lands back to the Department of Agriculture. On 10 August 1950, OCE relinquished the land by letter back to the Department of Agriculture. A 27 June 1945 letter from OCE to ORD advised that these lands must be decontaminated before disposal and that such must be done even if decontamination costs exceeded costs of acquiring the land in fee. All work proposed to be done is located on the lands formerly permitted to the Secretary of War by the Department of Agriculture. These lands remain under the ownership of the Department of Agriculture. There were no intervening owners who could have contributed to the ordnance contamination at the site.

5. This site is owned by the Western Maryland Railroad and the U.S. Forest Service. The Forest Service operates a wilderness and scenic area for the general public, while the railroad restricts access to its property. The wilderness area is open to the public at all times. There are signs at access points leading into the area indicating that it was used for military exercises during World War II and that old ordnance still remain in the area, and should not be handled. The public discovers abandoned shells on an annual basis and personal injuries have occurred. There is no other evidence of unsafe debris, hazardous or toxic waste, or unexploded ordnance resulting from DOD use of the site.

DETERMINATION

Based on the foregoing findings of fact, the site has been determined to have been formerly used by DOD. Moreover, it is determined that an environmental restoration project, to the extent set out herein, is an appropriate undertaking within the purview of the Defense Environmental Restoration Program, established under 10 U.S.C. 2701 et seq., for the reasons stated above.

21 May 90
Date

For EDWARD T. WATLING
Chief, Environmental Restoration Division
Directorate of Military Programs

PART III - POLICY CONSIDERATIONS

POLICY CONSIDERATIONS
DOLLY SODS WILDERNESS AREA
(WEST VIRGINIA MANEUVER AREA)
DAVIS, WEST VIRGINIA
PROJECT NO. G03WV006500

1. Current DOD policy permits remediation of DOD-generated ordnance contamination provided both the policy criteria and technical criteria are met. With regard to the policy criteria; the title transfer documents do not absolve the Government from site restoration responsibility. DOD correspondence indicates responsibility to decontaminate the site before disposal, even if the cost exceeds the cost of acquiring lands in fee. The owner did not receive compensation in lieu of restoration; the property has not been altered or beneficially used for ordnance related purposes by subsequent owners; and there were no deed restrictions violated.

2. With regard to the technical criteria, the site has been evaluated as having a Risk assessment Code (RAC) of 2. A RAC score of 2 indicates a need for action to mitigate hazards or protect personnel. A Remedial Investigation and Feasibility Study are appropriate.

PART IV - PROJECT RECOMMENDATIONS

PROJECT RECOMMENDATIONS
DOLLY SODS WILDERNESS AREA
(WEST VIRGINIA MANEUVER AREA)
DAVIS, WEST VIRGINIA
PROJECT NO. G03WV006500

1. It is recommended that the Remedial Investigation and Feasibility Study be approved as proposed.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
PROJECT DESCRIPTION
FOR
WEST VIRGINIA MANEUVER AREA
DAVIS, WEST VIRGINIA

PROJECT NO. G03WV006500

1. Introduction. As tasked by the Ohio River Division, the Huntington District has been tasked to make a site visit of the former West Virginia Maneuver Area. The purpose of the site visit was to assess the possible hazard condition of the former Maneuver Area.

2. Project Description. A decontamination survey and remedial action of a previously used munition range with unknown amount and type of hazardous unexploded ordnance is proposed. The project consists of making a survey report, locating unexploded ordnances, determining site clearance procedures and proper disposal methods for the environmental restoration of the site.

3. Description of Site: The project site is in Grant and Tucker Counties and owned by The Western Maryland Railroad and the U.S. Forest Service. The Forest Service operates a wilderness and scenic area for the general public while the railroad restricts access to the area. There are signs leading into the wilderness area that the area was used for military exercises during World War II and that some old ordnances still remain in the area. The area is at a very high elevation and temperatures are comparable to those several hundred miles to the north. The area is strictly controlled by the Forest Service and motorized equipment is prohibited in the wilderness area. The existance of unexploded ordnance is a prime concern of the Forest Service, as identification of unexploded ordnance by the general public is made on an annual basis.

SITE SURVEY SUMMARY
FOR
PROJECT NO. G03WV006500

SITE NAME: West Virginia Maneuver Area

LOCATION: Davis, West Virginia - Tucker and Grant Counties

DESCRIPTION OF PROJECT: Former maneuver area and artillery range.

SITE HISTORY: The site was acquired by the Army in the early 1940's for military exercises. The site was turned over to the Department of Agriculture in 1950.

AVAILABLE STUDIES AND REPORTS: None

CATEGORY OF HAZARDS: Ordnance and explosive waste project.

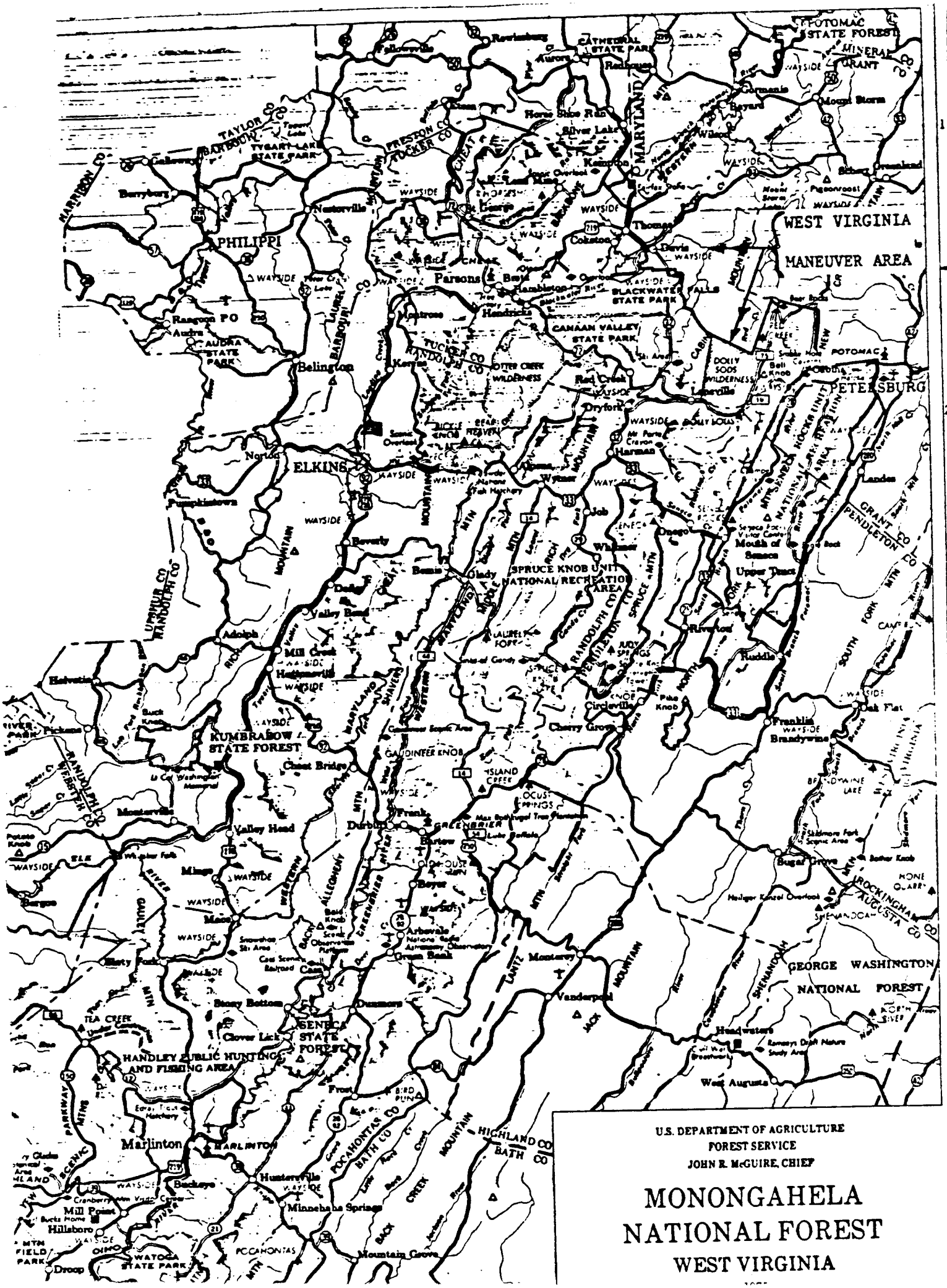
BASIS OF DOD RESPONSIBILITY: The Department of Defense leased the area for a maneuver and artillery range. The site was later abandoned by DOD and obtained by the Western Maryland Railroad and the U.S. Forest Service.

POS/DISTRICT: Frank R. Albert, Jr., 304-529-5194

STATUS: The U.S. Forest Service currently operates a wilderness and scenic area while remaining portions, which are privately owned, are restricted from the public.

DESCRIPTION OF PROPOSED REMEDIAL ACTION: A decontamination survey and remedial action of a previously used munition range with unknown amount and type of hazardous unexploded ordnance is proposed.

ESTIMATED COSTS: $500,000


U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
JOHN R. McGUIRE, CHIEF
MONONGAHELA
NATIONAL FOREST
WEST VIRGINIA
WEST VIRGINIA
MANEUVER AREA 15
PHILIPPI
ELKINS
Parsons
Belington
Buckhannon
Weston
Glenville
Spencer
Ripley
Sutton
Summersville
Richwood
Marlinton
Hillsboro
Droop
Franklin
Petersburg
Harman
Dryfork
Mount Storm
Davis
Thomas
Canaan Valley State Park
Blackwater Falls State Park
Tygart Lake State Park
Cathedral State Park
Potomac State Forest
Kumbrabow State Forest
Seneca State Forest
Handley Public Hunting and Fishing Area
Spruce Knob National Recreation Area
Monongahela National Forest
George Washington National Forest
Watoga State Park
Audra State Park
Mill Point
Hillsboro
Huntersville
Minnehaha Springs
Mountain Grove
Marlinton
Buckeye
Frank
Durbin
Bartow
Mingo
Mace
Valley Head
Mill Creek
Hacker Valley
Beverly
Elkins
Norton
Pickens
Helvetia
Adolph
Bemis
Glady
Dailey
Job
Whitmer
Mouth of Seneca
Upper Tract
Ruddle
Circleville
Franklin
Brandywine
Bayard
Wilson
Horse Shoe Run
Silver Lake
Kerens
Belington
Beverly
Huttonsville
Cheat Bridge
Gaudineer Knob
Cherry Grove
Bartow
Durbin
Frank
Arbovale
Green Bank
Cass
Bemis
Dunmore
Vanderpool
Headwaters
West Augusta
Bright Bottom
Clover Lick
Tea Creek
Fraser
Bird Run
Cranberry
Mill Point
Hillsboro
Droop
Watoga State Park
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Upper Tract
Ruddle
Circleville
Cherry Grove
Franklin
Brandywine
Bayard
Wilson
Horse Shoe Run
Silver Lake
Kerens
Belington
Beverly
Huttonsville
Cheat Bridge
Gaudineer Knob
Cherry Grove
Bartow
Durbin
Frank
Arbovale
Green Bank
Cass
Bemis
Dunmore
Vanderpool
Headwaters
West Augusta
Bright Bottom
Clover Lick
Tea Creek
Fraser
Bird Run
Cranberry
Mill Point
Hillsboro
Droop
Watoga State Park
Pocahontas
Mountain Grove
Minnehaha Springs
Huntersville
Buckeye
Marlinton
Hillsboro
Bugar Grove
Brandywine
Franklin
Oak Flat
Ruddle
Circleville
Cherry Grove
Upper Tract
Mouth of Seneca
Job
Whitmer
Harman
Dryfork
Davis
Thomas
Coketon
Bayard
Wilson
Mount Storm
Petersburg
Landes
Pendleton Co
Grant Co
Randolph Co
Pocahontas Co
Bath Co
Highland Co
Augusta Co
Rockingham Co
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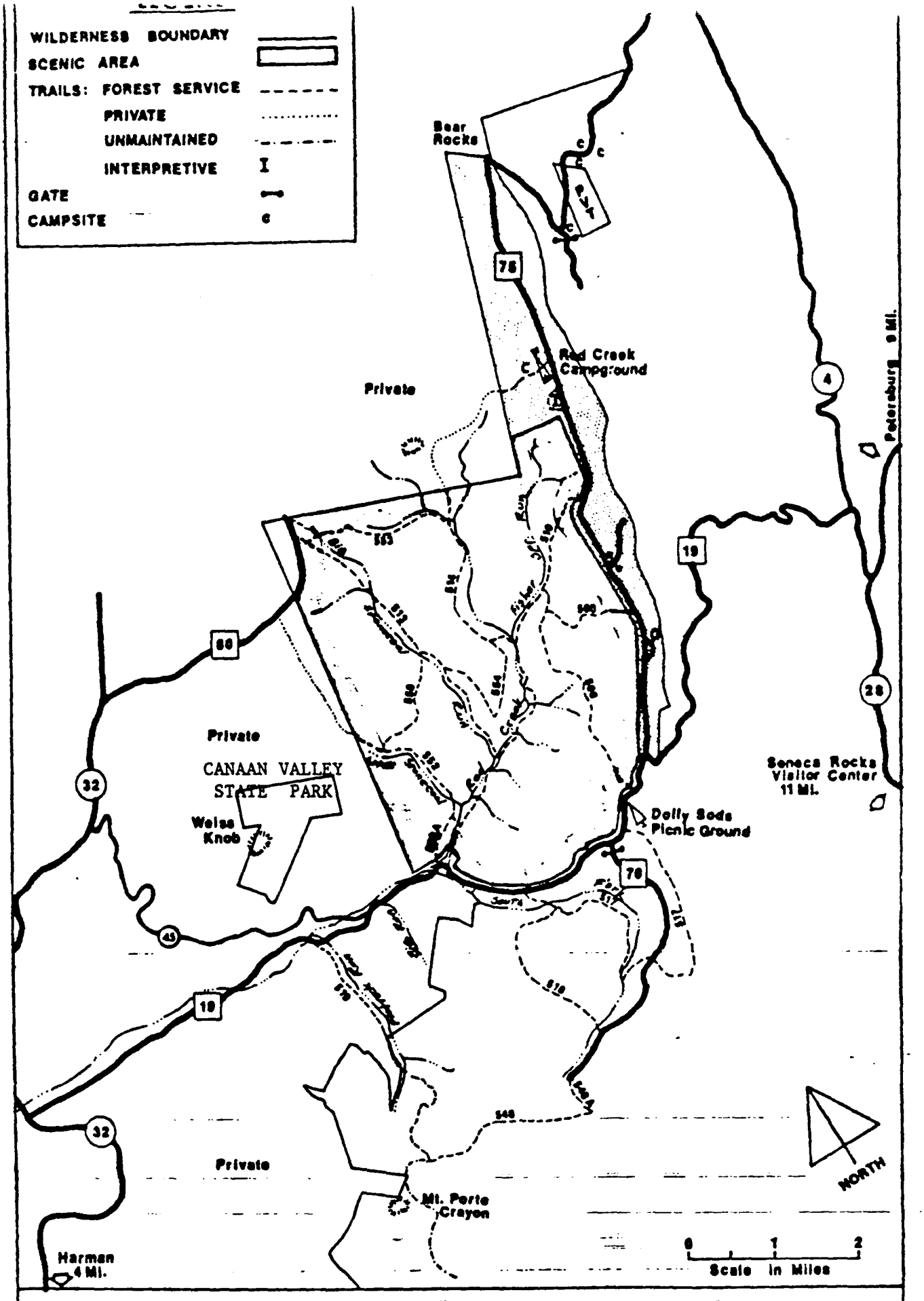
Marlinton
Huntersville
Minnehaha Springs
Mountain Grove



DOLLY SODS WILDERNESS AND SCENIC AREA

MONONGAHELA *National Forest* WEST VIRGINIA

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR FORMERLY USED SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY
WEST VIRGINIA MANEUVER AREA
DAVIS, WEST VIRGINIA
PROJECT NO. G03WV006500

FINDINGS OF FACT

1. A decontamination survey and ordnance removal project at a previously used munition range with unknown amount and type of hazardous unexploded ordnance is proposed. The project consists of making a survey report, locating unexploded ordnance, and determining site clearance procedures and proper disposal methods. The general public has uncovered abandoned unexploded ordnance on an annual basis.

2. The West Virginia Maneuver Area was an extremely large area in North Central West Virginia used by the Department of the Army for mountain training and maneuvering. The remaining records are skimpy, at best. It is not at all certain that good documentation ever existed for the land acquisitions that took place during the heat of the national emergency, World War II. The maneuver area consisted of a total of 2,180,367 acres of land. Of this, 350,531 acres were public lands of which more will be said later; 48,067 acres were leased, and 1,781,769 acres were so-called lesser interests. According to a warning order notice dated 26 March 1945, these lesser interests were covered by "trespass agreements." Apparently, the owners and Army agreed, given the contemporaneous emergency, that Army would shoot first and pay later. There are no records surviving that describe the trespass agreements or the area they covered. From the writer's extensive knowledge of World War II land acquisition procedures, it can be safely surmised that there is no information of record in any of the local courthouses as to this project.

Fortunately, better documentation remains for the public lands and leased lands. The public lands were all permitted to the Secretary of War by Department of Agriculture, all being a part (and virtually all of) the Monongahela National Forest. By letter dated 4 August 1943, 341,266 acres of Monongahela National Forest in Preston, Grant, Randolph, Tucker, and Pendleton counties, West Virginia, is so permitted. By letter dated November 10, 1943, an additional 9,265 acres is said to be permitted, but from that should be subtracted 114.63 acres which was excepted by attached map (which did not survive the audit pruning of the files), leaving a true acreage of 9,150.37, or a total of 350,416.37 acres of land under permit from the Department of Agriculture. Additionally, 65 tracts totalling 48,557 acres and one license from Western Maryland Railroad

Company for a stream line were acquired by purchase and condemnation during World War II. All lands where work is recommended are those covered by the permits from Department of Agriculture.

3. The U.S. Army used the area for military exercises during World War II. The exercises included the use of artillery into a designated area. No permanent facilities were constructed associated with the former maneuver area.

4. Just as the acquisition of these lands was rapid, and no actual legal description of the lands acquired survives (perhaps because there never was one due to unavailability of manpower or time), so was the disposal process unusual. Apparently, a warning order issued for the entire facility, dated 26 March 1945, stating that on 19 March 1945 the entire 2,180,367 acre facility was declared surplus (350,531 acres public lands), 1,781,769 acres "lesser interests," and 48,067 acres leased). However, a subsequent warning order dated 10 August 1945 withdrew the entire facility from surplus. As a Second Endorsement from the Louisville District Engineer to OCE through ORD dated 18 July 1950 notes, a 21 April 1945 letter from Office for Emergency Management, Office of Scientific Research and Development, Washington DC (hereinafter OEM-SRD) requested OCE issue a permit for OEM-SRD or its agencies or contractors to test fire rockets and projectiles. The Louisville endorsement indicates no further information was available as to whether such a permit was issued. Thereupon, in the normal process, on 10 August 1950, OCE relinquished the land by letter back to Department of Agriculture. What OCE, and apparently Louisville District, were not aware of was that such a permit had been issued and a copy is hereto attached. Apparently the permit expired by its own items either prior to or simultaneously with Army's relinquishment of the land back to Department of Agriculture. Also of interest, and perhaps importance, attached is a copy of a 27 June 1945 letter from OCE to ORD advising that these lands must be decontaminated before disposal and that must be done even if decontamination costs exceed costs of acquiring the land in fee. All work to be done is located on the lands permitted to Secretary of War by the Department of Agriculture and remain under the ownership of the Department of Agriculture.

5. The project site is owned by private industry and the U.S. Forest Service. The Forest Service operates a wilderness and scenic area for the general public while private industry restricts the area. The wilderness area is open to the public at all times. There are signs leading into the area indicating that the area was used for military exercises during World War II and that old ordnance still remain in the area, creating a severe hazard to the public. The public discovers these abandoned shells on an annual basis and in some cases, personnel injury has occurred.

Preliminary Assessment Report

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM (DERP)

PRELIMINARY ASSESSMENT REPORT

DOLLY SODS NATIONAL FOREST

PROJECT NO. G03WV00130

MONONGAHELA NATIONAL FOREST
PETERSBURG, WEST VIRGINIA

1. Introduction. This installation is located in Randolph and Tucker Counties, 15 miles west of Petersburg, West Virginia. The installation was an area where DoD conducted various military exercies and mainly used as an artillery range. Old ordnance is found yearly by the general public as numerous trails are throughout the National Forest. The impact area is on private and Department of Agriculture lands operated by the Forest Service. The portion of the impact area in National Forest has been designated by Congress in 1975 to the Dolly Sods Wilderness Area. Strict rules are enforced to preserve the natural condition of the area. One typical rule is that motorized equipment is prohibited at all times in the wilderness area.

2. Scope of Work. The following item is recommended for inclusion in the DERP program.

a. Cleanup of former artillery range.

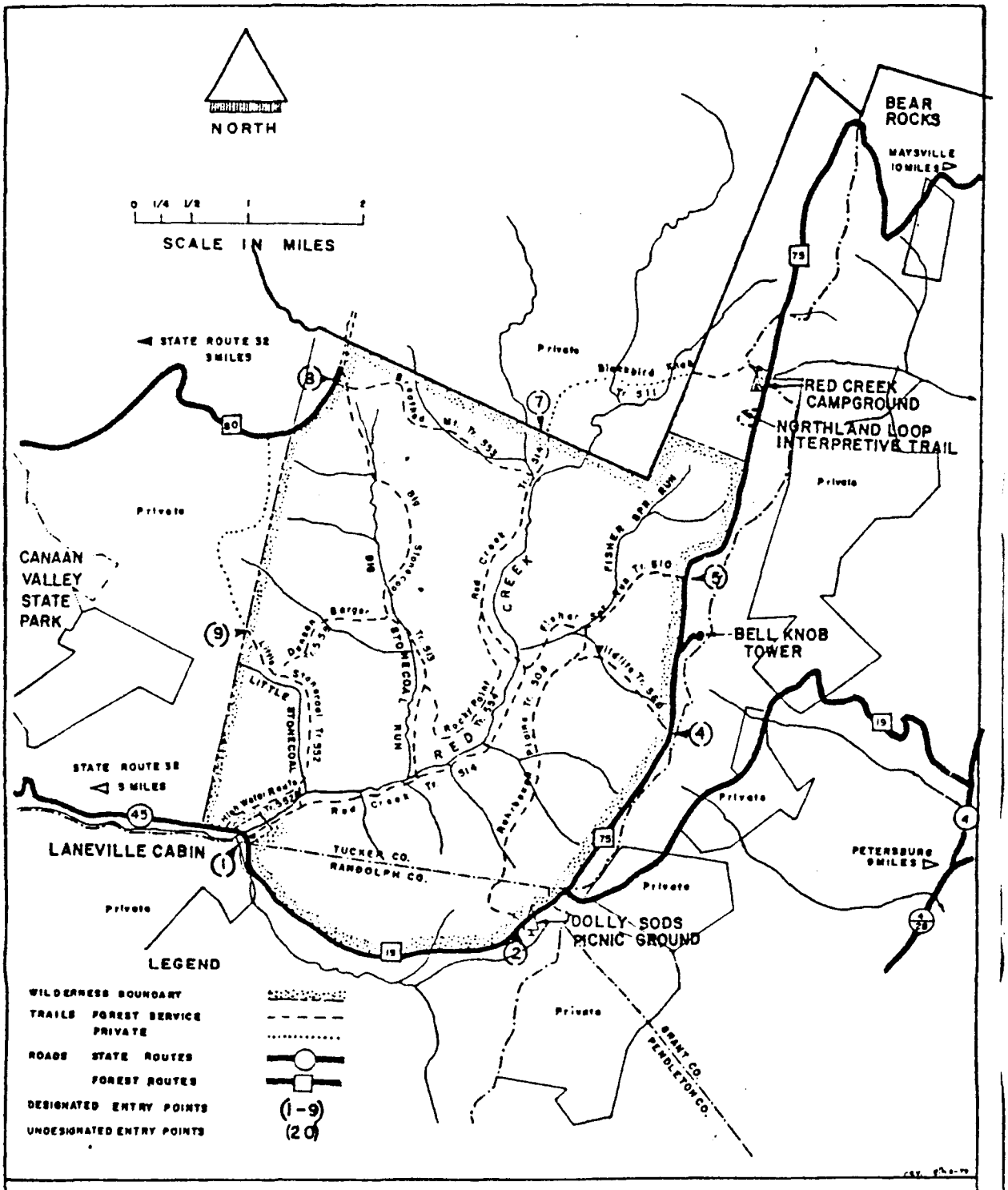
3. Photograph - Typical pictures of area is attached.

4. Real Estate Data - See enclosed information.

5. District POC - David J. Lambert 304-529-5246.

6. Recommendation. A review of all data to date indicates that the area was used for various military exercises during World War II and mainly as an artillery range. Since old ordnance is found on a yearly basis, it is recommended that this preliminary assessment report be forwarded to Huntsville Division for further investigation and evaluation. The Huntsville Division should prepare the complete survey report including the determination and findings sheet and complete the Real Estate search.

5 Encls
1. Photographs
2. Real Estate Data
3. Dolly Sods Brochure
4. Monongahela National Forest Plan Sheet
5. Impact Area - Quad Sheets



DOLLY SODS WILDERNESS

MONONGAHELA National Forest WEST VIRGINIA

Dolly Sods Wilderness

The 10,215-acre Dolly Sods Wilderness is located in Tucker and Randolph Counties, West Virginia within the Monongahela National Forest. This rugged mountainous area is set atop the Allegheny Mountains at the 4000 foot level, at the headwaters of Red Creek which runs into the Dry Fork River. It is a land of harsh climate, with dense rhododendron, thick, second-growth hardwood and spruce stands, bogs, streams, beaver ponds, and some open "sod" areas (sod is a local name for pastureland). The area is named for the pioneer Dahle (Dolly) family, which formerly owned and cleared some of the area for grazing.

Permits: One signed permit is required for each entry of individuals or a group into the wilderness. Day users as well as overnight campers must have permits. Maintained roads are outside the wilderness and permits are not needed to travel on them. Permits may be obtained free by writing, calling, or stopping at Forest Service Ranger offices at Parsons, Richwood, Bartow, Marlinton, Petersburg, White Sulphur Springs, or the Forest Supervisor's Office at Elkins. During the summer months permits are available at the Seneca Rocks Visitor Center and Bell Knob Tower. Check the nearest ranger station for the Visitor Center and tower schedules. It is recommended that Dolly Sods permits be obtained from Petersburg, Bell Knob Tower, or Seneca Rocks Visitor Center. Information needed is: Applicant's name and address; expected date and duration of visit; location of entry and exit, and number of people in party.

Maximum number of people per party is 10.,

of Motorized Equipment is prohibited in all rnesses.

ping is Permitted in this Wilderness, but not within 0 feet of live streams, trails, or roads, except at designated campsites. Leave one fire ring at designated ampsites. At all other campsites, remove the fire ring nd all other traces of human presence. The use of small ooking and heating stoves, rather than campfires, is ecommended.

Garbage and Human Waste: No garbage or toilet facilities are provided in the Wilderness. Pack out any garbage or other trash that cannot be burned. All human wastes should be buried at least 200 feet from trails, campsites, or streams. Leave a clean and sanitary camp for those who follow you.

More than 25 miles of Hiking Trails are maintained in and near the Wilderness. Most are marked with blue

paint on trees. The trails are not suitable for horses. Extreme care should be exercised in crossing streams during periods of high water and in cooler months.

Weather: You should plan for rain (or snow in winter, spring, and fall). The area receives more than 55 inches of precipitation annually, usually quite evenly distributed through the year. The weather frequently changes suddenly, and 2 to 3 inches of rain or 12 to 18 inches of snow in a single storm is not uncommon. Temperatures at high elevations are comparable to those several hundred miles to the north. Frost may occur during any month of the year. It is very important to have proper equipment and clothing for protection against insects, snakes, rain, and cold. Know the symptoms of hypothermia and how to treat it.

Water should be considered unsafe for drinking. To be on the safe side, treat it chemically or boil it before using.

Hunting and Fishing are Permitted subject to West Virginia State hunting and fishing regulations.

U.S. Geological Survey Topographic Maps: 7.5 minute topographic maps may be purchased from the U.S. Geological Survey, 12201 Sunrise Valley Drive, Reston, Virginia 22092. Four maps are needed to give complete coverage of the Wilderness. The quadrangles are Blackbird Knob, Blackwater Falls, Laneville, and Hopeville. These maps are excellent for topography, but not all trail locations shown are correct.

Safety: Always travel with a companion. If traveling in a group, make sure no one leaves the group without leaving word. Carry map and compass. If you do get lost, be deliberate in planning your moves. Don't get excited. Don't run.

The Dolly Sods area was used for military exercises during World War II. Some old ordnance remains. If you find an old mortar or shell, DO NOT TOUCH IT. It could still explode. Mark its location, draw a map of how to find it and contact the district ranger at the address below.

Wilderness Management: National Forest Wilderness is managed primarily to perpetuate natural conditions for future generations. Public use for primitive recreation is permitted only to the extent consistent with maintaining high-quality Wilderness. You will find few, if any, facilities for comfort or convenience. Please help maintain the wilderness character of this area.

Information: For additional information concerning Dolly Sods Wilderness, write District Ranger, Monongahela National Forest, Petersburg, West Virginia 26847. Telephone 304/257-4488.

National Forests provide a variety of uses, products, and pleasures for people. They were originally established to protect watersheds and supply timber, and they still do. But in addition, these forest lands are now rich in wildlife, forage, and recreation opportunities. These and other uses are managed by the Forest Service, U.S. Department of Agriculture. Specialists in many fields coordinate and balance uses so that all Americans will receive maximum benefits throughout the years.

☆U. S. Government Printing Office: 1979—652-088

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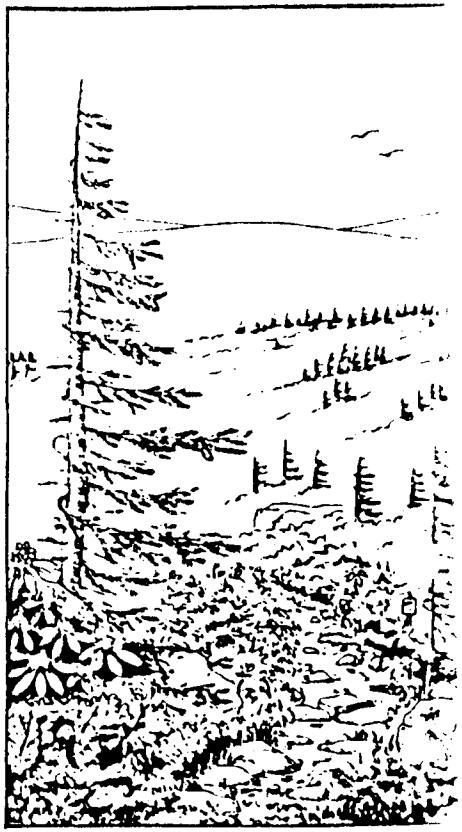
DOLLY SOD WILDERNESS



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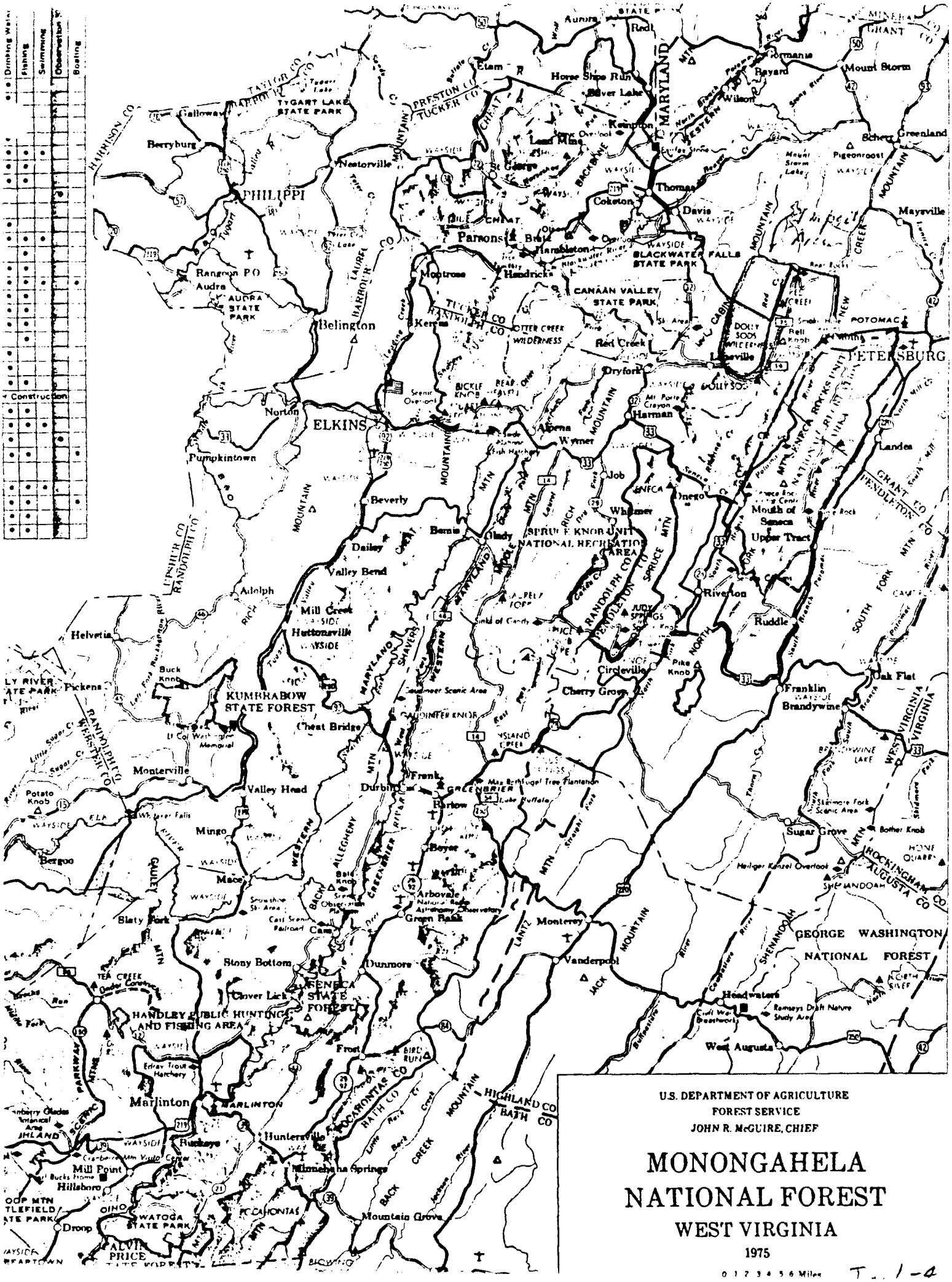
Drinking Water
Fishing
Swimming
Observation
Boating
Construction
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
JOHN R. McGUIRE, CHIEF
MONONGAHELA
NATIONAL FOREST
WEST VIRGINIA
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PHILIPPI
ELKINS
PETERSBURG
MARYLAND
VIRGINIA
TYGART LAKE STATE PARK
BLACKWATER FALLS STATE PARK
CANAAN VALLEY STATE PARK
AUDRA STATE PARK
KUMBRABOW STATE FOREST
SPRUCE KNOB-SENECA ROCKS NATIONAL RECREATION AREA
GEORGE WASHINGTON NATIONAL FOREST
SENECA STATE FOREST
HANDLEY PUBLIC HUNTING AND FISHING AREA
WATOGA STATE PARK
ALVIN PRICE STATE PROPERTY
Berryburg
Nestorville
Parsons
Thomas
Davis
Coketon
Hambleton
Hendricks
Mouthrose
Belington
Kerens
Red Creek
Dryfork
Harman
Wymer
Norton
Pumpkintown
Beverly
Bemis
Dailey
Valley Bend
Adolph
Mill Creek
Huttonsville
Helvetia
Pickens
Cheat Bridge
Monterville
Valley Head
Durbin
Frank
Mingo
Bergoo
Mace
Boyer
Arbovale
Green Bank
Cass
Slaty Fork
Stony Bottom
Dunmore
Clover Lick
Frost
Marlinton
Hunterville
Minnehaha Springs
Mill Point
Hillsboro
Mountain Grove
Monterey
Vanderpool
Headwaters
West Augusta
Sugar Grove
Franklin
Brandywine
Oak Flat
Circleville
Cherry Grove
Riverton
Ruddle
Upper Tract
Mouth of Seneca
Onego
Job
Whitmer
Landes
Mayersville
Pigeonroost
Greenland
Mount Storm
Bayard
Wilson
Romanie
Horse Shoe Run
Silver Lake
Kempton
Lead Mine
St George
Etam
Galloway
Aurora
Rodd
Rangoon PO
Audra
Bickle Knob
Bear Rocks
Dolly Sods Wilderness
Otter Creek Wilderness
Gaudineer Scenic Area
Max Bernhugel Tree Plantation
Seneca Rocks
Seneca Rock
Smoke Hole
Bell Knob
Mt Porte Crayon
Spruce Knob
Judy Springs
Pike Knob
Bother Knob
Heiligar Kanzel Overlook
Shenandoah
Cranberry Glades Botanical Area
Cranberry Mtn Visitor Center
Civil War Battlefield
Romneys Draft Nature Study Area
Edray Trout Hatchery
Cass Scenic Railroad
Snowshoe Ski Area
Potato Knob
Whitmer Falls
Buck Knob
Lt Col Washington Memorial
Tea Creek
Cedar Creek
Pocahontas
Bath Co
Highland Co
Randolph Co
Pendleton Co
Grant Co
Preston Co
Tucker Co
Harrison Co
Taylor Co
Upshur Co
Pocahontas Co
Augusta Co
Rockingham Co
Shenandoah Co
Hardy Co
Pendleton Co
Tygart River
Cheat River
Shenandoah River
Potomac River
Greenbrier River
Gauley River
Elk River
Sugar Creek
Little Sugar Creek
Tea Creek
Back Creek
Little Back Creek
Jackson River
Cowpasture River
Bullpasture River
Dry Fork
Laurel Creek
Leading Creek
Stony River
Seneca Creek
Spruce Knob-Seneca Rocks National Recreation Area
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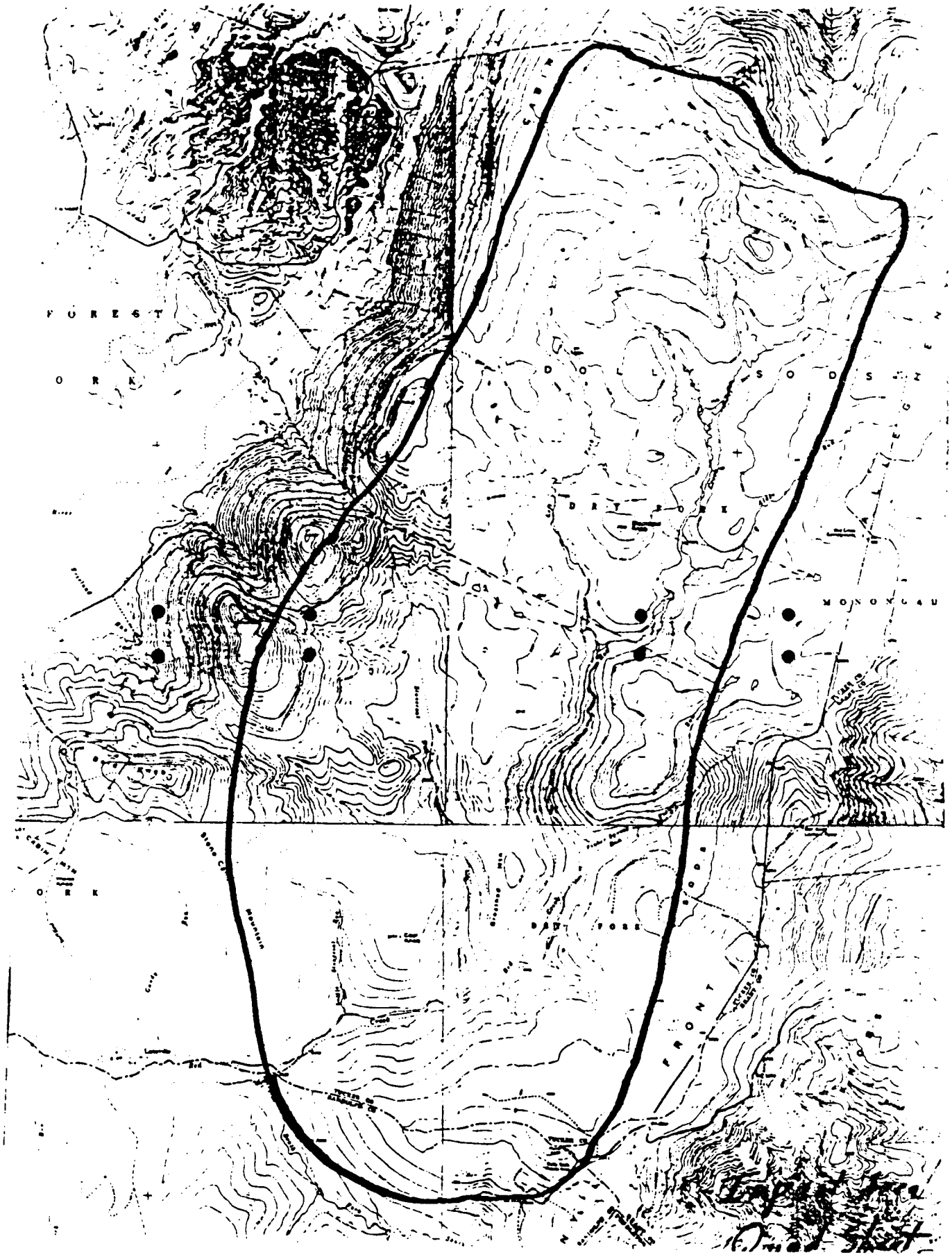

FOREST
O R K
D O L L S O D S Z
D R Y F O R K
MONONGAU
O R K
BAUT FORK
FRONT

Letter

B. William Vanorsdale USFS Retired

METCALF & EDDY
APR 22 1991
RECEIVED

P. O. Box 2445
1003 South Henry Avenue
Elkins, WV 26241
April 16, 1991

Metcalf & Eddy
P. O. Box 4043
Woburn, MA 01888-4043

Dear Folks, (Attention: Michael A. Lamphier or Bill Mooney)

Reference your letter dated April 11, 1991 and our telephone conversation of April 12th.

Referring to the map you provided of the Dolly Sods Wilderness Area, it appears there was relatively little intentional artillary firing across the area; although mortars could have been used anywhere in the area.

Cabin Mountain, at the northwest corner of the DSWA was a primary impact area from the east and I'm quite sure from the west - Canaan Valley - as well. The Blackbird Knob area was also an impact area from the east.

Gun emplacements were located along the Forest Service Road on the crest of the Allegheny Mountain from a point near the Bell Knob Tower, north to the end of the road.

Some of these artillery pieces would have fired across the northern extremity of the DSWA.

Emplacements on the east side of the mountain on the Allegheny Front (off your map) would have been north of the DSWA.

Unfortunately, I know of noone who could confirm the location of gun emplacements in Canaan Valley but the target area would have been Cabin Mountain north of the access road from the Valley - Yokum Run Road. On your map this would be the head of Big Stonecoal Run and the northwest corner of the DSWA.

I am enclosing a copy of a resume prepared August 31, 1978 which you may find helpful. Also, the following excerpts were taken from a memorandum dated July 19, 1978 by the then District Ranger at Petersburg:

"Last week an explosive ordinance team from Fort Lee, Virginia disposed of the second projectile reported this year by hikers". (Underlining mine).

Metcalf & Eddy, 4/16/91

"The last one (explosive) disposed of by the explosive ordinance team was a live white phosphorus round, 4.2 inches in diameter, about 18 inches long. The firing pin was in the firing position *********". This would confirm my recollection that the artillery pieces were 105mm in size.

I have been told it was the Third Army that used the maneuver area in 1943, not the Eighth Army as I had said. There were, of course, various other units including the Army's 94th. Signal Battalion (Ramberg); and reportedly, the 84th Engineers, 485th., 486th. and 487th. Medical Collecting Company with 30 ambulances (Spanitz).

I trust this will be of some help in your planning and in the decontamination process.

Kindly let me know if I can be of further help.

Enclosures

Sincerely,

B. WILLIAM VANORSDALE
U.S.F.S. Retired

Memorandum

B. William Vanorsdale USFS Retired

Received 22 APR 19

WORLD WAR II ARMY MANEUVERS - MONONGAHELA NATIONAL FOREST

Re/ postscript on Potomac's memorandum of July 19th.

To the best of my recollection, here are some data regarding Army Maneuvers on the Monongahela during WWII days. Even though I was up to my neck in the activity I must admit that some things are hazy and some I have forgotten altogether. Ms. Alice Welton, Editor of the Grant County Press could "dig" up some more facts, if needed; also retirees such as Jeff Goldisen, Charles Kelsey and Olliver L. "Lake" Mullenax could help. They were our field laison people and travelled with the Army units. C. R. McKim, Elkins could also help, I believe.

Size of maneuvers:

I would not know the number of men who maneuvered here. One outfit was trained and shipped out, only to be followed by another.

The area used was most of the Potomac and Cheat Districts; probably a small part of the Greenbrier and a lot of private land.

Type of Operation:

Full field maneuvers - night and day; heavy artillary and mortar firing; Rock climbing - day and night; night convoy movements; small arms use, etc.

Types of Projectiles:

105 MM Howitzers; 20 and 40-MM; mortars and small arms.

Years & Seasons:

Began in the spring or summer of 1943; ended 1944.

Remarks:

The Forest Service was given full responsibility for fire control in the maneuver area. The area of responsibility was extended beyond the forest Proclamation Boundary. Route 42 was the eastern boundary; US 50 was the northern boundary.

On the Potomac District additional lookout towers were built at Niges Cliff (south of Rt. 33) on North Mtn.; Pigeon Roost (now State-owned) near Bismark; Dolly Sods Tower was moved from original location to present location at Bell Knob. I believe only one tower was built on the Cheat - Bearden Knob near Davis.

Gun emplacements along Allegheny Front (Potomac) fired across Allegheny to Blackbird Knob Area near the head of Red Creek; emplacements along Dolly Sods Road fired across to Cabin Mtn.; it is possible that emplacements in Canaan Valley fired against Cabin Mtn. also.

Rock Climbing was done on Seneca Rocks, Champ Rocks, Blue Rocks and many other places. Fox Holes, of course, were everywhere.

Headquarters was set up in Elkins; a Division 7 Hdqrs. occupied the large field along the North Fork River north of the pumping station just north of Seneca Rocks - farm now owned by Mr. Harley Bennett (owned then by Wilbert Kisamore). I believe there was a Division Hdqrs. in Canaan Valley too, near Davis.

Telephone systems, composed of many circuits, stretched from Elkins to Seneca Hdqrs. and from Elkins to Davis.

The Army furnished the Potomac with two jeeps; the other districts had one or two. These were the first conventional jeeps ever to be used in the area.

We had numerous fires caused by artillery shells, tracer bullets, flares, cooking and warming fires, smoking and just about everything else. Several hundred acres burned in the Red Creek-Cabin Mtn. area.

K. P. Butterfield was Ranger on the Potomac; I was the District Dispatcher; R. L. Rowland was Ranger on the Cheat; Ernest B. "Pete" Olson was the District Dispatcher. I don't recall who was Ranger on the Greenbrier, perhaps "Bill" Maule.

We used our first radio communication in fire control on the Red Creek fires. We had a SX radio with SXA loudspeaker attachment at Bell Knob and perhaps two SX field units.

When the Army moved out they restored the area as near as possible to its original condition. (This is evident at the Bennett farm north of Seneca Rocks). The artillery range was ~~gridded~~ grid, searched and decontaminated of "duds". At a later time - several years - as berry-pickers and hunters discovered isolated projectiles the Army sent decontamination teams into the area again. For many years the Red Creek-Cabin Mtn. area was signed at all points of entry warning about the "duds", cautioning people to report but not to touch any projectile found.

B. W. VANORSDALE
August 31, 1978

Original to Ballantyne
9/1/78
BWV

Metcalf & Eddy's Site Visit Interviews

RECORDS SEARCH

MAY 6 & 7

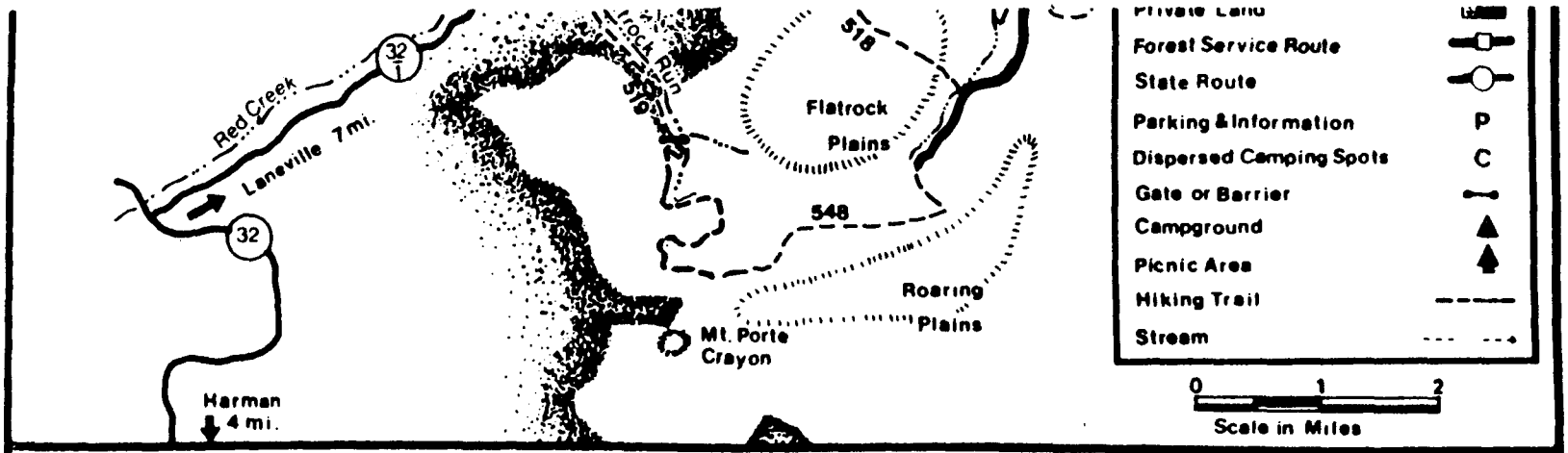
On Monday, May 6, 1991, Ron O'Brien OF Metcalf & Eddy visited the U.S. Forest Service office in Elkins, WV. Ron interviewed William VanOrsdale, Richard Trochill, and Linda Tracy.

William VanOrsdale, a retired Forest Service Ranger, showed Ron locations of artillery ranges (105 & 155 mm) and impact areas on a USGS quad sheet. He stated that the army was firing at the south face of Blackbird Knob and the East face of Cabin Mountain. The army fired at these rocky areas to minimize the risk of forest fires.

Richard Trochill indicated that, to his knowledge, only 81 mm mortar shells had been found in the Dolly Sods area. A geologist at the Elkins office, Linda Tracy marked the locations of mortar shells she had discovered on a USGS sheet. The two mortar shells were north of the Dolly Sods Wilderness Area.

On May 7, 1991, Ron visited the ranger station in Petersburg. Mernie Kimball (Forest Service, Petersburg) marked the locations of five mortar shells on a USGS sheet. Two of the shells were north of the Dolly Sods Wilderness while three were in the center parts of the wilderness area.

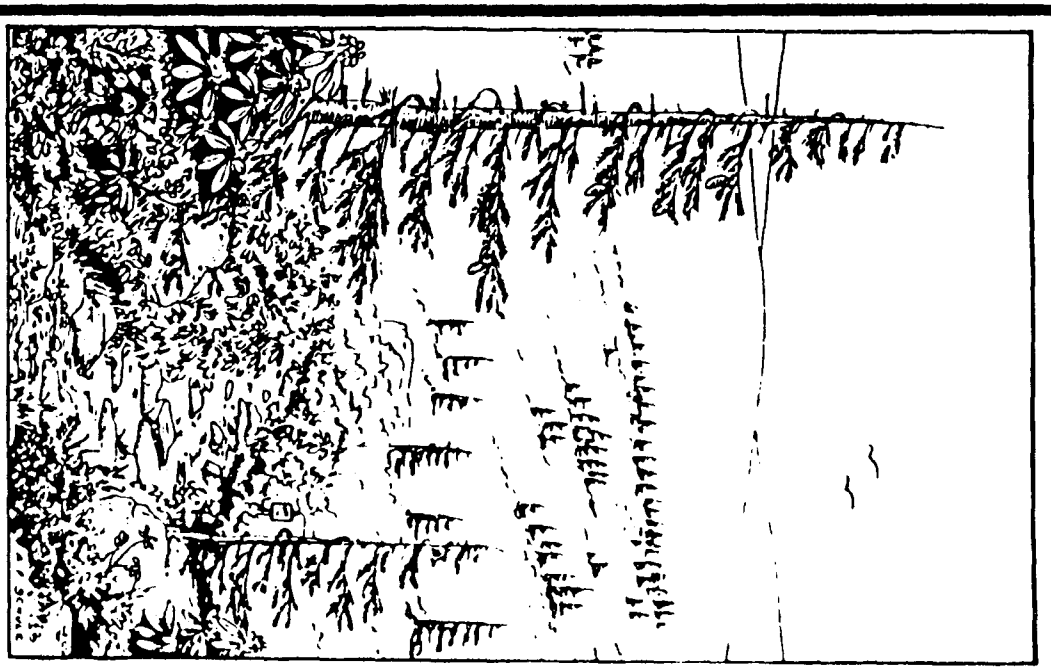
Dolly Sods Wilderness Brochure



Revised 6/88

DOLLY SODS WILDERNESS AND SCENIC AREA

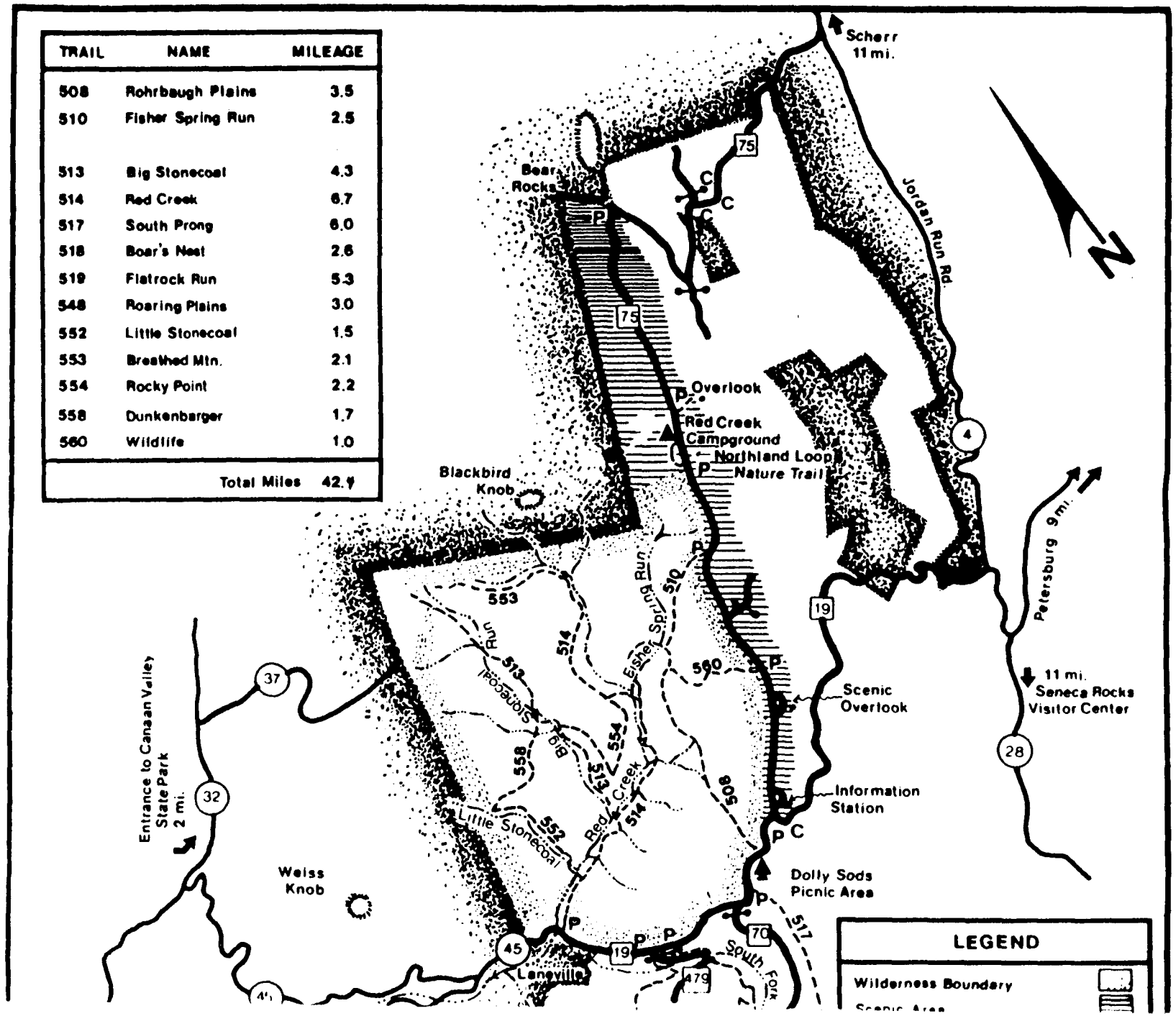
MONONGAHELA National Forest WEST VIRGINIA



DOLLY SODS WILDERNESS & SURROUNDING AREA

United States Department of Agriculture
Forest Service
Monongahela National Forest

TRAIL	NAME	MILEAGE
508	Rohrbaugh Plains	3.5
510	Fisher Spring Run	2.5
513	Big Stonecoal	4.3
514	Red Creek	6.7
517	South Prong	6.0
518	Boar's Nest	2.6
519	Flatrock Run	5.3
548	Roaring Plains	3.0
552	Little Stonecoal	1.5
553	Breathed Mtn.	2.1
554	Rocky Point	2.2
558	Dunkenbarger	1.7
560	Wildlife	1.0
	Total Miles	42.1



WELCOME TO DOLLY SODS, an area of high elevation wind-swept plains on the Allegheny Plateau At elevations of 2,600 to over 4,000 feet the area has extensive flat rocky plains, upland bogs, and sweeping vistas. The plant life and climate on this high plateau resembles northern Canada, and many species found here are near their southernmost range. The Wilderness and surrounding areas have an extensive system of hiking trails.

DOLLY SODS WILDERNESS. This 10,215 acre wilderness was designated by Congess in 1975 and is located in West Virginia's Tucker and Randolph counties. Its ecosystems are unaffected by human manipulation and influences so that plants and animals are able to respond to natural forces. Special rules apply to Wilderness visitors.

DOLLY SODS SCENIC AREA is located to the east and north of the Wilderness and sits directly atop the Allegheny plateau. A one and a half lane gravel road with turnouts (Forest Road 75) traverses this high plateau and offers a scenic motor trip. Red Creek Campground, Northland Loop Interpretive Trail, and a scenic overlook are found in Dolly Sods Scenic Area. Some special rules also apply in the Scenic Area.

FLATROCK PLAINS/ROARING PLAINS, a high elevation plateau similar to Dolly Sods, is located south of the Wilderness. This area has high elevation bogs, rocky plains, one-sided red spruce, heath barrens, and 20 miles of hiking trails

VEGETATION. Plant communities on the high plateaus of Dolly Sods and Roaring/Flatrock Plains include sphagnum bogs, patches of one-sided red spruce and stunted yellow birch, open areas of heath barrens, and aspen patches. Most of the high plateau is heath barrens, where the azaelas, mountain laurel, rhododendron, and blueberries seldom grow taller than chest-high. Cranberries and the insect-eating sundew plant can be found in the bogs growing on floating mats of sphagnum moss. Boulder-strewn areas are common on the flat plains. Northern hardwoods are found in the coves and drainages, and red pine plantations exist in several areas of Dolly Sods Wilderness and Scenic Area.

HISTORY The boulders which are strewn about on these plains were once covered with 7-9 feet of humus This humus layer was formed under a red spruce hemlock forest—a forest where the average tree was four feet in diameter After these huge trees were logged in the late 1800's, hot fires burning in the logging slash destroyed the fertile humus layer In the inhospitable climate and present rocky soil of Dolly Sods red spruce now struggle to attain 12" of diameter About the same time the slash fires raged, local farmers burned the plains to create grazing land or "sods" The pioneer Dahle family used the sods for grazing about the turn of the century Their German name became the present "Dolly" of "Dolly Sods" The Civilian Conservation Corps of the 1930's planted red pine and other conifers in the area and assisted with construction of Forest Road 75

THINGS TO DO AND SEE

HIKING TRAILS are maintained in the Wilderness and Scenic Area Most are marked with unpainted 2" X 6" axe blazes on trees and rock cairns (mounds) Trail signing in Dolly Sods Wilderness consists only of directional markers and trail numbers at trail junctions. Distances are not indicated The trail blazes in Flatrock/Roaring Plains are painted blue The trail map on the back of this brochure shows approximate trail locations but USGS topographic maps are recommended as well The 7.5 minute (1"=2000') Blackbird Knob, Blackwater Falls, Laneville and Hopeville quads are required to cover the entire area They may be purchased at some sporting goods stores USDA Forest Service, and from the U S Geological Survey, Federal Center, PO Box 25286, Denver, CO 80225 Permits are required to cross private land near the Blackbird Knob Trail on the north side of the Wilderness Contact Davis Volunteer Fire Department Davis, WV for permits

RED CREEK CAMPGROUND provides 12 campsites (2 walk-in and 10 suitable for trailers) and offers the only opportunity for camping with vehicles in the Dolly Sods area Vault toilets and a water well with a handpump are provided There are no electrical hookups or dump stations A fee is charged

DOLLY SODS PICNIC AREA is located on Forest Road 19 south of the Scenic Area This shady area has picnic tables grills and vault toilets Water from a spring in the picnic area is not tested and must be treated before drinking

PICKING BERRIES and other forest edibles for your own use is a delightful recreational pastime on Dolly Sods. Blueberries, huckleberries, teaberries, and cranberries can be found in the sods areas. Ramps (a very potent wild leek) can be found in moist wooded areas. While gathering edibles for your own use is allowed, collecting plants is prohibited in the Wilderness and Scenic Area. In June and July the azeleas, mountain laurel, and rhododendron come into bloom.

HUNTING AND FISHING are permitted subject to West Virginia State hunting and fishing regulations. Fishing is fair in the lower reaches of Red Creek, but trout cannot survive in the acid headwaters of Red Creek. Both the acidic Pottsville Sandstone (the bedrock which Red Creek cuts through) and the wetlands on the Sods (sphagnum bogs and beaver ponds) are likely factors which contribute to the natural acidity of Red Creek.

DO YOU SEEK SOLITUDE? The Dolly Sods Wilderness receives more visitation on weekends during the spring, summer and fall than during the middle of the week. Another area for those seeking solitude and the special features of the high-elevation plains is the Flatrock/Roaring Plains area.

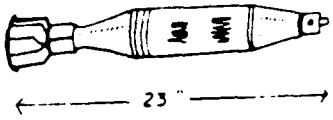
SAFETY CONSIDERATIONS

WEATHER on the Sods can change suddenly, and storms can be severe and life-threatening. Sudden dense fogs cause even the experienced hiker to become disoriented. The one-sided red spruce are a result of the fierce westerly winds across this high plateau. Be prepared for rain (or snow in the fall, winter and spring) and low temperatures any month of the year. The Sods receive more than 55 inches of precipitation annually, and frost may occur during any month. Poisonous snakes (timber rattlers and copperheads) live in the area but are rarely encountered. Know the symptoms and treatment of hypothermia. Travel is not recommended over Dolly Sods during winter, as forest roads accessing the area are not maintained in the winter. The roads are often impassable from November to April due to snow and ice. Vehicles should be equipped with tire chains for spring and fall travel across Dolly Sods.

STREAMS should be crossed with caution. Plan to wade across Red Creek as there are no foot bridges in the Wilderness. FLASH FLOODING occurs regularly in the Red Creek drainage, so you should seek high ground during periods of heavy rain. Red Creek has several scenic waterfalls along its course.

WATER from streams and springs should be treated before drinking or cooking. Treat water chemically or boil for 5 minutes before using. Giardia lamblia, the protozoan which causes the illness Gardiasis, can most effectively be killed by boiling water for 5 minutes.

OLD MORTAR SHELLS. Dolly Sods Wilderness and Scenic Area were used for military exersises during World War II, and some live mortars remain. If you find a mortar or shell, DO NOT TOUCH IT. It could still explode. Mark the location, draw a map of how to find it and contact the District Ranger in Petersburg.



Mortar shell

DO NOT TOUCH!

USER GUIDELINES

PROTECT THE WILDERNESS by following these guidelines.

"NO TRACE" CAMPING should be practiced using the following techniques. Only 10 people at one time may use a campsite. Maximum stay at any campsite is 14 days. Camp at least 100 feet from streams and trails and use a camp stove when possible. If a fire is necessary, use only dead and down wood and drown all fires with water before leaving. Cutting live vegetation is prohibited so the Wilderness can be allowed to persist in a natural condition. Bury all human wastes at least 6 inches deep and 200 feet from trails, streams, and camps. Pack out garbage that won't burn. Pets should be on a leash at all times.

GENERAL. To protect the scenic quality of Dolly Sods, roadside camping or open fires within 300' of Forest Roads 75 and 19 are not permitted, and saddle, pack or draft animals are not allowed in Dolly Sods Scenic Area. To protect Dolly Sods Wilderness, motorized vehicles and mechanized equipment such as bicycles are prohibited. Entrance permits are not required for Dolly Sods Wilderness.

DOLLY SODS is a very special place. You can help this wilderness endure for future generations if you treat this resource with respect as you enjoy its special qualities.

For Further Information Contact
FOREST SUPERVISOR
Monongahela National Forest
Box 1548, Sycamore Street
Elkins, WV 26241
Phone: (304) 636-1800
or
DISTRICT RANGER
Potomac Ranger District
U.S. Forest Service
Rt. 3 Box 240
Petersburg, WV 26847
Phone (304) 257-4488
or
Seneca Rock Visitor Center
Phone (304) 567-2827

The Forest Service is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, religion, color, sex, or national origin.

USFS Environmental Assessment Statement

United States
Department of Agriculture

Forest Service

Monongahela National Forest
Potomac Ranger District
Route 3, Box 240
Petersburg, West Virginia 26847
Phone: 304/257-4488

METCALF & EDDY

. . 3 1 1991

RECEIVED

Reply to: 2320 Dolly Sods Feasibility Study

Date: October 25, 1991

Metcalf & Eddy, Inc.
Mr. William F. Mooney,P.E.
30 Harvard Mill Square
Wakefield, MA 01880

Dear Mr. Mooney:

Enclosed you will find an environmental assessment statement prepared by Monica K. Gallion, The Dolly Sods Wilderness Manager, who was present during the disposal of unexploded ordnance in August, 1991. If you have any questions or comments, feel free to phone Monica at our office.

Sincerely,

Nancy R. F. Feakes

NANCY R.F. FEAKES
District Ranger

Enclosure

During the demolition, I was approximately thirty feet southeast of the Fisher Spring Run (trail #510) and Red Creek (trail #514) trail junction, which was approximately 500 feet south of the demolition site.

On the first shot, debris-- either shrapnel or a mixture of stone and soil--fell to the north within one foot of my position. The fallout made no apparent detrimental impact on that area.

After the final shot, I walked over an area of approximately 1/4 acres north, south and east of the demolition site. No apparent environmental damage was detected.

The only noticeable environmental damage was to the demolition site. There was a small indentation approximately eight inches round and three inches deep in a boulder beside Red Creek. All that was left of the exploded ordnance was a small pile of shrapnel collected and carried out by UXB Internal EOD Technicians and their assistants. The indentation was smoothed over and, thereafter, hardly noticeable.

Prepared by: MONICA K. GALLION
Forestry Technician

APPENDIX B

CORRESPONDENCE SUMMARY

CORRESPONDENCE SUMMARY

Correspondence from Corps of Engineers Huntsville Division:

Item: Letter from James Henderson (Huntsville) to J. Hamerick, III (Division of Natural Resources)
Subject: Onsite Disposal of Ordnance
Date: March 5, 1991

Item: Letter to Lt. Col. Barry Peterman (Huntsville)
Subject: Access to Government Documents
Date: April 11, 1991

Item: Letter from Vincent Guarin (Huntsville) to A. Talebi (Dept. of Commerce, Labor and Environmental Resources, W. VA)
Subject: Onsite Disposal of Explosives
Date: April 23, 1991

Item: Letter from Vincent Guarin (Huntsville) to Nancy Feakes (USFS)
Subject: Limitations and exclusions to perform study
Date: April 24, 1991

Item: Letter from Vincent Guarin (Huntsville) to Nancy Feakes (USFS)
Subject: Environmental Permit
Date: May 21, 1991

Item: Information from Jarel Starling (Huntsville) to Nancy Feakes (USFS)
Subject: Inventory Project Report (INPR)
Date: May 28, 1991

Item: Letter and Draft Work Plan from Jarel Starling (Huntsville) to A. Talebi (Dept. of Commerce, Labor and Environmental Resources, W. VA)
Subject: Review of Draft Work Plan
Date: June 25, 1991

Item: Letter and Comments from Walt Perro (Huntsville) to Bill Mooney (M&E)
Subject: Comments to Draft Work Plan
Date: July 15, 1991

Item: Letter from Walt Perro (Huntsville) to B. Mooney (M&E)
Subject: Approval of Work Plans
Date: July 30, 1991

Item: Letter from Walt Perro (Huntsville) to Bill Mooney (M&E)
Subject: Approval of Subsurface Sites
Date: September 3, 1991

Correspondence from Metcalf & Eddy Inc.:

Item: Memorandum from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Forest Service Requirements
Date: April 18, 1991

Item: Memorandum from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Environmental Permit Requirements
Date: May 9, 1991

Item: Letter from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Site Visit Investigation
Date: June 4, 1991

Item: Letter from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Draft Work Plan and Health & Safety Plan Submittal
Date: June 21, 1991

Item: Letter from Bill Mooney (M&E) to Wesley Sizemore (National Radio Astronomy Observatory)
Subject: Radio Communications at Dolly Sods
Date: June 25, 1991

Item: Letter from Daniel Wang (M&E) to John Brock
Subject: Locations of Ordnance
Date: July 26, 1991

Item: Letter from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Surface Clearance Operations
Date: August 16, 1991

Item: Letter from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Surface Clearance Operations
Date: August 26, 1991

Item: Letter from Bill Mooney (M&E) to Walt Perro (Huntsville)
Subject: Proposed Sites for Subsurface Investigations
Date: August 29, 1991

Item: Memorandum from Larry Landry (M&E) to Bill Mooney (M&E)
Subject: Meeting with Forest Service Archaeologist
Date: September 30, 1991

Correspondence from United States Forest Service

Item: Letter from Nancy Feakes (USFS) to Tom Yancey (UXB)
Subject: Forest Service Requirements
Date: April 10, 1991

Item Letter from B. William Vanorsdale (USFS retired) to Bill Mooney (M&E)
Subject: Military Operations during WWII
Date: April 16, 1991

Item: Letter from Nancy Feakes (USFS) to John Cline, II (Huntington District)
Subject: Right-of-Entry
Date: July 15, 1991

Item: Letter from Nancy Feakes (USFS) to Bill Mooney (M&E)
Subject: Environmental Assessment Statement
Date: October 25, 1991

Correspondence from State of West Virginia:

Item: Letter from A. Talebi (Dept. of Commerce, Labor and Environmental Resources, W. VA) to James Henderson (Huntsville)
Subject: Onsite Disposal of Explosives
Date: April 18, 1991

APPENDIX C

EXPOSURE DATA

M & E EXPOSURE DATA FOR DOLLY SODS

1) Man Hours On Site:

Site Visit: 2 weeks @ 40 hrs/week	= 80 hrs
Surface Investigation: 2 Persons for 5 weeks	= 400 hrs
Subsurface Investigation: 1 Person for 5 weeks	= 200 hrs

Total = 680 hrs

2) Total Flying Hours:

Site Vist: 3 round trips @ 3.0 hrs/trip	= 9 hrs
Surface Investigation: 6 round trips @ 3.0 hrs	= 18 hrs
Subsurface Investigation: 3 round trips @ 3.0 hrs	= 9 hrs

Total = 36 hrs

3) Total Motor Vehicle Miles:

Site Visit: 4 trips + misc. mileage = 4*150*1.5	= 900 miles
Surface investigation: 5 trips + misc. miles	= 1125 miles
Subsurface Investigation: 3 trips + misc. miles	= 675 miles

Total = 2,700 miles

4) Total Number of Flights:

= 4 + 5 + 3 = 12 Total flights

UXB EXPOSURE DATA

Man Hours on site:	= 3,136 hours
Total Flying Hours	= 14.3 hours
Total Motor Vehicle Mileage:	= 7,484 miles
Total number of flights:	= 4 flights

TOTAL EXPOSURE DATA

Man Hours on site:	= 3,816 hours
Total Flying Hours	= 50.3 hours
Total Motor Vehicle Mileage:	= 10,184 miles
Total number of flights:	= 16 flights

APPENDIX D

CLEARANCE AND DISPOSAL DOCUMENTATION

CLEARANCE AND DISPOSAL DOCUMENTATION

1. Clearance Certificate
2. DOD form 1348-1 (documentation of ordnance disposal)

Clearance Certificate

CERTIFICATE OF ORDNANCE CLEARANCE

UXB INTERNATIONAL, INC.

This Certificate Stipulates That:

UXB International Inc. is an established and recognized EXPLOSIVE ORDNANCE DISPOSAL company;

A trained Explosive Ordnance Disposal team has conducted the Ordnance clearance requirements described in the attached statement of work and property description.

All military ordnance and related debris located during clearance operations conducted by UXB during the period of July 29, 1991 to October 03,1991 has been removed from this work site.

Issuing this certificate does in no way mean, nor should it be construed to mean that UXB International, Inc., will certify that all military ordnance has been cleared from the project area to 100%

U.S. Army Corps of Engineers Huntsville Division	Dolly Sods Wilderness Area (Former W. Virginia Maneuver Area)	November 20, 1991
Issued to	*Project*	*Date*

John Boyden

Authorized Signature

Areas Cleared of Ordnance in Dolly Sods Site Investigation

The following areas within the Dolly Sods Wilderness Area have been cleared of surface and subsurface ordnance during site investigation activities which took place from August 19 to October 11, 1991. The total area cleared during subsurface clearance operations is 10.52 acres. Coordinates are given in West Virginia state plane coordinate system.

Area 1AS1
.672 acres

Corner	Northing	Easting
Northwest	193,633	2,004,800
Northeast	193,751	2,004,843
Southeast	193,609	2,005,071
Southwest	193,520	2,004,997

Area 1ES1
.612 acres

Corner	Northing	Easting
Northwest	192,301	2,007,967
Northeast	192,284	2,008,078
Southeast	192,065	2,007,964
Southwest	192,133	2,007,849

Area 1ES2
.328 acres

Corner	Northing	Easting
Northwest	192,404	2,007,711
Northeast	192,400	2,007,812
Southeast	192,258	2,007,790
Southwest	192,264	2,007,690

Area 1JS1
.428 acres

Corner	Northing	Easting
Northwest	191,418	2,007,588
Northeast	191,438	2,007,660
Southeast	191,214	2,007,601
Southwest	191,277	2,007,486

Area 1JS2
.557 acres

Corner	Northing	Easting
Northwest	191,395	2,007,745
Northeast	191,396	2,007,860
Southeast	919,188	2,007,822
Southwest	191,188	2,007,705

Area 7AS1
.807 acres

Corner	Northing	Easting
Northwest	179,769	2,009,319
Northeast	179,744	2,009,385
Southeast	179,491	2,009,236
Southwest	179,654	2,009,105

Area 7AS2
.527 acres

Corner	Northing	Easting
Northwest	179,759	2,009,499
Northeast	179,898	2,009,499
Southeast	179,759	2,009,375
Southwest	179,791	2,009,307

Area 7AS3
.802 acres

Corner	Northing	Easting
Northwest	180,196	2,009,531
Northeast	180,128	2,009,619
Southeast	179,898	2,009,499
Southwest	179,996	2,009,370

Area 7AS4
.576 acres

Corner	Northing	Easting
Northwest	180,024	2,009,168
Northeast	179,908	2,009,206
Southeast	179,690	2,009,063
Southwest	179,852	2,009,038

Area 7AS5
.599 acres

Corner	Northing	Easting
Northwest	180,117	2,009,368
Northeast	180,184	2,009,335
Southeast	179,897	2,009,241
Southwest	180,004	2,009,149

Area 7AS6
.328 acres

Corner	Northing	Easting
Northwest	179,080	2,008,982
Northeast	179,258	2,008,941
Southeast	179,027	2,008,917
Southwest	179,080	2,008,839

Area 7BS1
.473 acres

Corner	Northing	Easting
Northwest	177,731	2,008,234
Northeast	177,704	2,008,320
Southeast	177,510	2,008,176
Southwest	177,544	2,008,091

Area 7BS2
.837 acres

Corner	Northing	Easting
Northwest	177,403	2,008,041
Northeast	177,408	2,008,197
Southeast	177,151	2,008,123
Southwest	177,141	2,007,995

Area 11BS1
.297 acres

Corner	Northing	Easting
Northwest	179,553	2,006,776
Northeast	179,646	2,006,776
Southeast	179,598	2,006,939
Southwest	179,553	2,006,737

Area 11BS2
.356 acres

Corner	Northing	Easting
Northwest	179,756	2,006,733
Northeast	179,690	2,006,959
Southeast	179,653	2,006,942
Southwest	179,644	2,006,751

Area 14AS1
.457 acres

Corner	Northing	Easting
Northwest	178,526	2,007,415
Northeast	178,467	2,007,508
Southeast	178,337	2,007,325
Southwest	178,343	2,007,239

Area 14AS2
.407 acres

Corner	Northing	Easting
Northwest	178,343	2,007,238
Northeast	178,312	2,007,282
Southeast	178,140	2,007,212
Southwest	178,155	2,007,087

Area 14AS3
.168 acres

Corner	Northing	Easting
Northwest	178,151	2,007,003
Northeast	178,143	2,007,095
Southeast	178,065	2,006,902
Southwest	178,076	2,006,846

Area 14AS4
1.141 acres

Corner	Northing	Easting
Northeast	177,997	2,006,679
Southeast	177,669	2,006,814
West	178,616	2,005,936

Area 1781
.146 acres

Corner	Northing	Easting
Northwest	191,429	2,009,166
Northeast	191,388	2,009,171
Southeast	191,317	2,009,271
Southwest	191,234	2,009,264

DOD form 1348-1
(documentation of ordnance disposal)

DOC. IDENT.	M&S	STOCK NUMBER (FSC / NIIN)	ADD	UNIT OF ISSUE	QUANTITY	DOCUMENT NUMBER (SERV / REQUISITIONER / DATE / SERIAL)	SUFFIX	SERV	SUPPLEMENTARY ADDRESS	SIGNAL	FUND	DISTRIBUTION	PROJECT	PRIORITY	REQ'D DEL DATE	ADVICE	RI	UNIT PRICE DOLLARS	CTS.
				B	7	W2JTLD W22,0001													

SHIPPED FROM	SHIP TO	MARK FOR	PROJECT	TOTAL PRICE DOLLARS	CTS.
UXB INTERNATIONAL INC.	5X1283				

WAREHOUSE LOCATION	TYPE OF CARGO	UNIT PACK	UNIT WEIGHT	UNIT CUBE	UFC	NMFC	FREIGHT RATE		DOCUMENT DATE	MAT. COND	QUANTITY		
			7LB										

SUBSTITUTE DATA (ITEM ORIGINALLY REQUESTED)

FREIGHT CLASSIFICATION NOMENCLATURE

ITEM NOMENCLATURE

x ALUMINUM TAIL FINS - 81mm MORTAR

SELECTED BY AND DATE	TYPE OF CONTAINER(S)	TOTAL WEIGHT	RECEIVED BY AND DATE	INSPECTED BY AND DATE
		7 LB		1275
PACKED BY AND DATE	**NO. OF CONTAINERS**	**TOTAL CUBE**	**WAREHOUSED BY AND DATE**	**WAREHOUSE LOCATION**

REMARKS:

THIS MATERIAL HAS BEEN CERTIFIED FREE FROM EXPLOSIVES

FIRST DESTINATION ADDRESS	DATE SHIPPED		
	10/2/91		

TRANSPORTATION CHARGEABLE TO	B/LADING, AWB, OR RECEIVER'S SIGNATURE (AND DATE)	RECEIVER'S DOCUMENT NUMBER

DD FORM 1348—1 (4 PART) MAR 74 — DOD SINGLE LINE ITEM RELEASE/RECEIPT DOCUMENT

DOC. IDENT.	M&S	STOCK NUMBER (FSC / NIIN)	ADD	UNIT OF ISSUE	QUANTITY	DOCUMENT NUMBER (SERV / REQUISITIONER / DATE / SERIAL)	SUFFIX	SERV	SUPPLEMENTARY ADDRESS	SIGNAL	FUND	DISTRIBUTION	PROJECT	PRIORITY	REQ'D DEL DATE	ADVICE	RI	UNIT PRICE DOLLARS	CTS.
				B	96	5002													

SHIPPED FROM	SHIP TO	MARK FOR	PROJECT	TOTAL PRICE DOLLARS	CTS.
UXB INTERNATIONAL INC	5X1283				

WAREHOUSE LOCATION	TYPE OF CARGO	UNIT PACK	UNIT WEIGHT	UNIT CUBE	UFC	NMFC	FREIGHT RATE		DOCUMENT DATE	MAT. COND	QUANTITY		
			96										

SUBSTITUTE DATA (ITEM ORIGINALLY REQUESTED)

FREIGHT CLASSIFICATION NOMENCLATURE

ITEM NOMENCLATURE

x misc 4.2/81mm MORTAR Parts

SELECTED BY AND DATE	TYPE OF CONTAINER(S)	TOTAL WEIGHT	RECEIVED BY AND DATE	INSPECTED BY AND DATE
		96 LB		1115
PACKED BY AND DATE	**NO. OF CONTAINERS**	**TOTAL CUBE**	**WAREHOUSED BY AND DATE**	**WAREHOUSE LOCATION**

REMARKS:

THIS MATERIAL HAS BEEN CERTIFIED FREE FROM EXPLOSIVES

FIRST DESTINATION ADDRESS	DATE SHIPPED		
	10/02/91		

TRANSPORTATION CHARGEABLE TO	B/LADING, AWB, OR RECEIVER'S SIGNATURE (AND DATE)	RECEIVER'S DOCUMENT NUMBER

DD FORM 1348—1 (4 PART) MAR 74 — DOD SINGLE LINE ITEM RELEASE/RECEIPT DOCUMENT

APPENDIX E

UXB FIELD NOTES

DOLLY SODS FIELD NOTES

29 July 1991

General mobilization, pick up supplies, office trailer delivered and setup.

30 July 1991

Continue with mobilization. Build entry stairs for office trailer. Dave Pollard reported last night. Remainder of crew reported throughout the evening.

31 July 1991

Begin layout of area 1. Joe Rogers fell and sprained his ankle. Took him to the hospital and released him from the project. Replacement for Rogers will arrive on Sunday.

1 August 1991

0700 Depart for west side of Dolly Sods.

0745 Arrive at trailhead of 553 and depart for Area 1.

Complete layout of area 1 and begin establishing and sweeping 5 acre surface survey plots.

Team 1 begin layout of area 2.

Layout of surface survey areas 1A, 1B, and 1C. complete.

1800 Secure for the day.

2 August 1991

0700 Depart for west side.

0800 Arrive at trailhead of 553 and begin walk into Area 1.

Team one continue layout of area 2

Team two continue layout of sweep grids in area 1

Team three begin surface sweep of area 1 5 acre survey grids.

Team one complete area 2 layout.

DOLLY SODS FIELD NOTES

Team two complete layout of survey grids 1c and 1d.

Team 3 complete sweep of survey grids 1b and 1c.

1800 Secure for the day.

5 August 1991

0700 Depart for west side.

0800 Arrive at trail head of 553 and begin walk into area 1.

Team 1 begin layout of areas 4 and 5.

Team 2 continue layout of 5 acre sweep grids in area 1.

Tram 3 begin surface survey of area 1d.

Team 1 complete layout of areas 4 and 5.

Team 2 complete layout of 5 acre survey grids 1e, 1f, 1g, 1h, 1i, and 1j.

Team 3 complete sweep of grids 1a and 1d. Three sub-surface contacts were located with the schonstedt in grid 1a.

6 August 1991

0700 Depart for west side.

0800 Arrive at trailhead of 553 and begin walk into area 1.

Team 1 proceed to area 11 and begin layout of areas 11 and 14.

Team 2 begin layout and sweep of area 1k.

Team 3 begin sweep of areas 1e and 1f.

Team 1 complete layout of area 11 and begin layout and sweep of area 14.

Team 2 complete layout and sweep of area 1k.

Team 3 complete sweep of areas 1e and 1f. Located 1 ea. 4.2" Mortar HE M3 w/Fuze PD, M8 in the southeast corner of area 1e.

DOLLY SODS FIELD NOTES

7 August 1991

0700 Depart for west side

0745 Arrive at trailhead of 553 and begin walk into work areas.

Team 1 proceed to area 14 and continue surface clearance.

Teams 2 and 3 Proceed to area 1 and continue surface clearance.

Team 2 complete clearance of area 1G, and team 3 complete clearance of area 1H.

8 August 1991

0700 Depart for west side.

0745 Arrive at trailhead of 553 and begin walk into work areas.

Team 1 continue surface clearance of area 14.

Teams 2 and 3 continue surface clearance of area 1.

Team 2 complete surface clearance of area 1I, and team 3 complete clearance of area 1J. Team 3 located one strong subsurface contact with the schonstedt.

12 August 1991

0700 Depart for west side.

0745 Arrive at trailhead of 553 and begin walk into work areas.

Team 1 proceed to area 14 and continue surface clearance.

Teams 2 and 3 proceed to area 2.

Team 2 begin layout of areas 2A - 2D.

Team 3 begin surface clearance of 2A.

Team 2 complete layout of areas 2A, 2B, 2C, & 2D.

Team 3 complete clearance of areas 2A and 2B.

DOLLY SODS FIELD NOTES

13 August 1991

0700 Depart for west side.

0800 Arrive trailhead of 553 and begin walk into work areas.

Team 1 proceed to area 14 and continue surface clearance.

Teams 2 and 3 proceed to area 2.

Team 2 begin layout of areas 2E and 2F and begin clearance of area 2E.

Team 3 begin surface clearance of Area 2C.

Team 1 complete surface clearance of area 14. Located 2 ea. 81MM Mortars (1-High Explosive and 1-Smoke) and 1 set of 81MM Tail Fins.

Team 2 complete layout of 2E and 2F and complete clearance of area 2E. Located approximately 51bs per acre of non-ordnance metal scrap.

Team 3 complete clearance of areas 2C and 2D.

14 August 1991

0700 Depart for west side.

0745 Arrive trailhead of 553 and begin walk into work areas.

Team 1 proceed to area 13 and begin layout.

Team 2 proceed to area 4 and begin lay out of Areas 4A, 4B, 4C and 4D.

Team 3 proceed to area 2 and begin surface clearance of area 2F.

Team 1 was unable to get into area 13 because of heavy laurel and rhododendron thickets. Moved to area 8 and completed layout of that area.

Team 2 complete layout of areas 4A, 4B, 4C and 4D.

Team 3 complete surface clearance of area 2F. Located approximately 5 lbs per acre of non-ordnance metal scrap.

DOLLY SODS FIELD NOTES

15 August 1991

0700 Team 1 depart for area 3 to begin layout. Teams 2 and 3 depart for west side.

0730 Team 1 arrive area 3 and begin layout of area.

0745 Team 2 and 3 arrive trailhead of 553 and begin walk into work sites.

Team 2 begin layout of areas 5A, 5B, and 5C.

Team 3 begin surface clearance of area 4A.

Team 1 complete layout of area 3.

Team 2 complete layout of areas 5A, 5B and 5C.

Team 3 complete surface clearance of areas 4A and 4B.

19 August 1991

Received permission from COE to move area 13 to the North.

0700 Depart for west side.

0745 Arrive trailhead of 553 and begin walk into work areas.

Team 1 proceed to new area 13 and begin layout.

Team 2 proceed to area 11 and begin layout of areas 11A and 11B.

Team 3 proceed to area 4 and continue surface clearance.

Team 1 complete layout of new area 13.

Team 2 complete layout of areas 11A and 11B.

Team 3 complete surface clearance of areas 4C and 4D.

20 August 1991

0700 Team 1 depart for area 7 and begin layout. Teams 2 and 3 depart for west side.

0745 Team 1 arrive area 7 and begin layout. Teams 2 and 3

arrive trailhead of 553 and begin walk into work sites.

Team 2 proceed to area 11 and begin surface clearance.

Team 3 proceed to area 5 and begin surface clearance.

Team 1 complete layout of area 7.

Team 2 complete surface clearance of areas 11A and 11B. Located 1 ea. 57MM Armor Piercing projectile in area 11B.

Team 3 complete surface clearance of areas 5A, 5B, and 5C.

21 August 1991

Received permission from COE to relocate 10 acres from area 3 surface clearance to Added areas 17, on northern boundary between areas 1 and 2, and area 18 at Red Creek Campground.

0700 Team 1 depart for new area 17 and begin layout. Team 2 and 3 depart for area 7.

0745 Team 1 arrive area 17 and begin layout.

Team 2 begin layout of areas 7A and 7B

Team 3 begin surface clearance of area 7A.

Team 1 complete layout of areas 17 and 10.

Team 2 complete layout of areas 7A and 7B.

Team 3 complete one half of surface clearance of area 7A. Located 1 ea. 81MM Mortar Smoke and 1 ea. 60MM Mortar High Explosive.

22 August 1991

0700 Team 1 depart for area 15.

Team 2 depart for area 10.

Team 3 depart for area 7.

0745 Team 1 begin layout of area 15.

Team 2 begin layout of surface clearance in area 10.

DOLLY SODS FIELD NOTES

Team 3 continue surface clearance of area 7A.

Team 1 complete layout of area 15 and areas 16A and 16B.

Team 2 complete layout of areas 10A and 10B.

Team 3 complete surface clearance of area 7A. Located 1 ea 81MM Mortar Smoke, also located 25+ lbs/acre of non-ordnance metal scrap.

26 August 1991

0700 Team 1 depart for area 3.

Team 2 depart for area 16.

Team 3 depart for area 7.

0745 Team 1 arrive area 3 and begin layout of areas 3A, 3B, 3C, 3D and 3E.

Team 2 arrive area 16 and begin surface clearance of area 16A.

Team 3 arrive area 7B and begin surface clearance.

Team 1 complete layout of area 3.

Team 2 complete surface clearance of area 16A.

Team 3 complete surface clearance of area 7b. Located 25+ lbs/acre of nonordnance metal scrap.

27 August 1991

Project leader moved 81MM Smoke and 60MM High Explosive mortars off of Trail 510 to a safe holding area pending disposal.

0700 Team 1 depart for area 9.

Team 2 depart for area 13.

Team 3 depart for area 10.

0745 Team 1 arrive area 9 and begin layout and surface clearance.

DOLLY SODS FIELD NOTES

Team 2 arrive trailhead of 553 and begin walk into area 13 and surface clearance.

Team 3 arrive area 10A and begin surface clearance.

Team 1 complete area 9 and proceed to area 3 complete areas 3A and 3B.

Team 2 complete area 13.

Team 3 complete complete area 10A and 10B.

28 August 1991

0700 Team 1 depart for area 3.

Team 2 depart for area 17.

Team 3 depart for area 16.

0745 Team 1 arrive area 3 and begin surface clearance of area 3C.

Team 2 arrive area 17 and begin surface clearance.

Team 3 arrive area 16A and begin surface clearance.

Team 1 complete areas 3C, 3D and 3E.

Team 2 complete area 17 located 4.2" Mortar fragments. Proceed to area 18 and begin layout and surface clearance. Completed layout and one half of surface clearance.

Team 3 complete surface clearance of areas 16A and 16B.

29 august 1991

0700 Team 1 depart for area 12.

Team 2 depart for area 18.

Team 3 depart for area 15.

0745 Team 1 arrive area 12 and begin layout and surface clearance.

Team 2 arrive area 18 and continue surface clearance.

DOLLY SODS FIELD NOTES

Team 3 arrive area 15 and begin layout and surface clearance.

Team 1 complete surface clearance of area 12.

Team 2 complete surface clearance of area 18 approximately 10 lbs/acre of nonordnance metal scrap located. Proceed to area 6 and complete surface clearance.

Team 3 complete surface clearance of area 15.

3 September 1991

0700 Team proceeds to area 7A.

0745 Arrive area 7A. Team begins layout of 1/2 acre subsurface clearance areas and subsurface clearance of area 7AS1.

Complete subsurface clearance of area 7AS1. Located several pieces of mortar fragmentation.

4 September 1991

0700 Team depart for area 7A.

0745 Team arrive area 7A and continue subsurface clearance.

Complete area 7AS2 and half of area 7AS3. Located 1 ea 81MM Mortar Smoke in 7AS2 and numerous pieces of Mortar fragmentation. Also located approximately 10 lbs/acre of nonordnance metal scrap.

5 September 1991

0700 Team depart for area 7A.

0745 Team arrive area 7A and continue subsurface clearance.

Complete area 7AS3 and 7AS4. Located approximately 10 lbs/acre of nonordnance metal scrap and several pieces of mortar fragmentation.

6 September 1991

0700 Team depart for area 7A.

0745 Team arrive area 7A and begin setup for disposal of 3 ea 81MM Mortars and 1 ea 60MM Mortar located in area 7A.

DOLLY SODS FIELD NOTES

0900 Complete disposal operation and team continue subsurface clearance of 7A.

Complete area 7AS5. Located 1 ea 81MM Mortar Smoke. Also located several pieces of mortar fragmentation and approximately 10 lbs/acre of non ordnance metal scrap.

9 September 1991

0700 Team depart for area 7A.

0745 Team arrive area 7A and continue subsurface clearance.

Complete area 7AS6.

Performed GPS logging of corners of areas 6 and 18.

10 September 1991

0700 Team depart for area 7B.

0745 Team arrive area 7B and begin subsurface clearance.

Complete subsurface clearance of areas 7BS1 and 7BS2. Located 25+ lbs/acre of nonordnance metal scrap. No OEW located.

Set up for disposal of 81MM Mortar located in 7AS5.

Complete disposal operation.

Complete GPS logging of area 15.

11 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead 553 and begin walk into work site.

0830 Team arrive area 1A and begin layout and subsurface clearance of area 1AS1.

Complete subsurface clearance of area 1AS1. Located one piece of 4.2" Mortar fragmentation.

12 September 1991

0700 Team depart for west side.

DOLLY SODS FIELD NOTES

0745 Team arrive trailhead of 553 and begin walk into area 14.

0845 Team arrive area 14 and begin layout and subsurface clearance of area 14AS1.

Completed GPS logging of Areas 1AS1, 1A, 1E, 1E4.2HE, 1ES1, 1G, 1F, 1H, 1I, 4D, 4B and 1K.

Team completed subsurface clearance of area 14AS1, no OEW was located.

16 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead of 553 and begin walk into area 14.

0845 Team arrive area 14 and continue subsurface clearance.

Complete GPS logging of areas 10A, 10B, 7A except SE corner, 7AS5, 7AS4, 7A60MMHE and 7AS581FS.

Team completed subsurface clearance of 14AS2, no OEW was located. Located approximately 5 lbs/acre of non-ordnance metal scrap.

17 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead of 553 and begin walk into area 1E.

0830 Team arrive area 1E and begin subsurface sweep of 1ES1.

Team complete subsurface clearance of Area 1ES1, no OEW was located. Begin layout and subsurface clearance of 1JS1.

Complete 1JS1, located 2ea 4.2 inch Mortars.

18 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead of 553 and begin walk into area 14.

DOLLY SODS FIELD NOTES

0845 Team arrive area 14 and begin layout and subsurface clearance of area 14AS3.

Complete GPS logging of Areas 7B, 7BS1, 7BS2, 7AS1, 7AS2, 7AS3, SE corner of 7A, 7A81-1, 7A81-2 and 7A81-3

Team complete subsurface of 14AS3, no OEW was located.

19 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead of 553 and begin walk into 1E.

0830 Team arrive area 1E and begin layout and subsurface clearance of 1ES2.

Complete GPS logging of areas 16A and 16B.

Team complete subsurface clearance of 1ES2. No OEW was located.

23 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead of 553 and begin walk into area 14A.

0845 Team arrive area 14A and begin layout and subsurface clearance of 14AS4.

Complete GPS logging of Areas 4C, 4D, 4A, 5A, 5B, 5C, 11A, 11B and 11B57AP.

Team complete subsurface clearance of area 14AS4. No OEW was located.

Team completed GPS logging of Areas 14A, 14AS1, 14AS2, 14AS3, and 14AS4.

Set up disposal of 2 4.2" Mortars located in Area 14A.

Complete disposal operation.

24 September 1991

0700 Team depart for west side.

DOLLY SODS FIELD NOTES

0745 Team arrive trailhead of 553 and begin walk into Area 17.

0845 Team arrive area 17 and begin layout and subsurface clearance of area 17S1.

Complete GPS logging of Areas 1B, 1C, 1D, 1ES2, 3A, 3B, and 3C.

Team complete subsurface clearance of area 17S1 and GPS logging of area 17 and 17S1, proceed to area 1J and begin layout and subsurface clearance of 1JS2.

Team complete subsurface clearance of 1JS2. Located 2 ea 4.2" Mortars. Complete GPS logging of Area 1J, 1JS1, 1JS2 and the 4 ea 4.2" Mortars in area 1J.

25 September 1991

0700 Team Depart for west side.

0745 Team arrive trailhead of 553 and begin walk into area 11.

0830 Team arrive area 11 and begin layout and subsurface clearance of areas 11A and 11B.

Complete GPS logging of areas 3D and 3E.

Team complete subsurface clearance of areas 11A and 11B. No OEW was located.

Team complete GPS logging of areas 11, 11A, 11B, 8 and 13.

26 September 1991

0700 Team depart for area 2. Two personnel proceed to area 1 to begin pulling flagging.

0800 Team arrive area 2 and begin GPS logging.

Team complete GPS logging and pulling flagging in Areas 2A, 2B, 2C, 2D, 2E, and 2F.

Flagging pulled in areas 1 and 17.

DOLLY SODS FIELD NOTES

27 September 1991

0700 Team depart for west side.

0745 Team arrive trailhead 553 and begin walk into work sites.

Project leader and 2 personnel proceed to area 1J to perform disposal of ordnance items located in area 1. Remainder of personnel proceed to areas 2, and 4 to pull flagging.

Complete disposal operations in area 1J. 4.2" mortar from area 1E was moved to area 1J for disposal. 2 items kicked out of disposal shot and were reburied for security pending arrival of additional demolition materials.

Complete GPS logging of NW corner of area 12 and SE corner of area 9, the remainder of the flagging in these areas had been removed by unknown persons and consequently the other corners could not be located and logged. Since no OEW was located in either of these areas it is not considered crucial that the exact boundaries be established.

Dave McKeig, and Roger Topham released.

30 September

0700 Two personnel (Larry Cook, UXB and Chris Dwinel, M & E)depart for west side.

0745 Team arrive at trailhead of 553 and proceed to area 5 to pull flagging.

Remainder of personnel clean and repack equipment and load into rental pickup for transportation to Chantilly.

1200 Ward Stern and Richard Endress Released.

Cook and Dwinel complete pulling flagging in areas 5, 11 and 14B and complete GPS logging of 14B.

1 October 1991

0700 Larry Cook depart for Romney WVa to pick-up additional demolition materials. Project leader and Chris Dwinel go to Bell Knob Tower to meet Allied Trailer and turn in office trailer.

DOLLY SODS FIELD NOTES

1030 Larry Cook return with demolition materials and proceed to area 1J to dispose of two remaining 4.2 inch Mortars. Trailer personnel had not arrived and Chris Dwinel remained at Bell Knob Tower to meet them.

1230 Team arrive at area 1J and set up disposal of two remaining 4.2" Mortars.

Complete disposal operation. All ordnance items destroyed. Team police up remaining pieces and transport to holding area.

2 October 1991

0700 Team proceed to Bell Knob Tower, weigh scrap for turn in and load in Larry Cooks Truck. Cook depart for Letterkenny Army Depot to turn in scrap. Totals were 7 lbs of aluminum and 96 lbs of steel.

Project leader and Chris Dwinel pull flagging in areas 18, 6, 16, and 7.

3 October 1991

0700 Team pulls remainder of flagging in area 3.

1200 Larry Cook Released. Project Leader departs for Chantilly.

APPENDIX F

M&E WEEKLY REPORTS

Project DOLLY SODS Acct. No.
Subject WEEKLY REPORT Comptd. By Date
Detail SURFACE INVESTIGATION Ck'd. By Date

W/E AUGUST 2, 1991

MONDAY 7/29/91

M&E Ron O'Brien
DAN Wang

UXB Thom O'Neil
Larry Cook

PURCHASED EQUIPMENT & MOBILIZED FOR FIELD WORK

TUESDAY 7/30/91

UXB SET UP COMMAND POST AT THE BELL KNOB LOOKOUT (TRAILER, RADIO W/REPEATER, CHEMICAL TOILET)

M&E DEVELOPED APPROVED WARNING SIGNS AND POSTED THEM AT DOLLY SODS TRAIL HEADS.

WEDNESDAY 7/31/91

M&E Ron O'Brien
Dan Wang

UXB Thom O'Neil, Larry Cook, Ed Seuter, Joe Rogers, Roger Topham, George Payne, Dan Isbell, Walter McCaule, Ward Stern, Dave Pollard

FIRST DAY OF FIELD WORK. UXB'S FIELD CREW ARRIVED LAST NIGHT. HAD KICK-OFF MEETING IN THOM O'NEILS ROOM. M&E & UXB WORKED IN ONE GROUP TO BECOME FAMILIAR WITH DOLLY SODS. HIKED IN FROM THE RED CREEK CAMP GROUND ON FOREST SERVICE ROAD 75 ON EAST BOARDER OF DOLLY SODS (NE CORNER). HIKED TO AREA 2 AT THE FORK OF RED CREEK (APPROX 1.5 hr). JOE ROGERS SPRAINED HIS ANKLE, ED SEUTER PERFORMED FIRST AID & WE WALKED JOE BACK TO THE RED CREEK CAMP GROUND.

NONREPRODUCIBLE GRID FORM 145
METCALF & EDDY, ENGINEERS

Project [illegible]
Subject WEEKLY REPORT
Detail SURFACE INVESTIGATION

Acct No
Comptd By
Ck'd By

Date
Date

W/E AUGUST 2, 1991

THURSDAY 8/1/91

RON O'BRIEN & TOM YANCEY FILLED OUT ACCIDENT REPORT.

ARMY CORP PERSONNEL WALTER PELLO & JUDY WILSON HELD AN OPEN DISCUSSION PUBLIC MEETING AT THE POTOMAC RANGER STATION RTE 28 PETERSBURG. THE MEETING WAS HELD FROM 1:00pm to 5:00pm. RON O'BRIEN Represented M&E and TOM YANCEY REPRESENTED UXB.

LIST OF ATTENDENTS

RICHARD TROCHLIC	ELKINS FOREST SERVICE "LANDS STAFF MGR"
SHARON TEABO	ELKINS INTER-MOUNTAIN (NEWS PAPER)
TOM Hencke	Grant County Press (News Paper)

NO CITIZEN'S FROM PETERSBURG ATTENDED MEETING VERY UNEVENTFUL.

UXB worked in three Field teams:

TEAM 1	TEAM 2	TEAM 3
LARRY COOK	DAVE DOLLARD	ROGER TOPHAM
GEORGE PAYNE	DAN ISBELL	ED SEUTER
WALTER McCAULEY		WARD STERN

TEAM 1 AND TEAM 2 MARKED THE BOUNDARY FOR AREA 1. TEAM 3 SET THE CORNERS FOR 5-ACRE SITES 1-B, 1-C, AND 1-D. IT WAS DETERMINED THAT AREA 1-A (SET WEDNESDAY) WAS WELL OUTSIDE OF AREA 1 SO TEAM 3 RETRIEVED THOSE STAKES.

NONREPRODUCIBLE GRID FORM 145
METCALF & EDDY, ENGINEERS

Project DOLLY SODS
Subject WEEKLY REPORT
Detail SURFACE INVESTIGATION

Acct No
Compd By
Ck'd By
Date
Date

W/E AUGUST 2, 1991

FRIDAY 8/2/91

Joe Rogers was removed from the job by UXB. Tom Yancey stayed Thursday and Friday to replace Joe.

Ron O'Brien, Tom Yancey, Walter Perio, & Judy Wilson MET WITH PRESS AT SMOKE HOLE CAVERN AND DROVE TO DOLLY SODS. TOM YANCEY DEMONSTRATED MAGNETOMETER SURVEY.

UXB FORMED THREE FIELD TEAMS

TEAM 1	TEAM 2	TEAM 3
LARRY COOK	DAVE POLLARD	ROGER TOPHAM
GEORGE PAYNE	DAN ISBELL	ED SEUTER
WALTER MCCANLEY	THOM O'NEIL	WARD STEEN

TWO 5-ACRE SITES (1-B & 1-C) WERE CLEARED BY TEAM 3 IN AREA 1.

TEAM 1 SET THE BOUNDARY FOR AREAS 2 AND 4.

TEAM 2 MARKED THE CORNERS FOR SEARCH SITES 1-A AND 1-E.

NONREPRODUCIBLE GRID FORM 145
METCALF & EDDY, ENGINEERS

Project DOLLY JUDS Acct No
Subject WEEKLY REPORT Compd By Date
Detail SURFACE INVESTIGATION Ck'd By Date

W/E AUGUST 9, 1991

MONDAY 8/5/91

RICK ENDREES REPLACED THOM O'NEIL IN TEAM 2

THOM O'NEIL RESUMED HIS POSITION IN THE COMMAND POST AT BELL KNOB. THOM IS WORKING ON MAKING RADIO CONTACT WITH EITHER THE POTOMAC ~~RADIO~~ RANGER STATION OR THE GRANT COUNTY HOSPITAL IN PETERSBURG (RTE 28).

UXB TEAM 3 CLEARED AREAS 1-A & 1-D TODAY

UXB TEAM 2 SET THE BOUNDARY FOR AREAS 1-F, 1-G 1-H, 1-I, AND 1-J.

UXB TEAM 1 FINISHED SETTING THE BOUNDRY OF AREA 4 AND SET AREA 5's BOUNDARY

TUESDAY 8/6/91

UXB TEAM 3 CLEARED AREAS 1-E & 1-G
A 4.2" MORTAR WAS DISCOVERED NEAR THE SOUTHEAST CORNER OF AREA 1-E BURIED APPROXIMATELY 6-IN.

UXB TEAM 3 SET THE BOUNDARY AND CLEARED 1-K.

UXB TEAM 1 MARKED THE BOUNDARY OF AREA 11.

Mike

NONREPRODUCIBLE GRID FORM 145
METCALF & EDDY, ENGINEERS

Project [illegible] Acct No [illegible] Page [illegible]
Subject WEEKLY REPORT Comptd By [illegible] Date [illegible]
Detail SURFACE INVESTIGATION Ck'd By [illegible] Date [illegible]

W/E AUGUST 9, 1991

WEDNESDAY 8/7/91

UXB TEAMS 2 & 3 WORKED AS ONE 6-MAN TEAM AND CLEARED AREAS 1-F, 1-H, 1-I, & 1-J. MANY OLD BEARING ROCKS WERE LOCATED, AREA 1-J GOOD CONTACTS MAYBE OUTCROP.

UXB TEAM 1 WORKED IN AREA 14 CLEARING 1-ACRE.

*ELEVEN AREAS A-K HAVE BEEN CLEARED IN AREA 1 FOR A TOTAL OF 55 ACRES

THURSDAY 8/8/91

UXB TEAM 3 CLEARED AREAS 2-A & 2-B

UXB TEAM 2 SET THE BOUNDARIES FOR AREAS 2-A, 2-B, 2-C, & 2-D.

UXB TEAM 1 CONTINUED WORK IN AREA 14 CLEARING ABOUT 2 ACRES.

M&E PERSONNEL MET BRIEFLY WITH UXB TEAM LEADERS, THOM O'NEAL, LARRY COOK, DAN ISBELL AND ROGER TOPHAM AND DISCUSSED POTENTIAL PROBLEM WITH FUTURE INVESTIGATION. THOM O'NEAL MENTIONED THE POSSIBILITY OF DISPOSING OF THE LOCATED 4.2 INCH MORTAR ROUND ON MONDAY (8-12) OR TUESDAY.

NONREPRODUCIBLE GRID FORM 145
METCALF & EDDY, ENGINEERS

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

1/5

DATE 8/12/91 - 8/15/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA, WEST VIRGINIA

CONTRACTOR METCALF & EDDY, INC SUB. UXB INT.

WEATHER | TEMPERATURE

MONDAY, AUGUST 12, 1991. SUNNY, 70°

M&E FIELD PERSONNEL JOHN YOUNG AND CHRIS DUNNAL MET WITH UXB PERSONNEL AT HOMESTEAD INN AND PRECEEDED TO THE WESTERN BOUNDARY OF DOLLY SODS. CHRIS DUNNAL ACCOMPANIED TEAM 1 ~~IN AREA 14~~ CONSISTING OF LARRY COOK (TEAM LEADER), WALTER McAULEY AND GEORGE PAYNE INTO AREA 14. CHRIS DUNNAL & G. PAYNE PRECEEDED TO AREA 14B TO FINISH SWEEP ON 1.5 ACRE SITE. L. COOK AND W. McAULEY PROCEEDED TO AREA 14A TO RESUME SURFACE Search. Finished searching both Areas 14A & B. Two 81mm mortars were found in Area 14A - one approximately 1870 ft. from the NW corner along the old RR bed and 30' SE and the second approx. 2380 ft from NW corner along the old RR bed and 50' SEusterly. The Tail fin of an 81mm mortar was found just SE of the trail approx. 1840 ft. from NW corner.

Team 2 of Dan Isbell (Team Leader), Dave Pollard, and Rick Endress laid of 2-5 acre sites (2E & 2F) and swept site 2E. No ordnance found.

Team 3 of Roger Topham (Team Leader), Ward Stern, and Ed Sexton

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

2/5

DATE 8/12 - 8/15

CONTRACT DACA 87-90-D-0018

LOCATION Donut Swds Wilderness Area

CONTRACTOR Metcalf & Eddy Inc. Sub. UXB Int.

WEATHER TEMPERATURE

accompanied by John Young swept Areas 2C & 2D Marked some unknown contacts in middle of Area 2C, probably ore bearing rocks

Ron O'Brien suggested moving one 5 acre site in Area 11 to Area 14.

TUESDAY, AUGUST 13, 1991 - OVERCAST, 70's.

Team 1 of Larry Cook, George Payne, and John Young laid out the perimeter of Area 11 using the GPS navigational system.

Team 2 (same as before) laid out four five acre sites for sweeping in Area 4.

Team 3 (plus Chris Duinal) swept Area 2E based on information that 2F had already been swept. Found out 2E had already been swept so swept 2F. No ordnance but many metallic contacts such as old RR/logging equip. plus camping gear.

Apparently, Larry Cook spoke with a guy in town @ a store who knows where ordnance is located to the east of Donut Swds. It apparently is located on the western side of Bersey Mtn. Tom O'Neill will follow up on this issue. Tom O'Neills feelings on adding a 5 acre

Christopher O'Donnell
Signature

Note: Indicate the Contractor's Force and Equipment on the reverse side.

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

3/5

DATE 8/12-8/14

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA, W. VIRGINIA

CONTRACTOR METCALF & EDDY, INC. SUB: UXB INT.

WEATHER TEMPERATURE

site to Area 14 are that 1) a subsurface search will be done on Area 14 2) Area 11 will be easier to search than the remainder of Area 14 and 3) Area 14 will probably be determined to require further investigation and maybe even a full remediation.

WEDNESDAY, AUGUST 14, 1991 - OVERCAST, 60'S

Team 1 with new crew member Dave McKaig, laid out the perimeter of Area 8 with the GPS. Attempted access to Area 13 from the north but were turned back due to time constraints and rough terrain. Larry Cook feels Area 13 will not only be tough to access but even harder to search. He suggested skipping this area unless we can clear it.

Team 2 laid out 3-5 acre sites in Area 5 and swept 5A without finding any ordnance. Accompanied by John Young.

Team 3 (with Chris Duval) swept Areas 4A, 4B & 4D and found no ordnance.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Christopher A. Duval
Signature

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

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RESIDENT'S ~~DAILY~~ WEEKLY REPORT

4/5

DATE 8/12 - 8/15

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA, W. VIRGINIA

CONTRACTOR METCALF & EDDY, INC. SUB UXB INT.

WEATHER TEMPERATURE

THURSDAY, AUGUST 15, 1991 - overcast 67°

Team 1 (same as 8/14/91) laid out the southern boundary of Area 6 and laid out the perimeter of Area 10.

Team 2 (same as 8/14/91) laid out Areas 8A & 8B and swept both. No ordnance found only metallic objects & one bearing dirt / rock.

Team 3 (same as 8/14) swept Areas 4C & 5B and 2 sweeps on Southwestern end of 5C. No ordnance found just metallic objects & one bearing dirt / rocks.

Tom O'Neill hiked with John Brock on 8/14/91 to an Area between Areas 1 & 2. where John Brock had seen ordnance 10 years ago Couldn't locate by site but Tom thinks he'll move one 5 acre site from Area 3 to this Area. He also went to the road leading to Red Creek Campground where 37 years ago a man had his leg blown off by UXO. 5 years ago a grader turned up a mortar on the road as well Tom is going to

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

WEEKLY
RESIDENT'S ~~DAILY~~ REPORT

5/5

DATE 8/12 - 8/15

CONTRACT DACA

LOCATION DOLLY SODS WILDERNESS AREA W VIRGINIA

CONTRACTOR METCALF & EDDY, INC. SUB: UXB INT.

WEATHER TEMPERATURE

try to move another 5 acre site from Area 3 to this area.

Tom O'Neill talked with a man about Barney Mtn. Apparently, if you continue on Rt. 75 beyond Red Creek Campground it takes a hairpin turn to the South east and I believe the next high point (3378') is Barney Mtn. I guess there is a gas well up there near where ordnance was found

Tom O'Neill and Larry Cook suggested moving Area 13 just south of Area 8. Since Area 13 was chosen randomly, this idea doesn't sound bad given the difficulties ~~of~~ in accessing Area 13.

Tom O'Neill was able to borrow a radio from the Forest Service which can reach them most of the time in their tower. They then can radio to town. Tom's also looking into the possibility of using a cellular phone.

Tom Yancey brought up the computer so GPS coord. of the Areas & ordnance.

As of Thursday, UXB is 1-5 acre site ahead of schedule and feels the project will speed up as soon as we reach the eastern side.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

METCALF & EDDY, ENGINEERS

FORM 16C (Rev. 10/70)

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

WEEKLY RESIDENT'S ~~DAILY~~ REPORT

DATE 8/19/91 - 8/23/91

CONTRACT DACA 87-90-D-0018

LOCATION Dout Suds Wilderness Area Petersburg, W VA.

CONTRACTOR METCALF & EDDY, INC. SUB: UXB INT.

WEATHER TEMPERATURE

MONDAY AUGUST 19, 1991 - OVERCAST, SHOWERS, 60"

TEAM 1: Larry Cook (Team Leader), George Payne, & Dave McKaig Laid out the perimeter of Area 12.

TEAM 2. Dan Isbell (Team Leader), Dave Pollard, & Rick Endress. Laid out 5-acre sites in Area 11 and did reconnaisen work on Area 10.

TEAM 3. Roger Topham (Team Leader), Ward Stern, & Ed Seuter, & Sean O'Brien (M&E).

Swept Areas 5C and 11A

LEAD: Tom O'Neill & Chris Dwinal (M&E).

Set up GPS Professional Unit Base Station @ BM Plains 4122. Logged in corners of Area 1E, 1G, 1F, and 1A as waypoints. Unable to log SW Corner Area 1A due to lack of satellites and tree cover. 4.2 Mortar Round found on 8/6/91 was dug up and photographed and Caution Do Not enter tape was placed around.

TUESDAY AUGUST 20, 1991 — OVERCAST, 60's

Tom O'Neill and Chris Dwinal decided to cancel work due to a 40-70% chance of thunderstorms ~~causing~~ which could cause electrical & stinging hazards. Will work Friday.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

METCALF & EDDY, ENGINEERS

FORM 16C (Rev. 10/70)

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

DATE 8/19/91 - 8/23/91

CONTRACT DACA 87-90-D-0018

LOCATION DOUT SODS WILDERNESS AREA WEST VIRGINIA

CONTRACTOR METCALF & EDDY, INC SUB: UXB, INT.

WEATHER TEMPERATURE

WEDNESDAY AUGUST 21, 1991. OVERCAST, 60's

TEAM 1 w/ Sean O'Brien: Laid out the perimeter of Area 3 with GPS

TEAM 2: Laid out 2 - 5 acre sites in Area 10 and 1 - 5 acre site in Area 7.

TEAM 3: w/ Chris Dwinal: 8:50 am. While walking on trail through Area 7 on our way to Area 11, the boom & tailfin of either a 60 or 81 mm Mortar found on Trail 510 100' east of Red Creek. Did a search of immediate Area and found another boom & tailfin section as well as a piece of fragment. Area was flagged such that Team 2 could lay out a 5-acre site.

10:50 am. CONTACTED a 57 MM solid round with tracer parts ~~at~~ 50' North and 10' east of the SW Corner. Flagging was put around round and it was left in place

THURSDAY AUGUST 22, 1991 - CLEAR, SUNNY, 70's

TEAM 1. LAID OUT THE PERIMETERS of Areas 6 & 16. Area 16 was moved north to straddle jeep trail due to difficult terrain in original location.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Christopher O. Dewitt
Signature

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

RESIDENT'S ~~DAILY~~ REPORT

DATE 8/19/91 - 8/23/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA WEST VIRGINIA

CONTRACTOR METCALF & EDDY, INC. SUB: UXB INT.

WEATHER TEMPERATURE

TEAM 2 w/ Sean O'Brien. LAID OUT AREA 7b and swept. Found old clip from M-1 rifle.

TEAM 3 w/ Chris Dwinal: Swept Area 7-A. @ 10:35 am contacted 81 mm HE Tailfin on western boundary of 7-A approx. 210' North of SW Corner. 10:55 am Contacted unknown object with aluminum/copper parts which may be an electrical switch. Approx. 180' North of SW Corner in Trail. 11:40 am Found fragment 50' east of trail, 50' west of river and 150' North of southern boundary. 12 pm Found what was assumed to be a 60 mm, 8 ft HE, low ordered mortar projectile boom & tailfin. No fuse could be seen but explosive assumed to be buried. Approx. 10' from a campfire pit, 420' south of NW Corner, 50' east of trail on edge of river bluff. 2:30 pm. Contacted an 81 mm Tailfin and boom ~ 290 ft North of SE Corner along trail 510. 3:55 pm Contacted an fired and armed 81 mm White Phosphorus Mortar Projectile approx. 180' North of SE Corner Along Trail 510. Approx. 2 feet off trail center. and 20 feet west of eastern boundary. Barricaded with rocks and marked with Caution Do Not Enter. Tape.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

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RESIDENT'S DAILY REPORT

DATE 8/19/91 - 8/23/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA WEST VIRGINIA

CONTRACTOR METCALF & EDDY, INC. SUB. UXB INT.

WEATHER TEMPERATURE

FRIDAY AUGUST 23, 1991. CLEAR, SUNNY, 80's

TEAM 1: WAS TO LAY OUT AND SWEEP 5 acre plot in Area 13.

TEAM 2 w/ SEAN O'BRIEN: Swept Area 6 and were to sweep Area 15.

TEAM 3 Were to sweep Areas 10 A & B but only swept a portion of one due to a team member being stung repeatedly by yellow jackets. Team member took remainder of day off after going to the emergency room. Other 2 members of Team 3 combined with Team 2 for the rest of the day.

LEAD: Thom O'Neill and Chris Dwinal. Set up GPS Base Unit so Team 1 could log in Area 13 points. Met with Walt Perro of the Army COE and discussed progress. Met with WBOY TV 12 from Clarksville. Reported filmed footage of Team 2 sweeping along roadside in Area 6. Also spoke with Walt Perro & Thom O'Neill about project history and current work.

Chris Dwinal & Sean O'Brien left site 6 ~ 11:15am to shuttle UXB person to the emergency room. He was in good shape when we left.

Christopher O Dwinal
Signature

Note: Indicate the Contractor's Force and Equipment on the reverse side.

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

RESIDENT'S WEEKLY REPORT

WEEK ENDING 8-30-91 (Week 5)

CONTRACT 006856-0003

LOCATION Dolly Sods Wilderness Area, WVA

CONTRACTOR UXB International

During the fifth week of work at the Dolly Sods Wilderness Area the surface search was concluded and preparations were made for the subsurface investigation. Two pieces of ordnance were found including a 4.2 inch practice round in area 17 and a 81 mm white phosphorus round in area 7A2. Ron O'Brien, Daniel Wang, Thom O'Neal and Tom Yancey from M&E and UXB met Tuesday to determine potential areas for subsurface investigation. The 10 acres agreed upon included 3½ acres through areas 1 and 17, 2½ acres in area 7A, 1 acre in 7B, 2 acres in 14, and 1 acre in area 11.

8-26. Team 1 laid out and swept area 9 finding nothing. Because of difficulties with the terrain, it was impossible to sweep in squares or rectangles. The perimeter was swept in addition to open areas available.

cc:

Signature

Noted:

COMPLETE IN DUPLICATE - SUBMIT ORIGINAL TO BOSTON OFFICE

METCALF & EDDY, ENGINEERS

FORM 186

RESIDENT'S WEEKLY REPORT

WEEK ENDING 8-30-91

CONTRACT 006856-0003

LOCATION

CONTRACTOR

- Team 2 laid out areas 16A, 16B, 3A, 3B and 3C.
- Team 3 finished sweeping 10B and swept 10A. It also located a 60mm tail boom while in area 7A-2 with Thom O'Neal moving ordnance off of well travelled routes.

8-27 · Team 1 laid out and swept area 17 (between areas 1 and 2) finding a 4.2" sand filled practice round. This round was carried out to the Command Post.

- Team 2 cleared areas 16A and 16B and joined team 3 in laying out and starting to clear area 18 (between the Red Creek Campground and forest service road 75).
- Team 3 laid out areas 3D and 3E before joining with Team 2 in area 18.

cc:

Signature

Noted:

METCALF & EDDY, ENGINEERS

FORM 186

COMPLETE IN DUPLICATE. SUBMIT ORIGINAL TO BOSTON OFFICE

RESIDENT'S WEEKLY REPORT

WEEK ENDING 8-30-91

CONTRACT 006856-0003

LOCATION

CONTRACTOR

8-28 · Teams 1, 2 & 3 worked together clearing areas 3A, 3B, 3C, 3D and 3E as well as finishing area 18.

· Ron O'Brien, Thom O'Neal and Tom Yancey searched in the Brushy Ridge area for ordnance said to be located there by local people.

8-29 · Team 1 (L. Cook, D McKaig, G. Payne & R. Endress) laid out and swept area 12A. Nothing was found.

· Team 2 (R. Topham, W. Stern, E. Seuter & D. Dollard) laid out and cleared area 7A1 and area 7A2 located to the south and north of area 7A respectively. In area 7A1 the tail fins from an 81 mm high explosi round and the tail boom from an 81 mm white phosphorus round were located. In 7A-2 an 81 mm white phosphorus round was located with the tail end to the south-east.

cc:

Daniel C Wang
Signature

Noted:

METCALF & EDDY, ENGINEERS

FORM 185

COMPLETE IN DUPLICATE. SUBMIT ORIGINAL TO BOSTON OFFICE

RESIDENT'S WEEKLY REPORT

WEEK ENDING 9-6-91

CONTRACT 006856-0004

LOCATION Dolly Sods Wilderness Area, WVA

CONTRACTOR UXB International

During the week of 9-3-91 to 9-6-91 subsurface investigations were started at the Dolly Sods Wilderness Area. These investigations were performed at Area 7A for the week in question: chosen because of the large quantity of ordnance located during the surface search. Two rounds of ordnance were located during the week and four were destroyed (three from the surface investigation). Both of the rounds located were 81 mm ~~white phosphorus~~ mortar rounds, one white phosphorus, one high explosive.

- 9-3: Search 7A-SUB1, Locate some Frag (area 1/2 acre each)
- 9-4: Search 7A-SUB2, part of 7A-SUB3. Locate 81 mm WP round in 7A-SUB2 (E. side of Red Creek).
- 9-5: Finish 7A-SUB3 Search 7A-SUB4. Locate Frag. In 7A-SUB3 found pt of 81 mm HE tail boom. In 7A-SUB4 (W. side of Red Creek) Found boom from 81mm HE round w/ misc. frag.
- 9-6: Dispose of ordnance previously found in area 7A. Search area 7A-SUB5. Locate 81 mm high explosive round and boom from 81 mm white phosphorus.

cc:

Daniel C. Wang
Signature

Noted:

COMPLETE IN DUPLICATE - SUBMIT ORIGINAL TO BOSTON OFFICE

METCALF & EDDY, ENGINEERS

FORM 185

RESIDENT'S WEEKLY REPORT

WEEK ENDING 9-6-91

CONTRACT 006856-0004

LOCATION Dolly Sods Wilderness Area, WVA

CONTRACTOR UXB International

During the week of 9-3-91 to 9-6-91 subsurface investigations were started at the Dolly Sods Wilderness Area. These investigations were performed at Area 7A for the week in question: chosen because of the large quantity of ordnance located during the surface search. Two rounds of ordnance were located during the week and four were destroyed (three from the surface investigation). Both of the rounds located were 81 mm ~~white phosphorus~~ mortar rounds, one white phosphorus, one high explosive.

- 9-3: Search 7A-SUB1, Locate some Frag (area 1/2 acre each)
- 9-4: Search 7A-SUB2, part of 7A-SUB3. Locate 81 mm WP round in 7A-SUB2 (E. side of Red Creek).
- 9-5: Finish 7A-SUB3 Search 7A-SUB4. Locate Frag. In 7A-SUB3 found pt of 81 mm HE tail boom. In 7A-SUB4 (W. side of Red Creek) Found boom from 81mm HE round w/ misc. frag.
- 9-6: Dispose of ordnance previously found in area 7A. Search area 7A-SUB5. Locate 81 mm high explosive round and boom from 81 mm white phosphorus.

cc:

Daniel C. Wang
Signature

Noted:

COMPLETE IN DUPLICATE - SUBMIT ORIGINAL TO BOSTON OFFICE

METCALF & EDDY, ENGINEERS

FORM 185

RESIDENT'S WEEKLY REPORT

WEEK ENDING 9-6-91

CONTRACT 006856-0004

LOCATION Dolly Sods Wilderness Area, WVA

CONTRACTOR UXB International

During the week of 9-3-91 to 9-6-91 subsurface investigations were started at the Dolly Sods Wilderness Area. These investigations were performed at Area 7A for the week in question: chosen because of the large quantity of ordnance located during the surface search. Two rounds of ordnance were located during the week and four were destroyed (three from the surface investigation). Both of the rounds located were 81 mm ~~white phosphorus~~ mortar rounds, one white phosphorus, one high explosive.

- 9-3: Search 7A-SUB1, Locate some Frag (area 1/2 acre each)
- 9-4: Search 7A-SUB2, part of 7A-SUB3. Locate 81 mm WP round in 7A-SUB2 (E. side of Red Creek).
- 9-5: Finish 7A-SUB3 Search 7A-SUB4. Locate Frag. In 7A-SUB found pt of 81mm HE tail boom. In 7A-SUB4 (W. side of Red Creek) Found boom from 81mm HE round w/ misc. Frag.
- 9-6: Dispose of ordnance previously found in area 7A. Search area 7A-SUB5. Locate 81mm high explosive round and boom from 81mm white phosphorus.

cc:

Daniel C. Wang
Signature

Noted:

COMPLETE IN DUPLICATE - SUBMIT ORIGINAL TO BOSTON OFFICE

METCALF & EDDY, ENGINEERS

FORM 185

RESIDENT'S WEEKLY REPORT

WEEK ENDING 9-6-91

CONTRACT 006856-0004

LOCATION Dolly Sods Wilderness Area, WVA

CONTRACTOR UXB International

During the week of 9-3-91 to 9-6-91 subsurface investigations were started at the Dolly Sods Wilderness Area. These investigations were performed at Area 7A for the week in question; chosen because of the large quantity of ordnance located during the surface search. Two rounds of ordnance were located during the week and four were destroyed (three from the surface investigation). Both of the rounds located were 81mm ~~white phosphorus~~ mortar rounds, one white phosphorus, one high explosive.

- 9-3: Search 7A-SUB1. Locate some Frag (area 1/2 acre each)
- 9-4: Search 7A-SUB2, part of 7A-SUB3. Locate 81 mm WP round in 7A-SUB2 (E. side of Red Creek).
- 9-5: Finish 7A-SUB3. Search 7A-SUB4. Locate frag. In 7A-SUB3 found pt of 81 mm HE tail boom. In 7A-SUB4 (W. side of Red Creek) found boom from 81mm HE round w/ misc. frag.
- 9-6: Dispose of ordnance previously found in area 7A. Search area 7A-SUB5. Locate 81 mm high explosive round and boom from 81mm white phosphorus.

cc:

Signature

Noted:

COMPLETE IN DUPLICATE - SUBMIT ORIGINAL TO BOSTON OFFICE

METCALF & EDDY, ENGINEERS

FORM 186

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

DATE 9/23/91 - 9/27/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA - W. VIRGINIA

CONTRACTOR UXB International

WEATHER TEMPERATURE

MONDAY SEPTEMBER 23, 1991 - CLOUDY, RAIN, 50°.

LEAD (THOM O'NEILL & RICH ENDRESS) DID ALL GPS IN AREAS 4 & 5 AND DID MOST OF AREA 11. THOM & RICH ALSO WORKED ON DEMOLITION OF 2 - 81 mm ROUNDS found during the surface investigation in Area 14A.

TEAM 1 (LARRY COOK, Roger Topham, Ward Stern, Dave McKaig, Chris Dwinal (MEE), & Jim Halloway (EMT) laid out 0.5 acre subsurface site 14-54 and swept. No ordnance related items were found. Team 1 assisted in demolition of two - 81 mm Mortar rounds as well.

TUESDAY SEPTEMBER 24, 1991 - CLOUDY, 50°-60°

LEAD (THOM O'NEILL) ~~TO~~ DID PAPERWORK IN MORNING AND DID SOME GPS ON AREA 3.

TEAM 1 (LARRY COOK & WARD STERN) DID GPS ON AREAS 1 & 17.

TEAM 2 (ROGER TOPHAM, DAVE McKaig, Rich Endress, Chris Dwinal & Jim Halloway laid out 1/2 acre sites in Areas 17 & 1. No ordnance related items found in Area 17. 2 - 4.2" Mortar Rounds located in Area 17-52.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

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RESIDENT'S ~~DAILY~~ WEEKLY REPORT

DATE 9/23/91 - 9/27/91

CONTRACT DACA 87-90-D-0018

LOCATION Dolly Sods WILDERNESS AREA - W. VIRGINIA

CONTRACTOR UXB INTERNATIONAL

WEATHER | TEMPERATURE

1 - 8th sweep from West, 45' North of Southern Boundary
2 - 13th " " " " " " , 25' South of Northern " ".

WEDNESDAY SEPTEMBER 25, 1991 - OVERCAST, 60's

LEAD (Thom O'Neill & Rich Endress) attempted to do GPS on Area 12 but were unable to find area.

Team 1 (Larry Cook & Chris Duvinal) performed GPS and flag pulling on Areas 8 & 13. Also did GPS on Area 11 & ~~some~~ flag pulling in Area 14A.

Team 2 (Roger Topham, Ward Stern, Dave McKaig, & Jim Holloway laid out and swept 1 acre in Area 11. Carried out 57 mm Solid Round found during surface work

THURSDAY SEPTEMBER 26, 1991 - PARTLY SUNNY, 60's.

LEAD & TEAM 2 (Thom O'Neill, Roger Topham, Ward Stern, Dave McKaig, Rich Endress & Dave White (EMT)) performed demolition of 5 - 4.2" rounds in Area 1 & pulled flags in Area 17. LEAD (Thom O'Neill Rich Endress) went to do GPS on Area 12 but Thom nearly fainted on trail & had to turn back.

Team 1 (Larry Cook & Chris Duvinal) removed flagging in Area 4

Chris Duvinal
Signature

Note: Indicate the Contractor's Force and Equipment on the reverse side.

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

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RESIDENT'S ~~DAILY~~ WEEKLY REPORT

DATE 9/23/91 - 9/27/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA - W. VIRGINIA

CONTRACTOR UXB INTERNATIONAL

WEATHER TEMPERATURE

and did GPS in Area 2 and pulled Area 2 flags.
Found out later that only 3 of the 5 rounds exploded; 1 was FS Smoke and 2 were concrete filled and were carried out. The other 22 rounds were dented and will have to be hit again with more explosives.

FRIDAY SEPTEMBER 27, 1991 - Sunny, 60°-70's

LEAD (TIM O'NEILL, CHRIS DWINAL, & DAVE WHITE) ATTEMPTED TO LOCATE, DO GPS, & PULL FLAGS ON AREA 9. FOUND SE CORNER AREA 9A BUT WERE UNABLE TO FIND OTHER FLAGS AS THEY HAD BEEN REMOVED. ALSO PULLED FLAGS IN AREA 16.
TEAM 1 (LARRY COOK & RICH ENDRESS) DID GPS ON AREA 12. FLAGS HAD BEEN REMOVED PREVIOUSLY BY UNKNOWN PERSONS.
TEAM 2 (WARD STERN & DAVE MCKAIG) PULLED FLAGS IN AREAS 6, 18 & 15.

Chris Dwinal
Signature

Note: Indicate the Contractor's Force and Equipment on the reverse side.

FORM 16C (Rev. 10/70)

METCALF & EDDY, ENGINEERS

COMPLETE IN DUPLICATE – SUBMIT COPY WITH WEEKLY REPORT

1/2

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

DATE 9/30/91 - 10/3/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA - W. VIRGINIA

CONTRACTOR UXB INTERNATIONAL

WEATHER	TEMPERATURE

MONDAY SEPTEMBER 30, 1991 - SUNNY, 70's

LEAD (THOM ONZILL & RICH ENDRESS) TO CLEAN UP COMMAND POST & OVERSEE REMOVAL OF FIELD TRAILER. TRUCK DIDN'T COME TO PICK UP. RICH ENDRESS LEFT FOR VIRGINIA WITH UXB EQUIP.

TEAM 1 (LARRY COOK & CHRIS DWINAL) PULLED FLAGS IN AREA 5 & 11 and did GPS & pulled flags in Area 14B.

TUESDAY OCTOBER 1, 1991 - SUNNY, BREEZY, 60-70

LEAD (THOM O'NEIL & CHRIS DWINAL) TO OVERSEE REMOVAL OF FIELD TRAILER

TEAM 1 (LARRY COOK) to travel to Romney, W.V. to pick up explosives.

LEAD (THOM & LARRY) PROCEEDED TO DEMOLITION IN AREA 1. APPARENTLY, ONE OF THE ROUNDS LEFT BEHIND HAD WIRES, BLASTING CAPS, & BETA PRIMERS THAT WERE UNEXPLODED ON TOP OF IT. ROUNDS WERE DUG & HIT TWICE. BOTH WERE CONCRETE FILLED PRACTICE ROUNDS & WERE CARRIED OUT.

TRUCK CAME AND PICKED UP FIELD TRAILER.

SCRAP WAS ALSO WEIGHED AND BROUGHT OUT OF COMMAND POST FOR DELIVERY TO LETTERKENNY

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

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METCALF & EDDY, ENGINEERS

FORM 16C (Rev. 10/70)

2/2

RESIDENT'S ~~DAILY~~ WEEKLY REPORT

DATE 9/30/91 - 10/3/91

CONTRACT DACA 87-90-D-0018

LOCATION DOLLY SODS WILDERNESS AREA

CONTRACTOR UXB INTERNATIONAL

WEATHER | TEMPERATURE

WEDNESDAY OCTOBER 2, 1991 - SUNNY 70's.

TEAM 1 (LARRY COOK) WENT TO KEMNEY, W.V. TO RETURN MODULAR PHONE & WENT TO LETTERKENNY Army Depot in Chambersburg, PA to drop off 96 lbs of Steel & 7 lbs of Aluminum. 80 lbs were found in subsurface, 23 lbs in Surface.

LEAD (THEM O'NEILL & CHRIS DUGNAL) WERE TO PULL FLAGS ON AREAS 3, 7 & 10. However, Them rolled over the Bronco last night. We spent the morning towing the Bronco. Flags in Area 3 were pulled in the afternoon.

THURSDAY OCTOBER 3, 1991 - SUNNY, 80's.

LEAD (THEM O'NEILL, LARRY COOK & CHRIS DUGNAL) FINISHED CLEANING UP BELLKNOB TOWER AREA & PULLED FLAGS IN AREA 7 & 10. ~~THEM~~ LARRY DROVE THEM BACK TO THE UXB OFFICE AS HE HAD NO VEHICLE.

Note: Indicate the Contractor's Force and Equipment on the reverse side.

Signature

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METCALF & EDDY, ENGINEERS

FORM 16C (Rev. 10/70)